

ABSTRACT

Title of Dissertation: STRADDLING THE GAP: A MIDDLE SCHOOL
TEACHER'S JOURNEY TOWARDS GOOD
GEOGRAPHY

David F. Rosenstein, Doctor of Philosophy, 2016

Dissertation directed by: Dr. Linda Valli, Department of Teaching and Leadership,
Policy and Leadership

Research points to a gap between academic or disciplinary based geography and what is taught in secondary classes across the nation. This study documents a teacher's journey and efforts to bring a more disciplinary approach to two suburban heterogeneous sixth grade geography classrooms. The researcher traces student perspectives on geography and facility with geographic reasoning as well as his own perspectives and pedagogy with respect to student data. The study attempts to map the space where school geography meets and interacts with disciplinary oriented geography based upon the *Geography for Life* National Geography Standards.

Participants completed two sets of baseline assessments and two sets of end of year assessments as well as an initial intake survey. The seven primary participants were interviewed five times each throughout the academic school year and data were openly coded. The data suggest that students can learn geography and geographic reasoning from a disciplinary perspective. Students sharpened their geographic skills through deeper subject matter knowledge and developing spatial and ecological perspectives.

The data also indicate that the teacher researcher faced considerable challenges in implementing a disciplinary approach to teaching geography. The coverage demands of a crowded history-centric curriculum together with ill-fitting resources required a labor-intensive effort to put together and execute this study. Study findings indicate that the path to good geography pedagogy can be impeded by a host of external and internal challenges. However, to forward thinking practitioners, the effort to straddle the gap between school geography and disciplinary-based geography may be well worth it.

STRADDLING THE GAP:
A MIDDLE SCHOOL TEACHER'S JOURNEY
TOWARDS GOOD GEOGRAPHY

by

David F. Rosenstein

Proposal submitted to the Faculty of the Graduate School of the
University of Maryland, College Park in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2016

Advisory Committee:

Professor Dr. Linda Valli, Chair/Advisor
Professor Dr. Saroja Barnes
Professor Dr. Susan De La Paz
Professor Dr. Lisa Eaker
Professor Dr. Joseph McCaleb

©Copyright by

David F. Rosenstein

2016

ACKNOWLEDGEMENTS

I would like to acknowledge several people who guided, supported, and without whom this dissertation was not possible. I can divide my graduate school experience into two equally important parts. Dr. Bruce VanSledright guided and mentored me through all of my coursework and candidacy. He helped give me direction and our long conversation in West Virginia about teaching and learning paved the way for the second part of my university experience. I want to extend a special debt of gratitude to Dr. Linda Valli who graciously took over as my advisor and chair for the dissertation phase. Her critical feedback and encouragement guided and supported me through the completion of this dissertation. I would like to thank my school colleagues, especially Lisa Faust who read every draft of every chapter and offered insightful feedback and Elizabeth Sandersen who helped with honing my grading. I would also like to thank the two principals I have worked under for their support and understanding. I would like to thank every colleague and friend who made it possible for me to attend class, complete research, and write by opening their homes, families, and time to Anya. I could never repay your kindness in one life. Finally, I would like to thank Jeannette for helping to start me on this whole process and Lauren for helping me to finish.

There are two people throughout this whole experience who have been with me each and every step of the way and lived this experience daily. Anya, your support and words of encouragement kept me motivated. I am grateful for your understanding and maturity. Dad, I do not have words to express the depth of gratitude I have for the unsung and herculean task you took on without comment. The stories of your own dissertation

experience, the work habits you and mom instilled in me, and the open mindedness with which both you and mom approached life has made me the person I am today. Perhaps most importantly Dad, you were Anya's other parent. I could not have completed this journey without your parenting help. My only regret is that mom was not alive to see any part of this process although her spirit lives on in me. I dedicate this dissertation to both you and mom.

TABLE OF CONTENTS

LIST OF TABLES	vii
LIST OF FIGURES	viii
CHAPTER 1 WHAT IS GOOD GEOGRAPHY?.....	1
Geography as a Discipline	2
Epistemology of Geography	4
<i>Distribution</i>	6
<i>Context</i>	7
<i>Human Habitat</i>	9
<i>Maps</i>	9
<i>Geographic Thinking and Reasoning</i>	12
Connections to Secondary Geography Education.....	15
<i>High School Geography Project</i>	16
<i>Don't Know Much About Geography</i>	18
<i>The Response</i>	19
<i>GENIP</i>	20
<i>Geography Alliances</i>	21
<i>NAEP</i>	22
<i>Geography for Life</i>	22
Putting the Pieces Together: A Rational	24
<i>Why This Study?</i>	27
<i>Focus of the Study</i>	30
<i>Summary</i>	33
CHAPTER 2 REVOLUTION, RECONNAISSANCE, AND RE-EDUCATION	
LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK	34
Developmental Studies	35
Cognitive Studies	37
Policy Research.....	41
Pedagogic Practices	43
Teacher as Researcher.....	46
Conceptual Framework	54
<i>Organizing Concepts</i>	56
<i>Procedural Knowledge</i>	59
<i>Geographic Perspectives</i>	60
<i>In the Classroom</i>	62
<i>Lattice Redux</i>	66
CHAPTER 3 METHODOLOGY	68
Humanizing Authority	70
The Study	75
<i>Student-Sized Grain</i>	76
<i>The Task</i>	79
<i>Student Voice</i>	82
<i>Data Collection Redux</i>	84

<i>Data Analysis</i>	86
CHAPTER 4 MIND THE GAP: TEACHING GEOGRAPHY IN THE ETHER	
PERIODS 2&4.....	88
Introduction.....	88
Into the Fray.....	89
Geography as the Confluence of Content, Skills, and Perspectives	98
Periods Two and Four: The Students.....	103
<i>“Types” of Participants</i>	103
<i>Primary Informants</i>	107
Teaching as Relationships.....	110
Our Earth: An Introduction to Geography	117
Making Meaning of Geographic Representations	128
Tools and Techniques	133
North Africa and Southwest Asia: The Dawn of Civilizations.....	142
Simulation Stimulation	144
SLO GRAPES in Mesopotamia.....	153
Pedagogic Peregrinations: Teacher Responses to Student Data	156
Summary	164
CHAPTER 5 AN ANALYSIS OF STUDENT LEARNING IN GEOGRAPHY	169
Initial Student Perspectives.....	170
Initial Student Interviews.....	174
Student Learning Outcome Assessments: Baseline.....	179
Geography Oriented Written Task #1	192
Think-Aloud Verbal Protocol and Retrospective Interview	200
Student Learning Outcome Assessments: End of Year	210
Geography Oriented Written Task#2.....	227
Think-Aloud Verbal Protocol and Retrospective Interview	236
Summary	251
CHAPTER 6 FABLES AND REFLECTIONS ON GAP TECTONICS	255
Introduction.....	255
Limitations	257
Implications of Using a Disciplinary Approach to Teaching Geography.....	268
<i>Implications for Classroom Teachers</i>	268
<i>Implications for Students</i>	273
<i>Implications for Administrators</i>	277
<i>Implication for Teacher Educators</i>	280
<i>Implications for Policy Makers</i>	283
Summary	284
Future Studies	286
Conclusion	289
Appendix A.....	292
Appendix B	296
Appendix C	299
Appendix D.....	300

Appendix E	302
Appendix F.....	304
Appendix G.....	305
Appendix H.....	306
Appendix I	307
Appendix J	309
Appendix K.....	318
Appendix L	319
Appendix M	322
Appendix N.....	324
Appendix O.....	335
Appendix P.....	338
Appendix Q.....	341
Appendix R.....	346
Appendix S.....	352
Appendix T	356
Appendix U.....	362
Appendix V.....	369
Appendix W	372
Appendix X.....	384
Appendix Y.....	386
References.....	391

LIST OF TABLES

Table 1.1	Student and Teacher Research Questions	32
Table 4.1	Curriculum Literacy Framework	91
Table 4.2	Second Quarter HCPSS Sixth Grade Geography and World Cultures.....	94
Table 4.3	Teaching Unit Plan	99
Table 5.1	Period 2 SLO Baseline Data	182
Table 5.2	Period 4 SLO Baseline Data.	183
Table 5.3	Period 2 Geographic Oriented Written Task #1.	195
Table 5.4	Period 4 Geographic Oriented Written Task #1.	196
Table 5.6	Period 4 SLO End of Year Assessment.	214
Table 5.7	Period 2 Geographic Oriented Written Task #1 and #2.....	230
Table 5.8	Geographic Oriented Written Task #1 and #2.	231

LIST OF FIGURES

Figure 1.1 The Four Concerns of Geography.	6
Figure 1.2 Geographic reasoning model.	14
Figure 2.1 The three-part paradigm.	62
Figure 4.1 “Types” of participants matrix.	104
Figure 4.2 A/B First Day at School.	111
Figure 4.3 Cover of graphic novel used to introduce zombie based geography.	118
Figure 4.4 Example of vocabulary matching activity.	128
Figure 4.5 Maps with elements missing.	130
Figure 4.7 Classroom prize choices.	135
Figure 4.8 Classroom recognition paper.	135
Figure 4.9 Picture of completed spatial analysis chart.	137
Figure 4.10 Pictures of climagraphs.	139
Figure 4.11 Student directions for climate report act-it-out.	140
Figure 4.12 Hunting and Gathering simulation cards.	146
Figure 4.13 Hunting and Gathering simulation farming questions.	147
Figure 4.14 GRAPES Poster set.	154

CHAPTER 1

WHAT IS GOOD GEOGRAPHY?

If “good history, like good literature, beckons those who read it to understand the world” (Kelly & VanSledright, 2005, p 183) and ultimately asks of them an understanding of self, then what of good geography? What does geography call one to know or, deeper still, understand? The geography of popular culture, if this even exists, as found through athletic competitions, game-shows, artistic performances, and political elections invites one to understand little but to recall place names and perhaps location. School geography traditionally asks little more than this. VanSledright and Limon (2006) note that much of geography education consists of drilling students on map characteristics and memorizing place names and locations for assessment regurgitation at some later date. Little time, if any, is spent on reasoning with or about maps (Downs, 1994). Furthermore, teachers seem to transfer such information without the structure or concepts that underpin them, leading to fragmented or archipelago¹ knowledge bereft of a deeper understanding. Anderson and Leinhardt (2002) suggest that spatial or geographic reasoning is sacrificed to lower level term and place recognition without even achieving the desired result: significant retention success (Fenton, 1966; VanSledright & Limón, 2006).

Instead, geography education is subsumed into the more encompassing school subject of social studies and frequently only studied as an aid to other disciplines, particularly history. Research points out that this neither promotes a deep understanding

¹ Archipelago knowledge refers to islands of knowledge cast in a sea of unknown. This contrasts to continuous, contextual knowledge.

of geography, nor an equal treatment of the component parts of the discipline of geography (Gregg & Leinhardt, 1994). In their research, Gregg and Leinhardt (1994) found that certain themes were more privileged than others, while a grounding of the geographical concepts in the discipline of geography was lacking. Spatial concerns and perspective were missing, thus precluding students from reasoning with and from geographic information (Gregg & Leinhardt, 1994). How can students develop any genuine awareness of the world and of themselves with a disjointed knowledge base and schema? Consequently, students blend simplistic, superficial “understandings” with their own narrow and often inaccurate empirical prior knowledge to generate misguided assumptions and persistent misconceptions of the nature of self and other (Vosniadou & Brewer, 1992).

Geography as a Discipline

Before dealing with the above concerns, it seems politic to first categorize geography. Does geography even fit into the criteria of an academic discipline? VanSledright and Limon (2006) defined a discipline as “a category of specialized knowledge in which those who produce that knowledge employ particular methods for doing so” (p. 3). They concede, though, that overlap between disciplines is common. The debate regarding geography’s status spills over into pre-collegiate education with various factions, for a variety of reasons (Green, 1984; Salter, 1989), believing that geography fits better into the larger aegis of social studies, with its agenda of preparing active participants in a democratic society (National Council for the Social Studies, 1993). Subsequently, many of this ilk view geography as a simple, informational subject (Gregg & Leinhardt, 1994; Harper, 1990; Muessig, 1987; Vuicich & Stoltman, 1974) that fulfills

a supporting role, usually for history, rather than a complex epistemologically based discipline. However, Uttal (2000) argued that the manner in which geographers reason about and represent space in clear forms underscores the fact that geographic reason brings a unique spatial perspective unmatched by any other academic discipline.

Simply put, the etymology of its name, earth description, defines geography (Johnston, 1998). Gregg and Leinhardt (1994) defined geography as, “fundamentally the study of place and human environment interaction” (p. 317), much in the same way that history is the study of events over time. Haggett (1996) defined geography as the description and analysis of the inconsistent phenomena of Earth’s surface in the space in which the human population lives and interacts. As the copious body of research literature in history and history education points out, a definition serves as a convenient entry point into the complex and nuanced discipline itself. The same holds true for geography. Pattison (1964) offered what he termed the four traditions as both an alternative to the monistic definitions of geography and a link to professional and pedagogical geography. This, according to Pattison, simultaneously promotes communication with the layman.

The spatial tradition, area studies tradition, man-land tradition, and the Earth Science tradition comprise Pattison’s four traditions. Morrill (1985) explains Pattison’s Spatial Tradition as one of geometry (positioning and layout) and movement that abstracts certain aspects of reality such as the evolution of Earth’s surface vis-à-vis physical processes. Point of view, or the unique character of a place as a consequence of human-environment interaction, distinguishes the Area Studies Tradition. Morrill characterized the Man-Land Tradition as a series of relationships between society and the

physical environment: the rise and fall of nations, construction of public improvements, and the strategy of battles, to name a few. The Earth Science Tradition examines a variety of Earth processes that govern location and patterns of human activity. The four traditions contain much overlap. Regardless of the definition, geography encompasses practices, types of knowledge, and habits of mind (Anderson & Leinhardt, 2002; Cohen, 1988; Downs, 1994; Downs & Liben, 1991; Ford, 1984; Golledge, 2002; Gregg & Leinhardt, 1994; Lorimer, 2003) that demarcate it as a discipline, a broad and multifaceted one, but one nonetheless (Guelke, 1989; Stoddart, 1987).

Epistemology of Geography

What then constitutes good geography? In order to understand this, one must not only define geography as a discipline but also place it into the context of an epistemology. Morrill (1985) posited that geography is essential for four inescapable realities about existence. As he stated, “Space exists. Physical and social processes require space to operate. With respect to carrying on human activities, space (as the environment) varies in content and utility. Phenomena, including people are place bound, they cannot be everywhere at once” (p. 263).

As a result of the place-bound nature of phenomena and the efficacy, Morrill asserted two geographic meta-theories that define the principles of geography:

Space, both in the form of extent and separation of ‘things,’ and in the form of differential environmental quality or content, conditions physical and social activities and processes. Human activities both alter and define or ‘create’ the character of place and the structure of space. (p. 263)

In other words there exists a mutually impacting relationship between the environment and humans.

Golledge (2002) remarked on the changing nature of geographic knowledge. Within Morrill's meta-theories, geographic knowledge has been declarative – collecting and representing physical and human facts of existence. Simply, answering the questions of where and what. More recently, geographic knowledge additionally seeks to answer the questions why and how, thus emphasizing more cognitive demands and processes. Simply put, and congruent with Golledge and Morrill, geography is the study of place and human-environment interaction (Gregg & Leinhardt, 1994) or space and place. The authors of *Geography for Life* (Geography Education Standards Project, 1994) explain the geographic relationship of space and place as follows:

Space in the world is identified in terms of location, distance, direction, pattern, shape, and arrangement. Place is identified in terms of the relationships between physical environmental characteristics, such as climate, topography, and vegetation, and, such human characteristics as economic activity, settlement, and land use. Together, these characteristics make each particular place meaningful and special to its people. Place, in fact, is space endowed with physical and human meaning. It is the fascination with and the exploration of space and place that give geography its way of understanding the world. (p. 31-32)

Geographic knowledge is further demarcated into four equally valued and interdependent geographic concerns (see Figure 1.1).

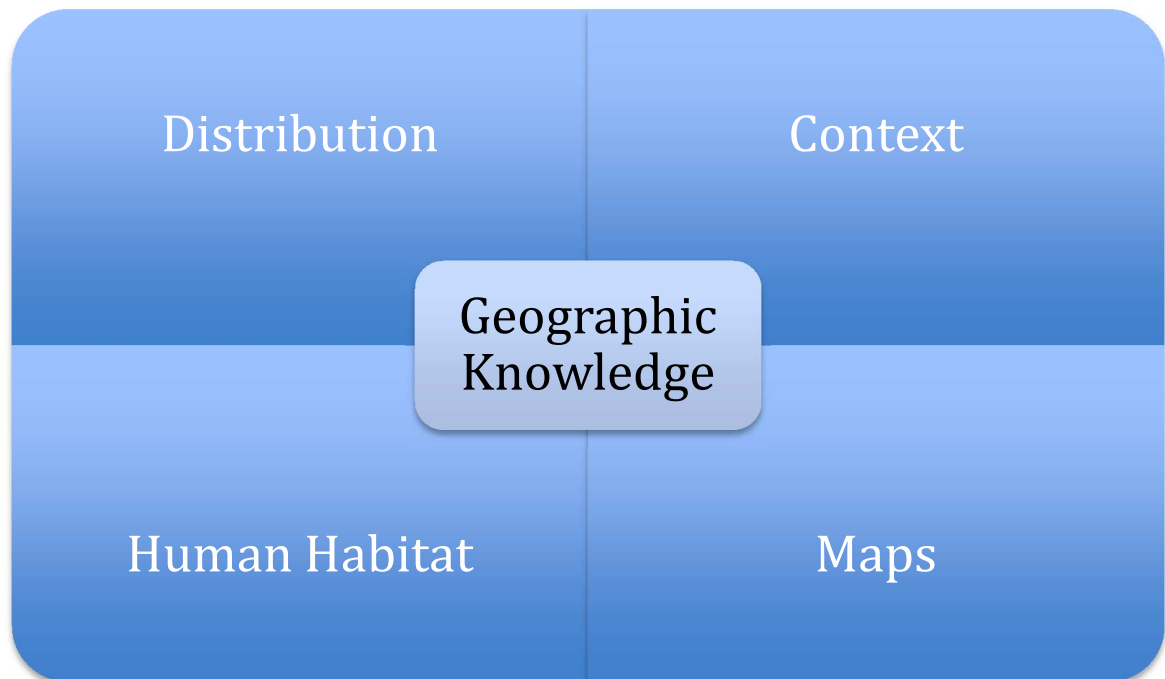


Figure 1.1 The Four Concerns of Geography as defined by Gregg and Leinhardt (1994).

Distribution

Geographers examine the spatial distribution of phenomena and processes that lend places their unique character (Ridd, 1977). These phenomena and processes are not equally distributed throughout Earth and, therefore, generate a veritable uniqueness – no two places are exactly the same. The specific circumstances significantly impact the distribution of people across the surface of Earth, which subsequently shapes social, economic, political, and even religious activities. Harper (1992) called this varied distribution of environment and people the “raison d’être of geography” (p. 124).

Geographers study the distribution of the factors that make distinction possible (Stoddart, 1986). Understanding distribution is paramount to an awareness of Earth and its peoples because distribution creates the conditions that influence life in each particular place (Gregg & Leinhardt, 1994; Muessig, 1987).

Distribution across the surface of Earth underscores the importance of location to understanding processes and phenomena. Moreover, the value and or importance of different locations hold important implications for people (Pigozzi, 1990) on multi-scalar levels. Geographers often study and categorize locations with similar environmental or cultural distributions into regions. This allows geographers to compare and contrast across different scales facilitating analysis and explanation of human decision-making through the lens of distribution. The concept of region also functions as an indispensable structure for organizing geographic information, thus facilitating retrieval. The geographic themes (mentioned below as part of the five fundamental themes of geography) of location, region, and aspects of place are, “direct consequences of the differentiation of the surface of Earth that results from the irregular distribution of geographic factors” (Gregg & Leinhardt, 1994, p. 318). In concert with Golledge (2002), this delves much deeper than the declarative natures of what and where, plumbing the depths of how and why.

Context

Simplified as context, these phenomena and processes are then studied in their exact context in order to comprehend how they interact vis-à-vis external factors and forces (Tuason, 1987). Geographers study both the unique geographical features of places and those that are common to multiple places (Ford, 1984; Muessig, 1987). While the specific phenomena and processes render a place unique, geographers can and often predict their type and influence based upon models derived from previous research and knowledge (Ford, 1984). Geographers study the phenomena and processes in an effort to understand the relations that exist between them with the goal of analyzing and

explaining human behavior and decision-making with respect to the physical environment (Cohen, 1988; Golledge & Stimson, 1987; Guelke, 1989).

The context of the environment and its relationship to people separate geography from other disciplines. For example, other disciplines try to control for contextual interference and isolate the process or phenomena (Ford, 1984), while geographers study the phenomena or process within the context to not only understand the phenomena or process itself, but also the relationship between the phenomena and its context. This, according to James (1962), facilitates geographic empathy, or understanding and consideration that phenomena and decision-making occur within a certain set of spatial circumstances, much like history's relationship to time. The spatial factors of location, distance, direction, diffusion, decay, and succession illustrate the complex processes of human decision-making (Cohen, 1988).

Context greatly impacts the ways in which phenomena and processes interact. As a consequence of studying how context informs phenomena and process, geographers developed three conceptual frameworks with which to analyze the world. Phenomena and processes occur at various scales and geographers consider how the scale of the phenomena or process influences human decision-making and choice (Gregg & Leinhardt, 1994; Harper, 1990; Harper, 1992; Tuason, 1987). Secondly, Earth and its people constantly change over time. This complicates and adds complexity to geography and geographic study. Lastly, and perhaps the most challenging and controversial, context urges geographers to examine and analyze phenomena and processes from the perspective of a particular society within the given environment (Gregg & Leinhardt,

1994). Geographic significance is the confluence of a multiplicity of factors including time, space, place, knowledge, culture, objectives, and attitudes (James, 1962).

Human Habitat

Geographers also study how human decision-making affects, and is affected by, phenomena and processes (Golledge & Stimson, 1987). As a result, geography concerns itself with the phenomena and processes at or near Earth's surface (Ridd, 1977) rather than on a microscopic or interstellar level; simplified as human habitat. In other words, geographers situate the concerns of distribution and context within the complex realm that explicitly has "an impact on human decision-making about the environment" (Gregg & Leinhardt, 1994, p. 320). Geographers study the portions of the world in which people live and that influence them (Ford, 1984). Different environments, through interaction with people, create various economic, political, and social systems that, in turn, result in cultural differences that affect and inform human decision-making (Harper, 1990).

Physical and cultural actualities shape the way in which people approach, solve, and react to problems, situations, and issues of their societies and lives (Gregg & Leinhardt, 1994). People make decisions based upon geographical relationships (Scarfe, 1965), whether explicitly known or not. Geographers study human habitats to construct meaning and make sense of the world.

Maps

Lastly, geography looks at how maps translate and articulate this information (Gersmehl & Andrews, 1986). Maps - complex representations of spatial information - fall into four conceptual categories (Gregg & Leinhardt, 1994). Maps are essentially scaled representations of spatial relationships among concepts and objects (Winn, 1991)

that utilize a notational system in order to function as a graphic data structure. Maps are also imperfect two-dimensional representations of three-dimensional space (Anderson & Leinhardt, 2002; Monmonier, 1991; Tyner, 1987). Monmonier (1991) stated that, “To portray meaningful relationships for a complex, three-dimensional world on a flat sheet of paper or video screen, a map must distort reality” (p. 1). All projections from three- to two-dimensions must alter one or more of shape, size, distance, and direction (Anderson & Leinhardt, 2002). The smaller the scale (larger areas represented) the greater the distortion as cartographers must deal with the curvature of Earth. Projections are generally designed to maintain true location; therefore, the main goal is to preserve the coordinate system of latitude and longitude (Gregg & Leinhardt, 1994) rather than representing the shape and scale of Earth’s surface accurately.

Cartographers create projections from cylinders, planes, and cones depending on their goals and agenda as different projections distort various aspects of Earth on a map. Given this, throughout history, entities such as governments, religious bodies, and all other manner of groups exploited map projections, and maps in general, for their own ends. Therefore, maps can be conceptualized as partial representations, selective and volitional statements about the world (Downs, 1985). Maps, much like historical artifacts, are not neutral. The authors of maps, with their bias and perspective, govern the projection, the content, and the structure or representation contained within a map. For instance, the European locus of early cartography produced Eurocentric maps that showed Europe as the center of the world, thus creating a sense of geopolitical hubris. Similarly, early Chinese cartography situated China in the center, thus facilitating the Chinese “Middle Kingdom” belief. Because map creation involves choice throughout the

process, maps are also conceptualized as cultural artifacts. Much as phenomena and process exist within a specific context that impacts their relationships, so too, do maps. Maps embody the context of their creation. Gregg and Leinhardt (1994) stated: “Maps can reveal important aspects of how a culture relates to its environment and the rest of the world” (p. 324).

Maps function as repositories of survey knowledge and as tools for solving different types of problems. Navigation has always been a common use of maps that involves decision-making incorporating and adjudicating information concerning position, routes, and surveying (Spencer, Blades, & Morsley, 1989). Maps greatly aid in solving situation and site problems because of their visual symbolic nature. In other words, they illuminate spatial relationships by making explicit what verbal communication can only render implicit (Downs & Liben, 1988; Winn, 1991). Because maps portray and explain spatial relationships, they serve as a tool for solving relational problems in which recognition and analysis of spatial patterns is paramount. Finally, maps assist in solving problems that involve seeking topical or regional information (Downs & Liben, 1988; Gregg & Leinhardt, 1994).

Taken together, distribution, context, habitat, and maps form the four concerns of geography. Kohn, in his address to the 1963 convention of the National Council for the Social Studies and the Association of American Geographers, presented geography as the concern with the location and distribution of phenomena and processes over the surface of Earth (Fenton, 1966). Kohn further explained this as the nominal, mathematical, and situational study of location coupled with the pattern, density, and aerial extent of spatial distribution (Fenton, 1966; Kohn, 1966). Out of this model emerged what Kohn called

the basic geographical concepts (see Kohn, 1963 or Fenton, 1966 for a detailed explanation) that seem to complement Gregg and Leinhardt's four concerns and Ford's (1984) core of geography.

Geographic Thinking and Reasoning

Good geography indeed calls those who study it to deeper insights of our world and human decision-making through geographic reasoning (Anderson & Leinhardt, 2002; Fenton, 1966; Gregg & Leinhardt, 1994; Harper, 1990; Muessig, 1987). Gregg and Leinhardt acknowledge that geography as a discipline contains its own methods and rules for generating knowledge. They explain geographic reasoning by differentiating between reasoning in geography and reasoning with geography. We reason in geography when we utilize geographic tools to understand phenomena and process across the surface of Earth. We reason with geography when we employ this understanding as a tool to work out and organize information in other disciplines through a spatial lens. Hence, geographic thinking becomes a means to not only understand spatial relationships and human-environment interaction, but also the decisions impacting upon and reacting to the environment. Moreover, these insights can then be utilized as a heuristic to better understand other modes of knowing the world, humanity, and choice. Geographic reasoning and disciplinary thinking in general also sharpen our ability to think critically and construct meaning (Ford, 1984; Greg & Leinhardt, 1994; VanSledright, 1996).

Geographic reasoning is a complex task that requires analytic, sequential, linear, holistic, analogic, and spatial thinking (Castner, 1990). Furthermore, geographic reasoning breaks down into five component parts (see Figure 1.2). Landscape (much like the primary source material for the historian) contains specific phenomena and processes

that geographers consider (Gregg & Leinhardt, 1994). Landscape provides the place for a geographic study (Ford, 1984; Stoddart, 1986); it supplies and locates specific phenomena and provides the relational context with which to compare it to other similar or disparate phenomena. Geographers then analyze and categorize the landscape in a variety of methods, depending on their questions and training (Ford, 1984) most often representing their findings on maps.

Maps provide a notational method for representing landscapes, phenomena, and processes at a given moment in time (Gregg & Leinhardt, 1994). Maps not only document the phenomena and context under study, but also represent and make explicit complex spatial relationships. Geographers, through maps, can scrutinize position, layout, movement, distribution, distance, decay, direction, spread, and succession (Bednarz, 1989; Cohen, 1988; Golledge & Stimson, 1987; Gregg & Leinhardt, 1994; Pattison & Kurfman, 1970) en route to hypothesis.

Geographers develop hypotheses to explain or predict spatial distribution of landscape phenomena (Ford, 1984; Gregg & Leinhardt, 1994) rather than just describe them in what Ford calls a travelogue approach. Geographers propose hypotheses to explain process; in other words, how some phenomena came into existence, why the landscape is studied, where else, or why one particular context produced the phenomena.

Process leads to discovery of how phenomena or patterns were created (Ford, 1984) including nature and rate of change over time in structure or pattern, with relevant agents of such change (Gregg & Leinhardt, 1994; Ridd, 1977). Geographers concentrate specifically on spatial processes. Ford (1984) pointed out that much geographic research lacks attention and concern for process.

Finally, geographic reasoning allows geographers to design functional models from which to generalize how what occurs in one landscape might manifest in another (Ford, 1984; Pattison & Kurfman, 1970). Despite the uniqueness of landscapes and contexts, models allow geographers to “approximate predictions about transfer of process” (Gregg & Leinhardt, 1994, p. 330). Such spatial understandings enlighten about context, causation, and interactions between humans and the world in which they live.

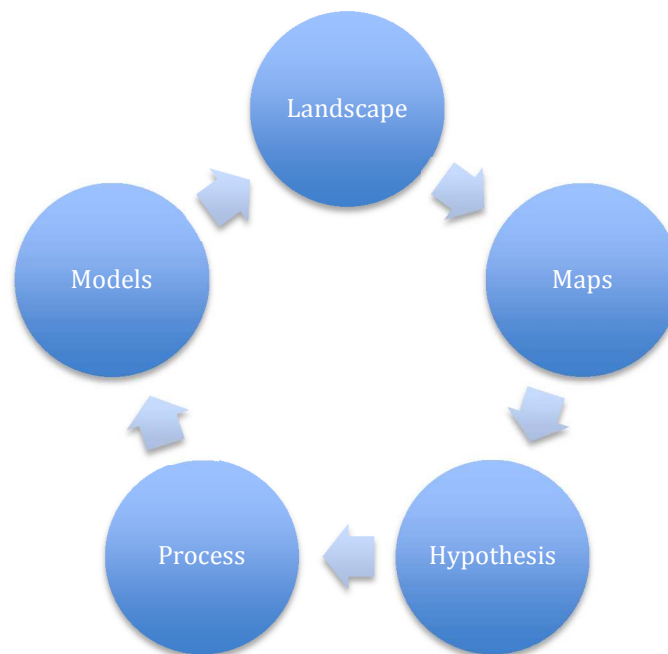


Figure 1.2 Geographic reasoning model conceptualized by Ford (1984).

Geographic thinking fosters greater understanding of human interdependency (Muessig, 1987) especially as technology, both digital and transportation, and modern global economies shrink the world. Geographic reasoning helps us to sort through the myriad and often conflicting events and reportage of international events such as the somewhat recent Tunisian and Egyptian Revolutions. In fact, mapping social media traffic may illuminate otherwise obscure phenomena and patterns of resistance. Geography examines physical and human conditions that shape life in seemingly

disparate places (Gregg & Leinhardt, 1994). Study through a lens of geographic reasoning potentially equips students with an appreciation of the similarities and differences in human cultures (Baker, 1989) and thus a discernment of self through sharpened cognitive tools. Peter Lee (2005) discussed historic empathy as crucial to truly grasping history and historical decisions:

When writing or reading history we must understand the ideas, beliefs, and values with which different groups of people in the past made sense of the opportunities and constraints that formed the context within which they lived and made decisions about what to do. (p. 46)

The same holds true for geography. To fully recognize the value of distant cultures, places, and human decisions, one must possess a certain amount of geographic empathy. Geographic thinking grants one a measure of geographic empathy. This, in turn, helps us to understand our own culture and decisions by opening the door of knowledge based upon the effects our own choices might have upon others as well as the reciprocity that others' choices have upon us (Gregg & Leinhardt, 1994).

Connections to Secondary Geography Education

Seemingly, many of the issues with secondary school geography are the failure of its pedagogy and content to keep pace with the epistemology of geography as a discipline, coupled with the teachers' dearth of requisite geographic understanding. Moreover, academic geography has had an interesting on-again off-again, sometimes condescending, but more recently, somewhat collaborative relationship with geography education and secondary geography. During the high water mark of environmental determinism in academic geography, any connection to geography education resided in

the training of secondary geography teachers (Johnston & Sidaway, 1997). This dynamic seemed to last until the co-opting of geography into the integrated school subject of social studies. After the successful launch of Sputnik in 1957, the U.S. government pumped prodigious amounts of money into education, particularly mathematics and science. A few years later, the government included geography into the list of school subjects deemed crucial for national defense and earmarked for improved student learning. This attention led to the High School Geography Project.

High School Geography Project

In 1961, a group of professional geographers began working for the government funded National High School Geography Project, designed to improve the content and resources in secondary geography courses (Fenton, 1966). They produced a six-unit course that aligned with the structure and epistemology of the discipline – distribution, context, human habitat, and maps. Furthermore, students grappled with real-world problems from an inquiry approach (Gregg & Leinhardt, 1994). This progressive reform effort and connection between academic and secondary geography became extinct, never establishing a lasting foothold and fading away after only a few years.

Several causal factors contributed to the failure of the High School Geography Project. The majority of writers and developers came from university and professional settings (Byford & Russell, 2007) whose ontology and epistemology of geography differed significantly from the teachers charged with its implementation. Gregg and Leinhardt (1994) suggested that during the time lag between the teachers' formative period and their university level geography classes, for secondary geography teachers and the High School Geography Project, the field of geography evolved. In short, the

secondary school teachers thought about and taught geography through a different ontological lens than the professional geographers designing the project itself, not to mention a dearth of appropriate professional development, creating a gap between disciplinary and secondary geography. This gap between disciplinary and secondary geography persists today.

Secondary school teachers experienced immense difficulty adapting to the changed epistemology of geography (Kohn, 1982). Furthermore, the design of the units and pedagogy requisite for implementing the curriculum often cut against the grain of typical high school teaching and teacher training (Byford & Russell, 2007; Lazerson, McLaughlin, & McPherson, 1984; Levin, 1972). Without much input from secondary school classroom teachers, the High School Geography Project paid scant attention to on-the-ground, classroom issues and constraints part and parcel to teaching and learning (Byford & Russell, 2007; Cirrincione & Decaroli, 1977; Kohn, 1982). The disposition of the academic geographers to the high school teachers charged with implementation of the reform effort seemed one of aloofness at best and condescension at worst, thereby exacerbating the gap and polarizing the players. The teachers' limited role was to implement and evaluate, not to co-construct or even to offer their emic practitioner perspective (Cirrincione & Decaroli, 1977; Kohn, 1982). Lastly, the case for a robust inclusion of geography into secondary school curricula was not strong enough to merit a course of study that teachers did not recognize as geography or have the requisite background knowledge to teach (Green, 1984).

Don't Know Much About Geography

In 1983, the poor results of a geography quiz at the University of Miami reached the national news and triggered a wave of editorials across the U.S. calling for more geography instruction in secondary schools (Helgren, 1983). In April of that same year, the National Commission on Excellence in Education (National Commission on Excellence in Education, 1983) published its influential, and infamous, report, "A Nation at Risk." This report not only politicized education but also sent a resounding shot across the bow of U.S. secondary education and its perceived poor state. The report's findings highlighted the fact that by the mid-1970s only 9% of 7-12 graders were enrolled in geography courses and by 1982 only 16% of students had completed a geography course. Furthermore, out of 5,000 teachers of geography in secondary schools, 20-30% received no geography instruction in college, 30% minored in geography, and only 10% majored in geography (D. P. Gardner, 1986), underscoring the bitter harvest triggered by the increasing gap in geography. A 1984 North Carolina survey (Kopec cited in Grosvenor, 1995) pointed out that

Seventy-four percent of the systems university students could not name a single Country in Africa south of the Sahara and north of the Republic of South Africa. Less than 50% knew that Alaska and Texas were the biggest states in the United States, and only 21% recognized Delaware and Rhode Island as the smallest. Some placed Vladivostok in Germany, Lima in Italy, the Ganges in Brazil, and the Amazon in Egypt. (p. 410)

Interestingly enough, this lies within the realm of place-name geography, showing failure at the most basic level of geographic knowledge.

The Response

These events coalesced into a perfect storm for the renewed involvement of academic geographers as well as business interests, professional societies, and secondary school stakeholders. This represented a much larger and varied group interested in reform than during the High School Geography Project of two decades previous. In fact, in the June 1985 edition of *National Geographic*, the National Geographic Society president, Gilbert Grosvenor (1995), bluntly said:

We are increasing our efforts in developing learning materials for our schools, and we are exploring joint efforts with others in the private sector. You will hear more from me on the subject of geographic education, and I would like to hear from you. I am angry; I am embarrassed; I am determined. (p. 410)

In 1984 the Association of American Geographers and the National Council for Geographic Education published their *Guidelines for Geographic Education* that suggested geographic skills and high school geography course listings (Bednarz & Bednarz, 2004; Boehm & Petersen, 1987). This publication introduced the five fundamental themes of geography as a structure to aid teachers in understanding the discipline and possible pedagogy of geography. This publication also seemed to spark a debate within the discipline as to their utility and the purpose of teaching secondary geography. The five themes alone do not make a geography curriculum, but help to give flesh to the ideas and concepts germane to the discipline (Gersmehl, 1992). The themes are designed to help teachers understand the structure of geography and the interrelated nature of its core elements (Boehm & Petersen, 1997). Without significant subject matter knowledge, though, the parameters and boundaries of the five themes may seem

nebulous, especially to teachers, and potentially static ideas unto themselves, rather than the interrelated and inextricably interdependent elements of geography (Harper, 1992) as illustrated by Ford (1984).

Furthermore, in the hands of novice geography teachers (novice in terms of subject matter knowledge and understanding, not teaching years or general pedagogic knowledge), the five themes may not provide a sufficient big picture of the world through a geographic perspective, fostering a lack of understanding of the world in which students live (Harper, 1992). This seems to leave out certain elements of Ford's (1984) core of geography. Another criticism is that the five themes do not include much physical geography (Geography Education Standards Project, 1994). However, according to various geographers and geography educators, when taught inductively through counterpoints, though usually requiring deep content knowledge, they establish an effective means to teach the discipline (Gersmehl, 1992). Although the five themes may help teachers reason with geography, the lack of generative power occludes them from reasoning in geography (Gregg & Leinhardt, 1994). What's more, lacking this deep geographic understanding may preclude an authentic and honest teaching of geography from a more disciplinary perspective.

GENIP

In 1985 the Geographic Education National Implementation Project (GENIP) formed with the goal of implementing the Guidelines for Geographic Education through a mass distribution campaign and a partnership with the National Geographic Society to create, produce, and disseminate a physical-political map of the United States graphically incorporating the newly exalted five themes complete with explanations (Boehm &

Petersen, 1997). GENIP succeeded in distributing over six million maps, thus institutionalizing the five themes and guaranteeing their inclusion in atlases and textbooks. This, however, in the hands of novice geography teachers may only represent a small step across the gap. Perhaps more significantly, GENIP boasted members of all four of the major U.S. geography organizations. Through GENIP participation all four organizations supported the reintroduction and strengthening of geography in American schools (Boehm & Petersen, 1997).

Geography Alliances

In 1986 the National Geographic Society brought its vast resources, including budget and influence, to bear on geographic illiteracy and education in the U.S. (Boehm & Petersen, 1997; Grosvenor, 1995) through the creation of local, state geography alliances modeled after one set up in California by UCLA geographer Christopher Salter. Dr. Salter's paragon conjoined university-based geographers, community college professors, high school teachers, and educational administrators in an effort to better equip teachers to deliver quality geography instruction and expand the role of geography in secondary school education (Boehm & Petersen, 1997; Grosvenor, 1995; Salter, 1986). By 1995 over fifty state alliances tendered professional development in the form of summer institutes consisting of content lectures, lesson plan development, and in-service training. The National Geographic Society not only greatly supported the state alliances (both in teacher training and a grassroots professional network), but also provided countless educational materials and resources, outreach to policy and decision-makers, and public awareness campaigns such as the National Geography Bee and Geography Awareness Week (Grosvenor, 1995).

NAEP

For the first time, in 1989, the National Assessment of Educational Progress, or NAEP, assessed geography (National Assessment of Educational Progress, 1990). Boehm (1997) stated that this move seemed to bolster reform efforts already set in motion. In preparation for their second edition of the geography assessment, NAEP now solicited and received participation from the geography community as part of the Goals 2000: The Educate America Act (Bednarz & Bednarz, 2004; Downs, 1994; National Assessment of Educational Progress, 1990). This inclusion generated a new conceptual framework informed by professional, academic geographers that jettisoned the five themes paradigm already established. Perhaps the success of the reform movements, especially the state alliances, and the renaissance of secondary school geography paved the way for the geography community to ratchet up the cognitive components of assessment and curriculum. The second assessment, in which NAEP would report the scores on a statewide basis, signaled to teachers that the students need to use higher order thinking skills such as analysis and problem solving in geography (Boehm & Petersen, 1997). This was quite a departure from the traditional geography pedagogy of rote memorization and recitation of place names, locations, and Gross Domestic Product (GDP) facts. The second NAEP test (1994) helped to drive the *Geography for Life* national geography standards (Geography Education Standards Project, 1994).

Geography for Life

Fallout from the Nation at Risk report led to Governors under President George H.W. Bush to recommend that geography join math, science, English, and history as one of the five core subjects taught in American schools. Government and industry felt that

good geography would augment international business and maintain U.S. economic hegemony in an age of global interdependence and the proliferation of multi-national corporations (Boehm & Petersen, 1997; National Commission on Excellence in Education, 1983). Boehm (1997) claims that with this decision, the U.S. government elevated geography to a pre-WWII position of prominence. The Clinton administration provided federal money to create national standards for the five core subjects. Learning from the High School Geography Project mistakes, professional geographers, teachers, school administrators, business and industry leaders, and parents all contributed to the national standards project in geography. In the fall of 1994, the National Geographic Society published *Geography for Life* (Geography Education Standards Project, 1994). *Geography for Life* consists of 18 standards organized under six essential elements, skills that provide a framework with which to analyze the world through the lens of geography, and two perspectives designed to help students see the world through a geographer's eyes.

The world of professional geography seems much more involved and heavily invested in K12 geography; however, the ontological gap remains. Geographic Inquiry into Global Issues (GIGI) and Activities, Readings in the Geography of the United States (ARGUS), and Activities and Resources in the Geography of the World (ARGWorld) are all projects directed through universities via professional geographers that prepare materials for secondary geography education (Bednarz & Bednarz, 2004). In fact, Downs (1994) believed that the involvement of professional geographers is critical for converting and translating the generalities contained within the national standards to local particulars, what he calls moving from outcomes to processes.

Putting the Pieces Together: A Rational

Why is studying secondary geography even important? Geography puts the pieces together. It serves as an entry point into the multiplicity of threads that run through all culture and ties us all together as humans, facilitating a way of understanding human decision-making and the evolutionary development of societies and cultures. Moreover, geography helps to illuminate the complicated dynamics behind historical “winners” and “losers”. How did certain societies and cultures colonize and suppress others? Geography explicates why Neolithic tools and food procurement practices still prevail in places on Earth like the Papua New Guinean highlands. Much of life revolves around survival. All living things adapt in some way to external, often geographically based, circumstances. Throughout history humans attempt to get their needs and wants met, often at great cost, in a world with uneven resource distribution. Countless micro (individual/family) and macro (business, society, government) decisions are made in an effort to gain access to resources and opportunities located somewhere else. The waves of migration throughout history shape and reshape cultures and the Earth’s surface itself. Transformational historical epochs such as The Agricultural Revolution, The Industrial Revolution, The Age of Exploration, and the World Wars of the 20th Century trace their causation to geographic concerns. In fact, modern political parlance includes the term geopolitical, used as a means to study the impact of geography on international relations and international politics.

The interconnectedness of the world today renders geographic literacy and reasoning even more critical. Phenomena in one part of the world affect other parts. The OPEC oil embargo of the early 1970s and the 1979 Islamic Revolution in Iran coupled

with the Iran/Iraq war of the early-mid 1980s triggered sharp spikes in US gasoline prices, although with gasoline prices today, many might look fondly back to those prices. New trade treaties such as NAFTA and modern technology shrink the world and stitch governments, economies, cultures, and people together more than any other time. One need only look at the Eurozone crisis and Greece's economic woes to see this play out yet again. Geographic understanding and reasoning allows people to see larger and deeper vistas. Some examples are making the connections between ever catastrophic economic inequality in Central America and lack of gainful employment with U.S. interference in the 1980s, NAFTA, and the current immigration issues/illegal border crossings in the United States.

A geographically literate person “sees meaning and patterns in the way that things are arranged, identifies the relationships and interactions between people, places, and environments” (Geography Education Standards Project, 1994, p.34). He or she perceives the world in terms of spatial distribution and how its irregular nature induces an unremitting flow of people and resources across Earth (Savage & Armstrong, 2004). Additionally, a geographically literate person brings these patterns, meanings, and spatial perspective to bear in solving problems and interpreting causation.

Geographic literacy provides answers to countless questions about human interaction, cultural development, and their differences while serving to mitigate a prejudiced worldview. Without sound geographic understanding, people at best answer these questions through myopic and even ignorant eyes while, at worst, they intentionally provide answers and perspectives that justify their misdeeds, often perpetuating ignorant stereotypes and divisive condescension. These issues can then multiply and metastasize

creating a misguided perspective informing, or misinforming and nefariously impacting, human decision-making and whole swaths of people. One only needs a cursory examination of the various propaganda campaigns of the 20th century and the catastrophic humanitarian results to see real-world examples of geographic and cultural manipulation that result in such atrocities as ethnic cleansing.

Geographic understanding provides a light with which to examine and perhaps extinguish this volitional or accidental darkness. In fact, research shows that geography, in terms of population distribution, even helps to explain disparate standardized test scores, as they tend to correlate with social economic status (Sirin, 2005). Geographic reasoning cultivates geographic understanding. Disciplinary thinking facilitates looking at the world critically. VanSledright (1996) argued that good historical thinkers are reflective, critical readers/thinkers better equipped to understand and participate in democratic society. Through 17 years of teaching experience that seems an admirable if not essential goal.

Geography is a way of knowing, a way of understanding the systems that impact and shape the world as well as a way of understanding human development and decision-making. Through this lens we gain understanding of the world and, thus, ourselves. However, this way of knowing is difficult, tortuous, and often tricky to capture and assess, much like light itself.

Do students benefit intellectually and motivationally from disciplinary oriented pedagogy? Can students appreciate the more egalitarian and social justice stance of geography? This begs the questions, “Is it worthwhile?” and “Can they even do this?” Ultimately, if little or no benefit exists for students, then the cost in hours, education,

research, and energy occlude a disciplinary view's utility; thus, it falls into the category of just another educational fad that enters the revolving door of school reform.

Why This Study?

Although change is in the air, secondary school geography often consists of lectures, recitations, drilling students on place names, and coloring maps (Bednarz, 2003; Muessig, 1987). I am interested in that space in which the worlds of theory and practice overlap. In order to map this space and determine the efficacy of the research in social studies education and understand its impact on teaching and learning, one must seek the viewpoint at the level closest to the ground: the classroom and those that show up day after day battling the hydra known as public school education, fraught with all of its competing tensions, ideas, and mandates. In this study I attempt to see what happens when teaching and learning is aligned with a more disciplinary approach to geography while still following the district-mandated curriculum. By following the official curriculum through a more disciplinary approach I attempt to make this research more appealing to practitioners, while at the same time, grounding the study in research literature on geography and geography education thereby enriching the body of research literature. Hopefully this study can bring both worlds closer together into shared and mutually beneficial space by modeling a way of bringing teaching and learning more in line with the research literature.

In other words, I hope to eliminate some of the typical fallback arguments that ambitious and disciplinary-minded teaching does not fit into the curriculum or that students cannot learn in this fashion while maintaining a connection to academic research. This study can potentially function as an entry point, a conversation starter to

improving teaching and learning in geography and closing the gap between disciplinary and school geography. Quite simply, I aim to move geography pedagogy, in practice rather than just theory, beyond place name recognition, coloring maps, and rote memorization of geographic facts. I envision using this study to inform and lead professional development opportunities within my school and school district. Moreover, I hope that the scope and implications of this study reach well beyond the local school district boundaries. Perhaps, the study will start a conversation and play a role in changing the way we do geography or teacher research in secondary schools.

While the research literature is rife with studies involving how students learn to understand mapping and wayfinding, geography policy, and reform efforts in geography, there is a dearth of studies exploring the intersection of students and geographic reasoning, especially from the perspective of the teacher participating in a self-study. Straddling the disciplinary-secondary school gap with one foot in the university and one in the classroom I feel perfectly placed to explore and map the landscape of potential shared space. Moreover, studying this landscape through the lens of geography and geographic reasoning augments my pedagogic and philosophical stance as a teacher and researcher.

Pedagogically, I try to engage students and get them out of their seats interacting directly with various geographic materials in an atmosphere utilizing situated learning (Lave & Wenger, 1991). An inquiry approach to education steeped in guided discover leads to active participation which fosters student engagement. Engaged learners demonstrate more investment in learning and understanding than passive recipients. Philosophically, I strive to create a culture of social justice within my classroom valuing

all variations of humanness. Through the curriculum I attempt to reveal oppression and exploitation while allowing students their own voice and power to make up their own minds and come to their own conclusion. In keeping with a stance of social justice and equality, I attempt to bring students prominently into the research process through interviews, allowing participants access to their individual data and even my analysis. I endeavor to empower students and give them more of a voice within the study and their educational experience.

A geographic perspective can in fact, in itself, be transformative. Good geography fits in with, underscores, and even promotes an egalitarian, social justice worldview. A developed geographic stance can help students rise above ethnocentrism and parochialism (Savage & Armstrong, 2004), highlighting existing power structures and lack of opportunity for oppressed groups based upon race, gender/gender identity, ethnicity and sexual orientation. Jared Diamond fashioned a New York Times bestseller and Pulitzer Prize winning argument for geography's impact upon human development. In Guns, Germs, and Steel, Diamond (1999) attempted to answer the question why certain people and societies became wealthy and dominant while others remained poor and often subservient. His treatise contradicts the traditional and retrograde racial/cultural theories employed to explain and justify colonialism and subjugation of non-whites by whites. Through transformative work such as Diamond's, certain patterns of individual and institutional discrimination become clearer and lose their justifications.

Disciplinary-oriented teachers can utilize Diamond's work and geographic thinking as a means to make transparent reified power structures and uneven opportunity created through geographic superiority. Understanding uneven resource distribution and

the impact of physical features allows students to grasp European conquest and superiority in Africa that led to the development of apartheid governments, ethnic cleansing in Rwanda, the tensions that instigated the creation of South Sudan, and modern, corrupt governments in Africa and Asia. Ethnocentric and cultural superiority arguments crumble like a house of cards when light is shined upon the causal geographic circumstances and their outcomes. The once popular arguments that Africans cannot govern themselves become an historical marker of prejudice and racism rather than truth. Students can bring these insights and examples to bear upon their own world and understand inequality in the United States and their own communities as something much larger than laziness or choice. A social justice stance as a result of geographic literacy fights against simplistic sound bites and stereotypes. Furthermore geographic literacy helps us understand cynical policies designed to disenfranchise certain voters and media representation of oppressed people.

Focus of the Study

The National Research Council (National Research Council, 2005) posited that effective teachers seek to understand students' prior knowledge in order to flush out and correct misconceptions while building on already existing schemas. This is where I embark on my study. Because teaching and teacher perspectives greatly influence student learning, I include teacher-oriented questions to trace the trajectory of teacher thought that are parallel to student-oriented questions (See Table 1.1).

Given the National Research Council's findings, it proves critical to know "What are students' and the teacher researcher's perspectives and understandings of geography?" and "What are students' and the teacher researcher's perspectives and

understandings of geographic reasoning with respect to solving problems?” These first research questions seek to unpack what knowledge, opinions, ideas, and misconceptions students and I possess. Just as a doctor cannot heal the sick without a medical history and diagnosis, learning and educational reform cannot improve or change anything without a similar starting point. This begins to get students a seat at the reform table, albeit indirectly, or at least focuses reform efforts on actual learning rather than mere assessments. If the research literature recommends a more disciplinary approach to teaching and learning than currently exists, inquiry becomes essential to see if students can indeed learn the skills and habits of mind inherent in a more disciplinary approach to geography.

This type of inquiry leads to another set of vital research questions that augments diagnosis: “Given a geographic reasoning task, what do the students do?”; “Given data from a geographic reasoning task, what does the teacher researcher do?”; and “How does the teacher researcher use the data to inform his instruction?” Of paramount importance is to discern what learners actually practice in the classroom setting. This, in turn, points to the next research question designed to plumb more deeply, adding texture and nuance to the diagnosis: “How do students reason with geography?” Germane and linked to gaining insight on student knowledge are the parallel teacher questions: “How does the teacher researcher determine geographic reasoning?” and “How does the teacher researcher foster geographic reasoning?”

Of research interest and aligned with current learning theory (National Research Council, 2005) are the paired questions: “How do students think about their reasoning with geography?” and “How does the teacher researcher think about his teaching of

geographic reasoning?” Lastly, the question “How does student thinking about geography change?” paired with “How does the teacher researcher’s thinking about geography change?” seek to chart progress through the course of the study. These questions form the basis of studying students’ and the teacher researcher’s geographic thinking, an important piece essential to closing this gap between geography as a discipline and how we teach and learn geography in schools.

Table 1.1

Student and Teacher Research Questions

Student	Teacher
What are student perspectives/understandings of geography?	What are the teacher researcher’s perspectives/understandings of geography?
What are student perspectives/understandings of geographic reasoning with respect to solving problems?	What are the teacher researcher’s perspectives/understandings of geographic reasoning?
Given a geographic reasoning task, what do students do?	Given data from a geographic reasoning task, what does the teacher researcher do? How des the teacher researcher use the data to inform instruction?
How do students reason with geography?	How does the teacher researcher measure geographic reasoning? How does the teacher researcher foster geographic reasoning?
How do students think about their reasoning with geography?	How does the teacher researcher think about their teaching of geographic reasoning?
How does student thinking about geography change?	How does the teacher researcher think about his teaching of geographic reasoning? How does the teacher researcher’s thinking about geography change?

Summary

Educational policy makers, heavily influenced by political and economic concerns that tend to command their attention while obfuscating classroom realities, often only indirectly consider the end user, the student, in their decisions. This leaves students and teachers bereft of much voice or power, consequently leading in many cases to passivity or the implementation of new initiatives in the dark, devoid of student perspectives. Incorporating student and teacher perspectives into education, specifically in the realm of teaching and learning, contains the seeds of student empowerment through deeper understanding of humanity, self, and the world beyond the superficial. This, in turn, can potentially enhance motivation and, conceivably, achievement. These changes shift the epistemic question from “to pass or not to pass,” to more subtle and sublime questions asked by teachers and students on the ground, in the trenches, from each individual classroom. There is much work to be done. People did not utilize fire, shift from the Paleolithic to the Neolithic, and agricultural to industrial society overnight. Contrary to neophyte historical understanding, revolutions take time and reconnaissance.

CHAPTER 2

REVOLUTION, RECONNAISSANCE, AND RE-EDUCATION

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

These days much of the discipline of geography and its epistemology revolves around geographic thinking. Golledge stated that

geographic thinking and reasoning has provided a basis for understanding -or reasoning out why there are spatial effects, not just finding what they are!

Further, it enables us to reveal patterns in spatial distributions and spatial behaviors that may not be obvious to a casual observer in the real world and consequently helps us understand the reason for occurrences of episodic behavior in terms of spatial processes. (2002, p. 6)

Due to geography's concentration on spatial processes, phenomena, and their symbolic representations, the bulk of cognitive research in geography focuses on spatial reasoning in the form of maps and mapping; however, it stops short of reasoning with maps, thus, not covering critical aspects of geographic thinking. Moreover, VanSledright and Limon (2006) noted that cognitive studies of spatial thinking have yet to go "mainstream" and that much of this research appears in disciplinary journals rather than general education research publications. VanSledright and Limon go on to comment that there exists a larger extant corpus of research in geography education, but much of it concerns itself with educational policy, curriculum designs, and "best practices" advocacy rather than epistemological concerns.

Cognitive research in geography splits into two core traditions. The first, developmental studies, investigates the interaction of task performance to learner characteristics and abilities. The other, cognitive studies, explores understanding maps and processes essential for their use.

Developmental Studies

Developmental studies in geographic thinking concentrate on the skills necessary to understand spatial representations. Understanding the sequence and nature of how these skills develop allows for prediction and treatment of meaningful sequencing difficulties (Downs & Liben, 1988). Developmental studies focus primarily on understanding maps, only one albeit important component of geographic thinking. They traditionally look at three aspects of geographic understanding: map reading, navigation of large-scale environments, and curriculum issues for teaching map reading and use.

Developmental psychologists further divide map reading into taking different perspectives and using maps as a model of the world. A significant number of developmental studies base their work on Piaget and Inhelder's (Piaget & Inhelder, 1956) three stages model. In the topologic stage, characterized by ego-centrism, children only see the world from their perspective. In the projective stage children add some directional nuance to perspective such as left/right or up/down. Finally, children reach the Euclidean stage in which they add accurate angles and distances to their awareness of other perspectives. However, Spencer, Blades, and Morsley (Spencer et al., 1989) confront Piaget's stages and attribute the differences found to methodological issues regarding construct validity. Further research demonstrates that the context of a study matters (Borke, 1975; Hart & Berzok, 1982; Herman & Siegel, 1978). In other words, situational

familiarity may augment students' understanding. Liben and Downs (1989) found that learning the concept of perspective taking is abstract and extremely challenging to children, yet critical for map alignment (Bluestein & Acredolo, 1979).

Developmental researchers consider maps as one big, complex symbol of the world. For this reason the research regarding maps as representations of the world is located within the larger discussion about how children learn about symbols (Gregg & Leinhardt, 1994). Much of the research on symbol understanding focuses on comprehension of symbolic representations of size, shape, pattern, and color with a focus on a person's ability to give them meaning. Liben and Downs (1989) claim that knowing the relationship between symbol and what it represents, rather than what it looks like, demonstrates nuanced perception, the abstract instead of the concrete nature of symbolization. Maps symbolically convey substantive and locational information about place, elevation, latitude, longitude, shape, and scale (Schlichtmann, 1985). Muehrcke (1974), in his research on map reading, discovered that children experienced difficulty interpreting the generalization process utilized by the symbolic nature of maps. Anderson (1985) added that some symbols are tangible and can actually be seen in the physical world such as buildings or roads while others are intangible, though very real and important human constructs such as boundaries.

Other research into maps as models of the world not only point out children's difficulty with using latitude and longitude (Sanford, 1982), but also the difficulty of adults to deeply understand the nature of the relationship between latitude and longitude and map distortion (Bartz, 1971). Kaplan (1990) found scale, because of the underlying complex mathematical concepts, one of the most challenging concepts for students to

access and learn. Muehrcke (1974) and Monmonier (1991) reported that distortion, inevitable on all maps, further obfuscates the concept of scale.

The vast majority of developmental research on map use involves navigation or wayfinding, especially the ability to plan a route and know your location while on that route. Research illustrates that young children demonstrated acuity in using maps to locate hidden objects and can even use landmarks to help in map alignment (Bluestein & Acredolo, 1979; Presson, 1982).

Much educational research in geography is based on developmental studies employed to suggest activities and lesson topics. Bednarz, Acheson, and Bednarz (2006) offer a thorough review of the integration of developmental studies into curricular goals. However, the majority of developmental research utilizes Piaget's early work on spatial development while ignoring recent research that does not support his early framework (H. Gardner, 1990; Spencer et al., 1989).

Cognitive Studies

Cognitive studies and researchers focus on the integration of a task and human information-processing architecture. Furthermore, in geography, cognitive studies investigate the cognitive processes that impact perception and memory of maps (Spencer et al., 1989). The first process a map user must undergo is to distinguish between what is a symbol and what is not (Liben & Downs, 1989; Muehrcke, 1974). This process often proves quite challenging. Then using a discrimination process, users must distinguish the particular map elements from each other (Winn & Sutherland, 1989). Next, users begin the process of recognition (Winn, 1991). Much recognition involves memory, the form in

which the information exists (Larkin & Simon, 1987), and interference errors (Tversky, 1981). For further discussion of interference issues see Gregg and Leinhardt (1994).

A large quantity of the cognitive spatial research concerns map recall and studying how people remember spatial information (Gregg & Leinhardt, 1994; VanSledright & Limon, 2006). This research has produced some debate and controversy as to how the brain stores spatial information. Various cognitive psychologists argue for either storage as an image, as a proposition (an abstract representation that stores the meaning of information) such as schema, semantic nets, and mental models, or a hybrid version of both. Furthermore, the proposition camp bifurcates along the fault line of hierarchical versus nonhierarchical theories. Once again, Gregg and Leinhardt (1994) provide a synopsis of the debates.

Much of this research on map recall, though, asks participants to sketch maps from memory. Abel and Kulhavy (1986) found that constructing maps improves recall, most likely because that depth of processing impacts recall (Jacoby & Craik, 1979). Lloyd (1989) studied the difference between learning through direct experience and studying a map. He found that the participants who studied a map demonstrated more accuracy and speed performing the experimental task of identifying location of well-known landmarks within a city. Those who did not study a map performed significantly less accurately. Lloyd concluded that cognitive maps encoded from cartographic maps are different from cognitive maps encoded from landscape navigation. Using several middle school students, Bausmith and Leinhardt (1998) examined the process of map construction. They found that a relationship exists between map element recognition and map accuracy. Leinhardt, Stanton, and Bausmith (1998) discovered that students gain

more geographic knowledge if they work collaboratively to construct maps. This, perhaps, highlights Lave and Wenger's (1991) idea of situated learning and communities of practice through legitimate peripheral participation that informs much of sociocultural theory.

Downs and Liben (1991) made important claims regarding the expert-novice gap in geography education. Using data from their research on college students' spatial reasoning, Downs and Liben argued that teachers need to understand the cognitive level of their students and enact pedagogic scaffolding that reaches to the students' level while simultaneously supporting their intellectual growth. They believed it crucial for experts in the field to, in a sense, forget their expertise when designing lessons. Downs and Liben employed two Piagetian tasks, shadow projections and planar water surface, to study Euclidean spatial concepts. They found that their college students experienced difficulty identifying any correct projections save for 90 degrees and, therefore, might experience difficulty understanding the concept of map projection and its inherent biases and distortions, further illuminated by Anderson and Leinhardt (2002) in subsequent empirical research. They proposed further expert-novice research in order to inform and illuminate expertise in geography and improve geography education, as there exists a nebulous understanding as to what exactly characterizes an expert geographer.

Vosiadou and Brewer (1992) published a study that falls into this expert-novice paradigm. They studied elementary school children's emerging shape of the Earth. Their research illustrated a developmental progression from simple, empirical understanding based upon their own experiences and life, to a more nuanced and geographically sound awareness. They noted the integration of new information through a reinterpretation of

their empirical observations as they combine new information with preexisting misconceptions. Research in history education (see National Research Council, 2005) further explored this cognitive functioning.

Anderson and Leinhardt (2002) conducted one such expert-novice study with significant implications for teaching and learning geography and geographic thinking. Drawing upon expert-novice studies in physics, mathematics, and other geography-related studies, Anderson and Leinhardt concluded that, “Experts use representations as tool to reason about real-life objects, whereas novices tend to reason within the representation itself and have more difficulty in moving back and forth between the representation and the real-world objects represented” (p. 285). In other words, the experts use the map as a reasoning tool while novices reason only within the map itself, treating it as an isolated entity.

The researchers selected 30 participants of diverse geographic expertise (seven experts and 23 multi-leveled and grouped novices) for a short scripted interview protocol and then administered a five-question psychometric exercise designed to measure their understanding of map projections. The participants estimated the flight path between pairs of cities around the world. As one would expect, the experts performed significantly better than the novices, with the preservice social studies teachers demonstrating the poorest results. The experts usually knew the answers immediately and if they did not, they knew the rules for generating a solution, or could draw upon the correct cognitive rules necessary for reasoning out a correct solution. The novices, in contrast, failed to solve the problems immediately. Furthermore, they knew fewer of the geographic rules, or could not draw upon any cognitive rules to aid in reasoning out a viable solution.

Experts understand the structure of their discipline; therefore, the information is stored cognitively in an organized, sophisticated, and readily available manner that they can make use of to solve problems. Anderson and Leinhardt (2002) found that “*They* [emphasis added] possess schemas built up over years of training in their discipline that allow them to quickly recognize the problem type and to employ sophisticated problem-solving strategies that reveal deep underlying conceptual knowledge” (p. 286).

This research is consistent with “expert” research from other fields (see Anderson & Leinhardt, 2002). Without an understanding of the underlying disciplinary structure, novices can only utilize general problem-solving strategies that rely upon their knowledge of the specific problem; they are circumscribed by the boundaries of the problem. The novices failed to solve 51 out of possible 65-coded tasks with preservice teachers faring the worst. This research augurs poorly for K12 geography education. If the teachers lack the ability to think geographically, how can they teach students to do this? One cannot teach what one does not know.

Policy Research

A rich body of policy research exists advocating geography as a stand-alone school subject rather than teaching it through the context of other disciplines. Downs (1994) raised the possible links between American geographic ignorance and circumscribing geography within the history-driven social studies curriculum on the one hand, compared to British and Swedish proficiency resultant from stand-alone geography courses, not to mention the prominent role of the British National Geography Curriculum. Gregg and Leinhardt (1994) presented a convincing and researched argument for geography as a stand-alone subject in secondary schools. Research seems to confirm that

learning geography within the context of other disciplines creates too much fragmentation in geographic knowledge (Gregg & Leinhardt, 1994; Muessig, 1987). This design subordinates the choreographic perspective to a substantive or chronological one, consequently arresting growth and development of geographic reasoning (Gregg & Leinhardt, 1994). Clyde Kohn (1963) posited that

learning geography will take place when children learn to think in terms of the basic concepts of geography and to think as practitioners of that discipline think. These objectives cannot be achieved so long as they are related to historic events. (p. 408)

With its six essential organizing elements divided into 18 standards, six geographic skills, and two perspectives, the *Geography for Life* National Geography Standards seem like wise bedrock and curriculum for secondary, stand-alone geography courses designed to foster geographic thinking.

Requiring a stand-alone geography course rooted in the National Geography Standards does not guarantee quality geography instruction and learning though. In a 2003 study of three Texas high school classrooms, Bednarz found very little implementation of either the form or function of the geography standards. It seems that the primary reform adapted was that of new teaching strategies such as working cooperatively in groups utilizing small group discussion and other activities designed to keep students active and engaged, but unlikely to require substantive ontological change in geography epistemology. In fact, Bednarz (2003) stated that

New ideas about how to teach are relatively familiar to the teachers. It is easy to accommodate them within their existing understandings of the teaching-learning

system. They are well supported by generic professional development and reinforced immediately in the classroom by positive student response. (p. 107)

Given her small sample size, though, one cannot draw too many conclusions or generalizations regarding standards implementation across the country. However, as Texas represents one of only four states that actually require a geography course for graduation and its curriculum lines up well with the national standards compared to many other states (Bednarz, 1998), the prospects do not seem to bode well. Consequently, more research is required to truly assess the state of the National Geography Standards implementation and integration into and impact upon secondary school education in the U.S.

Pedagogic Practices

If deeper understandings of our world and human decision-making is the goal and a stand-alone geography curriculum represents one of the vehicles to get there, then logic dictates that pedagogic practice and decisions should augment this process rather than obviate it. Research, in general, and subject-specific cognitive development theory shed light on this. Bruner (1977) encouraged teaching students the elements of a discipline's structure conjoined with the "special strategies of inquiry that are employed by specialists" (reprinted in Kohn, 1966, p. 408) so as to foster thinking from an internal disciplinary point of view. This more inductive approach, where students learn the tools of a field with the intention of analyzing and constructing their own meaning, rather than "learning" the prepackaged conclusions of others (textbooks, experts in the field, and teachers) relates closely with a Piagetian, and later Vygotskian, approach to education.

Copious research exists supporting the effectiveness of constructivist approaches to learning as a means to developing profound understandings. Researchers, particularly in history education, found that this approach aids in the retention of learning as well. Historic knowledge then becomes more meaningful than a set of names, dates, and events. Geographic awareness matures into the relational understanding of phenomena and processes, both natural and people-made, as opposed to place-name recognition and elementary characteristics of location on the surface of the Earth. The Newtonian-like thread that weaves through human decision-making becomes more accessible. Much of the present literature and research in learning theory and history education underscores Bruner's pedagogic theories (see Bain, 2000; Bain, 2005; Bruner, 1977; Downs & Liben, 1991; Gardner & Dyson, 1994; Fenton, 1966; National Research Council, 1997; National Research Council, 2005; VanSledright, 1996; VanSledright, 2004; VanSledright & Limón, 2006).

Although shortcomings in geography education result from various sources, the lack of a structural, disciplinary approach has "tried the patience, killed the interest, stifled the imagination, and insulted the intelligence of the learners" (Muessig, 1987, p. 515) while only providing fragmented understandings, skills, and concepts. Muessig (1987) asserted that educators need to aid children in thinking geographically as a means to promote awareness and create life-long learning. This, again, points to the disconnect or gap between disciplinary geography, with its focus on geographic reasoning, and school geography, with its focus on disjointed place name recognition and location (Downs, 1994; Gersmehl, 1992; Gregg & Leinhardt, 1994; Harper, 1990; Muessig, 1987; VanSledright & Limon, 2006).

Unfortunately, there is not a large body of research illuminating how the theory translates into pedagogic practice while maintaining the epistemology of the discipline rather than decontextualized “best practices.” Gregg and Leinhardt (1994) suggested inquiries built around geographic issues. They used the example of the Balinese volcano, Gunung Anung, to explore the pattern of population distribution around the volcano resulting from soil fertility due to prevailing winds and wind patterns. The use of inquiry about real-world problems elucidates the distributive and integrative context of geographical reasoning. Overlain upon this, students also use a cultural lens by scrutinizing the multiplicity of temples built to honor the gods of the volcanoes that created their island. Through a multi-layered approach, students appreciate the various, and sometimes competing, forces and tensions that inform human decision-making. Student inquiry built around geographic issues can consist of diverse maps (different scale representations and themes) as a means for students to gain a more complete picture of the complex context in which this volcano exists while simultaneously underscoring the importance of multiple sources of information (Downs & Liben, 1988; Gregg & Leinhardt, 1994).

Teaching and learning from an inductive disciplinary approach requires time, significant disciplinary and procedural knowledge, including second-order knowledge (see VanSledright & Limon, 2006; VanSledright, 2011) of conceptual ideas such as region or the world in spatial terms for geography, the proper spatial perspective, and a level of comfort on the part of the teacher. The majority of secondary school geography teachers lack the requisite disciplinary knowledge (Bednarz, 2003). Not only is their own geographic reasoning unsophisticated (Bednarz & Bednarz, 2004; Downs & Liben, 1991;

Gregg & Leinhardt, 1994; Herman, 1995; Muessig, 1987) but also the paucity of their epistemological understanding precludes them from making the requisite ontological shifts in order to teach from a more disciplinary approach (Bednarz, 2003; Cohen, 1990). In addition to the content and paradigmatic limitations, secondary (and now even elementary) educational reality presents the teacher with tremendous time constraints in the form of proscribed standardized testing regimes and broad fact-driven curricula. With the alignment of curriculum and testing, the emphasis on non-tested subjects and the window of time for instruction diminishes further. Coverage demands loom large. Considerable research illustrates the pressure and forces that impact teaching and learning in the modern classroom (see Grant et al., 2002; Grant, 2014; VanSledright & James, 2002; VanSledright, 1996; Yeager, 2005). Teachers must navigate these competing forces and make difficult pedagogic choices, along the arduous journey towards good geography.

Teacher as Researcher

As a middle school geography teacher I am often aware of the behind-the-scenes, unadulterated commentary and opinions of other secondary educators regarding teacher research from the academic community. Frequently, words akin to “ivory tower” and sentiments decrying a dearth of researcher distance to sustained classroom experience echo through the halls, lounges, and professional development experiences. In fact, many question inquiry-based instruction as too time consuming when weighed against curricular and testing constraints, too-advanced inductive thinking demands for “their students”, or lacking in content rigor and volume. Much of the literature augments these dispositions. Smulyan (1984) reported that teachers find traditional research studies in

education cumbersome and bereft of much classroom application, although some literature does show a more nuanced relationship (Kennedy, 2005). Furthermore, traditional research often fails to answer all teacher questions (Cochran-Smith & Lytle, 2009d) and subsequent findings and theories may fall short of capturing the complexities of the classroom (Canagarajah, 1993).

Another critique stems from academic research floundering to completely represent teacher perspectives (Cochran-Smith & Lytle, 1990; Dana & Yendol-Hoppey, 2009; Erikson, 1986; Valli, 1997). Teachers frequently view traditional educational research with skepticism finding it too complex and unfeasible in their own classrooms (Krathwohl, 1998). With a foot in both the university and the classroom, I feel perfectly placed to investigate the intersection of these two worlds and see the effects of inquiry-based, research-guided instruction by conducting the research myself. This underscores my choice to employ a researcher-as-practitioner design that places me in the nexus of where the classroom meets the field of educational research. It is an effort to light that candle within my own classroom.

Practitioner research, often used synonymously with teacher research, has had a long and variegated history flitting in and out of research-vogue with a somewhat steady din of criticism from more traditionally oriented segments of the academic community. Much of this criticism stems from a lack of understanding about the methodology, design, and goals of practitioner research and cynics who see its lack of overall generalizability and controlled experimental design as synonymous with a paucity of rigor and validity (Kemmis, 1980). Perhaps these critiques emanate from the so-called “hard sciences” with an emphasis on control, replication of context, and purveyance of

non-human subjects in social settings. Other critiques (Hodgkinson, 1957) seem to condescendingly believe that research beyond the capabilities of teachers takes time away from their jobs.

However, other researchers argue that practitioner research leads to improved practices (see Corey, 1953; Lewin, 1948; Yogev & Yogev, 2006). While setting out to gain insight into and transform their field, teacher researchers often find the experience transformative for their own practices (Anderson, 2002; NBPTS, 2012; Ramírez, 2006)). In completing her practitioner research dissertation, Jain (2013) commented: “As I read through the dissertations the teacher researcher in me also began to take notes on ways to improve my instruction and ideas to take into my future classrooms” (p. 82). In fact, practitioner research has a natural connection to teaching and pedagogy and, if done correctly, encompasses both rigor and high quality.

Furthermore, practitioner research has a lot in common with qualitative research in general. Bogdan and Biklen (1998) identify five features of quality practitioner research and state that high quality practitioner research needs to occur in a *naturalistic* environment so that actions and choices are understood in their context. This is also similar to historical or geographic empathy mentioned previously in this paper. Instead of numbers, practitioner research entails the collection of *descriptive data* in the form of words and images. In practitioner research there exists a *concern with process* rather than outcomes or products. Theories and analysis should be grounded in the data—in other words, *inductively* interpreted.

Lastly, high quality practitioner research is interested in making *meaning*, but meaning that is derived from the perspectives of participants. Krathwohl (1998)

describes several critical features of high quality practitioner research methods. In his description, practitioner research provides professionals with an orientation towards improvement of their practice, entails intensive reflection, is characterized by reflecting-planning-acting-evaluating, involves keeping a journal of constant reflection, simplifies data collection methods, and requires translating the journal into a written narrative.

Practitioner research falls into what Shulman (1986) calls the interpretive research paradigm. This paradigm relies principally on qualitative research methods that take place in natural settings such as a classroom in education or immersion within a particular culture in anthropology. This research paradigm, as contrasted with a more positivistic epistemology, is more context specific and not-as-concerned with generalizing across much larger situations. However, Donmoyer (1975) argued for reframing the generalizability of this paradigm through case studies and cites accessibility, seeing through the researcher's eyes, and a decreased defensiveness towards others as advantages rather than detriments to context-specific and often context-constrained research.

In other words, by recording and reporting their work, practitioner researchers open up new vistas while allowing the research and professional communities to appraise and critique, thus, rendering it constructive for other practitioners in the field or practitioner researchers in the research process (Borko, Liston, & Whitcomb, 2007). Consequently, some researchers call into question the ontological efficacy of such established concepts as validity and generalizability, substituting trustworthiness and transferability (Cochran-Smith & Lytle, 2009c). Practitioner research is grounded in the setting; hence, it is often referred to as "ecological," privileging local knowing over

“objectified” and distanced “truth” (Anderson et al., 2007; Cochran-Smith & Lytle, 1993).

From such studies researchers gain insight into their practice, thus potentially promoting greater effectiveness and improvement over time through the use of qualitative data (Coney, 1953; Goswami & Rutherford, 2009; Jain, 2013; Yoger & Yoger, 2006). Strauss and Corbin (1998) wrote that qualitative data might encompass interviews, student work, narrative descriptions, journal entries, and audio- or video-recordings to create a “thick” description that expresses the multi-faceted, complex environments essential to understand classroom phenomena and that teachers see absent in positivistic quantitative research. Qualitative research seeks to gain purchase on the complex relationships and interactions through description and interpretation in an effort to reap deeper understandings (Denzin & Lincoln, 1994).

Practitioner research brings teachers into the research process from the beginning rather than just as an end user, thus, potentially filling gaps in the research literature (Cochran-Smith & Lytle, 2009d). Such inclusion can empower teachers (Krathwohl, 1998) as they not only become involved in the research process but also knowledge dissemination through professional development opportunities making educational research meaningful through a localization of knowledge and possibly fostering a critical and democratic pedagogy (Cochran-Smith & Lytle, 1993). Johnson (1993) further states that practitioner research may support personal growth while promoting a more critical and reflective teaching practice open to new research. Goswami and Stillman (1987) reasoned that practitioner research facilitates a more critical stance towards research in general, opens doors for practitioner researchers who want to become resources for other

professionals and fosters collaborative problem solving with both colleagues and students.

Moreover, increased collaborative problem solving and collaboration in general, coupled with what Krathwohl (1998, p. 603) calls the “reflection-planning-acting-evaluation cycle,” complements Common Core objectives manifested through Student Learning Outcomes many educators are now required to write for their students. This cycle, including student performance on learning outcomes in a quasi-value added model, forms much of the basis for teacher evaluation and the Classroom-Focused Improvement Process (MSDE, 2014) archetype many local schools are currently implementing. Most importantly, though, Stoll (1992) asserted that if practitioner research improves teacher practice and hones professional judgment then student outcomes will, in turn, improve. Anderson (2002), Goswami and Rutherford (2009), Ramirez (2006), and Yogev and Yogev (2006) provide further evidence on the relationship between practitioner research and teacher practice.

Given the literature on practitioner research in the classroom and my personal ideas, conducting this study within my classroom aligned well with my epistemic and pedagogic goals. From a purely practical standpoint, studying another teacher within my building was logistically challenging given the non-teaching responsibilities of meetings, parent conferences, and grading papers. Given other teachers’ lack of a disciplinary ontological perspective, I did not quite trust that I would be able to study disciplinary oriented geography or geographic thinking. If I believed that this approach would be better for students, I needed to be able to study it. The potential teachers available seemed to have static pedagogic practices and a history-centric approach to the curriculum, with

which I disagreed. Lastly, and perhaps most importantly, I wanted to hold up the mirror to my own practice and improve my craft.

While conducting research within one's own classroom presents some potential pitfalls, it offers a unique vantage point from within the context and opportunity to cultivate positive, lasting relationships not afforded to outside researchers. One such concern was that I might be too close to the research, whether emotionally or in terms of proximity, to maintain an unbiased perspective. As humans exist within their own cultural frame of reference, they cannot fully (some would argue if even at all) extricate themselves from their context (Richardson & St Pierre, 2008), and even quantitative, positivistic studies are seen and interpreted through the eyes of the researcher. Keeping the study divorced from permanent student evaluation mitigated potential attachments to student evaluation and some issues of power. Furthermore, an awareness of potential bias allowed me to consistently check my blind spots both on my own and through other eyes. Audio recording of interviews and teaching segments allowed me to go back and not only gather more data but also to constantly review these blind spots.

Another important concern with teacher research is the dynamics between teacher and student, especially in terms of power. A potential threat to the validity of my research was that the students might not provide candid feedback, afraid of potential reprisal or wanting to be liked or thought of positively. In other words, did the students just tell me what I wanted to hear rather than their truth? Relationships form essential ingredients of the teaching and research dynamics. Good relationships infuse and facilitate good teaching and research. Trust underpins all good relationships. Furthermore, trust allows people to become vulnerable (Baier, 1994; Ennis & McCauley, 2002) and take

appropriate risks. Seeing students five out of seven days for ten months of the school year allowed the potential for trust to develop and flourish. Positive daily interactions that allow teachers to connect with students (Ennis & McCauley, 2002; Gregory & Ripski, 2008), honest, open discussion (Craig, 1996), and a democratic classroom (Wolk, 2003) lend themselves to fostering classroom trust. Further, teacher-researchers greatly facilitate trust through bringing the informants into the research process as active participants with decision-making ability (Johnston, 2006). I allowed the participants access to data and how I represented them for perusal and feedback. Once I established trust and safe risk-taking, the students seemed more likely to provide candid and, quite frankly, blunt feedback.

Typically, I begin the process of establishing trust on the very first day of school. I begin the school year with a half-shaved beard wearing a dhoti (traditional men's skirt from India) and long hair, greeting students' often shocked faces with a warm smile and inviting them to come in and take a seat. Before the students get much of a chance to ask questions, they complete a questionnaire asking their impressions of me based upon my appearance. They then continue answering questions regarding their impressions of me after listening to several eclectic musical selections, usually heavy metal, hip-hop, and classical music. The discussion then concludes with subjects ranging from stereotypes, assumptions, and American gender mores. This represents the first brick in the bulwark of risk-taking and trust that I try and create throughout the year. I follow this up with a commitment to attend out of school activities (plays, concerts, sporting events, dance recitals) and continuous positive social interaction throughout the day. For example, I often have students who like a quieter atmosphere during lunch eat in the classroom with

me. Lastly, I continuously point out my own mistakes and humanness, and I encourage the students to do the same in an effort to create honest discussion in which it is okay to be wrong.

Effective geographical understanding and teaching requires pedagogy grounded in the structure of the discipline of geography. This facilitates an understanding of the multiplicity of processes and relationships that forge the world in which we live through the dynamic crucible of interaction and adaptation. Adept geography learners can refocus this lens of analysis out of the classroom context and peer intellectually and critically at the world, and ultimately, at themselves. In other words, geographically literate students know how to transfer these skills to their lives and the world around them. Good geography is grounded in a conceptual framework steeped in the structure of geography as a discipline, yet appropriate and accessible to learners of various ages. *Geography for Life* (Geography Education Standards Project, 1994) provides such a framework for life-long learning in geography.

Conceptual Framework

Picture the beauty of an arbor covered with spectacular climbing roses. In order to achieve this beautiful and serene scene, gardeners must employ a lattice for support. Without the lattice the roses will not climb and their growth may lag. We can most definitely say the same about geographic thinking. Without adequate and quality support geographic reasoning does not grow along a positive trajectory. In fact, without care one can learn significant misconceptions and simplifications that ossify over time, becoming engrained and prove irresponsive to change.

Jerome Bruner (1977) posited that powerful and intellectually honest teaching and learning flows from a more nuanced and disciplinary perspective. In other words, if we can teach the structure of a discipline, its epistemological and ontological underpinnings, learners have access to a framework on which to hook new information. Furthermore, understanding the structure of a discipline facilitates reasoning and problem solving as experts possess knowledge organized and stored in memory for quick access (Anderson & Leinhardt, 2002) to exploit. The disciplinary structure acts as a cognitive support that learners build upon and utilize, a sort of mental lattice that aids growth.

A theoretical framework functions in much the same manner for learning to reason geographically. A strong lattice of inextricably linked ideas from the discipline of geography provides the structure that sustains and guides good geography, much like the structure of academic history does for professional historians or a trellis for a garden.

Geographic reasoning involves complex processes in which one examines multifaceted phenomena within their natural contexts (Gregg & Leinhardt, 1994). The interaction between the three fundamental components of academic geography, subject matter, skills, and perspectives, (Geography Education Standards Project, 1994) illustrates and completes the framework of thinking like a geographer, otherwise known as geographic reasoning. The organizing concepts or subject matter, and procedural knowledge or skills form the interlocking vertical and horizontal planks of the trellis while the geographic perspectives provide the nails or screws that hold the structure together - the structure of geography as a discipline. *Geography For Life* states that, “The subject matter is the basis on which geographic skills are brought to bear. Knowledge and skills must be considered from two perspectives: spatial and ecological” (Geography

Education Standards Project, 1994, p. 30). These two perspectives form the lens through which geographically informed people see not only the Earth, but also their world.

Organizing Concepts

Studying Earth necessitates not only analyzing it in various contexts such as a physical object, a physical environment, and as a human place but also the interdependent ways in which these contexts coexist. In an effort to capture these dynamics the *Geography for Life* authors developed a two level framework in which to organize the subject matter of geography. First they divided the subject matter into six essential elements that form the subject matter of geography, called organizing concepts. These organizing concepts span the broad range of geographic content. The following comprise the six organizing concepts: The World in Spatial Terms, Places and Regions, Physical Systems, Human Systems, Environment and Society, and The Uses of Geography. Once parsed out they line up nicely with Gregg and Leinhardt's (1994) four concerns of geography and Kohn's (1963) five basic concepts or basic fundamental principles of geography as outlined above. Although all prove critical for comprehensive understanding of geography, for this study I focus on parts of five out of the six and detail them below. The organizing concept of Physical Systems was omitted because it did not fit with the school district's geography curriculum.

In "The World in Spatial Terms" geographers map the relationships between people, places, and environments. Geographers represent information in a plethora of different ways including satellite images, pictures, graphs, charts, diagrams, and maps. Geographic literacy necessitates experience with analyzing, identifying, and using the various geographic representations in an effort to comprehend the world from a spatial

perspective and think spatially. Thinking spatially serves to develop a critical lens with which to view the world and scrutinize the organization and distribution of people, places, and things (Geography Education Standards Project, 1994).

Geographers lend structure and organization to the identities and lives of individuals and groups of people through “Places and Regions”. Place holds certain value for people. All humans are grounded in a particular place that shapes their personal and national identity. Nationalism, the feeling of pride in one’s homeland, feeds off this value, as does the fervor of international competitions such as the World Cup or the Olympics. One need only watch the Argentine fans singing, jumping, and gesticulating for 90 minutes without respite to appreciate the power of place. Physical (climate, landforms, flora and fauna) and human (religion, language, economic and political systems) properties distinguish each and every place. Places constantly change over time through a multitude of physical and human factors. Geographers, employing varied criteria and motives categorize multiple places into fluid constructs called regions. The concept of region provides cohesiveness and distinctiveness to areas allowing for ease of study and generalizing. Geographic understanding calls one to understand the beginnings, development, and meaning of places and regions (Geography Education Standards Project, 1994).

Humans, through various “Human Systems,” mold the planet through efforts to master and control Earth’s surface. Human actions significantly impact Earth. Human settlements differ in infinite modes through size, location, layout, and function. Life centers around these settlements where people get their wants and needs met. Building and resource extraction, often viewed as progress and necessary, affect and often

transform Earth's surface, but not always in a positive manner. Moreover, humans continuously compete for control of resources and land. Regularly promoting cooperation, but often provoking devastating conflict, shifting boundaries, and altering culture. In fact, sometimes humans try and exterminate an entire culture. A geographically literate person understands the means and conditions of settlement patterns across Earth's surface including cooperation and conflict (Geography Education Standards Project, 1994).

Through trying to master and control Earth's surface, humans create the "Environment and Society" dynamic in which humans play out a Newtonian action/reaction relationship with the environment: human activity adapts to but also impacts, sometimes fundamentally altering, the physical systems as well as Earth in general. In other words, humans continuously alter the physical environment in an attempt to get their wants and needs met; however, the physical environment also influences human activities creating an inseparable relationship. Geography literacy promotes and demands knowing that modifications to the environment encompass economic, social, and political consequences (Geography Education Standards Project, 1994). Furthermore, a geographically literate person knows how limitations of various physical systems impact human decision-making in both adapting to and altering the environment. Israeli agricultural history and practices exemplify humans turning swamps and deserts into fertile and profitable farmland thus impacting the relationship with Palestinians.

Finally, "The Uses of Geography" illustrate how geographers use geographic knowledge to interpret the past, the present, and to plan for the future. Geographic

literacy facilitates a deeper understanding of the interdependent relationships among people, places, and environments. Geographic understanding augments historical understanding through bringing the spatial and environmental perspectives into the chronological to help form a more robust accounting of the past (Geography Education Standards Project, 1994). Historical empathy requires awareness of the historical context within which people exist and operate (Lee, 2005). Historical action unfolds within and in reaction to a geographical context. Many important historical actions and decisions stem from geographic circumstances. In fact, “Geography is the key to nations, peoples, and individuals being able to develop a coherent understanding of the causes, meanings, and effects of the physical and human events that occur” (Geography Education Standards Project, 1994, p. 103).

Recognizing the sheer breadth of information, geographers in the *Geography for Life* project (Geography Education Standards Project, 1994) created a second level to this framework dispersing the subject matter throughout 18 multifaceted standards for spiral study across years of education. For this study I concentrate on aspects of “The World in Spatial Terms”, “Places and Regions”, “Human Systems”, “The Environment and Society”, and “The Uses of Geography”, more specifically, on the sub-concepts of spatial distribution and human settlements respectively as this matches the district’s sixth grade geography curriculum.

Procedural Knowledge

Experts in geography use their geographic skills as a way to understand, illustrate, and create knowledge categorized through the above organizing concepts. Asking geographic questions, acquiring geographic information, organizing geographic

information, analyzing geographic information, and answering geographic questions frame the geographic skills that, “provide the necessary tools and techniques for us to think geographically” (Geography Education Standards Project, 1994, p. 41). Much like historians, geographers ask questions. These questions may be aimed at understanding why things are located where they are, how they got there, and what consequences location and association create. Through maps, charts, fieldwork, interviews, library research, photographs, satellite images, and a variety of databases geographers acquire geographic information. The geographers then organize and display the data for analysis. Analysis consists of seeking patterns, relationships, and connections. From this, geographers develop generalizations and models that they can apply to similar circumstances and processes. Gregg and Leinhardt (1994) identified these as a geographer’s tools for spatial analysis and Kohn (1963) described the skills as special strategies for inquiry. Regardless of the name, this skill set engages Kohn’s six basic thinking processes (perception, association, concept attainment, relation, critical, and creative); Castner’s (1990) analytical, sequential, linear, holistic, analogic, and spatial thinking; and Ford’s (1984) core of geography. Together, these concepts are requisite for a more nuanced or disciplinary understanding of academic geography. As these skills represent a significant swath of geographic ability, I intend to concentrate on acquiring and analyzing geographic information as well as answering geographic questions.

Geographic Perspectives

In order to reason in or with geography, organizing concepts and procedural knowledge must be considered through two geographic perspectives. The spatial and ecological perspectives provide a “frame of reference for asking and answering questions,

identifying and solving problems, and evaluating the consequences of alternative actions” (Geography Education Standards Project, 1994, p. 57). They help geographers understand spatial patterns and the complex web of living and non-living elements that shape culture and society, ultimately leading to a better understanding of the world and of self.

The three-part paradigm outlined in *Geography for Life* project (Geography Education Standards Project, 1994) allows the researcher to unpack and examine the multifaceted web of geographic reasoning (see Figure 2.1). Each element forms a support that informs and combines with other supports replicating this process, over time, until it creates a geographically informed person. All facets prove necessary to reason or think geographically. They allow us to understand space and place. According to the *Geography for Life* project, “It is the fascination with and exploration of space and place that give geography its way of understanding the world” (Geography Education Standards Project, 1994, p. 32).

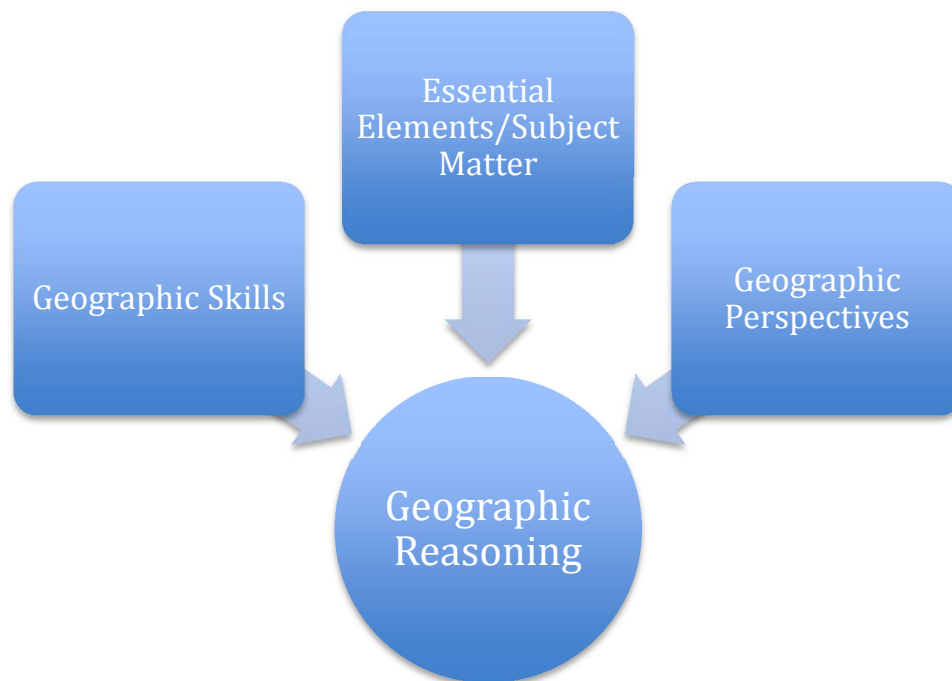


Figure 2.1 The three-part paradigm. Adapted from *Geography for Life*, (1994).

In the Classroom

The two-tiered structure of the organizing concepts lends itself well to classroom instruction. Each standard is further broken down into related ideas and approaches. These form neatly into classroom objectives. In this section I lay out the geography standards and skills that will guide my teaching, assessment, and data analysis. All standards and related objectives come directly from Geography for Life (Geography Education Standards Project, 1994). The format below consists of each standard with the subject matter or content in parentheses followed by the related ideas and approaches written in objective format as sub-ideas.

Standard One (The World in Spatial Terms): The geographically informed person knows and understands how to use maps and other geographic representations, tools, and technologies to acquire, process and report information from a spatial perspective.

- Therefore the student is able to explain map essentials.
- Therefore the student is able to construct a model depicting Earth-Sun relationships and use it to explain such concepts as Earth's axis, seasons, rotation, revolution, and principal lines of latitude and longitude.
- Therefore the student is able to use maps to make and justify decisions about the best location for human activity.

Standard Three (The World in Spatial Terms): The geographically informed person knows and understands how to analyze the spatial organization of people, places, and environments on Earth's surface.

- Therefore the student is able to analyze distribution maps to discover phenomena that are related to the distribution of people.

Standard Four (Places and Regions): The geographically informed person knows and understands the physical and human characteristics of places.

- Therefore the student is able to analyze the physical characteristics of places.
- Therefore the student is able to analyze the human characteristics of places.

Standard Twelve (Human Systems): The geographically informed person knows and understands the process, patterns, and functions of human settlement.

- Therefore the student is able to identify and describe settlement patterns.
- Therefore the student is able to identify the factors involved in the development of cities by being able to explain the geographic reasons for location of the world's first cities.

Standard Fifteen (Environment and Society): The geographically informed person knows and understands how physical systems affect human systems.

- Therefore the student is able to analyze ways in which human systems develop in response to conditions in the physical environment.
- Therefore the student is able to explain how the characteristics of different physical environments affect human activities.

Standard Seventeen (The Uses of Geography): The geographically informed person knows and understands how to apply geography to interpret the past.

- Therefore the student is able to analyze the effects of physical and human geographic factors on major historic events.

- Therefore the student is able to list and describe significant physical features that have influenced historical events. (Geography Education Standards Project, 1994, pp. 144-182)

Geography for Life utilizes a benchmark format to organize the five geographic skills (procedural knowledge). Each skill is matched and articulated to the end of grades fourth, eighth, and twelfth (Geography Education Standards Project, 1994). In my experience, students enter middle school (sixth grade) with significant gaps in their geographic subject matter knowledge and pronounced weaknesses in their geographic reasoning. As a result I incorporate and blend the k-4 and 6-8 skill benchmarks as they match the district's middle school curriculum and address some of the skills necessary for this study. Furthermore, in an effort to reflect this I drop their benchmark language and simply present the skills as objectives. However, the format in which I list the skills below maintains the integrity of their original benchmarks in parentheses following the related ideas and approaches written in objective format as sub-ideas.

Acquiring Geographic Information: The student should know and understand how to

- use maps to collect and/or compile geographic information (eighth), and
- locate, gather, process information from a variety of sources including maps (fourth).

Analyzing Geographic Information: The student should know and understand how to

- interpret information obtained from maps, aerial photographs, and satellite images (eighth),
- use maps to observe and interpret geographic relationships (fourth), and
- interpret and synthesize information obtained from a variety of sources (eighth).

Answering Geographic Questions: The student should know and understand how to

- make generalizations and assess their validity (eighth),
- use methods of geographic inquiry to acquire geographic information, draw conclusions, and make generalizations (fourth), and
- apply generalizations to solve geographic problems and make reasoned decisions (eighth).

I bring the two geographic perspectives into the classroom through asking, and teaching the students themselves to ask, questions focusing on the spatial and interconnected nature of space and place. Questions such as “Where? Why there? Where else?” augment a spatial orientation. Questions inquiring about the connections and relationships between humans, other life forms, and ecosystems guide attention and awareness through an ecological lens.

I use the subject matter standards, geographic skills, and perspectives as both a guide and a barometer to guide pedagogic decisions. As detailed above, the standards and skills parse out into teaching objectives to introduce, teach, and compare data. Written assignments including formative and summative assessments, survey answers, and collected assignments as well as verbal data gathered from interviews, in-class discussion, and spoken answers are continually compared to and coded through the lattice of geography. Additionally, students demonstrate successful geographic reasoning and sufficient subject matter knowledge when they effectively demonstrate well-reasoned arguments explaining where they accurately locate ancient civilizations on the geographically oriented written task. Students also demonstrate the ability to appropriately explain their thinking throughout class activities and specifically during the

think-aloud verbal protocols including making generalizations about the geographic conditions that promote the development of civilizations with respect to spatial and ecological considerations.

Lattice Redux

Together the three components of subject matter, skills, and perspectives form an interrelated and inseparable lattice necessary for geographic literacy. The five skills furnish and become the tools and techniques that when viewed through the spatial and ecological frame of reference generate geographic knowledge and reasoning mechanisms. Geographers then sort and categorize information through the six organizing concepts or subject matter that facilitate various ways of understanding Earth: as a physical object, as a physical environment, and as a human place. For example, through maps, charts, databases, or satellite images one can acquire geographic data. This information can then be analyzed for patterns and associations. The analysis is filtered through the bigger picture of either the spatial perspective of “whereness” involving the context of spatial relationships and processes of Earth or the ecological perspective with living and non-living elements interacting in order to generate hypotheses, generalizations, and models. The conclusions then form the geographic information or subject matter organized through the six elements. As the authors of *Geography for Life* (Geography Education Standards Project, 1994) posit,

Knowing population growth rates is not sufficient unless that knowledge can be related to an understanding of the resource base—the distribution of arable land, climate patterns—and to the transportation system that moves food supplies to consumers, and so on. Likewise, knowing where to find information on the

distribution of population is not sufficient unless you know how to evaluate the reliability of that information, can relate it to maps of arable land and transportation routes, and can then speculate on the impact of changing population policies, migration patterns, or new crops on the patterns of people and rates of food production. (p. 30)

This trellis forms a web of information that the geographically informed person can draw upon to understand the world and ultimately, self, much like good literature.

CHAPTER 3

METHODOLOGY

As illustrated above, a large corpus of research demonstrates the efficacy of disciplinary based pedagogy. Bruner (1977) advocates teaching the structure of a discipline coupled with the habits of mind and perspectives practiced by experts and professionals in the field as a means for learning -- rather than the all-too-common unsophisticated practice of rote memorization and drill that pervades the classrooms in schools across the United States. Anderson and Leinhardt (2002) further illustrate Bruner's ideas in their review of expert-novice studies in the fields of physics and mathematics, as well as their own empirical study on map projections and representations. They find that individuals with more expertise, in other words, a deeper understanding of the discipline including habits of mind and reasoning, rather than knowledge of formulas and facts, consistently solved domain-specific problems. The experts used maps as a reasoning tool and applied them to solve problems whereas novices remained trapped within the confines of the map itself.

Despite this research, the vast majority of secondary geography pedagogy remains stuck at the superficial level of place-name recognition and the memorization of facts and figures such as Gross Domestic Product (GDP). Precious little time is spent reasoning with maps and within geography (Downs, 1994; Muessig, 1987), let alone working with the structure of the discipline. Copious research exists supporting the effectiveness of constructivist approaches to learning as a means to developing profound understandings (see Bain, 2005; Bain, 2000; Bruner, 1977; Downs & Liben 1991; Dyson & Gardner, 1994; Fenton, 1966; Kohn, 1966; Leinhardt, Stainton, & Bausmith, 1998; National

Research Council, 2005; VanSledright, 1996; VanSledright, 2004; VanSledright & Limon). Researchers found that this approach aids in the retention of learning as well. Geographic awareness matures into the relational, interdependent understanding of phenomena and processes, both natural and man-made, as opposed to place-name recognition and elementary characteristics of location on the surface of Earth.

As there exists a paucity of practical, on-the-ground curricular and pedagogical literature bridging the gap between disciplinary and school geography, not to mention a lack of stand-alone geography classes, teachers interested in developing geographic reasoning and perspective in their students start from a place of relative darkness. Marilyn Johnson (2006) uses the metaphor of the lamp (action research) and the mirror (self-studies) for illuminating one's own teaching practice under the auspices of improving both instruction and learning. For the secondary geography teacher, the metaphor of a candle seems more fitting. Throughout numerous folk stories and in various mythologies, candles represent small, yet powerful tools, and in some traditions even become involved in miracles. Starting this journey with the halogen lamp of academic geography may burn or blind their charges, because a disciplinary approach represents new and often uncharted territory in a secondary social studies classroom. Part and parcel to such exploration is excitement, frustration, unlearning, relearning new learning, "ahas!", and the exchange of power and roles (to name a few) consequently necessitating caution and care. However, a teacher must start somewhere and if teachers ground themselves in the epistemology of the discipline of geography and proceed with a finger on the pulse of Downs' (1994) ideas of geographic expertise and reasoning, they

are perfectly placed to light that first candle and perhaps lead their students out of Plato's allegorical cave.

Humanizing Authority

Having grown up in a family of teachers and candle lighters I knew that my professional life would center on making a difference. Both of my parents participated in civil rights marches and together made plans to immigrate to Canada if my father was drafted into a war neither of them philosophically believed just. Furthermore, my paternal grandmother's family emigrated from the Soviet Union when she was 12. They fled the Civil War escaping religious intolerance and war, settling in New York City. My grandmother and her siblings all became card-carrying members of the New York City Communist Party. Her youngest brother fought and died as part of a Lincoln Brigade in the Spanish Civil War.

Around the time I entered middle school, my family relocated to Maryland as my father reluctantly gave up his teaching and research post to take a private sector job that offered significantly more monetary largesse. As much as he grew to enjoy his new career, he greatly missed the lifestyle on a university campus. Nestled between Baltimore and Washington DC my new hometown consisted of culturally and economically diverse families. The place in which we settled coupled with my family history dramatically affected my world-view in ways I did not realize until much later.

Upon matriculating as an undergraduate I continued my study of Russian History and Literature. In the mid-1990s I enrolled in a doctoral program in Russian History at a school in New York City. This experience proved life changing, as I did not enjoy countless hours holed up in various repositories reading about rural elections and other

detailed aspects of Russian and Soviet History. The alienating aspects of solitary research and living in a large city weighed heavily upon me until a family friend suggested I look into a graduate program in teaching designed for people without a teaching background wanting to change careers. Concurrently I realized very clearly that I needed passion in my career or else it would just be a job. I originally wanted to pursue a doctorate in Russian History because I enjoyed the subject matter and also the dynamics of teaching and learning. However, the passion was not there for that level of historic specificity and isolation but burned like a candle for teaching and relationships. Teaching History in High School? What better environment is there to make a difference, to light a candle? As my journey unfolded, it turns out that Middle School for me was that better environment. This program brought me back to the Baltimore Metropolitan Area.

Through the teaching program I apprenticed for an entire year at an urban high school in Baltimore City. The student population was almost exclusively African American. This seemingly homogeneous environment belied a richer diversity beyond demographics. Because the school pulled its student body from the entire city, the vast majority relied on public transportation and comprised a wide array of academic and social economic backgrounds. Teen mother and incarceration issues, both student and family, mixed with typical adolescent issues. As much as I enjoyed my time and felt incredibly appreciated at this school, the lack of school district support and organization helped direct me back to my hometown. I wanted to return and give back to the school system and communities that played such a large role in shaping my perspectives.

I accepted the first job offer I received and began an 18-year journey towards good geography. When I first started teaching 6th and 7th Grade Geography my concerns

revolved around surviving, keeping the students engaged and excited, and hopefully helping them to learn a few things along the way about geography. The unwritten rules of school culture (Tyack & Tobin, 1994) and the socializing nature of curricular demands, parent involvement, and discussion among colleagues kept my pedagogy traditional but somewhat unconventional in terms of delivery. I embraced a multiplicity of methods to keep the students engaged and excited, from dressing up and hosting cultural get-togethers to introducing students to music and art. Much of my pedagogy mirrored how my secondary social studies teachers and mentor teacher taught (Lortie, 1975) but with more flare. My secondary teachers taught history through unidirectional stories and factual recall (Cuban, 1991; Seixas, 2001). While this worked for a few years as I moved past the survival stage, something kept nagging at me from inside, tugging at my consciousness. I felt an intellectual and ontological restlessness.

The signing of the No Child Left Behind legislation and the educational community's ensuing reaction in terms of teaching materials, professional development, and assessment practices including scheduling gave flesh to my restlessness. Through the advice of my curriculum supervisor, I applied for and enrolled in doctoral level graduate work. Through my course work and discussions with other students in the school of education I learned a new vocabulary and way of thinking more in line with my personal history. Furthermore, I learned that my internal and epistemological schemas were undeveloped and malleable to the status quo (VanSledright & James, 2002).

In graduate school I quickly learned that there existed a significant corpus of literature that fed and gave voice to my intellectual and ontological restlessness, my sense that other perspectives and ways to view the world existed. Much of this training came

through the auspices of history education and its extant research literature. However, and just as important, another body of literature informed my worldview and my pedagogy. Through both my studies and graduate assistantship teaching responsibilities I dove into diversity and multicultural literature. This literature spoke clearly to me and, coupled with my family and contextual history, helped me articulate a social justice stance. This stance brought together and gave a unified voice to my immigrant experience, my exposure to cultural and socioeconomic diversity, and the sense of “othering” I felt tracing my biological and philosophical roots to what President Reagan, during an incredibly formative period in my life, called “The Evil Empire”. How could a country of millions of diverse people be evil? How could another government be called evil when their aims and goals mirrored their own government? This self-positioning pervades all aspects of my professional and personal life.

When I first started teaching social studies 17 years ago, my understanding of geography was cursory at best and I did not understand the concept of geographic reasoning. In fact, I had never heard of it until I began my graduate studies. Over the years my understanding evolved to thinking of geography as the study of physical and human characteristics and how they impact the relationship between earth and the people on it. Over the course of this study I began to embrace the most salient part of this definition: the impact of the relationship between earth and the people on it. We are inextricably linked to earth, regardless of what certain politicians claim, in a Newtonian fashion that shapes both. I also came to believe that geographic reasoning is the analysis and application of that relationship.

Geographic reasoning allows people to understand how earth and people impact each other and to employ that awareness to understand human decision-making and ultimately self. Of course there exist many perspectives and lenses through which to understand the world. The seminal work of educational researchers in history (e.g., Bain, 2000; Barton & Levstik, 2004; VanSledright, 2004; VanSledright & Limon, 2006; Wineburg, 2001) introduced me to the nature of historical reasoning. Applying and integrating this with the work of researchers in geography and geography education (e.g., Anderson & Leinhardt, 2002; Bednarz, 2003; Downs, 1994; Ford, 1984; Gregg & Leinhardt, 1994) further informed my perspective of geographic reasoning. This emerging understanding of geography and geographic reasoning drove my pedagogy throughout this study. I felt duty bound to bring everything in the curriculum back to this concept of relationship and impact.

Although I enthusiastically embraced my graduate studies I remained tethered to the classroom and grounded in the daily life of a practitioner. While many of my fellow students undertook full time study I was not in a position to do so and remained a full time 6th Grade Social Studies teacher. I may have not immersed myself fully into university life but I feel that having a foot in both worlds positioned me to bridge the gap between the two. I integrated the research literature in teaching and learning, history and geography education, and social justice into my practice on a daily basis. While this study represents the culmination of 11 years of graduate training, I have been working on it and incorporating it every day into my professional life as a practitioner, constantly honing lessons and the assessment tools used for this study. In other words, this study formalizes my pedagogic practices over the last 17 years and my stance as a teacher inquiring about his practice and helping students reason with geography.

The Study

How do civilizations develop? Where do they develop? What factors facilitate this process? What factors occlude this? These content related questions serve to gain entry, and the answers provide insight, into an individual's geographic reasoning or thinking. Ultimately, I attempted to answer the subsequent research questions: What are student perspectives/understandings of geography and geographic reasoning? Given a geographic reasoning task, what do students do? How do they answer it? How do they reason with geography? How do students think about their reasoning with geography? Essentially these questions get to the heart of disciplinary geography as defined by professional geographers and geography education researchers and as detailed in both the research literature and the *Geography for Life* National Standards.

In order to examine sixth grade students' emic perspectives on geography, geographic understanding, and geographic reasoning I designed a unit of study and collected data. This unit of study followed the local district enduring understandings and learning outcomes (see Appendix A for a listing of the curricula) that lasted throughout the academic school year. The district mandated enduring understandings and learning outcomes covered in this study are articulated through the following essential questions: How has geography influenced the settlement and population patterns of North Africa and Southwest Asia? What are the significant achievements of a civilization in North Africa and Southwest Asia? How do beliefs and values of a diverse culture affect individuals and society? How have modern conflicts been influenced by the history and geography of North Africa and Southwest Asia?

Moving beyond the district mandated objectives and goals, I implemented the unit of study from a more disciplinary and nuanced view of geography based upon the theoretical framework sketched out above. My study covered the district enduring understandings and essential questions (see Appendix A) but also focused on the geographic skills of acquiring geographic knowledge, analyzing geographic information, and answering geographic questions; therefore, extending the unit of study beyond the boundaries of the district's "Northern Africa and Southwest Asia" curricular unit and into the district's "Sub-Saharan Africa" and "Asia" curricular unit. The organizing concepts of "The World In Spatial Terms", "Places and Regions", "Human Systems", "The Environment and Society", and "The Uses of Geography"; and the geographic spatial and ecological perspectives served as a conceptual framework or filing system for storage and retrieval (see Andersen & Leinhardt, 2002; Bruner, 1977). These were taught within the concept of situated learning in which learning is seen as a social endeavor that involves the dynamics between students and teacher, as well as among students.

Student-Sized Grain

In the ever expanding and higher stakes world of educational research and policy with its prescriptive and mandated assessment regimes conjoined with accountability measures that often marginalize, either directly or indirectly, student input in favor of psychometric sorting, comparing, and labeling it becomes ever more crucial to give voice and illuminate phenomena at the classroom level, and even the individual level. In fact, it is of paramount importance to actually talk to students in an effort to understand their learning and perspectives. To drill deeper into student understanding and perspective I sat down with seven students from the two classes in which I conducted the study and

engaged them in several different methods of data gathering. Especially germane to gaining access to participant thinking was engaging them in a task that requires analysis and problem solving while creating a space for them to explain their cognitive processes. I engaged the participants in two geography oriented written tasks with supplementary verbal protocols in the form of think-alouds and interviews all within the unit of study.

My teaching schedule for the 2014/2015 school year consisted of three sections of Gifted and Talented Geography and World Cultures sections and two heterogeneous general education sections. It was tempting to try and select the participants from one of the Gifted and Talented sections because in my experience the GT students grasp concepts quickly and benefit from extensive prior knowledge. However, selecting participants from the general education sections seemed more representative of the general student population. Furthermore, I reasoned that GT students might already possess more advanced geography and geographic reasoning knowledge.

While every section participated in the unit and learning activities, I focused only on the two general education sections for this study. With this in mind, I gave an initial survey (see Appendix C) to both of my general education classes. The survey contained questions intended to elicit students' general thoughts on geography as a discipline (such as its definition and its utility to scholarship and their lives) as well as their thoughts about geographic reasoning. The initial survey also asked them about their understandings and feelings towards geography.

For logistical reasons I wanted to choose the primary participants from the same class section; however, because of IRB consent permissions I needed both sections to obtain the seven main informants. I did not receive enough parental consent to choose all

of my participants from one section and needed to draw from both. Although all students in both sections were granted parental permission to participate in the general class activities, only eight (four per class) were granted permission to be primary informants and take part in the audio-recorded verbal protocols and interviews. I ended up with seven key participants because I knew that one of the students was moving out of state so decided not to choose him.

I had initially wanted to choose primary participants through a combination of task answers, demographic background, initial survey answers, and completed consent forms in order to have as diverse a group of primary perspectives as possible. But, as explained above, choices were limited. While the seven primary participants did not quite match the class demographics in terms of culture and ethnicity, they did provide representation from minority groups and varying academic backgrounds. The seven main study participants were five boys and two girls of varied academic backgrounds, included students who marked like or dislike about geography and represented a mix on answer sophistication. Two of the students received accommodations through 504 Plans and one previously received special education services. One of the students receiving accommodations was identified as being on the autism spectrum.

Once the key participants were determined, I engaged them in an initial recorded intake interview (see Appendix D) designed to further flesh out their background and perspectives on geography and geographic reasoning. This design yielded a richer and more textured picture of their perspectives. The interview plumbed deeper and targeted their knowledge of the definition of geography, geographic reasoning, and the utility of geographic literacy, especially geography, as a way of knowing. The following

definitions guided my questioning. Geography is defined as the study of place and human-environment interaction (Gregg & Leinhardt, 1994). Ford (1984) defines geographic reasoning as the process of weaving together five core elements: landscapes, maps, hypothesis, processes, and models, to create an argument or case that explains human decision-making. The spatial perspective (Geography Education Standards Project, 1994) facilitates geography as a critical lens with which to view and understand the world.

The Task

Initially, I piloted the first geography-oriented task with the Gifted and Talented classes. This afforded me the opportunity to make adjustments related to clarity and hone the actual task, making sure the task appropriately targeted the concepts behind the research questions and produced an appropriate amount and type of data. Specifically, the task targeted the current level of geographic understanding and geographic reasoning as manifested in the geographic skills of acquiring geographic information, analyzing geographic information, and answering geographic questions, including map reading, interpretation, and synthesis. The task also targeted the four geographic organizing concepts of “The World in Spatial Terms”, “Human Systems”, “The Environment and Society”, and “The Uses of Geography” through the geographic perspective of spatial reasoning.

With a sharpened tool I collected richer data from the remaining students. The yield from the geography-oriented written task and the Student Learning Outcomes Assessment also served as diagnostic, allowing me insight into what geographic comprehension and reasoning these students bring with them to sixth grade. Not only did

this serve as an important starting point, but it also drove the instruction for this study, and technically for the entire school year. These initial formative assessments granted me access to the strengths and needs of the participants regarding geographic knowledge and thinking. For example, some of the students possessed acute reasoning skills but lacked specific geographic content of the organizing concepts or spatial perspectives. I then utilized these data to develop pedagogic strategies and learning opportunities that addressed the various aspects of the geographic lattice in my theoretical framework, within an environment that facilitates situated learning, thus benefitting all students.

The task itself comprised a blank outline map of Latin America for the participants to label where they believed two ancient civilizations would have developed. On a separate piece of paper the participants justified their locations using the supporting materials. The supporting materials consisted of climate, vegetation, and physical feature maps of Latin America. During the think-aloud I provided an organizer designed to break the task into the two cognitive steps of analyzing each map and determining how it would aid in answering the task. The inclusion of the maps furnished the students with evidence and geographic information for them to interpret and analyze. Could the students reason within and with the maps to choose likely places for civilizations? The choice of multiple locations precluded a lucky guess. Theoretically, the two choices should share some characteristics favorable to supporting the development of civilizations based upon their physical geography. I used a few questions on the initial survey to screen out students with potentially significant prior knowledge of Latin American civilizations including family vacations, documentary television programming, and historical reading.

I analyzed the geography-oriented written tasks applying a rubric developed from the theoretical framework. The conceptual framework provided a lens for me to gain purchase on these subtle aspects of geographic reasoning from the vantage point of skills, conceptual knowledge, and geographic perspectives as outlined in the theoretical framework. Using this framework, I looked for evidence of map reading and interpretation. How well did sixth grade students deconstruct three maps presented to them as evidence of ancient civilizations? Moreover, did they dig further and construct some meaning from the cartographic information? Did they understand the requisite concepts such as climate biomes and its impact upon human decision-making? I paid particular attention to how the participants analyzed the geographic information through patterns, relationships, and connections. This shed light on their ability to answer geographic questions by way of the generalizations and models, critical to Gregg and Leinhardt's (1994) research. Lastly, I focused on the participants' facility with spatial distributions of people and resources in addition to the treatment of both the process of human settlement and essential conditions like farming, soil quality, irrigation, rainfall, fresh water sources, non-farming food acquisition, potential for trade, transportation, and the relationship of food source to job creation.

The assessment strategy employed in this study proved valid for diagnostic information essential for instructional decision-making aimed at student academic evolution as well as determining a "starting point" for both their geographic reasoning and emic perspectives regarding a more disciplinary oriented pedagogy. Moreover, in order to ultimately determine epistemological utility and worth, one needs a starting point. In the geography-oriented written task (pre-assessment) and the Student Learning

Outcomes Baseline Assessments, the students were unable to utilize textual resources to bolster their answers or parrot back someone else's conclusions and research. Instead, the task required them to analyze maps, make inferences, and evaluate visual-spatial information in order to construct meaning; therefore, satisfactory (and higher) scores demonstrate evidence of such thought (Koziol & Moss, 1991). According to Koziol and Moss, however, this assessment alone is not valid for "achievement monitoring activities" (p. 21) due to inter-rater reliability issues, not to mention the fascination with the quantitative ontology of generalizability. It would be problematic to compare students across different classes, teachers, and schools based solely upon this assessment.

However, in an effort to further triangulate and speak more confidently about the data I did have, my partner 6th grade social studies teacher reviewed a random 15% sample of the Student Learning Outcome data. The random sample consisted of three baseline and four end-of-year assessments from the most challenging assessment. For the three baseline assessments we differed by a mean .8 points (out of 28) on the overall score. For the four end-of-year assessments, we differed by a mean 1.5 points (out of 42) on the overall score. The assessment design was generally for pedagogic information: diagnostics, instructional choices, and a beginning/ending point to study overall progress rather than inter-student ranking, sorting, and comparing. Simply put, this study illuminated where the participants initially started vis-à-vis geography and geographic reasoning and where they ended up after a period of teacher intervention.

Student Voice

In an effort to understand student thinking beyond the written answers, I implemented a think-aloud verbal protocol (see Appendix G) in which the participants

explained their reasoning and thoughts underpinning their answers to the written task. Additionally, having the students explain their thinking reduces assumptions or misconceptions often encountered in educational settings regarding what the students think or why they answered the task questions in a certain manner. The think-aloud opened up new lines of questioning and potential data trails.

Through retrospective interviews (see Appendix H), once I scored (see Appendix I) and coded the written tasks, I addressed any questions that remained and explored new paths of inquiry that arose from the student responses. This afforded me the opportunity to clarify, probe, and augment the collected data. Furthermore, this method provided the participants with the same opportunity, as I left space for them to ask questions and make comments.

The combination of the written task, think-aloud, and retrospective interview permitted entrée into how students think about and use spatially oriented evidence to construct answers to geographic questions. Moreover, the verbal protocols offered insight into the participants' metacognition, as well as, accessing and building upon their prior knowledge, which is identified as critical for true learning to take place (National Research Council, 2005).

Using the information gathered from the geographically oriented written task (pre-assessment) and the Student Learning Outcomes Baseline Assessments I designed lesson activities and pedagogic strategies whose efficacy I compared to the second geographically oriented written task (post-assessment) and Student Learning Outcomes End of Year Assessments. The lessons centered on the geographic skills of acquiring and analyzing geographic information through maps and charts. The teaching and learning

activities further explored analyzing geographic information by focusing on the spatial relationships and what that information reveals concerning processes and phenomena on the surface of the Earth and how humans interact with these in order to make decisions and create elements of civilizations such as job specialization, housing materials and structure, food and potable water procurement, the development of trade and economies to meet needs and wants, and the foundation and growth of religion and social structures. These skills and information were organized within the structure of geography as a discipline through aspects of “Human Systems”, “The World In Spatial Terms”, “The Environment and Society”, and “The Uses of Geography” and brought to bear on answering geographic questions through map interpretation. Lastly, the design began to foster a perspective or lens through which to “see” the world; therefore, introducing geography as a way of knowing for the students.

Data Collection Redux

Once the students completed the unit of study and demonstrated readiness, through a series of small formative assessments, the participants completed the second geography related written task and the Student Learning Outcomes End of Year Assessments. The task mirrored the first, although it involved a different part of the world. For this task, I supplied the students with a blank outline map of the area in question along with a packet of evidence in the form of climate, physical feature, and vegetation maps of the region. Once again, students decided where to place two ancient civilizations. For the Student Learning Outcomes End of Year Assessment I supplied the students with only a desk atlas as a resource. These tasks targeted the same skills, organizing concepts, and perspective as the first tasks through reading and interpreting

maps while understanding the spatial relationships that exist. The second written task, or post-assessment along with the Student Learning Outcomes End of Year Assessments, served as an endpoint with which to determine the students' geographic reasoning and understanding of the organizing concepts, or structure, of geography.

Just as in the first written task, I engaged the participants in a recorded think-aloud to further collect data on student thinking and geographic reasoning. This also allowed me to compare their thinking with the previous think-aloud and investigate any changes in reasoning strategies they employed to answer the geographic questions through their ability to interpret the maps and analyze the spatial information. Furthermore, I followed up with retrospective interviews to give both students and myself an opportunity to clarify, question, comment, and probe the data from the second geography oriented written task. Through these three data collection methods I also monitored changes in metacognition.

I interviewed the seven participants in order to collect data on their perspectives of geography, geographic education, and geographic reasoning. This served as another data point with which to track any changes in their thinking. Moreover, I asked the students about the learning process they experienced in the unit of study as a whole as compared to ways in which they learned geography in the past, in order to gather data on their feelings about learning in a more disciplinary manner rather than the traditional format of nominal place-name recognition and map labeling using an atlas or textbook.

I used several guiding question for my interviews and surveys. These revolved around eliciting students' perspectives on geography as a discipline and school subject,

thinking with geography including its utility in the world, and their own experiences with geography.

I scored the second geography-oriented written tasks utilizing the same rubric (Appendix I) used for scoring the first geography-oriented written task. Essentially I assessed the participants based upon their knowledge of the organizing concepts of “The World in Spatial Terms,” “Human Systems,” “The Environment and Society,” and “The Uses of Geography,” the geographic skills of acquiring and analyzing geographic information, and answering geographic questions through map interpretation and synthesis of spatial information. Additionally, I examined the manner in which the students demonstrated the process of weaving together the five geographic core elements: landscapes, maps, hypothesis, processes, and models to create an argument (Ford, 1984). In other words, could they, like a geographer, exploit the aspects of geography to reason and understand human decision-making?

This study not only explored students positioned at the academy/school gap, but also myself as a teacher researcher interested in exploring and mapping that landscape. Therefore, data collection also accounted for the trajectory of my own cognitive process. I maintained a practitioner-research journal that served as an invaluable source of teaching and research data (Dana & Yendol-Hoppy, 2009); it was a mirror with which I gazed at my thoughts and ideas.

Data Analysis

Using the theoretical framework I whittled the data into smaller grains. Using the constant comparative method (Corbin & Strauss, 2008), I analyzed the data for larger thematic and potentially overlapping patterns. Furthermore, I coded and examined the

data outside the entire coding scheme, inductively, with clean copies in order to leave some space for other emerging codes so as not to narrow my focus and miss any potentially pertinent trends. I then classified the coded data according to themes and patterns that came to light in order to get a sense of the overall picture of geographic reasoning as delineated by procedural knowledge, conceptual knowledge, and perspectives of the discipline of geography.

The research questions and data collection methodology permitted me to peer into and shed light on the emic world of the student, the most important stakeholders in education and educational policy. Often, in the realm of education and the range of adults (whether policy makers at the federal, state, or district level, curriculum developers, assessment personnel or building leadership, and sadly, teachers), the voice of the student gets lost in the cacophony that passes for discussion regarding “what’s best” for them, the students. This small, isolated study is an attempt to understand the intersection of students and geographic reasoning, a vital piece of disciplinary geography with the hope of affecting and closing the gap between academic and school geography. Additionally, I aimed to give a voice and apply scholarship to those most impacted by the choices of those removed, either physically or intellectually, from the trenches of United States secondary education.

CHAPTER 4
MIND THE GAP: TEACHING GEOGRAPHY IN THE ETHER
PERIODS 2&4

Introduction

Nestled at the confluence of key county arteries, a thriving commercial locus, and varied suburban neighborhoods, Endicott Hills² serves a diverse and upwardly mobile population. Endicott Hills comprises 46.3% Caucasian, 28% Asian, 14.4% African-American, 5.5% Latino, and 5.8% Multi-race students. Only 6.2% of the student population receives special education services while 12% receive free and reduced meals. The school had adopted the standard county mandated schedule. All academic classes meet for 50 minutes every day. On Wednesdays Endicott Hills Middle School shaves five minutes off all classes in order to create a 45-minute “PLUS” period that meets right after homeroom. During this time the majority of students throughout the school read silently for the duration while others receive extra help, time, and an opportunity to make up for absences. Teachers juggle a classroom full of students reading silently while offering small group/individual instruction to up to 15 students.

Both general education sections I taught offered a wide range of learning levels and cultural diversity. Additionally, each section offered a rich pool of diverse participants. Period 2 consisted of 23 students and Period 4 consisted of 25. Period 2 comprised five Caucasian, seven African-American (including two bi-racial students), six South Asian, and four East/Southeast Asian students. Period 4 comprised ten Caucasian,

² The names of the site and all participants have been changed to preserve students’ confidentiality

ten African-American (including two bi-racial students), three South Asian, and two Latino (including one bi-racial student) students. I go into detail about the make-up of each class when introducing the participants. What follows is a thick description of events that transpired over the course of the study against the backdrop to the 2014-2015 school year and an exploration of the pedagogic teacher research questions (RQ3 and RQ4): Given data from a geographic reasoning task, what does the teacher researcher do? How does the teacher researcher use the data to inform instruction? How does the teacher researcher determine geographic reasoning? How does the teacher researcher foster geographic reasoning?

Into the Fray

Teaching, when done honestly and earnestly, is an exceptionally challenging endeavor that involves a myriad of challenges and obstacles. Researching teaching and learning augments and oftentimes aggrandizes these further. Moreover, the nebulous landscape in which we navigate gives rise to a series of new challenges. The first challenge I encountered was trying to figure out how to live and teach in that ill-defined space or gap between the two worlds of academic and school-based geography. The publication of the national geography standards (*Geography for Life*, 1994) seemed to provide a path forward with its clearly defined standards, accompanying knowledge benchmarks, and learning opportunities. However, the sheer breadth of the content and skills contained within necessitated some challenging pedagogical choices. In order to teach geography from a more disciplined perspective, aligning the standards to the local sixth grade Geography and World Cultures curriculum became paramount. This proved a very tricky and sometimes frustrating task that brought to prominence the second and

perhaps greatest challenge, which I faced for the entire school year not just the duration of the study, lack of alignment:

As I plan the unit for my study on geographic reasoning/teaching I am left with a few thoughts or impressions. First of all the local curriculum does not correlate well with the *Geography for Life* standards. The approach of the district curriculum is to introduce geography skills in the first quarter and then take a regional approach (Eastern Hemisphere) for the remaining three quarters of the school year. While the curriculum's regional approach is geographically oriented and does involve some key geographic concepts such as the interactions between humans and their physical environment, culture, and the organizing concept of regions, it seems to be in the service of a more historical understanding of the world. As highlighted earlier in this paper, that ultimately does a disservice to a geographic understanding. So, while the curriculum starts off in a very geographically oriented direction, it quickly veers towards an historical approach not just a traditional, memorize the dead white men/important dates/battles approach but a nuanced disciplinary approach to be lauded. However, the historical investigations that the district pushes crowds an already packed curriculum that spans from ancient settlements, to development of civilizations, to modern day issues. So, while it is difficult to line up the curriculum with the Geography Standards, I am acutely worried about pacing and teaching enough of the curriculum. (Journal, 8-1-14)

A cursory glance of the curriculum framework (HCPSS Secondary Social Studies Office, 2012) highlights the historical nature and emphasis of the sixth grade Geography

and World Culture curriculum. Table 4.1 shows the literacy framework that undergirds the year-long course.

Table 4.1

Curriculum Literacy Framework

Close Reading	Student Questions	Outcomes (linked to Common Core Standards)	Prompts
<p>Sourcing Consider the document's source and purpose</p> <p><i>Prior to reading the document, students should carefully analyze the source.</i></p>	<ul style="list-style-type: none"> • Who wrote this? • What is the author's point of view? • Why was it written? • When was it written (a long time or a short time after the event)? • Is this a primary or secondary source? How do you know? • Is the source believable? Why or why not? 	<p>Key Ideas and Details</p> <ul style="list-style-type: none"> • Cite specific textual evidence to support analysis of primary and secondary sources (RH.6-8.1) <p>Craft and Structure</p> <ul style="list-style-type: none"> • Identify aspects of a text that reveal an author's point of view or purpose. (RH.6-8.6) <p>Integration of Knowledge and Ideas</p> <ul style="list-style-type: none"> • Analyze the relationship between a primary and secondary source on the same topic. (RH.6-8.9) 	<ul style="list-style-type: none"> • "I think the author probably believes..." • "The author's purpose is to..." • "I think the audience is..." • "Based on the sourcing information, I predict this author will..." • "I do/don't trust this source because..." • "If a contemporary of the author had written the text, his or her point of view would..."
<p>Contextualizing (<i>Imagining/Visualizing the setting</i>) Place the document in a time period, culture, setting, or subject-specific context</p>	<ul style="list-style-type: none"> • "What events were happening at the time the text was written?" • In what ways might this influence what you are reading? • What was it like to be alive at this time? • What things were different during the time when the text was written? What things were the same? 	<p>Key Ideas and Details</p> <ul style="list-style-type: none"> • Determine the central ideas or information; provide an accurate summary of the source distinct from prior knowledge or opinions. (RH.6-8.2) <p>Craft and Structure</p> <ul style="list-style-type: none"> • Identify aspects of a text that reveal an author's point of view or purpose. (RH.6-8.6) <p>Integration of</p>	<ul style="list-style-type: none"> • "I already know that _____ is happening at this time..." • "From this document I would guess that people at this time were feeling..." • "This document might not give me the whole picture because..." • "The events of the time were influenced by..."

	<ul style="list-style-type: none"> • What would it be like to see this event through the eyes of someone who lived in this time? • How might these perspectives and attitudes influence their actions? 	<p>Knowledge and Ideas</p> <ul style="list-style-type: none"> • Distinguish among fact, opinion, and reasoned judgment in a text. (RH.6-8.8) • Analyze the relationship between a primary and secondary source on the same topic. (RH.6-8.9) 	<ul style="list-style-type: none"> • “Life during this time period and life during the 21st century are similar and/or different because...”
<p>Critical Reading</p> <p>Read the text carefully to identify details and nuances in the author’s words, or in data, images, text features, etc.</p>	<ul style="list-style-type: none"> • What claims does the author make? • What evidence does the author use to support those claims? • How is this document supposed to make me feel? • What words does the author use to paint a particular picture of the event, or to convince me that they are right? • What information does the author leave out? 	<p>Key Ideas and Details</p> <ul style="list-style-type: none"> • Cite specific textual evidence to support analysis of primary and secondary sources (RH.6-8.1) • Identify key steps in a text’s description of a process. (RH.6-8.3) <p>Craft and Structure</p> <ul style="list-style-type: none"> • Determine the meaning of words and phrases as they are used in a text. (RH.6-8.4) • Describe how a text presents information (e.g., sequentially, comparatively, causally). (RH.6-8.5) • Identify aspects of a text that reveal an author’s point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts) (RH.6-8.6) <p>Integration of Knowledge and Ideas</p> <ul style="list-style-type: none"> • Distinguish among fact, opinion, and reasoned judgment in a text. (RH.6-8.8) 	<ul style="list-style-type: none"> • “The author claims that...” • “To support his/her claims, the author...” • “I think the author chose these words because they make me feel...” • “The author is trying to convince me...(by using/saying...)” • “The ordering of events allows readers to...” • “Specific vocabulary the author uses provides...”
<p>Corroborating</p> <p>(Cross-Checking)</p> <p>Compare multiple sources against each</p>	<ul style="list-style-type: none"> • What do other pieces of evidence (texts, images, data, maps, etc.) say? 	<p>Key Ideas and Details</p> <ul style="list-style-type: none"> • Cite specific textual evidence to support analysis of primary 	<ul style="list-style-type: none"> • “This author agrees/disagrees with...”

other to develop a well-supported interpretations	<ul style="list-style-type: none"> • Am I finding the same information everywhere? • Am I finding different versions of the story? (If yes, why might that be?) • Where else might I locate additional information about the topic? • Which pieces of evidence are most believable and why? 	<p>and secondary sources. (RH.6-8.1)</p> <p>Integration of Knowledge and Ideas</p> <ul style="list-style-type: none"> • Integrate visual information with other information in print and digital texts. (RH.6-8.7) • Analyze relationship between primary and secondary sources on the same topic. (RH.6-8.9) 	<ul style="list-style-type: none"> • “This document was written earlier/later than the other, so...”
---	---	---	---

Note: The Curriculum Literacy Framework is adapted from HCPSS Secondary Social Studies Office 2012.

In addition, the second quarter curriculum (see Table 4.2) introduces the historical process using the region of North Africa and Southwest Asia as the content frame of reference. In fact, only seven of the nineteen (36%) of the student learning outcomes are geography specific. Out of those seven, three require only surface level cognition. That leaves only four objectives challenging the students to delve deeper into geography and develop geographic reasoning. The third and fourth quarter curriculum, Sub-Saharan Africa and Asia respectively, offer a bit more geography oriented learning outcomes than the history-centric second quarter, but still lack a real connection to *Geography for Life*.

Table 4.2

Second Quarter HCPSS Sixth Grade Geography and World Cultures

Topic	Learning Outcomes	Vocabulary	Key Concepts
Geography of North Africa and Southwest Asia	<ol style="list-style-type: none"> 1. Identify the relative location of the Middle East and North Africa in the world, and describe the characteristics that make it a region. 2. Describe the major geographic and climatic features of North Africa and the Middle East 3. Identify selected countries and major cities of North Africa and the Middle East 	<ul style="list-style-type: none"> • Drought • Arid 	<ol style="list-style-type: none"> 1. Countries in this region share similar cultural, political, and geographical aspects. 2. This region comprises Africa and Asia and is linked by major waterways.
Introduction to Historical Process and the History of North Africa and Southwest Asia	<ol style="list-style-type: none"> 1. Interpret, organize, and evaluate primary and secondary sources of information. 2. Identify the author's position on a historical event and evaluate the author's purpose for creating the document. 3. Use context/background information to draw more meaning from the document. 4. Identify and evaluate the author's claims about an event. 5. Corroborate the claims with other pieces of evidence. 6. Identify the kinds of evidence that allows us to learn about the past, including primary and secondary sources, government documents, artifacts and pictures. 7. Distinguish between past, present, and future time and explain how major events are inter-related through the use of timelines. 8. Explain how geographic factors influence the development of civilizations in the Nile River Valley, along the Tigris and Euphrates 	<ul style="list-style-type: none"> • Mesopotamia • Agriculture • Common Era • Before Common Era • Artifacts • Prehistory • Irrigation • Cuneiform • Hieroglyphics • Polytheism • Fertile Crescent • City-state • Civilization • Silt 	<ol style="list-style-type: none"> 1. The study of history inspires students and enables them to understand the past, become more informed citizens, and to think critically about themselves, their community, and the world at large. 2. History is interpretation, often influenced by a person's frame of reference. 3. Interpretations about the past should be logical, reasonable, and be based on facts. 4. There is a specific methodology to analyzing sources about the past. 5. Timelines are used to order events chronologically and spatially. 6. Ancient civilizations developed along river systems such as Egyptians, Nubians, Sumerians, Babylonians, Assyrians, Phoenicians. 7. Many of these civilizations were credited with major achievements, such as the 365-day calendar, building the pyramids, and the wheel

	<p>Rivers, and the eastern region of the Mediterranean Sea.</p> <p>9. Recognize the chief characteristics of a civilization.</p> <p>10. Describe and analyze the cultural development and the major achievements of the ancient civilizations of this region.</p> <p>11. G/T: Relate the religious beliefs of ancient Mesopotamia to elements of the natural environment.</p>		<p>and others.</p> <p>8. G/T: Religions in ancient Mesopotamia were polytheistic. Mesopotamians associated catastrophic events such as floods, droughts, and disease to particular gods, who are depicted as human-like, or anthropomorphic.</p>
Culture	<p>1. Compare and contrast the three monotheistic religions that developed in the Middle Eastern region.</p> <p>2. Compare the patterns of life of various groups of people in this region.</p> <p>3. Describe ways in which people of this region have adapted to varied environmental conditions.</p>	<ul style="list-style-type: none"> • Monotheistic • Monotheism • Islam • Pillar • Hajj • Judaism • Christianity • Theocracy 	<p>1. Three major religions of the world developed in this region.</p> <p>2. Religion plays a significant role in the daily life in this region, such as manner of worship, diet, gender roles, clothing, and influence on government policies.</p>
Modern	<p>1. Analyze the relationship between modern conflicts and the history of this region of the world</p> <p>2. Identify a selected contemporary issue and predict possible future trends in the Middle East and North Africa</p> <p>3. G/T: Examine the economic future of nations in the regions who rely on the export of non-renewable resources.</p>	<ul style="list-style-type: none"> • Theocracy • Desalination • OPEC 	<p>1. Most people in this region live either on the coastline, near rivers or an oasis.</p> <p>2. Many of these nations rely on oil production to support their economy.</p> <p>3. Cultural, political and economic issues are still causing conflicts in this region.</p> <p>4. Dependence on oil exports has created economies that rely on the habits of other nations. While some Mid-Eastern countries have invested heavily in financial markets, others face a “feast or famine” future based on oil prices and sales.</p>

Note: HCPSS Sixth Grade Geography and World Cultures is adapted from HCPSS

Secondary Social Studies Office 2012.

My concerns regarding coverage demands began before the school year began. They continued to nip at my heels, growing louder and louder throughout the duration of this study, oftentimes engendering copious amounts of stress. The next challenge unfolded in the form of how: How to actually teach a more disciplinary oriented version of geography grounded in *Geography for Life*. I tackled the challenges of what (aligning curricula) and how (pedagogy) as one. Through parsing the standards, skills, and perspectives of *Geography for Life* while constantly comparing them against the district's curriculum, I saw points of convergence in which I concentrated my pedagogic choices and began to marshal resources and sketch out a unit plan. This led, eventually, to individualized lesson plans, a teacher's stock and trade. One set of materials I discovered that held great promise were the resource books *Zombie Based Geography* published by a curriculum company called Interact (Interact, 2013).

Zombie Based Geography consists of three books containing lesson plans and reproducible handouts that center on a fictional zombie outbreak in the United States. The idea is to track the outbreak (book one) of zombie attacks; the survival (book two) of humans, and the resettlement (book three) after this massive scourge affects different regions of the country. The program comprises ten projects broken down into several lessons based upon the national geography standards. I overlaid this onto *Geography for Life* and the local curriculum. Finally, I created a matrix (see Appendix J) that illustrated the above and the various research questions driving this study. The following journal entry traced the trajectory of my thoughts and the tensions present throughout this study:

I have essentially completed the sequence of the Unit Plan and have incorporated a lot of *Zombie Based Geography*. It seems to line up best with *Geography for*

Life; however, not as cleanly as I would like. Without using it, I think I would have to create everything from scratch. This is very time-consuming especially gathering the resources, sorting through the resources, and planning/grading for all 5 classes. *Zombie Geography* deviates from the district curriculum in that it seems to be organized more around *Geography for Life* and intersects with the curriculum at points and then goes elsewhere. Furthermore, the order does not line up with the local curriculum that well. It has a flow that makes sense from a Geography Standards perspective. So I am kind of jumping around a bit and doing parts of each “project”. It is divided into different projects. Each project has several lessons associated with it. One thing I have to be careful about is that some of the Interact (company that created the *Zombie Geography*) lessons/activities are kind of weak. In other words, they look really good on the surface but lack details/supporting materials to really flesh out their lessons. Furthermore, while they are theoretically good, the practice isn't always there, as the activities tend to be the same for every lesson. A lot of “think-pair-share” and making posters with a gallery walk and exit ticket. I need to make sure I am reading through each lesson carefully and making adjustments to fit the students and curriculum. I also want to make sure I am integrating the information from Gersmehl (Teaching Geography) into the lessons. I think his book is an excellent resource for teaching geography. I want to incorporate the key elements he discusses especially the four cornerstones of geography. Another potential issue with the *Zombie Geography* program is that the time frame for each lesson is one 50-minute class period. Generally I haven't found that to be true for their other

products I have used in the past; especially if the teacher wants to provide enough context/background on various concepts that come up through the lessons. I think 1 class period/lesson seems quite optimistic, especially given the constraints on individual class time including transitions from activity to activity, student questions, off-task behavior, and the usual things that pop up in a classroom during instruction. I do have a concern with being able to cover enough curriculum if I use too much Zombie Geo. More on that later. (Journal 8/11/14)

Geography as the Confluence of Content, Skills, and Perspectives

As detailed in Chapter Three, geographic understanding and geographic reasoning is the place where subject matter (content) knowledge, geography skills, and geographic perspectives meet. With this in mind I proceeded to plan for the unit of study. In my journal I noted some thoughts and ideas:

In order to foster geographic understanding in my students I need to figure out spaces in the curriculum in which I can go beyond the learning outcome (if necessary) and work in the skills of acquiring, organizing, and analyzing geographic information. I also want to make sure I am getting the students to start thinking of the world from a spatial and ecological perspective. In other words, can they start to think about how things are laid out and the impact that has on people and how they make decisions. Looking through the Zombie Geography materials I think that the lesson on spatial relationships will help the students to start thinking in terms of distribution. I think it is very important to make sure I am constantly bringing in examples from their lives or at least things they can relate to in an effort to make the strange familiar - take the learning from looking

at the distribution of resources in some other location or how things like zombie attacks move along transportation lines to experiences closer to their lives. For example, we can look at clothing or electronics and examine every step along the supply chain until the items get to the students. We can also look at potential consequences at certain points.

I feel like a combination of *Zombie Based Geography*, *Geography Alive!*, materials I have already created, and new materials taught through using the geography skills/perspectives and aligned with the subject matter (content) will go a long way towards getting the students to think more like geographers. Also, I want to work in the SLO requirements as well as I think they target some of the geography skills and subject matter. (Journal 8/16/15)

Table 4.3 shows the fruits of the labor detailed in the above journal entries and became the basis of my lesson planning for the unit of study.

Table 4.3

Teaching Unit Plan

Project/Unit Title: Straddling the Gap: A Middle School Teacher's Journey to Good Geography	
Timeline: Two academic quarters	
Desired Results	

<p>Overarching Understandings:</p> <ul style="list-style-type: none"> • Using geographic tools to understand human settlement patterns and development. • Geography influences how people live and work on earth in order to get what they need. • People are affected by environmental, social, and cultural concerns. • The physical environment affects the settlement and population patterns of a region. • Regions are defined by unifying characteristics. • People modify their natural environment to meet their needs. 	
<p>County Objectives:</p> <ul style="list-style-type: none"> • Define the term geography and give examples how it is used to understand the world around us. • Develop and use mental maps to organize information about people, places, and environments in a spatial context. • Define, locate, and compare major landforms and water bodies on the earth. • Identify the purposes of maps and their key components. Describe how the Earth's rotation causes night and day and the Earth's revolution causes the change in seasons. • Identify the purpose of the Global Grid and determine how this helps humans make sense of location on the Earth's surface. • Explain why there are 24 time zones, give examples why time zones are useful, and be able to calculate time differences. • Identify and describe the factors that affect climate. • Describe the earth's climatic zones and climatic regions/biomes. • Identify and analyze elements of culture such as religion, language, arts, food/diet, clothing and others. • Identify the relative location of the Middle East and North Africa in the world, and describe the characteristics that make it a region. • Describe the major geographic and climatic features of North Africa and the Middle East • Explain how geographic factors influence the development of civilizations in the Nile River Valley, 	<p>Geography for Life Outcomes:</p> <ul style="list-style-type: none"> • The geographically informed person knows and understands how to use maps and other geographic representations, tools, and technologies to acquire, process and report information from a spatial perspective • Therefore the student is able to explain map essentials • Therefore the student is able to construct a model depicting Earth-Sun relationships and use it to explain such concepts as Earth's axis, seasons, rotation, revolution, and principal lines of latitude and longitude • Therefore the student is able to use maps to make and justify decisions about the best location for human activity • The geographically informed person knows and understands how to analyze the spatial organization of people, places, and environments on Earth's surface • Therefore the student is able to analyze distribution maps to discover phenomena that are related to the distribution of people • The geographically informed person knows and understands the physical and human characteristics of places • Therefore the student is able to analyze the physical characteristics of places • Therefore the student is able to analyze the human characteristics of places

<p>along the Tigris and Euphrates Rivers, and the eastern region of the Mediterranean Sea.</p> <ul style="list-style-type: none"> • Recognize the chief characteristics of a civilization. • Describe and analyze the cultural development and the major achievements of the ancient civilizations of this region. 	<ul style="list-style-type: none"> • The geographically informed person knows and understands the process, patterns, and functions of human settlement • Therefore the student is able to identify and describe settlement patterns • Therefore the student is able to identify the factors involved in the development of cities by being able to explain the geographic reasons for location of the world's first cities • The geographically informed person knows and understands how physical systems affect human systems • Therefore the student is able to analyze ways in which human systems develop in response to conditions in the physical environment • Therefore the student is able to explain how the characteristics of different physical environments affect human activities • The geographically informed person knows and understands how to apply geography to interpret the past • Therefore the student is able to analyze the effects of physical and human geographic factors on major historic events • Therefore the student is able to list and describe significant physical features that have influenced historical events
Assessment / Evidence	
<p>Performance Tasks / Projects:</p> <p>Zombie Based Geography: Map Displaying Zombie Attack Data with short written explanation, Possible Regional Map Displaying Different Zombie Warnings, "Report" on Resettlement</p> <p>Geography Alive!: Each packet serves as a performance based task to check geography skills such as latitude/longitude, scale, recognizing landforms</p>	

District: Geography SLO (Student Learning Outcomes) pre-assessments	
Research Study: Geographically Oriented Written Tasks #1 & #2	
Quizzes, Tests, Academic Prompts: Landforms, climate, geo terms, Geography Alive! Chapter #1 & #2 quizzes, various Zombie Geography pre- and post-quizzes	
Other Evidence: Debriefing questions/discussion after simulations, peer discussion during simulations, multiple exit tickets with geography concepts/skills, mental mapping of the world, Several posters or other visual representations of geography content, various handouts with questions designed to process content, interviews with students, scavenger hunt answer	Peer/Self-Assessment: Debriefing simulations and choices made both inter and intra team, interviews with students
Learning Experiences	
Lesson Topics/Sequence: <ul style="list-style-type: none"> • Introduction to 6th Grade Geo and Research Study: Assumptions Lesson, setting classroom culture, explanation of study, initial survey, parental consent • Determination of prior knowledge: county pre-tests, first Geographically Oriented Written Task • Entry event: Graphic Novel “Dead Reckon” and discuss ways in which geography would help with a zombie attack, discuss geography as a discipline • Introduction to Geography: Zombie Project #1, lesson one - Intro to Geography • Different Types of Maps: Zombie Project #1, lesson two – Understanding the Purpose of Different Maps • Map Elements: Zombie Project #1, lesson three – Understanding the Elements of a Quality Map & Geography Alive! Chapter 1 • Analyzing Spatial Relationships: Zombie Project #1, lessons four, five, six, seven • Using Maps to Answer Questions and Show Data: Zombie Project #1, lesson eight • Mental Maps: Zombie Project #3, lessons one and two – Mental Maps • Land/Water Forms: Geography Alive! Chapter 2 • Rotation/Revolution: Zombie Project #4, lesson five & Geography Alive! Chapter 2 • Global Grid: Geography Alive! Chapter 2 • Time Zones: Map and worksheet • Factors Climate: Zombie Project #4, lesson 3 • Climate Biomes: Geography Alive! Chapter 2 & Zombie Project #4, lesson three • Elements of Culture: Zombie Project #10, lesson 1 • Regions: Zombie Project #2, lessons one, two, three • Human Environment Interaction: Zombie Project #4, lessons six, seven, eight & Zombie Project #8, lessons one, two, three • Relative Location N. Africa/Middle East: Map and Discussion (Region) • Geography/Climate of N. Africa/SW Asia: Scavenger Hunt with Atlas • Geographic Factors/Development of Civilizations: Hunting/Gathering Simulation, What Good Are Leftovers? Simulation & Zombie Project #7, lessons three, four, and five • Chief Characteristics of Civilizations: GRAPES Acronym and pictures • Achievements of Civilizations: Text Reading (Ancient Civilizations) 	
Materials	
Zombie Geography: Graphic Novel “Dead Reckon”, Jigsaw Notes (geographers), Geography Questions Design Sheet, Geography Tools Handout (different types of geography tools), Different Maps/Purpose Handout, Map Use Questions assignment, Map Gallery Note Taking Handout, Map Element Handout/Poster Directions, Exit Ticket	

Maps, Spatial Analysis Handout, Class Spatial Ticket, Human Environment Interaction Handout, HEI Poster Directions, HEI Exit Ticket, Readings: Opportunity/Constraints, Opportunity and Constraint Exit Ticket, Modification Readings, Modifying the Environment Exit Ticket, Human-Environment Impact Entry Ticket, HEI Exit Ticket, Long Distance HEI Brain Storm Directions/Questions, Long Distance HEI Exit Ticket, HEI and Technology Exit Ticket, Culture Entry Ticket, Cultural Characteristics Handout, Sketching Cultural Characteristics Directions, Cultural Characteristics Exit Ticket

Geography Alive!: “Geography Alive!” Text Chapters 1 & 2, Interactive Student Notebook pages for Chapter 1 & 2, Appropriate Geography Alive Transparencies for Chapter 1 & 2

Simulations: Hunting & Gathering Simulation – H/G cards, Farming Questions, Reading on Neolithic Revolution, H/G Individual and Team Recording Handouts, Debriefing Questions What Good Are Leftovers? Simulation – Wheat, Tools, Resource Chips, Exchange Rates Cards, Family Recording Handouts, Debriefing Questions, Invention of Writing Simulation – Grain Count Handouts, Grain Count Numbers, Debriefing Questions

Other Materials: GRAPES (Geography, Religion, Achievements, Politics, Economics, Social Structure) Poster Set and Chart for Elements of Civilizations, Time Zone Handout, Atlases, Mobile Computer Lab, Wall Map of the World, Scavenger Hunt Clues (in zip lock bags), magnets for bags, Blank Outline Map N. Africa/SW Asia

Research Study Materials: Cover Letter Research Study, Parent Consent Form, , Geographically Oriented Written Task #1 & #2, Think-Aloud Verbal Protocol #1 & #2, Interview Questions, Audio/Video Equipment

Periods Two and Four: The Students

It was not long before I understood that these two classes comprised students who possessed a wide range of academic skills and reading levels. In fact, between the two classes several students received services for reading, some were significantly below grade level, others received accommodations for diagnosed ADHD and anxiety, two were eligible for English as a Second Language services, and several had behavior issues with a history of low motivation and poor academic achievement. Conversely, several students participated in the Gifted and Talented program in other subject areas. I describe the “types” of students in these classes; then I focus on the students selected as the primary participants.

“Types” of Participants

Previously in this dissertation, I articulated questions about the efficacy of disciplinary oriented geography. In particular the question “Do students benefit intellectually and motivationally from disciplinary oriented pedagogy?” seemed germane to organize the participants. The two-by-two matrix of “types” (see Figure 4.1) consisted of motivation across the horizontal and achievement through the vertical. This structure

allowed for four fluid categories ranging from low motivation, low achievement to high motivation, high achievement.

	Low Motivation	High Motivation
Low Achieving	12 students	7 students
High Achieving	8 students	19 students

Figure 4.1 “Types” of participants matrix.

The low motivation, low achievement students exhibited insufficient learning behaviors and struggled academically. Kenny, as an example, is a generally easy-going, polite bi-racial (African American and Caucasian) student whose family owns a farm on which he works. He received services for significant reading deficiencies and rarely completed his assignments. His written work was often difficult to follow and he earned lower grades than many of his peers. Kenny got frustrated easily and displayed a bit of a temper. He sometimes asked to remove himself from the classroom in order to work in the hallway. Another student, Rumi was still receiving ESOL services and marginally participated in many class activities. He generally tried to participate in class discussions and more active classroom activities such as simulations but very rarely completed written or independent work. In fact, he asked to use the restroom every class throughout the school year. This seemed to be a work avoidance strategy. Rumi was a possible retention candidate as a result of his low grades in multiple classes. And a third example, Odele, is a Caucasian student whose mother is originally from Eastern Europe. Odele's transition to 6th grade was a bit rough. She seemed very scared, did not participate much during the first quarter, and appeared startled and lost when called upon. Her writing at the beginning of the year lagged behind those of her peers and she had trouble answering

simple questions clearly. After parent conferences with her mother, the introduction of a tutor, and time passed Odele participated more and her writing/academic achievement improved dramatically. She could often be seen drawing in class whenever she had a moment even during discussions.

Other students exhibited low motivation, but were high achievers nonetheless. These students generally exhibited insufficient academic habits but scored well on assignments through their aptitude. These were the students that worked below their abilities and often completed enough work to get by. Chrissie is a Latina student who had difficulty remaining on task and remaining focused during many class activities. When she was able to focus she demonstrated strong academic ability and deep thinking. She irregularly completed any work outside of class. Bob was a popular, capable, and funny Caucasian student who did just enough to get by without really pushing himself. He rarely completed his assignments or actively participated in classroom activities other than anything out of his seat. Mark is an artistic Vietnamese-American student who displayed a very dry sense of humor, oftentimes playing off some of the disruptive students in the classroom. Mark sporadically completed his assignments or participated in class activities.

Then there were a group of highly motivated, but low achieving students. They displayed sufficient academic habits, such as completing all of their assignments and participating in all activities including discussions and independent work, but often did not perform well on formal assessments. Luna is a confident, funny and social Latina student whose mom serves in the U.S. Military. She is a conscientious student who participated in all activities and rarely missed any assignments. She often struggled with

abstract reasoning and summative assessments. Ophelia is a pleasant Caucasian student who often participated in class discussions and always participated in class activities. Ophelia also struggled with independent academic work. Summer is an outgoing, happy Korean-American student who always participated in class activities and tried very hard to succeed in class. Summer struggled with abstract concepts as well.

The high motivation, high achievement students displayed appropriate academic behaviors such as work completion and participation during class activities. These particular students also consistently scored well on graded assignments. Ellen, for instance, is a polite and strong Caucasian student who consistently participated in activities and put a lot of effort and care into her work. I do not think she missed one assignment all year. Finian is a conscientious Caucasian student who thrived throughout the school year. He proved to be a leader based upon his academic confidence and ability. William is an energetic, friendly, and capable African-American student who was very conscientious about his grades, often asking me the percent his grade equaled. Sometimes during class discussion he would draw on a piece of paper rather than actively participate. Tracy is a vibrant, conscientious Vietnamese-American student who talked quite a bit in class but always got her work done with quality.

Most of my primary informants, whom I introduce in more detail next, fit into this last category. Bill, George, Ginny, Harry, and Hermione were all highly motivated and high achievers. While their degree of academic abilities varied they all generally participated in all classroom activities and completed the majority of their assignments. Ginny did not actively participate in whole class discussion for the first few months of the school year. Bill, Harry, and Hermione consistently asked clarifying questions when

they did not understand a concept. Ron was a bit of an exception. He began the year in the high motivation, low achievement category but by the end of the year he belonged mostly in the high motivation, high achievement category. Fred was somewhat of an outlier in this group. He fit mostly into the low motivation, high achievement category. Fred possessed enough raw academic intelligence to do well but struggled turning assignments in and actively participating in class activities.

Primary Informants

Ideally, my primary informants would have represented each of these types of students. However, as I explain, I did not have that choice. Originally I wanted to select the primary informants from one class with a seventh coming from the other general education class to act as an in-study pilot whom I would interview ahead of the others in a canary-in-coal-mine role. From this informant I could make any in-study adjustments vis-à-vis interview questions. Unfortunately because of schedule changes, family relocation, and parental permission, I had to use students from both classes in order to obtain my desired number of seven main informants. As mentioned in Chapter 3, only eight students received parent consent; therefore, I selected each of those students—Bill, Fred, George, Ginny, Harry, Hermione and Ron—as my primary informants. Because Kent’s family planned to move out of state a few months into the school year, I didn’t include him.

Bill is an Indian-American student who is bright, respectful, and diligent. Bill was enrolled in the Gifted and Talented program for mathematics and often participated in all class activities and discussions. He demonstrated exceptional effort and academic success

often taking time to make sure he understood every assignment and that he was on track with answers. Bill consistently presented insightful ideas and comments.

Fred is a quiet and bright African-American student who moved into the district before the start of sixth grade. Fred rarely participated in class discussions and I often redirected him away from drawing. In the rare occasions when he volunteered information, his contributions proved insightful. Fred, generally, dutifully completed his class assignments and actively, if quietly, participated in cooperative activities. Fred was also placed on a 504 plan prior to sixth grade and received accommodations for Autism.

George is an energetic, friendly, and capable African-American student who enthusiastically participated in all activities. Oftentimes too enthusiastically as George exhibited difficulty waiting his turn during class discussions, often calling out answers during both discussions and cooperative work. Additionally, George frequently raced through his work ostensibly in an effort to occupy one of the “comfy” chairs and get lost in a book for pleasure. I spent a lot of time redirecting him to check over his work and wait his turn. George often became frustrated with his peers when they did not grasp a concept as quickly as he did. He also seemed to hold himself to high product, rather than process standards and visually castigated himself when incorrect or when he lacked the required answer specificity. In other words, he rushed through his work and became upset when he made careless mistakes or missed part of the directions. I worked on getting him to focus on slowing down and concentrating on the process trying to get him to see that the results would reflect the process. George was placed on a 504 plan prior to sixth grade and received accommodations for ADHD and generalized anxiety.

Ginny is a very serious Indian-American student who was extremely concerned with and sometimes fixated on her grades. She often asked me what she could do in order to bring her grade up in social studies class. Sometimes she would ask multiple days in a row. Ginny was very quiet in class and rarely raised her hand throughout most of the school year. In fact, for the first few months of school she appeared surprised and scared if I called on her to answer a question or volunteer her opinion. Towards the end of the school year she seemed to feel comfortable and actively participated more during class discussions. Ginny conscientiously completed her class work and participated in all cooperative and independent activities. Ginny often worked very meticulously and slowly, sometimes running out of time especially on writing assignments and had to come in several times during the make-up Wednesday period to finish.

Harry is a bright, friendly student of Indian descent. Harry consistently completed all his assignments and actively participated in all activities. Harry demonstrated deep insight into class work and activities and worked very hard to understand concepts, often asking clarifying questions when he was not sure of something.

Hermione is a very bright, friendly, and confident African-American student. She exhibited a tremendous wealth of background knowledge that seemed to come from an enriched environment provided by her parents. She often made connections between her experiences and the content of the course and frequently asked questions to foster such connections. Hermione actively and enthusiastically participated in all activities often assuming a leadership role. Hermione diligently completed her class work; when she finished and had time, she was always ensconced in a book.

Ron is a very friendly, happy Indian-American student who worked hard throughout the school year. Ron often actively participated in class discussions and class activities. Ron seemed to struggle with abstract concepts but thrived with concrete information. Ron's parents actively supported him throughout the school year attending both parent/teacher conferences and not hesitating to contact me if they perceived any issues with Ron's academic performance. At the beginning of the school year Ron's parents disclosed that he was recently released from Special Education Services and they wanted to make sure he was transitioning well to middle school. He was.

Teaching as Relationships

During homeroom on the first day of school, August 25, 2014, students stared at me not quite sure what to say or make of their homeroom teacher. A few of the more confident students asked what I was wearing and what happened to my face. My simple reply suggested that they would have to wait for their social studies class. This response did not put the bold students off and they persisted, some even ventured to ask why I wore a dress, against the background of playful comments. I remained resolute if not impassive suppressing a smile that played on my lips as I welcomed them to not only a new school year but also their first as middle school students. (Journal, 8/27/14)

Over the past several years I've arrived to school on the first day wearing a lungi, only half of my face shaved (the other adorned with a full Hagrid-esque beard), some kind of political tee shirt, my long hair down and no shoes or socks (see Figure 4.2A/B). I've typically heard the same playful comments and quizzical looks. I find this a perfect conversation starter and a way to introduce some key ideas part and parcel to my

understanding of the sixth grade curriculum and geographic understanding. This past year I was not disappointed and events became even more interesting once students filtered in for their actual social studies classes throughout the day.



Figure 4.2 A/B First Day at School.

After I greeted the students at the door, smiling at their vivid facial expressions, I instructed the students to read the directions written on the front chalkboard. Nervous and excited the students found their seats (assigned and written on an index card taped to their desks), copied down their homework, read the objective/learning outcome, grabbed a paper form the front table, and began to answer the questions (See Appendix K). My verbal instructions charged the students to be honest with their answers and that whatever they wrote would not hurt my feelings. I then asked them, in a very serious tone, if we could make an agreement, a pact between teacher and each individual student. The agreement was that if they were honest with me I would be honest with them. This

included appropriate information that the other might not want to hear. They nodded their heads in silent assent. The first question asked the students to describe what I wore and their thoughts about me because of this. After a few minutes we reviewed their answers. I recorded and generalized several of their answers in my journal.

The students responses ranged from the thoughtful: Mr. R is very confident, he doesn't care what people think about him, Mr. R is cultural, Mr. R is proud of his cultural background, Mr. R is Indian (every class has several Indian students); to the typical: Mr. R is weird, Mr. R is confused, Mr. R is crazy; to the outrageous and possibly attention-seeking: Mr. R is a hippy, Mr. R is a rock star (in the traditional sense of the word), Mr. R does drugs. (Journal 8-27-14)

The next sequence of questions prompted the students to respond to their thoughts about me after listening to a song selection. We discussed each question before moving on to the next song and question. I wanted to trace their developing thoughts and possible assumptions based upon my appearance and musical selections. Perhaps their ideas and responses would change. This typically happened in the past. The first song was a selection called "Iron Man" by the British Heavy Metal band Black Sabbath recorded in 1970. Black Sabbath has often been called the first heavy metal band and recorded blues influenced songs with heavy, distorted guitar. I witnessed several sharp changes in facial expressions ripple throughout the room, some settling into disbelief and others into a tacit recognition of shared experience. Some of their responses included that I was the coolest teacher, their favorite teacher, and an awesome teacher. I

reminded them that they only knew me for about 30 minutes. Others now believed that there was something wrong with me and others who thought I was crazy or a hippy now obtained confirmation. (Journal, 8-27-15)

The second song was a selection called "Where I'm From" from the New York based alternative hip-hop trio Digable Planets. This song includes samples from Archie Bell and James Brown with a very mellow, jazzy feel to it. Essentially, it is quite different from Black Sabbath. This time, changing facial expressions rocketed through the classroom. Interestingly enough, some of the recognition abruptly changed to shock and some of the disbelief into smiling, nodding recognition. Their reactions emphasized the mercurial nature of perception and impression. Though more than a few who stated that I was weird or crazy did not change their perspectives and only used the third piece of evidence as further corroboration. (Journal, 8-27-14)

The final song selection was the second movement from Ludwig van Beethoven's 9th Symphony, completed in 1824. This selection stood in stark contrast to the other selections. Predictably, facial expressions morphed into panoply of different faces. Some students who switched their comments from seemingly positive to negative or vice versa essentially gave up replying that they did not even know what to think other than I was crazy and seemed like the cool teacher. (Journal, 8-27-14)

The following class period we proceeded to discuss assumptions -- the definition and what assumptions the students formed of me, and on what they based them. I reminded them that they barely knew me and were basing their assumptions on my appearance and three songs. The discussion then turned towards the parts of the world we would study and potential problems with making assumptions about unfamiliar places, cultures, and through this activity, people. Although this beginning may have seemed a bit unconventional, I hooked the students. Furthermore, I believe I established the threads of trust and appropriate risk-taking. Starting with this opening I strove to humanize myself in the eyes of the students rather than reaffirming the typical role of the teacher as the adult at the front of the class while simultaneously representing myself, and in turn, each individual student as a complex person that cannot be defined solely by appearance and the music to which they listen. This also served to allow the students to express, without reprisal, their beliefs and perspectives of the authority in the classroom. It was okay for them to think and express that I was weird or crazy or whatever they thought. The trick, and one of the threads woven throughout the course, was to get them to see themselves and other cultures in a similar manner.

The next several lessons involved logistical get-to-know you type of activities such as "Two Truths and a Fib", a matching game with all the staff in the building that the students might interact with including the custodial and kitchen staff, and setting classroom expectations and policies. In order to understand general prior relevant geography knowledge I created a prior knowledge gallery walk based upon the unit titles for the school year. This activity helped introduce the concept of misconceptions and begin to correct general student misconceptions with respect to the curriculum units

(National Research Council, 2005). In groups ranging from four-six, depending on class size, the students traveled around the room to six stations with each group using a different colored sharpie.

Each station had a large piece of newsprint paper with a different title written at the top. The titles matched the four unit titles ("Our Earth", "North Africa and Southwest Asia", "Sub-Saharan Africa", and "Asia") and "History" and "Geography" - two themes woven through the curriculum. I allowed the students two minutes at a station where they brainstormed and wrote down everything they knew as a group about the topic listed. At the conclusion of the two minutes each group rotated to the next station with their sharpie (so I could track each group's responses by color). They could write anything that pertained to the topic but could not duplicate what a previous group had written. After visiting each station we discussed what the groups wrote and tried to determine what ideas might have been assumptions based on a lack of evidence or misconceptions by the various groups. We then discussed possible sources of the assumptions and misconceptions. As noted in my journal this proved difficult; however, students were able to determine some solid sources of misconceptions. I wrote that, "Possible sources of misconceptions: teachers, parents, friends, news, Internet with a bit of probing the list expanded to movies (especially Disney), TV show including news and comedies, textbooks" (Journal, 9-10-15).

Recently the district changed the way in which it evaluates teachers. As part of their accountability measures, teachers must present evidence of student growth through mutually agreed upon (between administration and individual teachers) criteria and assessment scores. With administrative approval, teachers choose a class, content, and

literacy outcomes for students to achieve as measured by teacher developed assessments. The administration in my building required three main data points: beginning of year, mid-year, and end of year assessment scores, as well as work samples. This process was piloted the previous school year (2013-2014) and brought on line this school year as an official part of evaluations. Teachers and administration were expected to meet three set times to discuss results for each assessment. In accordance with this mandate and also as a starting point for my research study I decided to use a battery of assessments developed by the school district's social studies office as a means to assess what it termed "Geography Reasoning Skills." Having helped with some of their development I knew that they could fulfill my dual purpose of measuring student growth for my evaluation (SLO: Student Learning Outcomes) and tracing the arc of geographic knowledge and reasoning. Unfortunately, this battery of assessments required a lot of time to both administer and evaluate.

It took six days for all students to finish their SLO Baseline assessments. Administering four multi-part assessments proved exceptionally challenging and I was not exactly sure how to negotiate this space: students finished at varying times and I could not move students on because of logistical issues. I really had to push a few students (DeSean, Davon, Kenny, Ginny, Kusa, Rumi, and Lauren) to finish. A few absences didn't help either. I was not sure I could do this all four quarters (as suggested) and resigned myself to only complete the three required for my evaluation evidence because of the loss of instructional time.

Perhaps it was a mistake for the other sixth grade social studies teacher and I to do all the possible assessments. Maybe we could have just completed the

more challenging ones, skipping political and physical maps. Speaking with just my teacher hat on, these two assessments buttress student confidence and grades. The students last year all improved their scores dramatically and mastered them by the end of the year as they are the cognitively least demanding and practice helps them greatly. So, the dilemma was to skip these for time or to keep them because not only does this help the students but also my performance depends on how the students do overall. (Journal, 9-16-14)

The final opening activity was the “Initial Geography Survey” (see Appendix C). All five classes completed the on-line survey on the 17th and 18th of September.

Our Earth: An Introduction to Geography

In an effort to elucidate the structure of geography I created and used as a focal point of our discussion a PowerPoint slide presentation (see Appendix L). The slide presentation outlined geography through the framework of a disciplinary perspective. As a warm-up I asked the students to define geography. Most students wrote that geography studies Earth. Others added a cultural nuance to their definition such as religion and government. The presentation utilized Gersmehl’s (2005) Four Cornerstones of Geography to simplify Gregg and Leinhardt’s (1994) Four Concerns of Geography. We discussed each slide and I tried to emphasize examples from the students’ perspectives and lives.

The students of Periods Two and Four expressed excitement when I distributed the “Dead Reckon” graphic novel (see Figure 4.3).

George and Alan expressed utter shock and delight that we planned on reading it in class:

Alan: No way, are we really going to read a comic book in class?

DR: Way. Yes, actually graphic novels and comic books are great sources for social studies and cultural studies in general.

George: I love graphic novels. Can we read it out loud? Can I start?

DR: Sure, let's make sure everyone has a copy first and we can take a look at the cover before we begin.

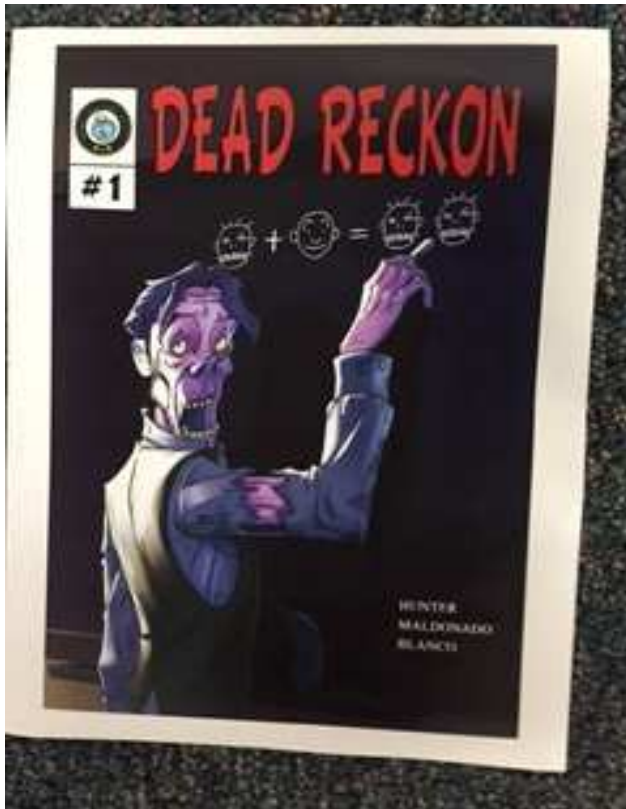


Figure 4.3 Cover of graphic novel used to introduce zombie based geography. Adapted from *Interact* 2013.

We read “Dead Reckon” aloud as a class with me pausing a number of times to link parts of the dialog and action to the Cornerstones of Geography slide presentation and discussion. At the conclusion I explained to the class that one day, perhaps, geography would save their lives so they need to pay careful attention. A few students, notably Odette (Period 2) and Austin (Period 4), rolled their eyes.

The subsequent lesson proved especially fascinating as a flood forced several teachers to relocate for the day. Fortunately, the only damage suffered to my classroom was a wet and warped ceiling tile. This, though, precipitated a peripatetic nature for our investigation of Dr. Snow's cholera mapping of a London neighborhood (See Appendix M). For a warm-up I asked the students if there were any ways that people could use maps to solve problems. Students generally answered that maps are good for finding their way when lost or going somewhere new. A few (Bob, Helen, Tracy, George, Bill from period two and William, Hermione, Darcy, Jeffrey, and Joseph from period four) referenced either a natural disaster or the spread of some kind of disease. The students then completed the "Mapping a London Epidemic" in pairs. We discussed the handout in both classes and what follows are those discussions with the first section captured from Period 2 and the second from Period 4. In each section I point out the particular five geography skills (*asking* geographic questions, *acquiring* geographic information, *organizing* geographic information, *analyzing* geographic information, *answering* geographic questions) in parenthesis.

Period 2:

DR: What does each dot represent?

Summer: A Cholera death.

DR: Yes, but where do you think the people died?

Kusa: In the hospital.

DR: Do we think there are that many hospitals? Look at the map closely.

Bill: In a house. (*analyzing*)

DR: OK, so where are most of the deaths concentrated?

Alan: In London. (class laughs)

George: Between Marlborough and King Street. (*answering*)

Munira: And along Broad Street on both sides of Lexington. (*answering*)

Bob: Also between Berwick and Poland. (*answering*)

DR: How might mapping these deaths be helpful?

Odette: To stay away so you don't catch what they have. (*answering*)

DR: OK, and?

Tracy: Maybe to help you figure out what happened. (*asking*)

DR: Good, so how might Cholera have spread?

Rebecca: The handout says that it is an infection in the small intestines so it might be something they ate. Maybe there was a party that everyone went to and they all got sick. (*answering*)

DR: That must have been some party! What are some other potential causes?

Helen: It could be bad water. (*answering*)

George: It could have been like the Plague - from rats. (*answering*)

DR: Great thinking but by then the plague didn't kill that many people in one day. Any other information that would be helpful for Dr. Snow to have?

Mark: Where the party happened and where they got the food for it. (*asking*)

Summer: Why it didn't spread farther out. (*asking*)

DR: OK, both show some pretty good geographic or spatial thinking.
Let's take a look at a second map and see how Dr. Snow used both maps to solve the problem and answer the question that Summer just asked. Perhaps we will also answer Mark's question and figure out if there was a party and if so who supplied the bad food.

We then examined the map of water pumps in SoHo and discussed their results. The students were able to use both maps to reason that the Broad Street water pump contained the cholera-infected water.

DR: Which pump do you think might have had cholera-infected water?
Why?

Luna: The one near Marlborough and King. (*answering*)

DR: Why?

Luna: A lot of people died there. (*analyzing*)

DR: True but a lot of people also died in other parts of the neighborhood.

Jeffrey: Broad Street. That is close to a lot of deaths. (*analyzing*)

DR: Excellent thinking. So how did Jeffrey come up with his answer?

Harry: He looked at both maps and compared them. (*analyzing*)

DR: What do you mean by comparing them?

Harry: The dots that represent deaths kind of match up to - are close to that pump on Broad Street. There aren't as many deaths near the other pumps. (*analyzing*)

DR: Excellent. What is that called? So, Jeffrey compared the two maps.
What do we call that? DeSean?

DeSean: Comparing and contrasting? (*analyzing*)

DR: It is but maybe I wasn't clear. We have a name when someone compares multiple pieces of information and relates them to one another.

William: Linking. (*analyzing*)

DR: Not what I was thinking but that is correct. Well done. When things relate with each other they have a relationship. So there is a relationship between the deaths and the water pump at Broad Street. What is that relationship?

Darcy: Um, the water coming from that pump caused people to get sick and die. (*answering*)

DR: Excellent. So what do you think Dr. Snow did with this information?

Ron: Warned people not to drink water from that pump. (*answering*)

DR: Excellent. In fact he used his maps to persuade the city officials to shut the pump down. I am pretty sure the authorities removed the handle to prevent people from using it. So, the map shows that all of the deaths didn't occur right around the pump. How can we explain this? Pete?

Pete: Maybe people were visiting their families who lived closer and drank the bad water? (*asking*)

Carrie: They could also have been visiting their friends. (*asking*)

DR: What Dr. Snow did was that he thought like a geographer. What do you think that means to think like a geographer?

Joseph: To map stuff and see how they link together. (*organizing*)

DR: OK, that is part of it but what is the first thing he did?

Ellen: He tried to figure out how the people died. He was trying to solve a problem. (*asking*)

DR: Good. In order to solve this problem he had to first do what?

Luna: Map where the people died. (*organizing*)

DR: True. But in order to do that he had to do two things. What are they?

Darcy: Get the records or some way to learn the info. (*acquiring*)

DR: So, if this happened in your neighborhood how would you find out?

Ron: The news. (*acquiring*)

DeSean: Ask my dad. (*acquiring*)

DR: OK, so in 1854 there was no TV. So what would you do?

Hermione: Ask people in the neighborhood. (*acquiring*)

DR: Exactly! He actually went door-to-door asking people and writing down notes. But before he went door to door he had to ask himself some questions. What do you think an important question he had to ask was?

Ann: Um, how people died. What caused the deaths. (*answering*)

DR: True. And if he suspected some kind of disease what else would he want to ask?

Ellen: How it spread. Kind of like what happened in Dead Reckon.
(*asking*)

DR: Exactly! He essentially asked geographic questions. Questions that involve what happens in space. Not outer space but on the surface of Earth. That is the first step. Then he went out and gathered information or acquired geographic information. What did he then do with the data or information?

Jeffrey: He reported it to the people in charge. (*answering*)

DR: Excellent, but how did he present the information? What did he do with it before he brought it to the attention of the city leaders?

William: He put it on a map. (*organizing*)

DR: Exactly. He mapped it or organized the geographic information. What else did he map?

Ellen: The location of the water pumps. (*organizing*)

DR: Exactly. Then what did he do with the two maps? Laurel?

Laurel: He compared them. (*analyzing*)

DR: In other words he analyzed them. What does "to analyze" mean?

Jeffrey: Study it. (*analyzing*)

Ron: Compare them. (*analyzing*)

DR: All true. When he looked at the two maps and compared them what caught his attention?

Carrie: The deaths were crowded near the Broad Street pump. (*analyzing*)

DR: Yes! The crowded part. What is that an example of?

Jeffrey: A mess of deaths. (*analyzing*)

DR: OK, a mess or cluster. Right? So what can we call this cluster or mess?

Ellen: A pattern. (*analyzing*)

DR: Exactly! He analyzed them by looking for a pattern that might show some kind of relationship. So by doing all of this he was able to do what?

Pete: Solve the problem.

DR: Yes, and prevent the deaths by informing the authorities. In other words, he answered his geographic questions. What he did and what we discussed are the five geographic skills that are needed for thinking like a geographer.

The dialog demonstrates that students can begin to think like a geographer, they just require scaffolding and guidance.

Now that students began to get a sense of geographic reasoning and the geography skills involved I decided to expose the students to a few examples of what professional geographers actually do through a series of interviews. *Zombie Based Geography* Project 1, Lesson 1 states,

The lesson helps to give students a deeper understanding of what Geography is and who actually uses it. Students will try to understand the definition of geography, read interviews with people who use geography, learn about the basic

tools used in geography, and try to design their own geographic questions." (2013, Interact)

I divided the classes into eight cooperative groups and assigned each group one of the four geographers from the lesson, giving us two groups assigned to each. Groups read, through reciprocal reading, an interview from the Geography Interview Handout (see Appendix N). Once finished the students, working together, completed the Geography Interview Analysis handout (Appendix N). Groups that shared the same geographer then met to compare answers and structure a short presentation for the class. The liveliest part of the discussions centered on the final question of selecting the particular geographer for their team of zombie apocalypse survivors. The students were still motivated by the zombie scenario. I wondered if they would be able to maintain this momentum throughout the duration of the study. That turned out to be a challenge as the school year unfolded.

I then handed out the resource sheet explaining the various tools that geographers use such as the Internet and Google Maps, specialized software like Geographic Information Systems from the company Environmental Systems Research Institute, and various thematic maps. We read through them as a class and discussed how a geographer might use each tool. Finally, the original eight groups completed the Geographer Question Design (Appendix N) in order to continue the process of thinking like a geographer and practice asking geographic questions. The Question Design tasked the students with creating their own geographic questions about the world. They were also supposed to explain why they wanted an answer to that particular question. The students experienced a lot of difficulty articulating their own geographic questions that were not

essentially the same as Dr. Snow's cholera mapping or a slight variation of what types of questions the four professional geographers asked (Journal, 10-3-14). Without much experience actually asking geographic questions they relied essentially on the questions from our Dr. Snow discussion or questions they read about in the four interviews. Another challenge that emerged was that geographers today rely heavily on computer generated mapping and modeling such as GIS and my knowledge of these is superficial at best. I know what they are but have never used them beyond GPS to find my way. Furthermore, many schools are not equipped with the software or even the proper computers to run and manage them.

With some background on geographic reasoning and a sampling of professional geography we moved on to more specific building block elements of geographic reasoning.

I introduced general physical feature vocabulary (e.g., isthmus, straight, peninsula, and plain), that figure prominently in understanding and decoding maps. After reshuffling the students into six cooperative groups I distributed a vocabulary packet (see Figure 4.4) to each group. The packets consisted of 4-5 pictures, large cutouts of each of the vocabulary words pictorially represented and separate definitions. The students had several minutes to discuss and match the proper picture, word and definition. Each packet contained different sets for a total of 30 matches. I rotated through the groups and let them know which matches were correct and which matches were not. I did not tell them what was incorrect and left it for each group to sort out. Once the group achieved a complete set of matches they completed the first column of the Geography Terms Chart (see Appendix O). The packets rotated through each group until everyone possessed a

complete set of vocabulary words/definitions. Now the classes were ready to embark on the more in-depth study of maps.



Figure 4.4 Example of vocabulary matching activity.

Making Meaning of Geographic Representations

The first order of business in studying maps was to look into the students' cognitive conceptualizations of maps and mapping. During one class period I directed the students to draw a map of the world on a blank piece of paper without using any resources other than colored pencils. The reason for this was two-fold: I wanted to understand their prior knowledge of the continents and oceans, and their grasp of scale (size of continents relative to each other and distance apart). Once finished I allowed the students to look at an atlas to compare their conceptualization with a professionally drawn map. We discussed some of the differences and they mostly brought out the lack of completion (missing continents), labeling (not knowing all of the names of continents and oceans or mislabeling), and shape (continents). Next the students created another mental map of their neighborhood. The students took a lot more time and care to

complete these and felt more confident in their products. Both classes discussed the differences in the processes of creating both maps and how the familiarity of their neighborhoods, use of symbols (square for house), and straighter lines that demarcated different streets made this task less demanding. I informed both classes that by the end of the year, their conception of Earth would be much stronger and comfortable.

For the next class I placed six maps drawn by me around the room. Each map was missing certain essential map components that all quality maps contain. The essential map components are the following: title, author, date, compass rose, scale, labeling, symbols, legend, figure-ground relationship surrounding places, and source. The students divided themselves into six groups. Once again I instructed them to use non-verbal communication but this time I added the caveat that groups must be mixed gender. After some initial grumbling the students quickly divided into their groups. Each group moved to one of the maps spaced out along the walls of the classroom. All students brought with them a piece of paper titled "What's Missing?" and proceeded to rotate around the class (much in the same fashion as the previous gallery walk) brainstorming what important map components or elements were missing from each of the numbered maps I had created (see Figure 4.5). Students rotated after two minutes until they visited all six maps. Upon completing a full rotation, each group reported out what they thought was missing from the last map they analyzed. Other students chimed in elements missed by the reporting group. After each group reported their findings I distributed the Map Elements handout from Zombie Based Geography Project 1, Lesson 2 (see Appendix P) and discussed the essential map components found on all maps and listed above. During the discussion I highlighted why each was important through questioning the students and

showed examples in the desk atlases. This lesson required two class periods and heightened my sense of coverage dis-ease.

By trying to incorporate elements from different resources and materials in an effort to make sure students gain a deeper understanding of geography I am going deeper than the curricular requirements, delving into topics more and attempting to link everything to geographic reasoning. While this may prove beneficial it is taking a lot of class time. I am left wondering if this is worth it. Will the students have a deeper understanding of geography doing this or will it essentially be the same if I just stuck to the curriculum? (Journal 10-7-14)

This last question from the above journal entry stayed with me throughout this study, although it was not part of my initial research questions.

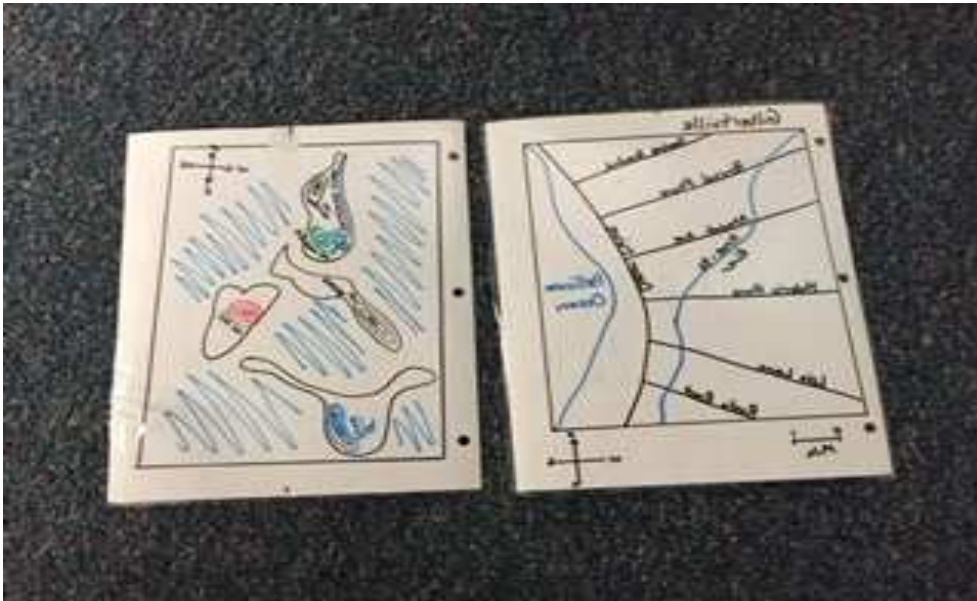


Figure 4.5 Maps with elements missing.

The following day we moved on from essential map components to different types of maps. Students entered the classroom to find various published maps posted and numbered all around the room. Keeping the same cooperative groups from the previous

lesson the students rotated through another gallery walk this time completing the Map Gallery Notes (see Appendix Q). The Map Gallery Notes directed the students to describe aspects and details of the maps such as color scheme, information presented, layout, and method of data presentation. Once completed, we discussed the various types of maps, their purpose, and different methods for presenting information. Students then completed the Map Use Question Assignment. Students were given six different scenarios and they had to choose and justify a type of map to use for each scenario.

Most students performed exceptionally well on this. In Period 2, Brian, Kusa, Rumi, and Kenny experienced some difficulty while in Period 4, DeSean, Davon, and Ophelia experienced some difficulty. The common thread of difficulty was discerning the maps purpose and connecting that to real-world use. For example, DeSean, Davon, and Rumi could not connect physical feature maps to placing mills along rivers or ski resorts near elevated land without me telling them. Brian, Kusa, and Ophelia linked climate maps to looking for good places to vacation but not to places that traditionally competed successfully in the Winter Olympics or to particular economic activities that might depend heavily upon climate.

To continue working with maps and at the same time introduce map skills such as latitude/longitude, scale, and understanding seasons required by the district objectives and that are part of the *Geography for Life* (1994) subject matter, I divided the class into two groups: Cartographers and Geologists. I sent all the students into the hallway with a reading about gold discoveries in Alaska. While students read through the information I placed 20 pieces of paper randomly on the floor of the classroom. Seventeen of the papers had pictures of rocks and three had pictures of gold. I numbered the pictures 1-20

on the back. I summoned the cartographers in, handed them a blank piece of paper and instructed them to create a map for their partner to "find" the gold.

After five minutes the cartographers retreated back to the hallway and resumed their reading. I reminded the students that they were not allowed to talk at all (I am sure a few broke that rule) and returned to the classroom and flipped all of the papers over displaying just the numbers for identification purposes. I then tipped desks over, moved chairs, and generally "trashed" the room in an effort to simulate a storm that changed the topography, hopefully rendering the student maps essentially useless. It is amazing how quickly one can mess a classroom up! I made sure not to move any of the pieces of paper that simulated gold and rock deposits. I brought the geologists in and asked them to find the pieces of gold by writing down (on their maps) the number on the paper which they thought contained the gold using only their partner's map. They were not allowed to touch the papers (to flip them over and find the "gold") or move anything.

After about two minutes I brought the cartographers back in and we discussed the activity: what numbers contained the gold, how the cartographers created their maps, what they could do better next time. I pointed out the latitude and longitude coordinates I posted along the classroom walls. If the students utilized the coordinates they would have easily located the three gold deposits. No group found all three gold deposits and only a few located two deposits. Most only found one or none. By this time class was almost over and we scrambled to put the room back together for another class to enter and go through the same process. This introduction to the importance of map skills such as latitude and longitude proved a springboard into Chapter One of *Geography Alive!*, a curricular program and textbook modeled after TCI's successful *History Alive!* series.

Tools and Techniques

Geography Alive!'s first chapter "Tools of the Geographer" begins with a short textbook reading (one page) and a vocabulary (four words) chart followed by a series of skill-builder activities introducing and explaining the map reading skills mentioned above. I utilized the students' natural inclination for competition and cooperative learning by creating a game like atmosphere for each phase of the skill-building Chapter. Each phase consisted of a short one-page reading and approximately 10 questions designed to help the students reinforce the skill introduced in each phase (see Figure 4.6) printed on small cards. For example the first phase asked questions related to interpreting the symbols and key of a state park map and the second phase asked questions about latitude and longitude. The students wrote their answers in a reading notes packet that everyone received (see Appendix R).

Once the rules were explained I turned the students loose to complete the phases. The caveats were that they all had to participate, a representative would show me the answer that everyone had written down and agreed upon, and they could not move to another question until everyone in their group had the correct answer. The group that finished the phase first received a token classroom prize (see Figure 4.7), while the runner-up received a classroom recognition paper (see Figure 4.8). These same skills could have been taught by reading in a textbook, through various worksheets, or direct instruction from the teacher; however, I found that using a bit of friendly competition where success is determined by everyone completing and understanding the concepts worked better. The following journal entry captured the atmosphere during these skill builders.

Students in period four are working on Geo Alive! in small groups. Most students are on task - talking to each other, correcting their peers, helping to get the concept. In other words, discussing the process. While there are some occasional off-task comments, fleeting moments that come and go, the chatter shows learning happening and also little successes and celebrations. Whenever Jeffery gets an answer correct he shouts "Bam!" and breaks into a quick dance on his way back to his group. (Journal, 10-24-14)



Figure 4.6 *Geography Alive! Phase cards*. Adapted from Teachers Curriculum Institute, 2006.

These skill builders required several class periods to complete so the students were expected to come in and get started right away. Some of the students (particularly Jeffery and DeSean in Period Four and Kenny and Odette in Period Two) who typically cut it close to being tardy and took a long time to settle down and get started arrived at the beginning of class very focused and started gathering materials before the rest of their group appeared. I recall Jeffrey rushing in from lunch whirring around getting started

every day we worked on these. Occasionally I paused their work on the phases to supply some extra practice with traditionally tricky skills such as figuring out latitude and longitude, scale, and map distortion.



Figure 4.7 Classroom prize choices.



Figure 4.8 Classroom recognition paper.

The next lessons were adapted from Zombie Based Geography's Analyzing Spatial Relationships sequence. Analyzing spatial relationships is a vital component of geography as a discipline and in geographic thinking. Although, it is only marginally included in the district's curriculum I felt this essential to help students understand geography. These lessons introduced the concepts of structures, relationships, and

processes and how to use them to analyze how places relate to each other. Structures are the places or locations on which the analysis is brought to bear. They include countries, states, cities, stores, or any other locations. Relationships are the things that connect the structures such as highways, rivers, shipping lanes, or satellite connections, to name a few. Processes are the patterns that occur or what and how things move across the relationships. Migration, commuting to work, communicating, trading are all examples of processes.

In order to help students understand this type of analysis, I decided that we would analyze a simple classroom transaction. I handed a student in each class a folded note that said “Mr. R Rocks!” and asked them to give it to another student. I then asked the class what just happened and told them we were going to analyze this situation. At first the students answered simply that I just handed a student a note and that student gave it to another student. I told them it was not that simple and we could really take apart what everyone witnessed. On the chalkboard I drew the following chart:

	Classroom	Country	Student Choice	Student Choice
Structures				
Relationships				
Processes				

I asked the students questions determined to get them to think about the details of passing a note from one student to another, to pay attention to not only the note but to the starting and ending points, the path traveled by the note, and the manner in which the note changed hands. Through discussion of the actions and details encompassed in the simple act of passing the note from one student to another we completed the classroom column analyzing what happened to the note I passed out. As a class we then completed

the country column with what might be traded between two countries and discussed various answers. Then the students completed the final two columns, first as a table group and then independently, with structures of their own choice

	Classroom	Country	Neighborhood	Vacation
Structures	Seats / desks	USA China	home Giant / Subway	home Beach → OC → OBX
Relationships	table groups Paths in room	Pacific Ocean Air Routes	Streets Suburban Field Paths	Rt 60 Rt 404 Rt 95 Side roads highway beach path
Processes	Walking throwing the passing time	Car, ship 3, 12, 2007 24 air travel	driving, walking, biking 300, skateboard to get groceries	family + suitcases → clothes driving + walking → beach bags → food → purchased goods from vacation

Figure 4.9 Picture of completed spatial analysis chart.

The class discussions and written answers provided in Figure 4.9 pointed to student understanding of analyzing spatial relationships. Once I thought the students seemed to grasp the process of analyzing spatial relationships it was time for them to apply their knowledge by plotting the Zombie Attack data on maps and analyze the spatial relationships in order to predict where the next attacks might occur. Working in six collaborative groups the students recorded zombie attack data (number of attacks per city) on the Zombie Attack Data Tracking Sheet (see Appendix S). However, understanding how to compile the data proved challenging for period two. As noted in my journal from 11/7/14:

Students are recording zombie attack data for three different regions. They had a lot of difficulty understanding how to actually complete the chart. I had to walk them through step by step to understand how to plot the data - several students plotted the first day of an attack to a new city on day 1 even though that particular

attack didn't happen until day 2 or 3. Others plotted the data we used as an example even if they were assigned a different region. Several of the students didn't look at the data to make sense of it before getting started. They just dove right in (Odette and Alan) without thinking. Two students (Rebecca and George) had band sectionals and left during class. As a result of the above, the lesson is taking much longer to complete. Instead of the predicted 1 class period it is going to take at least 2-3. This really slows down the research unit and makes coverage somewhat precarious.

Given Period 2's difficulty I changed the structure for Period 4 to hopefully mitigate these hindrances explained above. By reviewing the data and chart using one set of data that everyone could look at before breaking them into collaborative groups, this lesson started more smoothly. However, it still progressed very slowly and many students complained when they had to add the number of attacks. They claimed that this was not math class and asked to use calculators.

After recording information the students plotted the data, on Google Maps that I downloaded (Google, 2014) and printed out, and predicted where the next attacks might have occurred over the next two days. After the individual groups completed the activity, the two groups that shared the same region and, therefore, data compared results and discussed differences. As a class we discussed their answers and the process through the frame of structures, relationships, and processes. In addition, I related the process to Dr. Snow and the geography skills of asking geographic questions (Where will the next attacks be located?), acquiring geographic information (provided data from news sources), organizing geographic information (completing the data tracking sheet and

plotting attacks on the maps), analyzing geographic information (structures, relationships, processes), and answering geographic questions (predicting where the next attacks would happen). This process lines up with both Gregg and Leinhardt's (1994) Four Concerns of Geography and Ford's (1984) Core of Geography.

Climate biomes, or climate zones with the plants and animals that live in it, are critical to understanding geography and to reasoning with and within geography. Climate biomes form some of the building blocks requisite for developing the ecological perspective discussed in *Geography for Life* (1994). I implemented elements of *Geography Alive!* Chapter Two, "Seeing the World like a Geographer", in an effort to introduce the various climate biomes on Earth's surface and teach the students to interpret climographs. After completing another short (one-page) introductory reading and completing an eight-word vocabulary chart from Chapter Two intended to introduce ways in which geographers understand the world, the students interpreted and analyzed climographs (see Figure 4.10) representing each of the different climates. Climographs display temperature and precipitation through line and bar graphs. The students recorded the information on the *Geography Alive!* reading notes (Appendix T) and also completed information about vegetation, population density, and economic activity in the same reading notes packet.

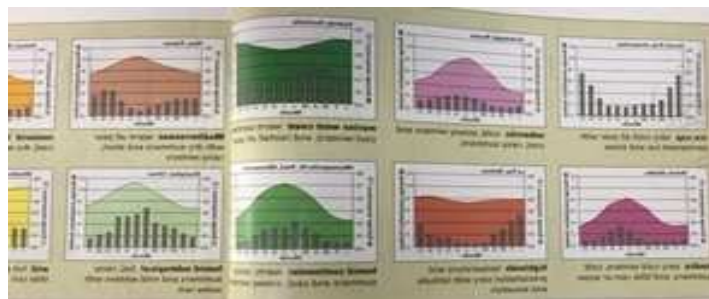


Figure 4.10 Pictures of climographs. Adapted from *Geography Alive!*, Teachers Curriculum Institute 2006.

Following completion of the climate notes I divided the classes into 11 groups and instructed each group to create a one-minute climate presentation based upon the information they collected. Their presentations were guided by an extension activity from *Geography Alive!* (see Figure 4.11). George, Allan, and Jerry created their climate report based on the “Ice Cap” climate. They brought in heavy winter clothes to enhance their presentation and reported “live” from Greenland and Antarctica. George described the temperature and recreational activity from Greenland while Allan described the types of jobs available to people in Antarctica based upon the climatic characteristics. The class enjoyed their enthusiasm and easily identified their climate type based upon location and description. Both classes then discussed the relationship between the climate, vegetation, population density, and economic activity maps, allowing the students to begin to understand climate biomes and make connections between climate, vegetation, where people live, and how they make their living. During the discussion I asked questions trying to link climate and vegetation to elements of culture such as clothing, recreation, and possible food choices/availability.

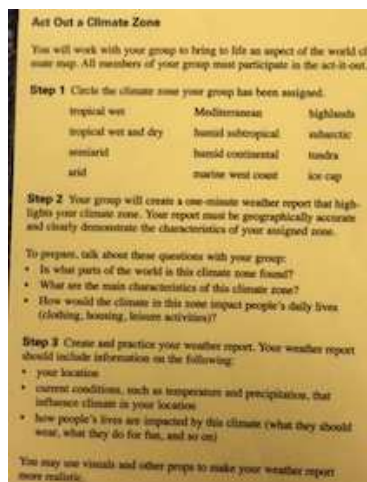


Figure 4.11 Student directions for climate report act-it-out. Adapted from *Teachers Curriculum Institute 2006*.

We finally reached the last district learning objective for quarter one (identify and analyze elements of culture such as religion, language, arts, food/diet, clothing and others), although it was well past the beginning of the second quarter. With time becoming increasingly tight I decided to take care of this objective through a relatively quick activity rather than go through the Zombie Based Geography lessons I identified over the summer while planning for the research unit. As a class we brainstormed a definition of culture and discussed what different elements or components that make up culture might include. After the discussion I passed out file folders and stacks of old National Geographic magazines.

The students chose ten different elements of culture (e.g., diet, religion, language, clothing, recreation activities, and transportation) and looked through the magazines to cut out and glue in a picture for each element with a caption labeling and describing the particular element. Whatever was not finished after two classes I assigned for homework and allowed students to take magazines home or use the Internet to download pictures on their own. The next day each class, in small groups, discussed what elements and pictures they chose and why. Through whole class discussion I asked how some of the things we just studied such as climate and vegetation might impact culture and, therefore, human decision making. This discussion proved somewhat challenging with respect to certain cultural elements such as language, religion, holidays, and traditions. The students experienced difficulty linking these elements of culture to climate and vegetation. Other elements, such as clothing and recreation, seemed much easier for the students to grasp. In an effort to have students bring their own cultural knowledge to these more abstract elements of culture I tried to steer the discussion to the spatial relationship analysis model

introduced earlier through personal experiences of the students who either immigrated or were first generation Americans. I think this helped to illustrate that a combination of geography plus spatial relationships impacts culture. For instance, the classes compared the differences of Christmas traditions in the northern and southern hemispheres as well as the same traditions in the middle and low latitudes. In both examples the climate helped to shape the culture.

Before the coverage demands in the second quarter curriculum became too great I wanted to make sure both classes completed the Geography Oriented Written Task #1 (Appendix E). I evaluated the students according to the Geographic Reasoning Rubric (Appendix I).

North Africa and Southwest Asia: The Dawn of Civilizations

As stated above, the second, third, and fourth quarter curriculum attempts to apply the geography concepts taught in the first unit through a regional approach. The second quarter curriculum, North Africa and Southwest Asia begins with physical geography. Through a warm-up and class discussion that utilized the classroom atlases and wall map both classes figured out the relative location (a concept learned previously) of North Africa and Southwest Asia and why geographers designate it as a region. I discovered that both classes had to review the concept of region. This became a trend and emerging theme: that concepts and skills needed periodic review to keep them fresh, even when initially understood. This trend begged the question that if the students were supposedly learning geography at a deeper level, why would they need review? Perhaps the students were not learning geography at a deeper level. Perhaps too much time passed without any review.

With the purpose of reviewing the concept of region I asked all the students to stand up. I then split the class up according to language with places in the room designated as English only, English and a European language, English and a South Asian language, English and an East Asian language, and English and a Sub-Saharan African language. Once the class was split up we reiterated the unifying nature and characteristics that bind regions together. I then repeated the process according to religion and then clothing color. I pointed out that people switched regions when the unifying characteristic switched just as geographers classify locations into different regions depending on the criteria. We then discussed the criteria used to designate North Africa and Southwest Asia as a region.

The classes continued to identify the physical and political features of North Africa and Southwest Asia through our first scavenger hunt. For this activity I placed 26 Ziploc bags around the walls of the classroom. Each bag was numbered from 1-26 and contained a multitude of the same clue, such as “These mountains are found near the cities of Bechar, Oran, and Algiers”, “These mountains are found between 40° and 30° north latitude near the city of Shiraz”, and “This body of water has traditionally served as a vehicle for cultural exchange between Northern Africa, the Middle East, and Europe.” For example, bag one contained several copies of clue number one. Students either chose to work alone or with a partner trying to solve all 26 clues and writing their answers on a blank physical feature map of the region. They could use an atlas or the pull-down wall map as an aid. The parameters were similar to the skill-builders in that the students were required go in order, have one clue at a time, and check with me before moving on to the next clue. This also worked well as an ongoing formative assessment. Although this

“scavenger hunt” started off slowly, once students got the hang of reading the maps and answering the clues the class soon became a beehive of kinetic energy. My journal entry (12-11-14) captured the classroom activity during period two:

Today, students worked on the scavenger hunt for N. Africa/SW Asia in pairs (some alone). Was interesting who the students chose as their partners and who chose to work alone. I thought George and Alan would have chosen to work together but perhaps they realized that they tend to fool around when working together. George uncharacteristically took a long time to get settled down and started. He also started getting frustrated with himself and softly banged himself in the head whenever he answered a clue incorrectly. I think he was trying to make up for lost time and was seriously rushing. I don't think he was reading the clues carefully enough, for example if the clue asked for a country he was labeling a physical feature. Once he slowed down a bit he achieved more success. The excitement level was high and engagement was good - everyone essentially on task. I guess the competition to earn a ticket for a comfy chair or HW pass coupled with not having to finish anything for HW is motivating the students - they were whirring around like dervishes.

Simulation Stimulation

After a few physical geography objectives situated during modern times the curriculum shifted to ancient civilizations with an emphasis on history. This shift in the curriculum positioned the classes at the beginning of a critical stretch of content central to the research study. The two geographic written tasks required the students to analyze three maps and then draw upon the information to reason where two ancient civilizations

might have been located. The two classes were just starting to study the content related to the development of civilizations. This task required the students to sort through different data about climate, vegetation, and physical features of a specific region, some conflicting in terms of the favorable conditions for civilizations, and then apply the data to the process of humans settling down and forming civilizations. I needed to make that process accessible in a way the students would remember and understand the process of settlement more deeply than reading about the development of civilizations or having me deliver that information to them.

In an effort to try to make the process of human settlement and the revolutionary shift from hunting and gathering more meaningful, I implemented a simulation in which the students in cooperative groups of four-five traveled around the room "hunting" and "gathering" clues taped and placed around the room. Some were hidden but most were in plain sight. Students "collected" clues by writing them on their Hunting and Gathering Sheet (see Appendix U). At intervals set by each team, students went back to their base and wrote their clues on the Hunting and Gathering Team Sheets (Appendix U) hopefully matching the four numbered clues (80 clues total making 20 sets of four) in order to create a fully formed question and paragraph location of the answer (see Figure 4.12). A complete question and paragraph location allowed the students to find the appropriate answer. The answers were all located in an article I distributed to each team. Each correct answer earned them one piece of food. The object was to survive by securing enough food to match the number of team members, for example a group of four needed four pieces of food.



Figure 4.12 Hunting and Gathering simulation cards. Adapted from *Interact* 2009.

After I painstakingly explained the directions and checked for understanding, I allowed the students a few minutes to discuss strategy in their teams while I quickly touched base with each group. This was really a cover. While the students figured out their plan I secretly met, under the guise of checking their strategy, with one team per class and told them they were doing something a little bit different. I actually handed them (cut into strips) 60 questions (see Figure 4.13) along with the paragraph number where to find the answers. In essence I gave them the means to bypass the process of going around the classroom and searching out the clues. During the debriefing this group served as a stark contrast to the other “hunting and gathering” groups in terms of food earned. All the students needed to do was answer the questions allowing the “farming” group to more efficiently use their time and answer more questions, simulating the difference in food production experienced in the Neolithic Period. I quickly instructed them in the art of discretion. Engagement and energy was very high as students buzzed around the room “hunting” and “gathering”.

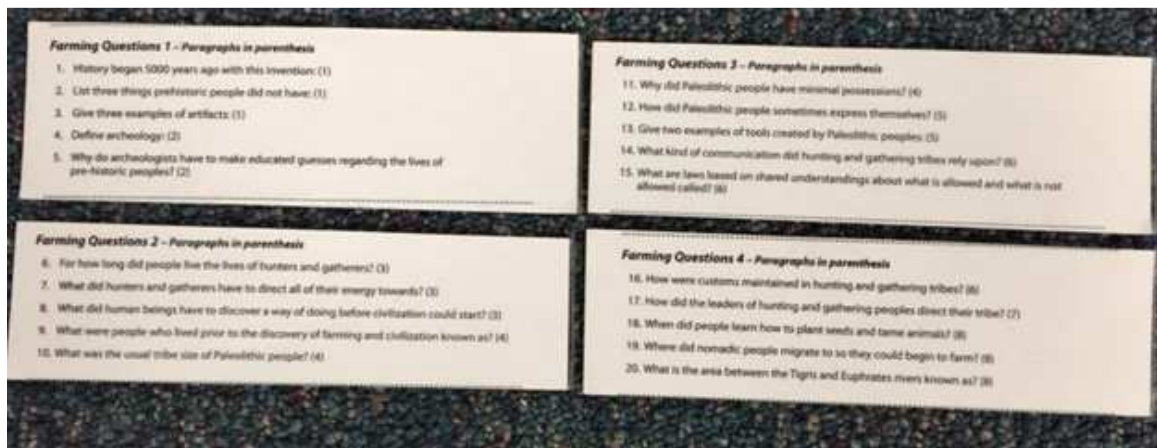


Figure 4.13 Hunting and Gathering simulation farming questions. Adapted from *Interact* 2009.

At the conclusion of the activity stage the most food any of the hunting and gathering teams procured was four for Period 2 and five for Period 4. The farming teams finished with 36 and 43 units of food respectively. The other students were surprised and even appalled. They could not believe how this happened. Munira (Period 2) and William (Period 4) wondered how this was even possible as there were only the possibility of securing 20 units of food. I let them know that once the winning teams answered all 20 questions I gave them 20 more and then 20 more after that to show the potential productivity of “farming.” Now the accusations of cheating began to fly around the room. In our debriefing we analyzed the various strategies and concluded that they were not very efficient. A lot of time was wasted covering the same terrain that a fellow teammate had already been over. Returning to a base every few minutes to write down clues a second time also wasted valuable time. We brainstormed some possible ways to increase efficiency such as having one person remain at the base to work on answering the questions or copying the clues from the individual to the team paper. Finally, the farming group revealed their secret. Both classes erupted accusing me of cheating and being

unfair. They took this very seriously. In fact, every time we started some kind of activity like this they asked if I was going to cheat for one group.

Once the clamor died down we discussed the difference in efficiency and all agreed that having the questions already formed was much more efficient (and not fair). I transitioned the discussion to the shift from hunting and gathering to farming. We discussed the advantages of farming including having to stay in one place to be near their cropland. If the farmers followed the migratory patterns of animals they would have to leave their fields untended for animals to eat or ravage the crops. I indicated that this was called settling down. At first many students thought that farming was easier, until Kenny quickly gave several examples of all the work he had to do on weekends and often before school on his family's small farm. I used his examples during Period 4 to emphasize the same point. We concluded that farming may actually have been more labor intensive, but it was a much more efficient way to obtain food. This led to discussing the process of domesticating plants through trial and error. We also discussed the domestication of animals and the advantages of having farm animals. Students indicated that they could be used for their labor, skin, wool, meat, and eggs. Other than eggs, these were all things that Neolithic farmers received from animals. I added fertilizer and dairy products such as milk, cheese, and yogurt to their list. The process of shifting from hunting and gathering to domesticating plants and animals is called the Agricultural or Neolithic Revolution.

So, people settled down and started to farm. What happened next? How did they transition from small farming settlements to bustling civilizations in places like Mesopotamia, Egypt, India, and China? Yet another fundamental concept that necessitated more than just a transmission of facts. Through a friend in another district I

discovered a simulation, named “Leftovers,” that fit perfectly into what I wanted to do with the students. This simulation was designed to get the students to understand the importance of surplus crops. The surplus of wheat during the Agricultural Revolution supported population growth and job specialization, two necessary hallmarks of the development of civilizations.

In order for the simulation to run smoothly two students acted as village clerks overseeing the financial transactions throughout. This freed me up to observe and engage the students during the entirety of the simulation. Having village clerks served no symbolic or historical purpose but greatly aided in the simulation’s execution. “Wheat,” represented by small chits of laminated paper imprinted with a stalk of wheat, acted as a currency with which to trade for either consumer or capital goods. The consumer goods were necessary to achieve success and the capital goods were necessary to increase wheat production, which facilitated the purchase of consumer goods. While this simulation focused on economic literacy it also highlighted the critical importance of wheat surplus on the development of civilizations in the Middle East.

Once again, the students divided into teams and received the directions, a Team-recording Sheet, and Trade Chart (Appendix V). Two students from each class volunteered to play the role of the village clerks. All transactions processed through the village clerks. The game played out in several rounds, each round represented a year. The object was to be the first team to acquire a mud brick house, ten woolen garments, and have 20 units of leftover wheat. All trades were based upon a set number of wheat units. Each round (year) progressed in three stages: getting harvested wheat (distributed by clerks), trading wheat for goods (managed by clerks), consuming 20 units of wheat

(represented by handing in 20 units to the clerks), and recording the inventory on the team sheet. The merchandise for trade could be divided into two groups: capital and consumer goods. Capital goods produced more goods down the road while consumer goods were finished products and required to win the game.

The game for each class lasted several rounds. A few groups died after the first year - they quickly traded wheat for consumer goods that depleted their store of wheat below the 20-unit threshold needed to survive. Other teams traded for capital goods for the first few years and ultimately generated large stores of wheat with which to produce consumer goods. I decided to play a few rounds beyond the "first to finish" rule in order to see what would happen. Interestingly enough, some groups became so flush with wheat that they purchased multiple homes. A hierarchy developed that broke roughly down into four categories: teams that died, teams that got by and lived year to year depending on the annual harvest, teams that achieved the desired results, and teams that accumulated vast amounts of wheat and goods. The students answered some questions designed to debrief the simulation and channel their thinking towards the idea that possessing a surplus of wheat benefitted them. During the discussion I probed further to unpack the hierarchy that developed and some of the comments that resulted. A reflection from my journal underscores the comments at the heart of a stratified society.

Some very interesting things happened during the "Leftovers" simulation. A few groups went gung ho and spent too much wheat right away in an effort to accumulate the items needed to win. They went for instant gratification rather than investing in capital goods that would benefit them down the road. Some teams did just that and held off on their gratification long enough to start earning

tons and tons of wheat. They ultimately became very wealthy. The other groups broke down into 2 categories: the ones who played it very cautious and made some seemingly poor choices and survived but just and lived harvest to harvest. The other teams did well and eventually “won” but didn't accumulate enough wealth as the two groups (Bob's and Finian's). What became very interesting was the discussion after the debriefing questions. Through the debriefing questions the students understood the importance of a surplus and the changes that it brought to the village - one farming for many, free time, job specialization, population growth, development of a complex economy getting wants and needs met. But, what the discussion brought out and especially through their comments to each other during the game and discussion were the attitudes that the winning groups had about the groups that died: they were stupid, not as smart as the winning groups, jokingly I even heard someone refer to them as losers. Furthermore, the groups who died lamented that the other groups were lucky and it wasn't fair that they died so soon (even though it was because of their own choices). I pointed out that some of these same comments have been going on throughout time and that whenever a hierarchical social structure develops some of the same attitudes develop right along with it. I used some modern day examples and asked what they think or hear whenever they see a homeless person or watch someone who is super rich on TV. Several of the students couldn't quite make the connection but enough were able to comment for the discussion to make an impact. I know that the concept of surplus, free time, job specialization, population growth, etc. will have to be reinforced throughout the year as I find that students seem to have very

short term memories. I hope that by hooking the content to a simulation that can evoke some emotional response not only will the students understand the concept but will also retain it. The discussion continued with me pointing out that everyone started with exactly the same goods and the same circumstances and that their choices early on coupled with some things out of their control - a poor harvest or drought - set them onto disparate paths that can become difficult to change. We started to talk about barriers to people becoming successful and discrimination and institutional racism came up (mostly by me). Once the three teams (Two from Period 4 and one from Period 2) started to gain wealth it became difficult to lose it and the same for the other end of the spectrum. I made sure to point out that this was a simplistic example and the development of social structures and civilizations was a lot more complex but there definitely were similarities that the students need to take note of and think about when they see people in different economic places. Unfortunately, this activity was already taking a long time and I was growing concerned that we would run out of time before the winter holiday and I wanted to make sure we left in a place with a natural break rather than in the middle of something. So I concluded the discussion speculating on whether hunting and gathering societies were more egalitarian than Neolithic farming villages and the civilizations that developed from them. Overall the discussion went very well. Period 2 seemed more interested in and adept at discussing the discrimination/institutional racism aspect than Period 4. The three GT classes really got a lot out of this discussion and almost everyone was participating. I think it went on a little bit too long for some

of the students in Period 2 (Brian, Odele, Mark, Rumi, and Fred) and Period 4 (Chrissie, Davon, Austin, Pete, Jose, and Laurel). (Journal 12-23-14)

SLO GRAPES in Mesopotamia

Best-laid plans do not always come to fruition, especially when working in a school with a crowded curriculum. I wanted to fit in more content before giving the mid-year SLO assessment battery (see Appendix W) but the "Leftovers" simulation and discussion required more time than I allocated and the last day of school of 2014 saw several students absent getting an early start on their holiday. So when the students returned after the long winter break I decided to get the week of SLO assessments over before we started on the curriculum again. This assessment was challenging because the students had to negotiate two sets of maps, Africa and Asia, in order to answer questions on North Africa and Southwest Asia. Generally the students were able to negotiate that space; however, Kusa and Rumi encountered a lot of difficulty choosing which map to use and which map matched with which region. Sonya also had some difficulty with map selection. George finished his assessment first and a quick perusal seemed to show that he did not follow the directions too well. In period four DeSean worked extremely slowly taking a very long time to finish the first and least challenging assessment. Davon and Luna seemed to struggle moving back and forth between the two sections (Africa and Asia) in the atlas to answer the questions. Jeffrey appeared to be having a very difficult time remaining focused - he was singing, drawing on his assessment, and making a lot of noise.

In getting back to the curriculum we turned to a poster set (see Figure 4.14) that utilizes the acronym GRAPES designed to help students remember the chief

characteristics. GRAPES stand for **G**eography, **R**eligion, **A**chievements, **P**olitics, **E**conomy, and **S**ocial structure. We discussed the definition of each aspect of GRAPES and gave examples from their own lives using the United States. We later applied this model in our examination of the various Mesopotamian civilizations such as the Sumerians, Assyrians, Babylonians, and Persians.

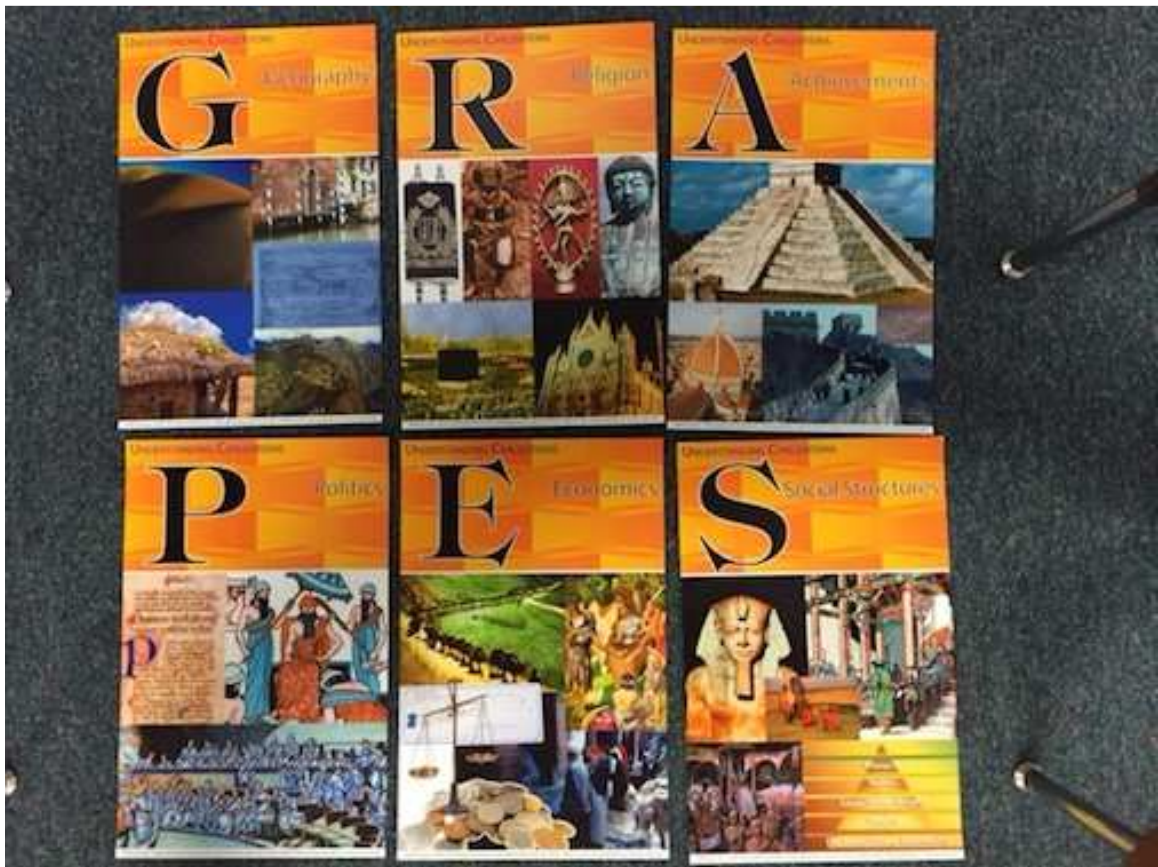


Figure 4.14 GRAPES Poster set. Adapted from *Social Studies School Service* 2007

The next several lessons entailed what archeologists consider the first civilization. The students read a section about the first civilization in our *Ancient World* text, summarized the reading in 3-5 sentences, and then illustrated three ways in which geography impacted human decision-making. In other words, any way that the people adapted to the geography, changed it to suit them, or played a role in the development in

the civilization. Once we discussed this, the students completed an organizer (see Appendix X) designed to break down the factors that led to the development of the Sumerian civilization in Mesopotamia. I asked the students to think about the simulations that we participated in and their ensuing discussions. Their homework assignment was to turn the chart into an essay. We spent a full class period reviewing the answers and key ideas of their essay once they were graded and returned.

We then revisited *Zombie Based Geography* to look into ways in which humans adapt to and change their physical surroundings. In cooperative groups students brainstormed ways in which people adapt to their environment and also ways in which they change it. After sharing out their ideas, the groups read through the Human-Environment Interaction Handout. Each group then completed a group processing paper and shared their answers with the entire class. After a brief discussion/share-out the students completed a Post-Apocalypse Zombie Exit Ticket (see Appendix Y for all handouts) and shared their answers with the class. The discussion for the group processing stalled a little bit when considering the answers about ancient civilizations. The modern component was much easier for the students. The zombie exit ticket was more problematic and required a lot of teacher leading and prompting, especially in period two.

With the newly instated Partnership for Assessment of Readiness for College and Career (PARCC) testing fast approaching and Measures of Academic Progress (MAP) testing and Naviance (a student services driven career and goal setting program) interspersed, time was getting very tight. With the numerous schedule changes due to testing and a seemingly inordinate amount of snow days giving the school year a stop-

start feeling, I struggled to consistently get a flow of instruction going. These changes and interruptions caused a significant prolonging of the research unit and I decided to hold off on the second geography oriented written task and allow the formal school-wide testing season to pass. This also gave time to revisit much of the geographic knowledge and reasoning as we covered more of the curriculum, because the scope and sequence of the curriculum essentially repeats itself but with a different region for the third and fourth quarters.

Finally, after covering the geography portion of the fourth quarter curriculum the students sat for the second written task, which asked a question similar to the first but about a different region of the world, therefore, requiring different evidence (see Appendix F). The second task also asked the students to generalize the information about how ancient civilizations develop, including the requisite conditions.

Pedagogic Peregrinations: Teacher Responses to Student Data

The results of the Baseline SLO Assessments were not entirely surprising. The baseline scores somewhat mirrored the results from the previous school year, my first administering them. I recall the previous baseline assessments being quite low as well. I detail the results in Chapter 5 but will summarize the results, as they are germane to my third and fourth teacher research questions. Similar to the previous school year the students' earned scores all below the 70% threshold with the second "Analyzing World Maps: Why There?" and the literacy written response assessments yielding the lowest scores. The students seemed to struggle with understanding exactly what information the questions required and where to find that information. This gave the impression that they guessed a fair amount, especially since some of their answers did not even fit the criteria

of the question. Furthermore, the students appeared to experience difficulty sorting through potentially conflicting information and linking multiple maps when necessary. In my journal I recorded, “For example on the questions that had multiple criteria the students provided an answer that only fit some of the criteria and not others. In fact, some of the criteria would rule out the answer they provided” (Journal, 9/24/14).

The matrix explained earlier in the chapter divided the participants into four categories: low motivation, low achievement; high motivation, high achievement; low motivation, high achievement; and high motivation, high achievement. While all groups generally experienced increased scores on the various data gathering protocols, certain groups experienced sharper increases.

The low motivation, low achievement group experienced the flattest increase in the assessments directly measuring geographic reasoning. Three of the students’ scores for the two writing tasks remained the same at 24%. This group of students responded well to the out of seat activities such as the scavenger hunts and the simulations but struggled to maintain motivation during whole class discussions and independent work. During the out of seat activities this group of students participated as much as the two high motivation groups. In fact, these were the activities in which Rumi, Brian, and Davon contributed significantly. Rumi consistently asked to use the bathroom during class discussions and independent work. The communities of practice benefited this group of students and the small group work exemplified by the Geography Alive! Skill competitions in which DeSean and Jeffery made sure to get to class on time and begin working right away. I smiled as I watched Jeffery dance around the room eager to celebrate every correct answer with his team.

The high motivation, low achievement students consisted of the least number of students but experienced the second sharpest increase in scores. This group of students' sustained motivation worked in their favor in terms of their assessment gains. Every student in the group increased their scores on all of the geographic reasoning tasks. While Luna, Summer, and Ophelia significantly increased their scores on the "Why There" map analysis assessment their scores remained below the 70% threshold. From this group, only Luna scored below the 70% threshold on the "Where?" map analysis assessment. Scaffolding and communities of practice benefitted this group of students. Scaffolding allowed me to break down complex concepts such as the connection between a surplus and the development of civilizations into smaller pieces. For example, during the debriefing of the simulation I used spiraling questions to guide the students through the factual aspects of the simulation to the connections of the benefits of acquiring a surplus and finally through the process of how a surplus of wheat facilitated the development of civilizations. Moreover, I used personal examples of family business from students in each class to illustrate and reinforce the definition of key vocabulary such as capital and consumer goods. Map skill work done through communities of practice allowed this group learn from each other with perhaps more feedback than I could give through independent work. For instance, the skill builder competitions with the caveat that every member of a group needed to have the answer and be able to explain how they figured it out before I would check required the students to work together and learn from each other. This facilitated students such as Luna, Summer, and Joseph in increasing their formative skill-based assessments as well as their summative SLO assessment scores.

The low motivation, high achievement group was almost as small as the high motivation, low achievement group of students. This group generally experienced an increase in their geographic thinking assessment scores but not as sharply as the high motivation, low achievement students. In fact, a few students experienced some decline in their scores as the SLO assessments increased in difficulty. As with the low motivation, low achievement students, this group benefitted from the out of their seat activities. Chrissie, Bob, and Mark generally lacked participation in independent work and class discussions. During the out of seat activities they were much more invested in the learning. During the leftovers simulation Bob was proud of his group's success and actively participated in the debriefing discussion. Bob typically did not participate too enthusiastically in class discussions. These students got off task the most during communities of practices. Perhaps their history of achievement allowed for them to take certain learning activities for granted. Furthermore, some of the students in this group demonstrated a lack of motivation that extended into some of the more active activities. Pete and Austin were also the first students to mock other "family" groups that did not survive during the "What Good are Leftovers?" simulation.

The largest group of students was the high motivation, high achievement students. As indicated, five of the seven primary participants came from this group. Every student in this group experienced increases in the "Why There?" map analysis assessment and the second written task. Only three students' percentage scores decreased for the "Where?" map analysis assessment. The individual and communities of practice map work benefitted this group significantly. This group of students' geographic reasoning became the strongest with all but three achieving above 90% on the second written task and all

but two students achieving above 70% on the end of year “Why There?” map analysis assessment. In fact, ten students from this group scored above a 79%.

The data generated through the two main assessment protocols (Baseline SLO and First Geographic Oriented Written Task) allowed me to answer my third and fourth teacher research questions. The third question asks “Given data from a geographic reasoning task, what does the teacher researcher do? How does the teacher researcher use the data to inform instruction?” Equipped with the Baseline SLO data I needed to make some pedagogical decisions. I knew from my previous experience that map practice would produce favorable results on the first two End of Year SLO Assessments (political and physical maps). The district curriculum provided sufficient opportunities for students to engage with desk atlases completing superficial understandings. These two assessments target atlas familiarity. In order to tackle the third and fourth SLO Assessments I needed to incorporate some more significant pedagogical moves. In my journal I wrote that

For the next two assessments I feel that I will have to break them down question by question and process the answers with the students. I think I might try and have the students re-take the assessments with a partner or two and talk through the answers. If time is too tight – probably – then we will review and dissect them as a class and I will try to make my thinking transparent during the process. Perhaps some questioning along the way – “What is this question asking?” “What are the key words?” “What maps do you know you will have to use?” will all help the students to better understand what they are being asked and what type of information they need to find. (Journal 2/27/14)

It turned out that time was indeed tight so I elected to review the two assessments as a class, taking care to make my reasoning transparent to the students by constantly explaining the reasons behind every action and answer. I think the students became somewhat frustrated with the tedious nature of this exercise but a fair number appreciated the modeling.

The results of the First Geographic Oriented Written Task further pointed to a lack of geographic reasoning. Correspondingly, the students overlooked disconfirming evidence (detailed in Chapter 5) and treated the geographic evidence (the three maps) as separate. The geographic literate person stitches them together to see a bigger picture. The lack of subject matter knowledge became apparent as the students struggled to incorporate and understand the evidence. The students' superficial subject matter knowledge seemed to lead the students to reason only within the problem itself (Anderson & Leinhardt, 2002), applying modern day evidence such as hydroelectric power or petroleum.

Combining the results of the Baseline SLO Assessments with the First Geographic Oriented Written Task, I did not feel that breaking down the questions and making my thinking visible was enough. The “Analyzing World Maps: Where?” and “Analyzing World Maps: Why There?” assessments as well as the written tasks required geographic reasoning. The students needed to interpret multiple maps and treat them as a set of evidence looking at them as a whole rather than treating them as separate, individual data sources. I needed to make sure that the students possessed enough subject matter knowledge to develop schemas and cognitive rules to solve geographic problems. This required activities designed to aid in remembering and accessing critical geography

content and using multiple sources of evidence to inform their thinking, especially for the low motivation, low achievement and high motivation, low achievement groups of students. These two groups of students seemed to possess the least amount of geographic subject matter knowledge and required scaffolding to help structure their thinking.

My fourth question asks: “How does the teacher researcher determine geographic reasoning? How does the teacher researcher foster geographic reasoning?” Through activities such as the Dr. Snow map analysis, the Geography Alive! Skill builders, Zombie Attack Data analysis, Climate Biomes map comparisons, the North Africa and Southwest Africa Scavenger Hunt, and the Zombie Based Geography adapting to surroundings, I provided multiple opportunities for students to compare multiple maps in order to answer questions solve problems. The two simulations provided the students with some emotional responses to personalize and recall geography oriented subject matter requisite for geographic reasoning. The emotional responses and out-of-their-seats nature of the simulations appeared helpful for the two low motivation groups and particularly so for the low motivation, low achievement group of students often marginalized by traditional pedagogic practices. The visual representations used throughout the school year—including the vocabulary matching, reading of Dead Reckon, and GRAPES—afforded the students something on which to hook their disciplinary subject matter knowledge for later recall. The use of visual representations seemed beneficial to the two low achievement groups as some of these students struggled with written text.

The pedagogical choices I selected were designed to foster geographic reasoning. I determined geographic reasoning in my classroom when students used geographic

information to make sense of the world and explain human decision-making. In other words, when students combined and applied the three parts of the geographic lattice (subject matter, skills, and disciplinary perspectives) they demonstrated geographic reasoning. Students demonstrated using the geographic lattice through writing and discussion. In writing I observed geographic reasoning through explanations that convey their thought processes and how they wove together the three parts to form their own geographic lattice. Some students created very strong lattices that supported a strong understanding of geography. Other students fashioned a weaker lattice that can break down with pressure. Often in discussion, their cognitive lattices manifested through questions that students asked or responses to my questions. Frequently in order to determine geographic reasoning through verbal interaction I asked probing questions to lead and press students to access their geographic lattice.

In an effort to further foster geographic reasoning in my classroom I relied heavily on situated learning (Lave & Wenger, 1991), trusting the powerful nature of socialization through inter-student dialog and processing through discussion. I used both whole class discussion as well as small groups of differing configurations. I encouraged students to refer to evidence to back up their claims and regularly challenged them to justify their ideas. While situated learning seemed effective with all students, I feel that it worked especially well with the two low achievement groups of students. The nature of the class developed into a combination of movement, working in groups of various sizes, and discussion.

Summary

My experience teaching Geography and World Cultures to a diverse group of sixth graders permitted me to witness and experience the trials of trying to negotiate and live in the gap between what professional geographers do and what is taught in the middle school classroom. I realized the multifaceted impediments in trying to plan and implement a more disciplinary based pedagogy. Finding worthwhile and developmentally appropriate resources based upon *Geography for Life* (1994) proved challenging. Many of the resources purportedly based on the geography standards I found did not line up with the local curriculum enough to make them valuable or they only consisted of the subject matter or content element of the standards rather than a confluence of content, skills, and perspectives. This leaves the study of geography bereft of the necessary elements that create the lattice (subject matter, skills, perspectives) described in Chapter 3, thus, obscuring the gap with an illusory veneer of disciplinary structure.

Furthermore, resources that were based upon a more disciplinary approach and adequately lined up with the curriculum lacked a robustness required to engage middle school learners or they required a lot of time to implement. One set of resources brooked great promise and was based upon the subject matter from *Geography for Life*. However, it turned out to be five PowerPoint presentations with examples from only the United States. Perhaps such a presentation would work better with the high motivation, high achievement group of students or in an AP Human Geography class populated by older students with longer attention spans and who are better suited to remaining in their seats taking notes while the teacher reads to them. I doubt it, however. The presentations appeared dull and, once again, lacked a focus on the skills and perspectives necessary for

disciplinary geography. They only contained the subject matter or content potentially leading to a superficial understanding of disciplinary geography. Moreover, just because highly motivated, high achieving or older students have greater attention spans and may have been trained to receive knowledge from the teacher does not equate to pedagogical appropriateness. Knowing the essential map components does not help students apply the map to understand human decision-making. In fact, the geography standards are written in such a way that to truly understand them, students have to use the skills and perspectives of disciplinary geography.

Out of the various data emerged three takeaways for teaching geography from a more disciplinary orientation. First of all, the out-of-seat activities including the simulations, scavenger hunts, skill builder competitions, and act-it-outs allowed the students to work more “hands on” and engage directly with the content. Sometimes this provoked an emotional response that I could refer to later on and that emotional memory seemed a place the students could hook content onto. In fact, even during the last weeks of school the students still gave me a hard time about their perceived slight during the hunting and gathering simulation in which I “cheated” by allowing one group to “farm” for their answers. Several of the primary participants mentioned the simulations or the scavenger hunts as effective and also fun. I fondly recall the scenes of both classes working diligently on the scavenger hunts and the skill builder competitions. I will never forget Jeffrey taking the lead as his team’s spokesperson checking their answers with me and dancing his way back to his peers ready to start anew.

Motivating activities, getting the students out of their seats, and having them participate in all different types of communities of practice seemed valuable in

motivating students, helping them make connections, and learning. However, I needed an organizing structure from which to work. The lattice of *Geography for Life* provided that structure to keep the activities from just being a list of learning activities. *Geography for Life* provided the disciplinary structure that underpins this entire study. The increase in student achievement suggests that organizing the various activities designed to help learning and keep students engaged with the conceptual framework was a wise pedagogical decision. Furthermore, given that I do not have a geography background the conceptual framework kept my teaching grounded in the epistemology of geography.

The final takeaway from teaching Geography and World Culture to a diverse group of 6th grade students was to constantly bring every discussion, as much as possible, to the impact of geography on human decision-making. If good geography is about understanding the world and self, then understanding how humans and their environment interact is paramount. Throughout this study I constantly asked how the physical geography shaped human geography and culture. Given that the two classes comprised diverse populations including several first generation Americans, I often posed questions related to their own immigrant experience and the slow drift away from a pure representation of their home country's culture to more of a hybrid blend. By the end of the school year, students began to better understand how geography helps to shape culture and decisions.

Perhaps the place to begin for the ambitious teacher is to immerse themselves in the disciplinary arts of geography through study of *Geography for Life*. Then the next step is to adapt and add to professionally created materials. Conceivably enhancing and applying materials based upon disciplinary geography subject matter can encourage a

deeper understanding of geography. That requires a lot of work. I found that I needed to pick and choose the prefabricated resources with care, modifying, molding, and bending them to my instructional needs of balancing the curriculum, the SLOs, and good geography.

The most pressing challenge for me, and I would imagine for others as well, was pacing. I felt up against the clock throughout this entire study. Several factors contributed to this reality. Firstly, the curriculum was not designed to teach a more nuanced approach to geography. It contained bits and pieces but served too many masters as a social studies course. By and large, the histo-centric nature of the curriculum precluded a true disciplinary approach to geography. Additionally, the time required for students to learn, to think, more like a geographer and implement geographic reasoning is greater than a crowded curriculum allowed. I needed to supplement and expand the curriculum. As a consequence I found that answering the third and fourth teacher research questions required a delicate balancing act and the switching of pedagogic hats from teacher bound by the curriculum and school district mandates to the teacher researcher interested in disciplinary geography and bound by ontological concerns. Sometimes these forces worked in concert and other times in opposition. I am not sure I have fully worked out this balance.

I did find that a collaborative approach grounded in situated learning (Lave & Wenger, 1991) allowed the students to work as teams in solving problems and discovering geographic concepts. This also, at times, translated content into pieces more digestible for sixth grade students. In other words, students learned not just from the teacher but also from each other. If I could determine the nature of geographic reasoning

and provide circumstances and cognitive transparency for students to engage with it, the students can become novice teachers and translators of knowledge. Students at times became the mediums of fostering geographic reasoning. I think this especially helped the students who struggled with reading and confidence. Lastly, I found that by making connections between their lives, the curriculum, and geographic knowledge while weaving in social justice themes³ when appropriate, the students began to see geography as a lens through which to see the world. In the next Chapter I focus on data related to the students' ability to understand and reason with geography.

³ Social justice was not directly addressed in this study but is important to understanding myself as a practitioner, person, and culture of my classroom. Social justice is also important for thinking critically about the world.

CHAPTER 5

AN ANALYSIS OF STUDENT LEARNING IN GEOGRAPHY

Introduction

Previously in this dissertation, I articulated a series of student and teacher research questions that framed the study in terms of teaching geography from a more disciplinary model based upon the components of *Geography for Life* (1994). The student questions are the following:

1. What are student perspectives/understandings of geography?
2. What are student perspectives/understandings of geographic reasoning with respect to solving problems?
3. Given a geographic reasoning task, what do students do?
4. How do students reason with geography?
5. How do students think about their reasoning with geography?
6. How does student thinking about geography change?

In this Chapter I describe the results of the study by examining the first four questions above within the context of the two general education classes I taught during the 2014/2015 school year. The focus will be to understand and attempt to articulate the trajectory of student learning organically grounded in a classroom setting. I answered the first two teacher researcher questions⁴ in Chapter 3 and the second two teacher research

⁴ Teacher research question #1: What are the teacher researcher's perspectives/understandings of geography? Teacher research question #2: What are the teacher researcher's perspectives/understandings of geographic reasoning?

questions⁵ in Chapter 4. I discuss the remaining teacher research questions in Chapter 6 along with the final two student research questions within the framework of my experiences as a teacher researcher straddling the gap between disciplinary geography and school geography.

The structure of the remainder of the chapter is to introduce and interpret data gathered from various sources, first for the two classes in general and then specifically for the primary informants. Data come from a variety of sources including an initial digital survey of all participants, student writing, classroom discussion, student interviews and think-aloud protocol interviews, and collected assignments. These data are organized thematically and assertions are developed to summarize the key ideas. I begin with a description and analysis of the initial survey.

Initial Student Perspectives

On September 18, 2014 the students in both Period 2 and Period 4 logged onto the district server and completed the initial geography survey (see Appendix C). Prior to this the students and I completed various relationship-building activities (discussed in Chapter 4) and the Baseline SLO Assessments. Any other previous school-based geography came from elementary school, was sparse, and a secondary aspect of history lessons. I designed the questions in an effort to explore the students' background and perspective of geography, geographic reasoning, and school geography. As a result of shifting schedules and absences a total of 43 out of 47 completed the survey: 21 students from Period 2 and 22 students from Period 4.

⁵ Teacher research question #3: Given data from a geographic reasoning task, what does the teacher researcher do? How does the teacher researcher use the data to inform instruction? Teacher research question #4: How does the teacher researcher determine geographic reasoning? How does the teacher researcher foster geographic reasoning?

After looking through the first part of the initial survey (definition of geography, thoughts/feelings of geography, importance of studying geography), it seemed that the students had positive feelings about geography with only four (out of 21 and 22 respectively) for each class either not liking or strongly not liking geography and geography as a school subject. However, 19/21 (Period 2) and 12/22 (Period 4) thought that it was important to study geography. While 2/21 (Period 2) and 7/22 (Period 4) were not sure if it was important to study, 1/22 (Period 4) responded that it was not important to study geography. Some of the reasons given were that it was a school subject and therefore, important; they want to pass the class; and they will have quizzes and tests so it was important to study it. Others believed it important especially if they would be traveling. In fact, traveling was the most frequent response from Period 2. One student interestingly enough responded that it would help him when older and voting. Another student from Period 2 responded that geography was important especially if someone was kidnapped and he might need to know the capital of Iraq. Some responses from Period 4 were that it was important to study geography because it was “a part of school and they will be quizzed”, “to know history”, “to understand basic knowledge about Earth features”, “wayfinding”, and “if you become a geologist”. I presume that particular student meant geographer rather than geologist. Another responded that her “parents said it is important”. Some students responded that they were not sure if it was important, called into question its usefulness responding that “it is not as important as science or math”, “that it is just maps and textbooks”, and that “geography is not really used in jobs.”

A fascinating aspect of the initial survey was the students' perspectives on what geography is. The answers seemed to fall into four general categories. Some students believed that geography was social studies or specifically history. I imagine their elementary school experience shaped this belief. The local district curriculum in elementary social studies focuses almost exclusively on local history (district and state) and U.S. History during the colonial time period. Any geography is in the service of history. For example, a typical activity is to complete a map labeling the 13 colonies. A second group of students focused on the cartography facet of geography and responded that geography was all about maps and understanding maps. A third group believed that geography was about other cultures, a view that might have been informed by the course title: *Geography and World Culture*. The remaining students combined various aspects of the aforementioned characteristics of geography and a few added land features and land use. The student responses seem quite limited and do not incorporate the process and interactive aspects of geography that inform the spatial and ecological perspectives. In other words, it seems as though most students viewed the world as fixed ("what we see is what we get") rather than understanding the processes that change, shape, and define Earth and the interaction with people on its surface. This reminds me of novice views of history as being fixed: something that just happened.

Many of the students viewed their geographic understanding as insufficient. In fact, several responded that their own understanding was "horrible", "not good", or "very little." Many judged their knowledge to be average, while a few responded that they didn't know about their knowledge. One student in Period 4 responded that they "don't know much and are not interested." A few students from Period 4 rated their knowledge

as a “good amount” or expressed confidence because they find the class very interesting and can really pay attention. Two students in Period 2 responded that their geography knowledge was good because they had an “A” at the time of the survey and another responded that it was easy, without actually answering the question.

When asked about how they used geography in their lives most of the students either responded that they didn’t, they didn’t know, or they only used it to find their way, mostly using a GPS. One student responded that they used geography when calling Vietnam and knowing that Vietnam is 12 hours ahead of the U.S. A few students mentioned map reading at a mall or museum or when traveling.

After looking through the rest of the initial survey it seemed that their perspectives and knowledge of geographic thinking/reasoning or thinking like a geographer were very limited. For the initial survey 11/22 students in Period 2 and 7/22 in Period 4 responded that they did not know anything about geographic reasoning. Other answers remained in the superficial realm of location: finding a good vacation spot, exploring new places, hiking, help when moving (although this could be more nuanced with further explanation), and map reading. A few answers dealt with aspects of geography and possible pieces of geographic reasoning such as time zones. Several students responded with limited ideas and even misconceptions such “as studying geography”, “using geographic terms”, “helping a group of people”, “and explaining about geography”. One student replied that using geographic thinking “will help when voting for president.” Some answers such as “thinking about the world”, “to provide proof by geography”, and “using the climate and environment to study that country” began to show some promise and a slightly deeper view of geographic reasoning.

A few students responded that geographic reasoning can be used to “see what happens in the world” or to “prevent disasters.” This seems to point to the beginnings of geographic reasoning. Perhaps geographic reasoning cannot be used to prevent natural disasters, but understand their genesis and process while attenuating the impact.

These responses seem like a good entry point to understand geographic reasoning. Geographic reasoning helps to not just see what happens in the world but to try and understand it, to gain some purchase on where, why there, and where else. Finally, one student responded that geographic reasoning helps to understand the “impact of putting something in an area.” Not only does this capture one of the many uses of geographic reasoning but engages both the spatial and the ecological perspectives. Discovering the impact, typically done through environmental impact surveys, necessitates utilizing the geography skills presented in *Geography for Life* (1994) and Ford’s (1987) model.

Initial Student Interviews

The primary informants believed that geography was a combination of maps, culture, and Earth. Hermione defined geography as “History and the world and culture.” George, Ginny, and Fred associated geography with the study of maps. George seemed to believe that geography consisted of maps, “Geography, I think it’s like when you study maps.” George thought that geography was important to study only because it is a school subject, “something they ask you to study.”

Ron stressed the study of cultures and what people do in their cultures. For example, he stated that, “It’s basically, um, you’re learning about different cultures, about the world and what they do, what people do.” Ron’s stress upon the human aspect of geography clearly comes through when he stated that, “Um, because, um, you have to

know what's going on in the world of course" and that, "... you might wanna learn how you do, er, what people do." Ron's personal identification underscores the importance of geography for him.

DR: Would you say that geography is important to you?

Ron: Well, yeah, because I have a different culture than other people, so um, I have to, I might share information about what I do and what they do, what friends do, what they may do.

Ron also seemed to conflate geography and history. When asked about topics studied in geography class Ron described the chronological concerns of history rather than the spatial concerns of geography.

Bill and Harry's perspective of geography was more nuanced than the others. Both of their responses brought in a relational aspect of Earth to people. Bill seemed to have one of the most nuanced definitions. For him geography was the study of and how Earth works, "Well, geography to me is, it's uh, geography is the understanding of just like culture, Earth, um, religion, uh, all that stuff. You can learn about many religions, many cultures, also the Earth, a lot about the Earth and how it works." Bill seemed to think geography important for understanding geography to know "most facts" and to help when grown. He believed that it could help you with a job and Earth's landscapes. Bill further developed his ideas when articulating how geography could help people understand human decision-making.

DR: Ok. That makes a lot of sense. So what ways do you think geography influences human decision-making.

Bill: Um ... so say there's, um, a beautiful landscape, ok?

DR: Mm-hm.

Bill: Like with valleys and everything. And somebody rolls around and decides to make a big, coun-, they might, they might want to make a mall there. And there's like a lake there, there's like a, there's a bunch of natural animal life there. So, if that human decided to make a mall, he would have to think about all the qua-, things, like trees, the lake, the, the animals, the-, they all need that place and the more you make, the more you take away from it, the more natural stuff is gone, and then Earth is gonna turn less green.

Bill hints at the bigger picture of geography and a geographic understanding of the interconnectedness of Earth, although at this point his understanding seems quite neophyte. Hermione and Harry also hinted at a bigger picture. This understanding for students can deepen when refracted through the ecological perspective and impact that development and human decision-making has upon Earth's biomes and animal populations that, in turn, impact other humans. This deepening of understanding was something that I looked for throughout the study. Ginny, Fred, Ron, and George's understanding of geography on human decision-making was somewhat less developed. Ginny and Fred focused on wayfinding. Ron believed that geography could be used to help people survive floods and other natural disasters. Part of this study was to see what happens as his ecological and spatial perspective deepens. George didn't see geography impacting human decision-making. This answer did not surprise me as it illustrates the extreme novice nature of young people exposed to school, let alone a simplistic, version of academic, geography for the first time.

The primary informants' perspectives on geographic reasoning followed along similar lines as their perspectives and understandings of geography in general. Bill, Harry, and Hermione related geographic thinking to understanding and problem solving. Hermione discusses thinking like a geographer for military purposes. She believed that countries could make alliances based upon geographic need and knowing the climate and culture critical for troop deployment. Bill believed that geographic thinking was using "certain clues," "some common sense," and thinking "outside of the box" to explain phenomena (my word). Harry's perspective followed closely with Bills in terms of using geographic clues to explain how the world works.

Fred, George, Ginny, and Ron struggled to articulate any coherent ideas about geographic reasoning. Fred believed that thinking like a geographer meant to understand maps. George and Ginny had no idea what thinking like a geographer or geographic thinking was. Ron responded that it is about gathering information about the past and gathering information about the present in order to use it and understand cultures in the world. While that response contains the potential seeds of geographic thinking, Ron could not provide anything further.

Emerging Themes

Several themes became apparent from the students' perspectives on geography. First of all, many of the students seemed to understand geography as map reading and/or cultural studies. Several of the students added physical features of Earth or the study of Earth. None of the students truly understood the inextricably linked nature of Earth and all the living things on it and the reciprocal nature of this relationship. Simply put, the

students had an understandably simplistic and incomplete understanding of the definition of geography.

While the vast majority of students believed geography important to study, their reasons varied and they experienced difficulty articulating why they felt geography was important to study. Probing of the primary informants yielded a bit more nuance – especially Bill and Harry– but in general the students lacked enough understanding of geography to appreciate its importance.

Another theme that became clear throughout the various data sources was that students conflated geography with history and often referred to geography in terms of studying the past. As mentioned above, this is not surprising considering they have essentially never studied geography as a standalone course and the curriculum subordinates geography to the service of history.

Two main themes emerged from data related to students' perspectives on geographic reasoning. Firstly, most of the students had no idea what geographic reasoning or thinking like a geographer means. Even more had difficulty explaining how a person would use geographic reasoning. This makes perfect sense and augments one of the themes from question one: the students are extreme novices when it comes to geography and their perspectives are very limited. This seems to fit in with much of the expert novice research.

The second theme that emerged from the data was that students still conflate geography and history. Several of their answers regarding geographic reasoning and its uses went back to the idea of looking in the past and what happened in the past. Geography does involve examining the past – from a spatial and ecological perspective.

The students seem to regard it more from a historical or chronological perspective. In other words, looking at the past to make sure we do not make the same mistakes earlier people made.

Student Learning Outcome Assessments: Baseline

At the beginning of the third week of school I administered the baseline Student Learning Outcome Assessments. As mentioned in the previous Chapter, the assessments required six full instructional periods to complete. Both Period 2 and Period 4 averaged 45% and 44% correct answers respectively on the battery of content assessments. The content assessments consisted of four separate assessments designed to measure students' ability to read maps (political and physical) and reason with geography (analyzing maps one and two). Further parsing out the assessment series yielded 45% and 63% respectively on the political map assessment. Students needed only to locate numbered countries on a blank outline map using an atlas and color code the seven continents.

The second assessment, labeling and color-coding physical features saw the student scores in Period 2 rise to 63% and fall to 57% in Period 4. These two assessments required only being able to decode maps in an atlas and label blank outline maps. Typically scores on these two assessments improve dramatically throughout the school year as students become more comfortable and adept with map reading. Practice seems to affect their scores for these two assessments greatly.

The third assessment, Analyzing World Maps: Where? (see Appendix Z), demanded heavier cognitive input. On this assessment students answered questions using various maps found in the atlas. Answering these questions mostly necessitated

interpreting one thematic map and making inferences with the information. In other words, reasoning in geography. Period 2 averaged 55% and Period 4 62%.

The final subject matter assessment, Analyzing World Maps: Why There? (see Appendix Z), encompassed analyzing several maps and drawing inferences by evaluating all the information in order to answer multifaceted questions with appropriate explanations. As befits such complexity, each period averaged only 25% on this particular assessment. During the first round of assessments many of the students struggled to understand exactly what the questions asked. Given that I could not help break the questions down until after I collected (and graded) the assessments, the responses contained a lot of guessing. Much of the trouble, beyond understanding the question itself, students experienced revolved around their struggle to adjudicate conflicting information and adequately make connections between geographic concepts. Oftentimes a student would answer a question incorrectly, citing evidence from one of the maps that another map contradicted. Furthermore, students often lacked a clear explanation of the link between population density and physical features and climate or climate and land use. Without much experience in “thinking like a geographer” and a paucity of geographic subject matter knowledge, students struggle with geographic causality. Therefore, this result should not surprise anyone.

The literacy assessment consisted of two steps: completing a chart of geographic information (population density, climate, physical features, and natural resources) for three locations listed only by their absolute location (latitude and longitude) and arguing (through writing) how a provided picture matched up to one of the locations. In other words, the students selected one of five pictures and then chose which location it matched

up to and explained their answer using evidence from the atlas maps. Given that argument writing is somewhat new as both part of the Common Core Curriculum and middle school, the students lacked experience with this format. Period 2 averaged 34% on this assessment and Period 4 averaged 17.5%. Poor writing skills such as organization, sentence fluency, and supporting their answers definitely influenced their scores. However, the students experienced great difficulty using the information (evidence) from the various maps to inform, elucidate and support their argument.

Table 5.1

Period 2 SLO Baseline Data

Baseline - Quarter 1, 2014-15 - Mr. Rosenstein								
	SLO: Content						SLO: Literacy	
Period 2	Political Map 24 points	Physical Map 24 points	Analyzing World Maps: Where? 14 points	Analyzing World Maps: Why There? 28 points	Total	%	Where in the World? 4 points	%
Tracy ⁶	N/A	N/A	N/A	N/A	N/A	N/A	2.5	63%
Munira	19	21.5	10	14	64.5	72%	2.5	63%
Bill	15	22	11	12	60	67%	1	25%
Rebecca	15	17.5	10	12.5	55	61%	3	75%
George	15	20	11	7	53	59%	1	25%
Summer	14	20	10	9	53	59%	2	50%
Fred	14	18	13	8	53	59%	0	0%
Emma	15	14	10	12	51	57%	2	50%
Bob	14	20.5	9	5	48.5	54%	2	50%
Allan	15	18	7	7	47	52%	2.5	63%
Nataifa	15	19	6	3	43	48%	1	25%
Mark	15	14.5	7	6	42.5	47%	0	0%
Kusa	12	10	11	2	35	39%	1.5	38%
Brian	0	18.5	7	7	32.5	36%	0	0%
Helen	5	10	9	8	32	36%	1	25%
Kenny	12	1	4	3	20	22%	1	25%
Odele	0	6	7	4	17	19%	1	25%
Odette	0	8	6	3	17	19%	1	25%
Rumi	0	1	6	3	10	11%	1	25%
Averages	11	14	9	7	34	45%	1.37	34%

⁶ Tracy's schedule change placed her into my Period 2 class after students completed the content SLOs were but before I administered the Literacy SLO.

Table 5.2

Period 4 SLO Baseline Data.

Baseline - Quarter 1, 2014-15 - Mr. Rosenstein								
	SLO: Content						SLO: Literacy	
Period 4	Political Map 24 points	Physical Map 24 points	Analyzing World Maps: Where? 14 points	Analyzing World Maps: Why There? 28 points	Total	%	Where in the World? 4 points	%
Peter ⁷	N/A	N/A	N/A	N/A	N/A	N/A	2.5	63%
Darcy	21	20	13	16	70	78%	1.5	38%
Hermione	19	22.5	13	13	67.5	75%	2	50%
Ellen	19	23	9	15	66	73%	0	0%
Chrissy	20	21	13	8	62	69%	0	0%
Finian	19	19	10	11	59	66%	2.5	63%
Austin	18	20	11	9	58	64%	1	25%
Ann	19	19	8	10	56	62%	1	25%
William	18	21.5	7	4	50.5	56%	1	25%
Ron	18	14	11	7	50	56%	0	0%
Carrie	10	20.5	9	6	45.5	51%	1	25%
Kendra	18	16	7	3	44	49%	0.5	13%
Ophelia	15	19.5	4	3	41.5	46%	0	0%
Jose	19	7	7	6	39	43%	1	25%
Luna	16	12.5	3	3	34.5	38%	1	25%
Jeffrey	14	12	6	0	32	36%	0	0%
Pete	19	1	6	3	29	32%	0	0%
Harry	19	4	4	0	27	30%	0	0%
Laurel	8	6	9	3	26	29%	1.5	38%
Joseph	10	3.5	7	1	21.5	24%	0	0%
Davon	0	0	4	2	6	7%	0	0%
DeSean	1	1	4	0	6	7%	0	0%
Darcy	21	20	13	16	70	78%	1.5	38%
Averages	15	14	8	6	40	44%	0.73	18%

⁷ Peter moved into the Endicott Hills school district in between the content and literacy SLOs.

Primary Informants

I organized this section by assessment: the political and physical maps (Baseline SLO Assessments One and Two), the two analytical assessments (Baseline SLO Assessments Three and Four: “Analyzing World Maps Why?” and “Why There?”), and finally the argument writing (Baseline SLO: Literacy Assessment).

Political and physical maps. On the first two assessments (scores: 15/24 and 22/24 respectively) Bill experienced little trouble with completing the maps. The only real issue that he experienced was attending to specific detail. His border identification and island designation was somewhat lax, failing to include certain islands like Greenland and Iceland in their proper geographic continent. Much like Bill, George’s lack of attention to detail affected his score on the first assessment (political map, score: 15/24). His border identification and island designation were sloppy. George’s habit of rushing through his work to finish and read for pleasure might have contributed to his lack of precision. George scored well on the second map (physical) assessment (20/24). Fred also demonstrated a lack of attention to continental borders and island inclusion that explains his score on the political map assessment (score: 14/24). Additionally, Fred skipped or missed several items on the physical map assessment (score: 18/24).

Ron faced the same issues as the vast majority of the other students with his lack of attention to detail concerning his border identification and island designation on the political assessment (score: 18/24) and not answering several items on the physical map assessment (14/24). Ginny struggled with the first two assessments (9/24 and 13.5 respectively). She did not follow the directions closely and skipped several items. On the political map assessment she missed all of the continents. She identified only Mali, Niger,

and Chad as the continent Africa; Brazil as the continent South America; Canada and the U.S. as North America; China, Kyrgyzstan, and Kazakhstan as Asia; and Poland and part of Russia as Europe.

While Harry showed more attention to detail than many of the other students, including most of the primary informants, on the political map assessment he did so with numerous mistakes (score: 19/24). He was able, however, to identify all of the borders correctly save the one between Asia and Europe. This border required a fine eye as it zigzags around country boundaries and seas, and follows two separate mountain ranges. As the year progressed, Harry cleaned up these finer grained issues. Harry fared less well than the other primary informants on the physical map. In a reasonable amount of time, he only completed a small part of the assessment (score: 4/24).

Hermione's lack of attention to detail on the political map border identification and island designation explains her score of 19/24. However, Hermione competently completed the physical map (22.5/24) and the first map analysis (score: 13/14) assessments. A more careful reading of the directions may have yielded perfect scores for these assessments. Hermione typically answered written questions conscientiously and rarely made these types of mistakes. In fact, Hermione scored the second highest percent on the content SLO assessments out of both classes with a 75%. Only Darcy (78%) scored higher.

Analyzing world maps. Only an oversight on the first analyzing world maps assessment prevented Fred from achieving a perfect score (score: 13/14). He neglected to identify the map he used to find his answer to item number five. Ginny performed well on the "Analyzing World Maps: Where?" assessment (12.5/14), only incorrectly

identifying hot as a climate type and substituting Asia for Australia on the question that asked about continents without a polar climate. Bill's lack of attention impacted his performance on the "Analyzing World Maps: Where?" (score: 11/14) assessment. For example on Question Six, Bill was supposed to name the three continents that do not have a polar climate and he only answered two. He also misread the climate map and answered a question with "mild climate" rather than the specific name of the climate. Bill corrected these minor errors on subsequent assessments.

Similarly, George's lack of attention to detail also affected the "Analyzing World Maps: Where?" assessment (score: 11/14). George skipped one question outright and incorrectly answered another question by using the wrong map. When asked how land is mostly used in Europe, George answered, "copper". Copper is one of the plentiful resources in Europe but not how the land is used. On the same assessment Ron adroitly answered most of the items correctly (score: 11/14), only incorrectly identifying two of the three continents that do not have a polar climate. He also selected a political map rather than a climate map to inform his answer.

Harry also significantly struggled with the "Analyzing World Maps: Where?" assessment (score: 4/14). In fact, this assessment required so much of Harry's time that he was unable to complete the next two assessments. On the first analysis assessment Harry labored with accurately identifying either the geographic phenomena such as the climate found most often between 5°N and 5°S and the human decision as a result of phenomena like land use in Europe.

Similar to all of the students, Bill struggled quite a bit with the "Analyzing World Maps: Why There?" assessment (score: 12/28). He seemed to grapple the most with

making connections between geographic phenomena and human decision-making. Each assessment item asked two questions. The first was to identify some result of human decision such as the region in Asia with the lowest population density or naming two continents that have the most area of “no widespread use”. This question required that the students interpret various thematic maps. The second then asked students to explain why particular geographic phenomena such as climate and physical features might produce the resultant outcome. Bill adeptly identified the outcomes but faltered in explaining how the phenomena might explain them. For example, Bill’s answer to how climate might help to explain why Northern Africa has the lowest population density was: “Climate may help because of the desert key which shows Northern Africa in a desert.” While true, Bill neglected to explain the characteristics of a desert that would keep population low. Consistent with other data, it seems that Bill’s lack of subject matter knowledge impacted his ability to draw upon the requisite information to satisfactorily explain the connection. Although a novice, Bill showed promise in his geographic reasoning.

Hermione exhibited the same issues with the second analyzing maps assessment as Bill (score: 13/28). She effectively answered the first part of most of the assessment items but ineffectively connected the human decision-making to the potential causal phenomena. Similarly, Ginny endured considerable challenges on the second analyzing world maps assessment (score: 10/28) especially with making connections between geographic phenomena and human decision-making. She correctly chose Africa and Asia as the two continents with the most area of “no widespread use” but unsuccessfully explained her choices simply answering that the climates are hot. Fred experienced the same obstacles as Bill, Hermione, and Ginny in terms of making connections between

geographic phenomena and human decision-making on the “Analyzing World Maps: Why There?” assessment (score: 8/28) and he also skipped two of the assessment items writing “IDK” for answers. Ron struggled significantly with the second analysis assessment (score: 7/28) showing an inability to answer the most of the questions and weak geographic reasoning.

George struggled a great deal on “Analyzing World Maps: Why There?” (score: 7/28). Not only did George experience similar issues with the other primary informants vis-a-vis making adequate connections, but he also demonstrated some gaps in fundamental subject matter knowledge. When asked to name the two continents containing the most area of “no widespread use”, George wrote, “Anartica and canada”. Spelling and capitalization issues aside, Canada is most definitely not a continent. Even without the prior knowledge the various maps in the atlas should provide information to correct these misconceptions. However, it seems changing misconceptions with prior knowledge requires teacher intervention.

Argument writing. On the Literacy SLO assessment (score: 2/4) Hermione correctly matched Location B (31°N, 121°E) to the picture of Shanghai. However, her description lacked specificity and enough supporting evidence stating that, “Shanghai is urban and the picture is urban. Also the words on the signs are asian, and Shanghai is in Asia.” With time she would learn to support her answers more skillfully and completely.

Both Bill and George (score: 1/4) incorrectly matched their chosen location to the appropriate picture. George mistakenly identified location A (25°N, 33°E) as Istanbul for his literacy assessment (score: 1/4). He matched image four, a very urban scene, to this location and argued his choice by stating that because Istanbul is the capital of Turkey

(Ankara is the capital) and has over 250 people per square mile, it matches the picture. George's answer on the Literacy Assessment highlights a lack of ability in using absolute location to identify places on Earth's surface and a superficial facility in supporting a position through detailed use of evidence. Bill answered similarly to George. He included some supporting evidence but it also contained misconceptions.

Ron disregarded the directions entirely for the argument writing assessment (score: 0/4) and did not match photograph two to any of the locations. He wrote that, "Photograph 2 was most likely taken in the Himalayas because in the picture there is a mountain and the himalayas looks like that in page 157 in the Desk Atlas book."

Ginny left the argument writing assessment blank (score: 0/4). Between the various assessments, the recorded think-aloud protocols, and the different interviews Ginny, unsurprisingly, exhibited a limited ability to reason with geography. Ron and Harry also did not provide an answer for the argument writing assessment. Ron superficially completed the pre-writing organizer but did not articulate an answer. Harry did not complete the organizer. He was still catching up and completing the "Analyzing World Maps: Where?" and "Why There?"

Given Harry's eventual understanding of geography and geographic reasoning by the end of the year, it seemed that working very slowly and methodically may have hindered his ability to complete such a large number of assessments. Furthermore, the teacher in me felt pressure to move the class along after a certain amount of time as this round of assessments required six periods to complete. The district social studies department suggested an average of four days to administer the battery of assessments. By the sixth day, and with the vast majority of students finished, I decided that I had to

move on with the curriculum. I also did not think it prudent for Harry to take any instructional time to catch up to the remainder of the class.

Emerging Themes

The comprehensive battery of the Baseline SLO Assessments generated a rich array of data. From these data numerous themes emerged. A vast number of the students lacked the requisite level of attentiveness to detail. Their lack of attention to detail manifested in three principal issues and potentially influenced another. A significant number of students lacked the specificity necessary for identifying the continents in the political map assessment. Large islands such as Greenland and Indonesia and significant islands such as Iceland and New Zealand were often not identified. Additionally, a majority of students had difficulty following multistep directions, often answering only the first step or question. This occurred primarily on the third section of the political map, all sections of the physical map, and the “Analyzing World Maps: Why There?” Lastly, several students supplied answers that may have been factually correct but were outside the question parameters.

The lack of precision and attention to detail may have influenced another theme. Various students seemed to not fully understand what some of the questions asked. Several of the students supplied an answer not germane to the question. For example, if the question asked for a country the student answered with a physical feature. A lack of attention to detail might have explained this as an oversight. It is also plausible that some of the students lacked an understanding of what the question asked and, therefore, wrote down guesses. I suspected that this was the case with several students, particularly those

with reading difficulties. Regardless of the genesis concerning either an oversight or a guess I perceived significant subject matter knowledge gaps.

Just about all of the student responses on the “Analyzing World Maps: Why There?” assessment illustrated significant subject matter gaps. These ranged from lack of geography vocabulary to difficulty understanding concepts like absolute location and the ability to apply latitude and longitude. Several students did not seem to know the difference between continents and countries or plains and peninsulas.

The themes mentioned directly above form building blocks to understanding geography and are mandatory to even begin trying to think like a geographer. The next two themes require more cognitive heft. Students struggled in assimilating conflicting information. When identifying a continent that fit into a list of criteria some students wrote down an answer that fit some of the criteria but completely did not fit into the other criteria. Perhaps the area of greatest difficulty was making connections between geographic concepts like climate or physical features to human decision making represented by population density or land use.

The Baseline SLO Literacy Assessment highlighted writing issues. Many of the student answers suffered from poor organization, awkward sentence structure lacking fluency, and a general lack of support either from the evidence (what they could see in the pictures or data from the numerous maps) or sentences explaining their ideas. Even the stronger writers did not include enough evidence-based support in their answers. Several factors including the nature of baseline assessment, my past experience, and the fact that it was the beginning of the school year led me to expect these results on the baseline SLO assessments. Students within the low motivation, low achievement group

comprised the bottom of the overall baseline assessment scores. Several of the students have been identified as below grade level readers. Kenny, Davon, DeSean, Peter, Rumi, and Brian all received services from the reading specialist throughout the school year. Kusa was recently released from ESL services and was still eligible for accommodations.

Geography Oriented Written Task #1

I had hoped to administer the first geography oriented written task early in the school year, but a few factors encouraged me to defer. Critical to teaching, especially given the age and transitional nature of sixth grade, relationships and comfort are critical. The beginning of the year activities I utilized that year required several teaching days. I strongly believe it was worth it given the relationship building and classroom culture that developed. Additionally, I was required to make use of baseline assessments for my evaluation. Fortunately, teachers in the district have the freedom to choose their assessments and the district social studies department developed a range of assessments designed to match common core curricula, including the range of geographic thinking assessments used for this study. Unfortunately, the series of assessments required over a week of instructional time to complete. In retrospect, I might have selected only the assessments (the two “Analyzing World Maps” and the argument writing assessment) that aligned better to my goals for the research study and my interest in how a teacher can straddle the gap between disciplinary and secondary school geography. Add to this class time required for the initial survey (completed in the media center on computers) and the never ending spate of schedule interruptions for pictures, grade-wide assemblies, and mandatory fire drills and I was already feeling the weight of the crowded curriculum I needed to teach. I figured that the students were already completing a baseline assessment

so I could delay the geographically oriented written task until it fit in with the flow of class and the curriculum.

January 9th the students completed the first geographically oriented written task. This task required the students to analyze three maps and marshal evidence to argue for the possible location of two ancient civilizations (Appendix E). I scored the task using the Geographic Reasoning Rubric (Appendix I) developed by the district social studies department. Period 2 averaged 12.6/24 raw score (2.1/4 based on a four-point rubric) and Period 4 averaged 10.2/24 raw score (1.7/4 based on a four-point rubric) on the first geographically oriented written task. Helen and Alan earned the highest scores (16.5/24; 2.75/4) and Kusa and Rumi earned the lowest scores (8.4/24; 1.4/4) for Period 2. Kendra (14.4/24; 2.4/4) earned the highest score and Davon, Peter, Laurel, and DeSean all earned the lowest scores (6/24; 1/4) for Period 4. Generally the responses demonstrated little geographic reasoning or support from the evidence. Students made a variety of assumptions about the development of civilizations and sometimes overlooked disconfirming evidence. For example, many students claimed that the tropical rainforest would be an excellent place for civilizations to develop because it is a warm, rainy climate would work well for agriculture. The sheer amount of rain and oppressive heat precludes the cultivation of important high calorie cereal crops such as wheat, barley, or rice that aided the development of civilizations. Moreover, the dense forests make land cultivation tricky. A dearth of substantive subject matter knowledge further eroded the students' ability to reason with geography. Numerous students did not treat the three maps as pieces of the same puzzle. They treated each map as a separate piece of evidence rather than fluidly moving among them. Lastly, a fair amount of students lacked

geographic empathy, introducing modern ideas such as tourism and money into their answers.

Table 5.3

Period 2 Geographic Oriented Written Task #1.

Period 2					
Student Name	First Written Task/4	First Written Task/24	Second Written Task/4	Second Written Task/24	Score Delta
Jerry	n/a	n/a			
Helen	2.75	16.5			
Alan	2.75	16.5			
George	2.6	15.5			
Munira	2.5	15			
Harriott	2.5	15			
Bill	2.5	15			
Rebecca	2.5	15			
Tracy	2.3	14			
Bob	2	12			
Mark	1.9	11.5			
Sonya	1.8	11			
Brian	1.75	10.5			
Odele	1.75	10.5			
Davis	1.75	10.5			
Summer	1.75	10.5			
Nathifa	1.75	10.5			
Fred	1.75	10.5			
Emma	1.7	10			
Kenny	1.5	9			
Odette	1.5	9			
Kusa	1.4	8.5			
Rumi	1.4	8.5			
Mean	2.1	11.3			

Table 5.4

Period 4 Geographic Oriented Written Task #1.

Period 4					
Student Name	First Written Task/4	First Written Task/24	Second Written Task/4	Second Written Task/24	Score Delta
Harry	2.4	14.5			
Ellen	2.4	14.5			
Kendra	2.4	14.5			
Finian	2.25	13.5			
William	2.25	13.5			
Darcy	2.25	13.5			
Ann	2.25	13.5			
Ron	2.1	12.5			
Carrie	2	12			
Luther	2	12			
Ophelia	1.8	11			
Hermione	1.8	11			
Luna	1.75	10.5			
Pete	1.7	10			
Jose	1.7	10			
Jeffrey	1.5	9			
Chrissie	1.4	8.5			
Joseph	1.3	8			
Ginny	1.3	8			
Austin	1.2	7			
Davon	1	6			
Peter	1	6			
Laurel	1	6			
DeSean	1	6			
Mean	1.7	10.5			

Primary Informants

I organized this section by results, starting with the highest score (George) and continued through to the lowest score (Ginny).

George scored a 15.5/24 (2.6/4) on the first written task. George established some aspects of geographic reasoning when he wrote that, “I think that 1 location that a Latin American civilization could start is in the land between the amazon and Madeira river.

One reason for this is that most ancient civilizations started between rivers.” George was essentially correct that most ancient civilizations developed along rivers and river systems. He located his other civilization between two other rivers. George went on to explain that rivers provide food and transportation to trade with other civilizations. While his answer contained the seeds of geographic thinking he scarcely mentioned other factors/evidence but stated that they are both good for food. George seemed to concentrate on one map and mentioned the others as boxes to check off.

Bill scored a 15/24 (2.5/4) on the first written task. He actually introduced all three maps in an introductory paragraph that attempts to explain what each map contributes as evidence. He based the location of the two ancient civilizations on elevation, climate, and vegetation. For the elevation (physical map) he stated that, “Brasilia most likely be a developed civilization because based on the elevation map, it is in an area no too high and not too low. This is an advantage because then they have a solid amount of almost-to-flat land.” Bill was correct that flat land is advantageous for the agricultural lifestyle that precipitated the development of civilization; however, he offered no further explanation or linking flat land to farming. Bill chose the savanna (first civilization) and Mediterranean (second civilization) vegetation and tropical wet/dry (first civilization) and highland (second civilization) climates as the other criteria to try and triangulate his civilization. As with elevation he provided no link between the characteristics and food cultivation other than that they were “good for farming, and other activities.” Additionally, Bill neglected to explain how civilizations developed with respect to geography. His answer reads like a list of facts rather than a cogent argument.

Harry earned a 14.5/25 (2.4/4) on the first written task. Harry integrated some pieces of geographic thinking,

I thought that a civilization would be made in x number 1 because there are low, flat lands over there. That would be good for farming. There is also the Amazon river which means you get fish and you could also do irrigation.

While his answer reads more like an essay than a list of facts, he, much like all of the other students, neglected to explain how these geographic phenomena would lead to the development of civilizations.

Ron scored a 12.5/24 (2.1/4) on the first written task. He provided some very good reasons such as the importance of farming, developing near water, fish, and a favorable climate, but just as with the other students he lacked details explaining how and he did not connect the maps together.

Hermione earned a score of 11/24 (1.8/4). Hermione lacked both subject matter knowledge and geographic thinking. She wrote that,

My second option would be Marmabondo because you have wide spread use and great climate for farming. You also have alot of buffalo hides to make tents and clothes out of animal hides. You aren't that close to the water but it does rain alot.

I would also pick it because it is near forest and you can get food and wood to make lots of things.

This part of her answer does show the slightest hint of geographic thinking with the use of wood from the forest and animal hides to make clothes and tents. However, it suffers from a lack of subject matter knowledge and map interpretation.

Fred earned a 10.5/24 (1.75/4). Fred suggested some good, solid reasons and curriculum learned in class, but offered barely an explanation. He wrote that,

Civilizations might develop between the Amazon River and the Madiera river because there is enough water to use for canal, and there is a tropical rainforest so you can cut down trees to build huts and also there are lots of areas with mud to make mud brick houses. There is also a low elevation, so you can farm easier without being bothered by hills.

Fred definitely incorporated aspects of content learned in class. While this is a good start, he does not explain or link any of his ideas. His answer is essentially a list in paragraph form. Furthermore, Fred failed to consider the disconfirming evidence of the tropical rain forest mention above.

Ginny scored an 8/24 (1.3/4) on the first task and seemed to misunderstand the directions. She answered very generally and did not actually write about any specific location. She only mentioned one physical feature (rivers) and that was only as an example of a physical feature rather than criterion for deciding where a civilization may have developed based on geographic evidence. Ginny later expressed in her first retrospective interview that,

DR: Ok. And the directions and the expectations for the task, were they pretty clear?

Ginny: Not really.

DR: Ok. Can you explain what was not clear about it, and what maybe you didn't quite understand?

Ginny: Well, if the wording was different, I think I would have understood it better.

Think-Aloud Verbal Protocol and Retrospective Interview

On the SLO map analysis assessments, SLO literacy assessment, and the Geography Oriented Written Task) Hermione (61%, 50%, 45% respectively) struggled with some misconceptions and supporting her ideas with geographic reasoning. Hermione was able to link civilizations to farming and a climate she thought facilitated agriculture for both of her ancient civilization locations. During the retrospective interview Hermione explained that the animal population was good for civilizations.

Hermione: The low, flat land and the climate all make both my places good to live because lots of tropical fish live in tropical places, like the two I picked. There are also a bunch of animals that you could eat or use for other purposes in the rainforest. You could use hides for clothes or even trade them.

While this did demonstrate some thinking about food and trade, she mistakenly connected her prior knowledge of North American Native Americans to South America and wrote that, “You have a lot of buffalo to make tents and clothes out of animal hides.” In her answer she conflated attributes from the Paleolithic (pre-farming hunting and gathering nomadic clans) with the Neolithic (agrarian based villages and civilizations) Moreover, she did not support either of those answers with any sort of explanation other than “. . . great climate for farming.” In fact, for her second civilization, Hermione did not even name the climate, let alone describe what about it made it “great for farming.”

On the Geographic Oriented Written Task #1 Bill wrote quite a lot of text. He actually wrote more than any other student across the two classes and directly references all three sources of geographic evidence (the maps I provided: physical feature, climate, and vegetation). He also attempted to link the geographic phenomena to human decision-making. However, his links and explanations were tenuous, never truly explaining how the geographic phenomena impacted the development of his two civilizations. It almost seemed that he knew the “facts” but did not understand the relationships and how to connect everything together. Bill did use the three maps in conjunction more than the other participants.

On the SLO map analysis assessments, SLO literacy assessment, and the Geography Oriented Written Task), George (45%, 25%, 65% respectively) struggled greatly with geography reasoning. He was able to make some inferences based on his prior knowledge combined with class content. For example, on the written task he located his ancient civilizations near rivers.

George: Um, because most ancient civilizations, I think, um, were, like, made or lived, uh, between or near to rivers. So, since rivers are low elevated areas, you, on, on a map, like a physical map you could look for lower elevated areas with lots of rivers near them as possible places where ancient civilizations could have lived.

However, his understanding was constrained by his lack of a spatial perspective and subject matter knowledge. Rivers may eventually flow through lower elevated areas as they run their course and empty into large water bodies; however, they begin high in the mountains and flow downward because of gravity. Moreover, rivers also provide many

other favorable conditions and resources. Without recognizing this, George has to look elsewhere to locate his civilizations. He incorporates the coast to provide food, in the form of fish, and transportation for trade that rivers already supply.

DR: Ok. Anything else on here that would help with your answer?

George: Um, it also probably might be near, uh, the coast line since that also is kind of near, that's also has a lot of water, where a lot of civilizations need food. Because, like water, like, you could use it as a lot of things. You could use it if you need water to survive. You can get food from, like, oceans. You can get, um, you can get, as like transportation. You could use it as, like, a trade route for other people to come and trade with your colony or place or group of people.

The following two exchanges with George illustrated his early neophyte geographic understanding:

DR: So what data did you find important in the maps to help you answer and complete the task?

George: Um, what the, uh . . . wait, what? Uh, uh, like, uh, I don't know. I mean . . . I mean I didn't really find anything, like, important or not important. Since you gave 'em to us I assumed that they were used to help us, so I guess . . .

DR: I mean specifically things on each map. Were there things that you were, like, "Ok that's not really that important" or things that were "that's really important"?

George: Uh, well . . . uh, well, no not really.

The fact that George did not find anything very important on the map, which he later confirmed, shows that he was only thinking within the map (Anderson & Leinhardt, 2002) and not able to use the map beyond its borders.

DR: Any suggestions you have for me, for the next time we do this?

Not the interview but the task. We'll do a similar task. Anything that would make it go smoother, anything like that?

George: Uh, not have us write an essay.

DR: Ok [chuckles]. And is that just because you don't want to write an essay?

George: No, it's because you, you can't really use, find a lot of the maps because, the maps don't really have anything to do with ci-, with, like, ancient civilizations, like, itself. It has more to do with, like, what is it called? Like, what is it called? Uh . . . [snaps fingers 6 times] . . . what is it called? I forgot. Like, just, like, the landscape of the place, so it kinda helps but not really. So it, you have to, you have to kinda more, like, use common sense or inference than use the maps to kind of write an essay or . . . (Emphasis mine)

George's thinking was very focused on the topic ancient civilizations and his evidence from the three maps was subtler. It needed comprehension, interpretation, and then application. George was constrained within the map and used them as separate pieces of evidence rather than conjoined to inform a better answer.

Fred (50%, 0, 44%) realized that rivers provided other advantages beside fresh water; especially fishing.

DR: You mentioned you could also see rivers. Does that help you?

Fred: W-, w-, why-, yes . . .

DR: Ok.

Fred: . . . because near bodies of water, that's where people mostly gather because of the resources near the water and in the water.

DR: What kind of resources do you think might be near the water and in the water?

Fred: Well, the thing is, you can farm along rivers, um people can farm along rivers and also, um, along rivers . . . and also, um, they can fish for fish.

DR: Ok. Good. Anything else?

Fred: No, that's it.

However, similar to George, Fred's lack of subject matter knowledge precluded his ability to fully reason with geography. Rivers provide so much more than fresh water and fish.

Harry (10%, 0, 60%) struggled with finishing the Baseline SLO Assessments. He labored through the first three assessments so much that he was unable to finish the second map analysis assessment ("Why There?"). However, his first written task showed potential. For his second civilization Harry addressed some of the important content: flat land for farming, a surplus of crops that free up people to specialize and create other (than farming jobs), and a climate favorable to agriculture. Harry started to link the

geographic phenomena (climate, water, landscape) to human decision-making (settling down to farm, specializing in other jobs). He needed to develop these ideas more and describe how all of these circumstances related while situating them within a location containing the favorable phenomena. Harry located his first civilization in an area that contained conflicting geographic phenomena. The dense nature of a tropical rainforest and the prodigious amount of rain makes it extremely difficult to farm the cereal grains that ancient civilizations depended upon.

Harry displayed a developing ability to interpret and integrate the various maps. During the retrospective interview Harry explained how he used the Tropic of Cancer and the Tropic of Capricorn to know that between them the climate had to be warm all year and that would help to grow crops. I thought that very prescient as we had yet to discuss the idea of a long growing season and its impact upon human settlement and the transition to an agrarian based development and economy. Harry also explained that he used information from the climate map to eliminate areas with arid, semi-arid, or highland climates, even though on other maps it seemed favorable. While Harry demonstrated these abilities he was not consistent in applying them to both civilizations.

Ron scored 43% on the SLO map analysis assessments, 0% on the SLO literacy assessment, and 53% on the Geography Oriented Written Task. His overall Baseline SLO content score (political map, physical map, “Where?”, and “Why There?”) score of 56% benefitted greatly from the more concrete assessments. He scored a 25% on the second map analysis assessment (“Why There?”). All of his answers on this assessment lacked any discernible geographic reasoning. He wrote down information, sometimes misinterpreted, gathered from the various sources of geographic evidence (maps). On the

first written task Ron listed important content discussed in class such as climate, access to water, and crops) but did not explain either their interconnectedness or impact on human decisions. Ron located his civilizations near the coast, not distinguishing the difference between salt and fresh water.

Ron also struggled to perceive and incorporate any conflicting evidence from the maps. He located one of his civilizations in Brazil, noting agricultural benefits of the precipitation in tropical wet climate but neglecting to include the dense rain forest that precluded Neolithic farming. The exchange below underscores Ron's inability to discern conflicting information.

DR: And did the maps, um, provide any conflicting data? So one map said something that you thought, 'Oh, this might be a good place for civilization,' and then another map in the same location had information that might be bad for civilization, so you had a conflict.

S: Um . . .

DR: Did you find that at all? If you didn't . . .

S: No.

Ginny (54%, 0, 33% respectively) seemed to experience a lot of difficulty reasoning with geography. Actually, she expressed that she didn't use the evidence from the maps to inform her answer. The exchanges below further reveal this obstacle.

DR: So how did the physical features, the information you can get from this map -- elevation, the physical features, you mentioned rivers,

um -- how did that help you figure out where to put your civilizations, if it factored into your answer?

Ginny: I'm not sure.

DR: And specifically, so, what did you use? Like if you were, when you were locating your civilizations, what information about the vegetation did you use to help inform your answer?

Ginny: I'm not sure.

DR: Ok.

DR: Ok. If you could please tell me how the information that you can learn from this map helped you in your answer to the task.

Ginny: I'm not sure if I wrote it, but I said I could use those answers on the back to locate the civilizations.

DR: So, what I hear, hear you saying is that you can use the climate information to help you locate the civilizations. Can you possibly be more specific? It doesn't have to be what's in your answer, um, but just what do you think? So, for example, um, did any of the climates help you to figure out where you would locate the civilization? Like, did this information make a difference for you in where you put the civilization?

Ginny: It could.

DR: Can you give me an example, even if it's not something you put in your answer?

Ginny: I'm not sure.

DR: Ok.

Perhaps Ginny was very nervous to interview, as she began the year extremely shy and appeared almost scared when called upon to offer her opinion during discussions or answers to questions. Nevertheless, her actual answer to the first geography oriented written task show a subsequent lack of geographic reasoning. Her answer essentially stated that the evidence (physical features, climates, and vegetation) helped to determine where an ancient civilization would be located because every place was located in a place that has some kind of climate, some type of elevation, and some type of vegetation and you need to know where they are so knowing these will help you determine where the civilization developed. No details or specific examples were provided.

Emerging Themes

Lack of subject matter knowledge (geography content) and geographic perspectives constrains the students' abilities and effectiveness with geographic reasoning. They did not have the information to draw upon in order to use their geography skills to their full potential. Without enough subject matter their inference and analytical potential was limited and remains superficial and inconsistent. The lack of adequate subject matter knowledge often prevented the students' from calling upon necessary information to make geographic connections and causal relationships. This came through on both the SLO assessments and the first geographically oriented written task.

Using maps separately rather than together creates a choppy and incomplete understanding of the geographic connections between humans and their environment. All students experienced great difficulty on the second map analysis SLO assessment

(Analyzing World Maps: Why There?). Period 2 averaged a 7/28 (25%) and Period 4 averaged a 6.2/28 (22%). Many of the students could not answer the first part of each assessment item that required utilizing multiple maps to identify either a human decision or geographic phenomena. Moreover, all students across both classes poorly explained, if at all, the connections between the geographic phenomena and the human decision. In other words, they could not sufficiently explain how physical features and/or climate might cause a certain population density or particular land use. This required students to apply the information gathered across multiple maps.

Trying to simultaneously collect data and teach the curriculum from a more disciplinary approach created tension between teacher and researcher roles. The researcher in me wanted to take my time and collect data very deliberately and make sure the order of things fit in well with my research agenda. The teacher in me wanted to get on with the crowded curriculum. The sheer load of the curriculum constantly weighed upon me and impacted some of my pedagogic choices. Sometimes I felt that the two roles got in each other's way.

Writing issues emerged throughout the study in the form of actually having to teach the students the proper way to write an essay based upon evidence. The low motivation, low achievement group of students scored the poorest with the other three groups interspersed throughout. Even though the high motivation, low achievement group was mixed with the other groups, they tended to fall on the bottom half of the scores. The baseline SLO literacy assessments severely lacked supporting evidence. The first geographically oriented written task also lacked supporting evidence. I had to teach the students how to organize, support, and write an essay that flowed logically and included

an explanation of how and why, essentially teaching them how to include a level of analysis. Although this is necessary and valuable in class, taking the time to do so for the assessments used in the study further eroded the time spent directly on the curriculum. After each SLO series was graded I reviewed the two analysis assessments with each class. We spent a lot of time working on how to dissect a question, making sure students actually understood what the question was asking. We also walked through the process of interpreting the different maps and putting the information altogether. Once again, this process was extremely time consuming.

Student Learning Outcome Assessments: End of Year

On May 13th students sat for the third and final SLO assessment. Much like the baseline assessment taken at the beginning of the year, the end of year assessments required more than a full week of instructional time. Period 2 averaged 81% on the four content assessments and Period 4 averaged 80%. Further parsing out the SLO assessment scores yielded a 93% and 97% averages respectively for the political map assessment. As noted above, this particular assessment required very little in the way of cognitive ability and reasoning. The students need only identify numbered countries in Asia and then color code each sub-region (Central, South, East, and South East) of Asia. The student atlases contained separate maps of each Asian sub-region and the assessment itself grouped the countries together by region. All students in both classes answered the first part with almost flawless accuracy, while a few students (Kusa, Summer, Sonya, Kenny, Ginny, and Kendra) in each class had difficulty color-coding the sub-regions accurately.

The students averaged 89% for Period 2 and 88% for Period 4 on the physical map assessment. This assessment asked more from the students in terms of finer detail

and multi-step directions but the information was still mostly concrete. All of the students in both classes scored above a 70% except three (Rumi, Davon, DeSean). Given the amount of map work and spatial practice done throughout the school year, the improvement of 48 and 34 percentage points respectively for the political map assessment and 32 and 25 percentage points for the physical map assessment were not surprising. In fact, the students' scores even increased significantly on the mid-year SLO assessments for the political and physical maps.

Student average scores increased for map analysis assessment (Analyzing Maps of Asia: Where?) by 11 and 23 percentage points respectively for a final average of 73% for Period 2 and 78% for Period 4. Generally the students exhibited improvements in decoding the question and interpreting the necessary map(s). In Period 2, five students (Helen, Kenny, Kusa, Rumi, Odette) and four students (Davon, Luna, Jose, DeSean) from Period 4 scored below a 70%. The final content assessment (Analyzing Maps of Asia: Why There?) had the lowest class averages 69% and 65% respectively, but also some of the most significant growth at 44 percentage points for Period 2 and 40 percentage points for Period 4.

Just as in the first map analysis assessment, students proved more adept at decoding the question and understanding what was being asked. A steady diet of deconstructing questions over the course of the school year in multiple subjects greatly aided their abilities. This alone does not explain the improved scores. Students also enhanced their facility in interpreting and linking multiple maps in order to answer and explain multiple step assessment items by making stronger connections between geographic phenomena and human reaction. A deeper pool of subject matter knowledge

augments this as well. While fewer students achieved a 70% on this assessment than the other three, the vast majority of students improved their scores.

Students' scores saw significant gains on the SLO literacy assessment. Period 2 averaged 69% for an increase of 36 percentage points and Period 4 averaged 61% for an increase in 44 percentage points from the beginning of the school year. The improved SLO literacy scores benefited from multiple potential factors. Since this was the third administration of the series of assessments, the "practice principle" most likely helped. Furthermore, with all disciplines throughout the district adopting Common Core the students allegedly receive more critical thinking activities and argument style writing in their classes. In fact, all students receive direct instruction in argument writing through both their social studies and English language arts courses. Lastly, all through geography this year I stressed discussion and activities designed to stimulate geographic reasoning and analyzing human decision-making through the spatial and ecological perspectives of geographic phenomena.

Table 5.5

Period 2 SLO End of Year Assessment.

End of Year - Quarter 4, 2014-15 - Mr. Rosenstein								
	SLO: Content						SLO: Literacy	
Period 2	Political Map 29 points	Physical Map 44 points	Analyzing World Maps: Where? 25 points	Analyzing World Maps: Why There? 42 points	Total	%	Where in the World? 4 points	%
Bill	28	42.5	25	42	137.5	98%	4	100%
Emma	29	44	22	34	129	92%	3	75%
Munira	29	44	23	31	127	91%	3	75%
Tracy	29	41	25	30	125	89%	3.5	88%
Mark	27.5	43	21	32	123.5	88%	3.5	88%
Odele	25	44	19	35	123	88%	3	75%
Rebecca	28.5	44	18	32	122.5	88%	3	75%
Nataifa	28.5	41	19	32	120.5	86%	2	50%
Allan	28.5	34.5	18	38	119	85%	4	100%
Bob	28	41	19	30	118	84%	2.5	63%
Fred	27	35	21	35	118	84%	1	25%
Sonya	22	43	19	34	118	84%	3	75%
Brian	25.5	41	18	29	113.5	81%	2	50%
Summer	25	40	20	28	113	81%	3	75%
George	27.5	38.5	18	26	110	79%	4	100%
Helen	28.5	42.5	13	23	107	76%	4	100%
Odette	27.5	36	10	29	102.5	73%	2	50%
Kusa	24	41	14	23	102	73%	1.5	38%
Kenny	22	33	13	20	88	63%	2	50%
Rumi	28	11	12	0	51	36%	1	25%
Averages	27	39	18	29	113	81%	2.75	69%

Table 5.6

Period 4 SLO End of Year Assessment.

End of Year - Quarter 4, 2014-15 - Mr. Rosenstein								
	SLO: Content						SLO: Literacy	
Period 4	Political Map 29 points	Physical Map 44 points	Analyzing World Maps:Where? 25 points	Analyzing World Maps: Why There? 42 points	Total	%	Where in the World? 4 points	%
Harry	29	43	25	42	139	99%	N/A ⁸	N/A
Ellen	29	43	25	35	132	94%	4	100%
Hermione	28.5	43.5	23	35	130	93%	3.5	88%
Finian	28.5	44	23	33	128.5	92%	4	100%
Ann	28.5	41.5	23	35	128	91%	1	25%
William	29	40	23	35	127	91%	2.5	63%
Austin	29	44	23	29	125	89%	4	100%
Ron	29	42	20	34	125	89%	2.5	63%
Darcy	29	43	19	33	124	89%	3	75%
Joseph	29	39	21	33	122	87%	3	75%
Carrie	29	39.5	20	33	121.5	87%	3	75%
Ginny	25	43	20	31	119	85%	2.5	63%
Luther	28.5	38	20	30	116.5	83%	0	0%
Jose	28.5	39	16	32	115.5	83%	2.5	63%
Kendra	25	36	22	32	115	82%	3	75%
Ophelia	29	39	21	23	112	80%	2	50%
Jeffrey ⁹	27	40	22	23	112	80%	N/A	N/A
Chrissy	29	44	18	7	98	70%	0%	0%
Luna	26.5	34	13	24	97.5	70%	2.5	63%
Pete	29	38.5	18	11	96.5	69%	3.5	88%
Davon	29	29	12	20	90	64%	2	50%
Peter	27.5	31	9	11	78.5	56%	2.5	63%
Laurel ¹⁰	28.5	37	N/A	N/A	65.5	47%	2.5	63%
DeSean	28.5	17.5	10	8	64	46%	0	0%
Averages	28	39	19	27	112	80%	2.55	61%

⁸ Harry was absent for the Literacy SLO and neglected to make up the assessment.⁹ Jeffrey was absent for the Literacy SLO and neglected to make up the assessment.¹⁰ Laurel was absent for the duration of the two map analysis assessments and neglected to make them up.

Primary Informants

I organized this section by results, starting with the highest score (Harry) and continued through to the lowest score (Fred).

Harry achieved stellar results across the board on the End of Year SLO battery of assessments. He topped the list of combined content results scoring at the top of the 90%-99% range. His scores increased across the battery of assessments. He increased the political map assessment from 79% to 100%, the physical map assessment from 17% to 98%, the first map analysis assessment from 29% to 100%, and the second map analysis assessment from 0% to 100%. Also like Bill, Harry put forth a tremendous effort throughout the school year, completing the vast majority of his assignments, participating in all class discussions and activities, and attacking his work with a disciplined level of focus. Harry constantly asked clarifying questions if he was unsure of a concept or idea. Harry did not complete the baseline map analysis assessment, but an appraisal of one of his end of year answers underscores his geographic reasoning.

End of Year: (2.) Compare the population densities in the western and eastern halves of China. How do physical features and climate help to explain why they are so different?

Harry: West mostly have 0 to 5 people per square mile and some 5 to 50 people per square mile. East is mostly 250 people per square mile. The west is mostly a highland climate while east is mostly humid subtropical. The west has Himalayas and desert and semi-desert while the east has trees like needle leaf forests. These population densities are so different because one major thing is farming. In

highlands (west) it is colder and rocky from the highlands. The west has desert and semi-desert. That is good only for nomadic herding. The east is good for commercial farming. The better climate, elevation in the east make it more densely populated. You can use the land more than in mountains and deserts.

Harry's response lacked the inclusion of rivers. He could have also discussed the idea of jobs and possibly an economy as well; though, he did provide enough accurate interpretation and connection for the assessment item. Harry was absent for a few days during the assessments and did not take the literacy assessment.

Bill also achieved stellar results across the board for the SLO end of year assessments. His combined content score was an impressive 98%. He raised his score on every assessment. He increased his political map from 64% to 97%, physical map from 92% to 97%, the first map analysis from 79% to 100%, the second map analysis from 43% to 100%, and his literacy score from 25% to 100%. Bill benefitted from the same opportunities listed above, but he also applied himself with discipline and vigor completing all assignments and actively participating in all aspects of class. The following two assessment items (HCPSS Social Studies Department, 2013) and Bill's answers illustrate the growth and depth of his geographic reasoning.

Baseline: (9.) Name the two continents that have the most area of "no widespread use". How does climate help to explain why?

Bill: North America and Africa. Climate may help because it shows places where people may not prefer so which may lead to no widespread use.

End of Year: (2.) Compare the population densities in the western and eastern halves of China. How do physical features and climate help to explain why they are so different?

Bill: In eastern Asia, there is a lot of population. In western there is very few. In western Asia there is a lot of desert, which is not famous for living in. Plus, the climate's mostly desert and highlands. It has a lot of mountains that are not famous for living in also. Eastern Asia, however, has continental hot summers and humid subtropical climates. It also has a lot of cropland, grassland, and forests which are good for people to live because you can grow food, get supplies like wood, and have jobs for people to make money.

Not only was Bill's second answer significantly longer but it also includes accurate supporting details linking physical features (deserts and mountains in the west and cropland and grassland in the east) and climate (desert and highlands in the west and humid continental and humid subtropical in the east) to the stark population density differences in China. Other than the substitution of Asia for China the answer was accurate and fulfills the requirements of the assessment. As Bill's level of geographic analysis deepens, I would expect to see the inclusion of rivers and perhaps some more development of the "jobs" idea.

Hermione rounds out the three primary informants with a combined content assessment score in the 90%-99% range. She improved along the same trajectory as Bill save for the second map analysis assessment ("Why There?"), which was not as sharp of

an increase. Hermione's scores improved for all assessments except for one that essentially remained static. Her political map assessment increased from 79% to 98%, the physical map from 94% to 97%, the second map analysis from 46% to 83%, and literacy from 50% to 88%. Her first map analysis assessment actually decreased by one percentage point from 93% to 92%. A comparison of items from the baseline and end of year assessments for Hermione exemplifies her growth in terms of map analysis, inference, and application of geographic information.

Baseline: (9.) Name the two continents that have the most area of "no widespread use". How does climate help to explain why?

Hermione: North America and Europe because its covered in frost.

End of Year: (3.) For a travel guide of my country, I write: Our climate is mild seasonal with cold winters and warm summers. Our capital city has over 250 people per square mile and offers attractions of an urban life, like shopping, museums, and entertainment. The northern part of our country offers winter hobbies, like skiing, because of the high elevations. I also include a map of islands that make up my country. Which country am I writing about and why do you think so?

Hermione: The country this person lives in is Japan. I think this because it is an island with little ones called Ryukyu Islands. It also has high elevations like Mt. Fuji but is very dense in population. They also have lots of attractions in the mountains and in the southern part. They're climates fit the requirements.

While her second answer could benefit from some more specific examples of the climates and how they match the criteria, it fits the assessment criteria. Plus, her second answer is a vast improvement from the first answer on the baseline assessment.

Ron came close to an overall content assessment score in the 90%-99% range. He was the top primary informant within the 80%-89% range with a combined content score of 89%. He increased his scores for all of the assessments except the first map analysis, in which his score essentially remained the same, increasing by only one percentage point. In fact, much like the Harry and Bill achieved a very sharp increase in his score (more than doubling). Ron's political map assessment increased from 75% to 100%, the physical map from 58% to 95%, the first map analysis from 79% to 80%, the second map analysis assessment from 25% to 80%, and literacy from 0% to 63%. The same two assessment items (HCPSS Social Studies Department, 2013) that I used for most of the primary informants and Ron's answers illustrate the growth and nature of his geographic reasoning.

Baseline: (9.) Name the two continents that have the most area of "no widespread use". How does climate help to explain why?

Ron: Asia and Africa have the most area. Climate is filling the whole continent and is showing how tall they are compared to continents.

End of Year: (2.) Compare the population densities in the western and eastern halves of China. How do physical features and climate help to explain why they are so different?

Ron: The Western half of China has only 0 to 5 per square mile or 5 to 50 per square mile. The Eastern half has mostly over 250 people

per square mile. The climate map tells me that the Western side has highlands and desert climate which are bad places to farm while the Eastern side has humid subtropical which is good for farming. The physical features help because it shows that the West half was mountains which are bad for growing crops while there aren't mountains in the east side.

As with other informants, Ron's end of year answer demonstrated much more thought, subject matter knowledge, and details. It also seemed as though he did not quite understand the baseline assessment item. His answer for that does not quite make sense. There was marked growth; however, his answer still lacks the requisite development and linking of the physical geography to human results. He mentioned that certain climates were bad or good for farming but neglected to explain how.

Ginny improved on all assessments except for the first map analysis. She also earned an overall content score of 85% placing her squarely in the middle of the 80%-89% range. She increased her political map assessment from 38% to 86%, physical map assessment from 56% to 98%, the second map analysis assessment from 36% to 74%, and literacy from 0% to 63%. She fell from 89% to 80% on the first map analysis assessment. Examining Ginny's answers to the same two assessment items as Bill and George (HCPSS Social Studies Department, 2013) one can trace the arc of her growth and the increasing depth of her geographic reasoning.

Baseline: (9.) Name the two continents that have the most area of "no widespread use". How does climate help to explain why?

Ginny: They are Asia and Africa. Climate helps to explain why because, I think widespread deals in places with hot climates, and Asia/Africa have hot climates.

End of Year: (2.) Compare the population densities in the western and eastern halves of China. How do physical features and climate help to explain why they are so different?

Ginny: More people live in the Eastern half of China, and less people live in the western half. Physical features may help to explain that, since most of the Western half has a highlands climate, meaning, it varies with the elevation. The Plateau of Tibet/Tien Shan are physical features with high elevations and are in China. People may not like climate that is caused by the physical features, so that's probably the reason for the different population densities. Most of the Eastern half has a humid subtropical climate, meaning that there are humid summers/cool winters. People may be able to live with that climate, so they move to the Eastern side. Also, there are more resources that are provided by the physical features.

In her second answer Ginny accessed and employed much more subject matter knowledge. She even started to connect certain physical features with human outcomes. However, she ascribed the population density to people moving to an area because they might like the environment there better rather than the harsh geographic reality of scratching out a living in the desert or lack of opportunities in the highest mountains.

Essentially she has yet to grasp that certain geographic phenomena make high population densities terribly problematic.

Fred, much like Ginny, improved his scores results on all of the assessments except one. Also similar to Ginny, he placed in the middle of the 80%-89% combined content assessment score with an 84%. Fred increased his political map assessment from 57% to 93%, the physical map assessment from 75% to 80%, the second map analysis assessment from 29% to 83%, and the literacy assessment from 0% to 25%. Once again, similar to George, Fred's first map analysis score decreased from 93% to 84% while his second map analysis score increased significantly. Fred exhibited a deeper level of thinking than George but still lacked adequate explanation and links between the geography and outcome. Fred had difficulty linking human decisions to geographic causality. Similar to George, Fred's answers to the two assessment items below, from the end of year second map analysis, show his ability to infer from multiple maps (first answer). But he had some difficulty causally connecting the physical geography to human decisions.

End of Year: (3.) For a travel guide of my country, I write, Our climate is mild seasonal with cold winters and warm summers. Our capital city has over 250 people per square mile and offers attractions of an urban life, like shopping, museums, and entertainment. The northern part of our country offers winter hobbies, like skiing, because of the high elevations. I also include a map of islands that make up my country. Which country am I writing about and why do you think so?

Fred: I think you are writing about Japan because it has high elevations, a colder climate to the north, lots of urban areas and attractions, and made up of islands.

End of Year: (4.) What type of land use is found in Bangladesh? How might climate explain why?

Fred: In Bangladesh, land is used for crops. Climate explains it because it has a tropical rain forest climate that is warm all year. In a modern world, people might have cut down trees for that kind of land use.

Fred adroitly synthesized information from several (at least four) maps to match the proper criteria and come up with Japan. His explanation could have provided more detail but was sufficient to demonstrate understanding. In Item Four, Fred exhibits some subject matter knowledge and even a bit of spatial thinking. However, he lacked enough explanation and analysis to adequately connect climate to land use.

George followed in the footsteps of Fred and George by improving on all assessments except for the first map analysis. George barely fell out of the 80%-89% range for the combined content assessments with a 79%. He increased his political map assessment from 64% to 95%, his physical map assessment from 83% to 88%, his second map analysis score from a 25% to 62%, and his literacy assessment from 50% to 100%. Only his first map analysis assessment decreased from 79% to 72%. One possible explanation for three of the primary informants' scores to decrease might be that the assessments were designed to increase in difficulty through the year. Another potential reason might involve the fact that their baseline scores were very strong (79%, 93%, 89%

respectively) on a smaller scale assessment (the baseline was out of 14 points and the end of year was out of 25 points). While George improved his second map analysis assessment dramatically, he still struggled to put everything together and articulate a good causal explanation for the link between geographic phenomena and human decision-making. Below I included answers from George to the same questions answered by Bill and Ginny above:

Baseline: Anartica and Canada are the least widespread use because that area of the world is very cold.

End of Year: The reason western China has a lower population density than eastern China is because most of Western China is a part of the plateau of Tibet leading into the mountains and people don't live in the mountains but will live on the coast of Eastern China.

The seeds of making the connections seem more present but still raw and developing in George's case.

Emerging Themes

The Baseline SLO Assessments yielded a rich lode of data from which I extracted several themes. I list these here and then address each with respect to the End of Year SLO Assessments. The themes that emerged out of the Baseline SLO Assessments were the following:

- A lack of attention to detail that manifested in incomplete map labeling, failure to follow multistep directions, and answers outside the question parameters
- Not understanding various questions
- Subject matter gaps

- Inability to assimilate conflicting information
- Inability to make meaningful connections between geographic phenomena to human decision-making
- Various writing issues including organization, clarity, and a lack of supporting details from the evidence

Overall the students seemed more focused on the details of the End of Year SLO Assessments than on the Baseline SLO Assessments. The significant improvement for both classes on the political and physical map assessments suggests that students better attended to the details. The first two assessments required labeling maps using the desk atlas as an aid. As long as the students minded the small details and multistep directions the answers were all provided in the desk atlas. The improvement also suggests that students became more adept at map interpretation. Furthermore, on the analysis map assessments (“Where?” and “Why There?”) most student answers, whether correct or not, more closely matched the question parameters. Lastly, paying closer attention to details would seem to cut down upon the oversight issue mention in the Emerging Themes section for the Baseline SLO Assessments.

The improved scores and more complete answers on the two analysis assessments seem to point towards a greater understanding of the assessment questions. The students who struggled with reading still struggled with figuring out exactly what some of the more challenging questions asked. This may help to explain why the end of year map analysis assessment results showed significant separation from highest (Bill, Harry, Tracy) to lowest (DeSean, Odette, Rumi) scores. A deeper cache of subject matter knowledge augments better understanding of the assessment questions as students

understood key vocabulary words within each question more successfully than on the baseline assessments. As an example, in the previous section, the comparison of Ginny's two answers demonstrated her increased subject matter knowledge and understanding of a complex question.

The increased subject matter knowledge more favorably positions the students to deal with the cognitive heft of geographic reasoning. Students on the whole were better able to assimilate conflicting information. This was demonstrated through the improvement of answers on questions that required students to examine several maps and sort through a plethora of data, some complimentary and some conflicting. While the students improved on making connections between geographic phenomena and human decision-making, this was an area in which most students struggled. Both classes improved their averages on the "Analyzing Maps of Asia: Why There?" by significant margins: 44 percentage points for Period 2 and 40 percentage points for Period 4.

However, the overall average for both classes remained below the 70% threshold. The low motivation, low achievement group of students scored at the bottom for the two classes. Kenny, Rumi, Davon, Peter, Lauren, and DeSean all scored below the 70% threshold. Odette and Kusa scored slightly above that benchmark but were significantly aided by the two non-analytical assessments. George's answer to one of the "Why There?" assessment questions illustrates the growth and the continuing difficulty with explaining geographic causality. George connected the difference in population density to physical features but neglects to explain why mountains inhibit high population densities.

Lastly, the dramatic increase (36 percentage points for Period 2 and 44 percentage points for Period 4) in the End of Year SLO Literacy Assessment reveals a marked

improvement in the students' writing. Bill's argument writing on the literacy assessment exemplifies the improvement in terms of fluency and inclusion of accurate, detailed supporting evidence marshaled from both the picture and the map evidence. Nevertheless, while they improved, many students still experienced great difficulty articulating a cogent argument as shown by the mean for both periods still below the 70% threshold.

Geography Oriented Written Task#2

On June 11th both Period 2 and Period 4 sat for the second geography oriented written task. This task mirrored the first geography oriented written task but was situated in a different location on the surface of Earth. However, this task also contained a second question. The second question asked the students to generalize about the development of ancient civilizations and describe the factors that determine where civilizations develop. Period 2 averaged an 18.3/24 raw score (3.05 on a four-point rubric) and Period 4 averaged an 18.5/24 raw score (3.1 on a four-point rubric)). Helen earned the highest score (24/24; 4/4) and Odette and Kenny earned the lowest score (9/24; 1.5/4) for Period 2. Harry and Darcy (24/24; 4/4) earned the highest scores and DeSean (6/24; 1/4) earned the lowest score for Period 4.

Generally speaking the students scored significantly higher. Period 2 increased their average raw score by 7 points and Period 4 by 8.5 points. Every student in Period 2 except Kenny, Odette, and Jerry experienced growth. Kenny and Odette's scores remained the same and Jerry came midway through the year and did not participate in the first written task. Fred's score improved the most with an almost 10 point increase. Every

student in Period 4 except DeSean achieved some improvement in their scores. Ginny's score improved the most with a dramatic 14-point increase.

Just about every student also significantly increased the amount of writing for the second task. While this does not translate to a better answer, it does show evidence of more subject matter knowledge. Increased subject matter knowledge allows for more retrieval of information to explain in more detail and even to analyze and judiciously marshal appropriate evidence while disregarding various locations due to conflicting or disconfirming facts. Considerably more students included the length of growing season, fertile soil, and the Agricultural Revolution into their arguments and explanations. Furthermore, a sizeable number explained the geographic phenomena responsible for the long growing seasons and fertile soil. A few explained the impact of the Agricultural Revolution directly mentioning the concept that one could farm for many, which in turn, because of the favorable environmental conditions, led to enough food to support a larger population that additionally freed people up from agricultural toil in order to invent and specialize in different jobs. This led to the growth of a complex economy with luxury pursuits and a social structure that undergirded early civilizations. Most students wrote about parts of the Agricultural Revolution without describing it in detail or actually naming it. Some students still struggled with incorporating enough subject matter knowledge or finding a way to sufficiently integrate it into an account of the development of civilizations.

For the second written task, more students referred directly to the evidence citing page numbers and map titles. One fundamental issue that came through during the first written task was treating each map separately and not really integrating them as pieces in

a puzzle. This, it seems, coupled with a severe lack of subject matter knowledge influenced students' ability to consider and apply disconfirming evidence. For the second written task, more of the students seemed to deftly combine the maps. For example, Jose (raw score increased by nine points) wrote that,

This is because of the steppe (semi-desert climate). It is hot all year with very little rain. But since the Godavari river is near the Himalayas, the river can flood because of the snow melting in the highlands giving fertile soil and water for crops.

Ellen (raw score increased by eight points) also blended the maps together in order to inform her answer. Perhaps Darcy (raw score increased by over ten points) integrated the evidence from the various maps the most seamlessly. She wrote that,

The climate map shows that the area has a desert climate but provides good cropland (vegetation map: my addition), due to the 3 rivers that conjoin there. The physical map shows that the rivers come from the Himalayas and then come together to form the river, this means that in warmer seasons the river would flood, providing good resources.

Darcy not only weaved together the three maps but also added subject matter knowledge to connect the evidence to the development of civilizations.

Table 5.7

Period 2 Geographic Oriented Written Task #1 and #2.

Period 2					
Student Name	First Written Task/4	First Written Task/24	Second Written Task/4	Second Written Task/24	Score Delta
Helen	2.75	16.5	4	24	+1.25
Bill	2.5	15	3.8	23	+1.3
Harriott	2.5	15	3.75	22.5	+1.25
Rebecca	2.5	15	3.75	22.5	+1.25
Alan	2.75	16.5	3.7	22	+1.2
George	2.6	15.5	3.7	22	+1.1
Jerry	n/a	n/a	3.7	22	n/a
Tracy	2.3	14	3.6	21.5	+1.3
Emma	1.7	10	3.5	21	+1.8
Fred	1.75	10.5	3.3	20	+1.55
Munira	2.5	15	3.2	19	+0.7
Summer	1.75	10.5	2.9	17.5	+1.15
Bob	2	12	2.9	17.5	+0.9
Odele	1.75	10.5	2.8	17	+1.05
Davis	1.75	10.5	2.8	17	+1.05
Nathifa	1.75	10.5	2.8	17	+1.05
Sonya	1.8	11	2.75	16.5	+0.95
Brian	1.75	10.5	2.7	16	+0.95
Kusa	1.4	8.5	2.7	16	+1.3
Mark	1.9	11.5	2.6	15.5	+0.7
Rumi	1.4	8.5	2.2	13	+0.8
Kenny	1.5	9	1.5	9	0
Odette	1.5	9	1.5	9	0
Mean	2.1	11.3	3.05	18.3	+1.02

Table 5.8

Geographic Oriented Written Task #1 and #2.

Period 4					
Student Name	First Written Task/4	First Written Task/24	Second Written Task/4	Second Written Task/24	Score Delta
Harry	2.4	14.5	4	24	+1.6
Darcy	2.25	13.5	4	24	+1.75
Hermione	1.8	11	3.8	23	+2
Ellen	2.4	14.5	3.75	22.5	+1.35
Ginny	1.3	8	3.7	22	+2.4
Finian	2.25	13.5	3.7	22	+1.45
Carrie	2	12	3.7	22	+1.7
Ron	2.1	12.5	3.4	20.5	+1.3
William	2.25	13.5	3.3	20	+1.05
Luther	2	12	3.3	20	+1.3
Kendra	2.4	14.5	3.3	20	+0.9
Jose	1.7	10	3.2	19	+1.5
Ann	2.25	13.5	3.2	19	+0.95
Joseph	1.3	8	3.1	18.5	+1.6
Pete	1.7	10	3.1	18.5	+1.4
Chrissie	1.4	8.5	2.9	17.5	+1.5
Luna	1.75	10.5	2.8	17	+1.05
Peter	1	6	2.8	17	+1.8
Jeffrey	1.5	9	2.75	16.5	+1.25
Ophelia	1.8	11	2.4	14.5	+0.6
Laurel	1	6	2.4	14.5	+1.4
Davon	1	6	1.9	11.5	+0.9
Austin	1.2	7	1.9	11.5	+0.7
DeSean	1	6	1	6	0
Mean	1.7	10.5	3.0	18.4	+1.3

Primary Informants

Bill increased his raw score from 15/24 on the first written task (2.5/4) to 23/24 (3.8/4) on the second task. Bill's greater cognitive repository of subject matter knowledge allowed him to satisfactorily support and connect the evidence. The following excerpt

from Bill's answer displays his deeper subject matter knowledge and greater ability to gather together the different strands of evidence in order to weave a cogent argument.

Based off the climate map (pg. 159), the #1 area receives a savanna (tropical wet and dry) climate. This climate is favorable for a civilization to develop because there is a 9 month growing season. It receives 9 months of warmth and precipitation all year which provides a long-growing season. The precipitation (rain) is a good amount to hydrate crops for farming. Farming uses domestication of plants and animals. This leads to surplus's (extra food). Now 1 can farm for many. People will get better diets. Less people will die, but there will be more births. This way the population will boom! Now people have a lot of freetime, so they do jobs, called job specialization. A complex economy has started or a developed civilization.

Bill continues to define a second location based upon flat grassland with a Savanna climate using similar explanations and justifications. He then generalizes using basic human needs as an organizing idea from which to explain the conditions likely to produce civilizations.

George increased his raw score from a 15.5/25 (2.6/4) on the first written task to a 22/24 (3.7/4) on the second task. The most striking thing about George's second written task was the answer length. On the first assessment, George wrote about two-thirds of an unlined piece of paper in large handwriting. Moreover, in the retrospective interview after the first assessment he complained about the writing on the assessment. Clearly, George did not look forward to writing and would rather verbalize his answers. As I mentioned previously, he often rushed through his work to slake his prodigious thirst for reading for

pleasure. For the second written task George used lined paper (his choice) and completed two-and-one-half pages in (for him) neat handwriting. George supported his reasons more thoroughly than in the first written task and integrated the maps better, although he could still improve upon that a bit. George shines more through his generalizations of the factors that led to the development of civilizations. His explanation of the importance of vegetation encapsulates the growth that George experienced.

The reason I think the vegetation are important because vegetation directly effects farming. If you farm in the tundra it would be to cold if you farmed in a coniferous or broadleaf forest there is no space and not enough of stuff plants need to survive because the huge trees will block it out. Also, it effects where you can grow your crops, you don't want to grow them in the desert scrub because only certain plants can grow there. You would want to plant crops on a vegetation like chappral or grassland because its flat land, which is good for planting and there are no huge trees to block out what plants need to grow.”

This excerpt is rife with spelling and writing convention issues. Some teachers might take issue with the quality, but his improved geographic thinking shows through.

Fred improved his raw score from a 10.5/24 (1.75/4) on the first task to a 20/24 (3.3/4) on the second task. In the second retrospective interview Fred admitted that during the first written task he was thinking about lunch. His score seemed to corroborate this. While the answer to his second task still lacked some integration of the evidence and a rich description, he did accurately utilize more subject matter knowledge and think more spatially than previously. The following excerpt from Fred's second task illustrates his use of greater subject matter knowledge and spatial thinking:

I think civilizations developed near the Ganges and Chambala rivers. Both areas have a humid subtropical climate, and have the cropland vegetation type. Because they are near rivers, it would also be a good place to settle down and farm.

Because of that, civilizations could develop strongly around these areas.

Civilization 1 is near two other rivers that they can use as transportation to trade with Civilization 2.

Ginny spectacularly increased her raw score from 8/24 (1.3/4) on the first task to 22/24 (3.7/4) on the second task. Much like George, she added significantly to the volume of her writing. She also added details. On the first written task, Ginny included no details from the maps. She essentially stated that all civilizations have physical features, a climate, and elevation. On the second written task she includes detail and a significant amount of subject matter knowledge to inform her answer.

I think the first civilization developed between the Narmada and Godavari rivers, at 21°N, 74°E. I think this, since it has a reasonable climate for farming, because it is a pretty warm climate, and the precipitation this place gets is 20-40 in. per yr., which will make the crops grow, and because there are reasonable farming conditions, more crops than needed will grow. That is known as a surplus.

Because there is a surplus, I can farm for many, and that leads to others having free time. During this free time, they will learn to do things other than farming. Once they are really good at doing that, that leads to job specialization. Then, that leads to a population increase. A civilization is a settlement of a group of people who have a complex economy and social structure.

While sentence fluency and length require a bit of work, the content and detail explaining the development of civilization was a big improvement from her first written task answer.

Harry increased his raw score from 14.5/24 (2.4/4) on the first task to a 24/24 (4/4) on the second task. Harry profited from his increased subject matter knowledge. This allowed him to develop his ideas more than the first written task and include sufficient details, especially in connecting the climate and vegetation to farming. In the first written task he stated that certain climates and vegetation were conducive to farming without enough detail to demonstrate a deep understanding of either. On the second written task Harry discussed the length of the growing season for the chosen climates (humid subtropical and tropical wet and dry) and soil fertility (cropland). He then explained that the conditions made the places he chose ideal for the transition from hunting and gathering to farming, detailing the progression from its rudimentary beginning to the development of a complex economy and population growth.

Ron increased his raw score from 12.5/24 (2.25/4) on the first written task to 20.5/24 (3.4/4) on the second task. Ron also benefitted from increased subject matter knowledge and a deeper reservoir of available details to integrate into his argument. Ron did a considerably better job explaining how the factors he chose led to the development of civilizations; however, he still treated each map as separate and demarcated each into a separate paragraph. It seems that the next step for Ron is to move away from compartmentalizing information to integration of information.

Hermione increased her raw score from 11/24 (1.8/4) on the first written task to 23/24 (3.8/4) on the second written task. She was another student who wrote considerably more on the second task. In fact, her first written task consisted of only a few sentences

(three-four) for each location. Hermione exhibited considerable subject matter knowledge and she integrated the various maps to inform her answer. She wrote,

Having a Savanna climate is good because it has a long growing season of 12 months, all year, it warm, it doesn't rain enough to drown your plants but it doesn't rain too little to dry them up. Two rivers are good for trading, fish, and if you needed to irrigate. When the season becomes dry you can use the river, and when the river floods it leaves fertile soil.

Hermione definitely came a long way from,

I would pick South of Santiago because of the climate. It has a Mediterranean climate which is great for farming and recreations. Also since it is by the water you have fish and trading available. I would also pick it because it is near forest and you can get food and wood to make lots of things. You also have a lot of options for berries and other herbs.

Think-Aloud Verbal Protocol and Retrospective Interview

George attributed his improved second written task to a greater amount of subject matter knowledge. He stated that,

Well, it definitely was kind of easier, since we had, since we kinda knew a little more, since we did this at the beginning when we didn't know. So, I think it wasn't eas-, it wasn't really easy, but since we got a lotta, since we did a lot of stuff leading up to this, I think it definitely made it easier.

George displayed this deeper well of subject matter knowledge several times throughout the second think-aloud verbal protocol and the retrospective interview. Moreover the

greater subject matter knowledge facilitated an aptitude for thinking beyond one map and reasoning with geography.

DR: Ok. What did you find important in making your decisions? What data was really important to you in your answer?

George: Probably the climate and the, where, like, wh-like the rivers. Because from stuff we learned in class, a lot of civilizations developed near rivers, because of the resources and the food and stuff. So, from prior knowledge in class I knew that might help. And also prior knowledge in class, we, I knew that, like, the climate was really important, and the vegetation, because you can't plant stuff without having, like, in a bad climate, or else it won't grow.

The following exchange further highlights this burgeoning geographic understanding and reasoning.

George: Um, I probably combined the Land Cover Map with the Climate Map because you need to have a climate that's, uh, hot generally all year and has a good source of rain. And you need to have vegetation that doesn't have a lot of sp-, it has a lot of space, not a lot of trees. So, with those two things I think that probably it would be where a good civilization would start

DR: And what about physical features at all?

George: Um, I don't, I don't know about the physical features. I didn't think about that/

DR: You, earlier mentioned something about the physical features map, where you located, what you looked for.

George: Oh yeah. I looked for places, like between rivers or near rivers.

Fred also benefitted greatly from a deeper subject matter knowledge that, in turn, seemed to allow him greater facility with combining the different maps.

Fred: Well, mostly I had them be by rivers, not just because of farming but also, um, but also because, like they could be used as transportation.

DR: Excellent. So the idea of a freshwater source . . .

Fred: Yeah.

DR: Ok. An-, any other data that you used that was really important to you besides the location of the rivers?

Fred: Um, well, also I used the climates, um, which, the one I chose, both of my locations were in humid subtropical climate.

DR: Ok. And so what it sounds like to me is you were able to combine together to help inform your answer.

Fred: Yeah.

Below, Fred not only used multiple maps but additionally used his subject matter knowledge to adjudicate conflicting evidence that tripped up most of the informants on the first geographically oriented written task.

DR: Ok. And why are the rivers good for farming?

Fred: Well, they're good for farming 'cause they can help go into the soil and then grow crops. And also you can grow things by rivers too,

because, like well, because the area's by water, even if it's in the desert. Usually areas by rivers have a little bit more fertile soil than areas that aren't by, then places that aren't by rivers.

DR: Can you give me an example of one that you know?

Fred: Well, one that I know is the Nile River, because that's where most, because most people in Egypt live by there.

Perhaps, none of the informants (primary or whole group) profited more from increased subject matter knowledge than Ginny. The think-aloud protocols for the first written task and the first retrospective interview with Ginny was challenging. She seemed to lack some basic understanding of the maps and their purpose. Consequently, she scored poorly on her first written task. With a little probing her responses grew in length and depth. Comparing the answers of her first and second climate verbal protocols reveals the difference in her depth of knowledge.

DR: Ok. If you could please tell me how the information that you can learn from this map helped you in your answer to the task.

Ginny: I'm not sure if I wrote it, but I said I could use those answers on the back to locate the civilizations.

DR: So, what I hear, hear you saying is that you can use the climate information to help you locate the civilizations. Can you possibly be more specific? It doesn't have to be what's in your answer, um, but just what do you think? So, for example, um, did any of the climates help you to figure out where you would locate the

civilization? Like, did this information make a difference for you in where you put the civilization?

Ginny: It could.

DR: Can you give me an example, even if it's not something you put in your answer?

Ginny: I'm not sure.

DR: Ok. Alright, if you could do the same with the second map, so tell me the title and what we can learn from that map.

Ginny: The title of this map is Climate.

DR: Ok.

Ginny: What you can learn from this map is, I mean, um, what climates different places have and where different places are, since it's also a map.

DR: Ok, and how could, how did you use this map to help you with the task?

Ginny: Um, to see which climate was reasonable enough for farming.

DR: Ok. And out of the climates that are there in South Asia, what climates were good for, what climates were favorable for farming?

Ginny: I think it was the savannah, which was tropical wet and dry . . .

DR: Mm-hm.

Ginny: . . . and the semi-desert, which was the semi-arid climate.

DR: Ok. Any others good for farming there? Not saying necessarily which ones you chose, but ones in general that would be good for farming.

Ginny: Mediterranean and humid-subtropical.

DR: Ok, and what made those climates, or what makes those climates good for farming? In general, you don't have to break down each one.

Ginny: The temperature and the amount of rainfall they receive.

Ginny improved from answering the written task with vague information synthesized from common sense and a generalized schema to more specific, supported answers based on evidence from correct map interpretation. Ginny still experienced difficulty articulating how she combined evidence from the various maps, although her answer to the second written task clearly shows her ability to do so.

Harry showed a much improved and mature (compared to other students) understanding of geography and geographic thinking. Harry adeptly employed his larger reserve of subject matter knowledge to combine evidence, sort out conflicts, and support his answer to the second geographic written task. While answering the second written task's verbal protocol, Harry demonstrated improved content knowledge and through questioning was able to utilize that to navigate confirming and conflicting evidence.

Harry first discussed assembling confirming information. He explained how he matched favorable vegetation with climate and eliminated locations with unfavorable climate or vegetation. Harry then presented a few exceptions to his model such as rivers in arid climates assimilating potentially conflicting information.

DR: Were there other types of vegetation on there that could have some things that are favorable, favorable about them, but then some things that are not so favorable?

Harry: Well, you can make semi-desert and desert work, but only if you have a river next to it.

Harry also explained how he eliminated locations that may have favorable climates or vegetation but other factors that potentially precluded ancient civilization from developing.

DR: Ok, and what about the ones that were the broad-leaf forest of the needle-leaf forest or the tropical rainforest?

Harry: Well, in tropical rainforest, you need to cut down the trees first of all, because it's really dense there. And then it'll be hard to use the space for farming.

DR: . . . that makes sense. Ok, was there anything else you wanted to add about the vegetation?

Harry: Um, well, like, usually in a vegetation with, like, scatter-, with like tons of trees, like, densely packed you could tell that it rains a lot there. And then if there's scattered trees, you could tell it doesn't rain as much there. Ok, well, for, for Bangladesh there's a bunch of rivers there, which might be, which might be good. And then, uh, right here it says it has a lo-, a lot of, that's cropland, which is the good vegetation, but once you go to the climate map, it's tro-, it's

tropical rainforest, or tropical wet, which isn't as, which isn't that good.

Harry also demonstrated clever map interpretation by linking densely packed trees with a rainforest and more scattered trees with less precipitation. Too much rain was not advantageous for farming the high yield, nutrient dense cereal crops that formed the cornerstone of ancient civilizations.

Lastly, Harry displayed significant subject matter knowledge geographic causality through his explanation of the Agricultural Revolution. Harry links the favorable geographic conditions to successful farming that led to population growth through improved diet and a surplus of food. As the population grew and non-farmers specialized in other jobs, a complex economy developed to supply inhabitants with their needs and wants.

Ron experienced a significant increase from the first to the second geographic oriented written task. However, he required a lot more probing in the audio-taped interviews/think-aloud verbal protocols to articulate the greater subject matter knowledge and more dexterous use of evidence from multiple sources that he demonstrated in his assessments. In the next section I included excerpts from these interviews with Ron to highlight the amount of scaffolding he, and other students, required to bring geographic reasoning to bear on their work.

Hermione also saw a tremendous improvement in her score from the first geographic oriented written task to the second. A prodigious increase in subject matter knowledge is illustrated by the following exchange:

DR: Ok. And how can you use that information to help inform your answer to the task about deciding where ancient civilizations may have begun?

Hermione: Um, well obviously you're not gonna put your civilization in, like, polar climates because that's not really a good idea because it's too cold . . . to grow, like, to farm or anything like that. And unless there's, like, a river nearby, you're most likely not gonna put it in a desert or a semi-desert, because it's too dry and your crops might wither up. Um, but you also want to think about how, well, the, you would put them in, like, warmer climates but you also need to think about, well, if I have a climate that's too rainy . . . 'cause you want like a rainy climate but you don't, you don't want one that's too rainy so that there's a lot of trees or it might dry your crops, but you don't want the one,, you don't want one that's not rain, that doesn't rain enough so, like, your crops will dry up or you can't even, like, use the land. Um, you also wanna think about how the pers-, like, the people who live there might adapt to the climate, because even if you could, let's say you could farm in the tundra, you probably don't wanna live there 'cause it might be too cold, or it might be too hot, or other things you might not be able to do o-, over there, 'cause it's probably barely any rivers because it's so cold and they probably just froze up.

Hermione then continued to explain the characteristics of each of the climates (Tropical

Wet/Dry, Mediterranean, Humid Subtropical) she (accurately) believed to present the most favorable conditions for agriculture. She touched on the length of growing season, average temperature, and amount of precipitation.

Another significant piece of content knowledge that Hermione discussed and applied to the evidence was the transition during the Agricultural Revolution from hunting and gathering to farming and domestication of animals. The transcript and my interpretation below came from the second written task think-aloud verbal protocol,

DR: Alright so you talked about which climates are favorable, which aren't, and you mentioned the idea of farming. Why farming? Why is farming important to your decision?

Hermione: Like, all . . . the whole thing with the job specialization and stuff like that?

DR: Mm-hm.

Hermione: Ok, so, there's, so in farming, usually, well, before there was farming, there was hunting and gathering . . .

Hermione subsequently explained that hunting and gathering was difficult for people to survive. She explained that hunting and gathering required the people to follow animals as they migrated in search of food, water, or better climates. This existence did not permit a settled existence. Farming forced people to stay in one place in order to tend to and protect their crops. Settling down and farming in favorable places generated a surplus of food. One could farm for many and not everyone had to farm. This gave people not farming free time that led to job specialization. People freed from the daily toil of food procurement created a rash of new inventions, concepts, and jobs. From this

came the development of organized religion and government through laws designed to keep order. Although her explanation contained some simplification and omission, Hermione obviously understood the process that spawned ancient civilizations.

Compared to other students in both classes, Hermione demonstrated an emergent and increasingly sophisticated capacity to think beyond the map and reason both within and with geography (Gregg & Leinhardt, 1994). She laid out the criteria for civilizations and explained how she then used those criteria to eliminate all of the places that do not contain them or work out seemingly conflicting evidence.

Hermione: Usually before you would think, ‘Oh, well I know a lot about this, so I’ll just use, like, my, the knowledge that I have now.’ You think you have, like, everything you need. But then when you start getting taught the thing, you’re like, ‘Oh wait. I didn’t know that. I th-, I thought wrong. I thought this was great. Like, at first I didn’t think about how the tropical was bad because I didn’t, you know, I didn’t know how to read a climograph, or something like that.

DR: Ok.

Hermione: And then once I learned, ‘Oh wait, this is not favorable because it has a lot of rain and that might drown the crops, or they might have too much trees, or too much forests, and that’s gonna be too hard to cut down to make civilization, kind of thing. But, you know, if it has, ‘Oh, it has savanna climate. Oh, it has flatland. Oh, it has a river. Oh, it has scattered trees. Oh, it has blah blah blah.’ And

then you put all those things together, like, this sounds pretty good
'cause you might have, like, a, like, in my mind I had a checklist of
what I had to have and, you know, I checked it off if it sounded
good or not, I mean, it sounded favorable or not, because . . .

DR: Mm-hm.

Hermione: . . . you, you just have to understand that.

Bill also benefitted greatly from increased subject matter knowledge.¹¹ On his first written task Bill introduced all three maps and used evidence from each to inform his answer. However, he did not develop a causal link between the map data and methods of food cultivation. Furthermore, Bill provided no explanation of how civilizations develop. His answer reads like a list of facts. On the second written task Bill continued to utilize data from all three maps but this time he clearly linked geographic phenomena to the characteristics and development of civilizations. He skillfully connected the data to the process of development highlighting the shift from hunting and gathering to farming and the improved quantity and quality of their diet. Bill then rolled that into the development of specialized jobs and a complex economy.

Emerging Themes

The first Geographic Oriented Task provided a rich array of student data from which I extracted various themes. I list these themes here and then address each with respect to the second Geographic Oriented Written Task. The themes that emerged out of the Geographic Oriented Written Task #1 were:

¹¹ Bill's second retrospective interview and think-aloud verbal protocol data were lost and not transcribed. However, I use all of his other data, especially his two written tasks to make inferences about his growth in geographic thinking.

- Students overlooked disconfirming evidence
- Treated each map as a separate piece of evidence
- Lacked significant subject matter knowledge
- Lacked geographic empathy

Two core themes emerged from the second Geographic Oriented Written Task and subsequent round of interviews. Both emergent themes addressed the themes from the first written task indicated at the beginning of this section. Deeper subject matter knowledge helps students make connections with evidence, sort through seemingly conflicting evidence, and support ideas. Having substantially more reserves of information and understandings of geography to draw upon facilitated the students' ability to put pieces of information together and make connections between the various maps. Whether they utilized the maps to corroborate their ideas or eliminated locations with conflicting evidence, the students integrated the maps into their ideas more skillfully. Furthermore, mostly absent from the second writing task answers were the inclusion of modern day industries such as tourism, hydroelectricity, petroleum as well as modern ideas such as a monetary basis of exchange. This absence of modern circumstances suggests a stronger geographic empathy and view of the world through geographic eyes.

Anderson and Leinhardt (2002) discuss the ability of experts in the field to draw upon various cognitive schemas to solve problems. According to their research with air travel routes, the experts were not circumscribed by the flat map and accessed their more nuanced understanding of the world and map distortion. I am not suggesting that these students became experts in geography over the course of one academic year. However,

their improved end-of-year SLO assessment and the second geography oriented written task results suggest a broader and deeper knowledge of geography and geographic reasoning. Part and parcel with their emerging geographic understanding and reasoning was the development of their spatial and ecological perspectives. Harry demonstrates the emerging perspectives in the following responses during the second retrospective interview. He illustrated his understanding of the importance of the proximity and spatial layout of civilizations through trade and the development of a complex economy. Harry stated that being in the center of other civilizations or important trade routes could help that place to become a center of trade, much like Mesopotamia. He believed that this led to jobs and the development of a complex economy.

Harry also discussed the interconnectedness of climate and developing civilizations. He talked about the importance of climate for the development of farming in terms of the climates that were favorable and unfavorable for farming. He listed ice cap, tundra, and highland as not favorable because of the extreme temperatures, poor soil, lack of vegetation. Harry acknowledged the interconnectedness of climate and the development of civilizations through the Agricultural Revolution. George also connects climate to human development in terms of temperature and access to water. Both of these were critical to the transition from hunting and gathering to farming.

Understanding the subject matter (content) and having facility with geographic skills, without the inclusion of the spatial and ecological perspectives, is not enough to truly understand geography for geographic reasoning. Geographic reasoning and understanding requires all three pieces of the lattice (subject matter, skills, and perspectives) described in Chapter 2.

The second theme that emerged, this one directly from the second think-aloud/retrospective interview and seemingly corroborated by the second written task scores, was that several of the students required scaffolding throughout the unit of study. The low motivation, low achievement group's scores were near or at the bottom for both classes. Brian, Davon, Kusa, Rumi, Jeffrey, Laurel, Kenny, Odette, and DeShean all scored below the 70% threshold. Most of the low motivation, low achievement group of students experienced gains, although Kenny, Odette, and DeSean did not experience any gains in their second written task. The high motivation, low achievement group of students benefitted from scaffolding. As a group they averaged a 26% increase on the second written task.

Of the primary informants Ron required the most scaffolding. He struggled at times during our interviews to understand some of my questions and to articulate his ideas. During the second retrospective interview I experienced a telling exchange with Ron, who expressed that a good climate was necessary for farming. I then probed further asking him to describe a "good climate." He responded well: that a good climate was one with a "long growing season." We had discussed this in class during the debriefing of the "Leftovers" simulation and also when learning about Mesopotamia. We also reviewed it a few times when fitting in the lesson. Again, I probed further and Ron struggled a lot to articulate the definition of a long growing season and its beneficial nature. I tried to lead him to state that it was the length of time that people could grow crops because of the warmth (frost free). I tried to connect it to the four seasons experienced in Maryland and when people can grow food crops. Ron recalled the fact that a favorable climate was important for farming and the development of civilizations in particular places in the

world but struggled to explain the underlying concept and reasons why. After an arduous discussion in which I led Ron down a path, he was able to adequately define long growing season.

Summary

In this Chapter, I detailed what happened when I engaged students in a more disciplinary approach to geography and tried to foster geographic thinking. Several themes with implications for teaching and learning emerged. I describe these themes through the first four student research questions.

First, participants in this study, novice geography thinkers, seemed to conceptualize geography flatly. Their understanding lacked depth, texture, and geography epistemology. Many students identified geography as just map reading, especially wayfinding. Some of the students conflated geography with history; I was not surprised by these findings, as elementary school geography in this district falls into the larger subject of social studies and serves the history portions of the curriculum. For example, students map the 13 colonies and color code their physiologic regions without going into too much depth from a spatial or ecological perspective. The initial survey and initial interview suggest that the students began the school year without much of a conception of geography as a discipline. In fact, responses such as “it is not as important as science or math”, “that it is just maps and textbooks”, and that “geography is not really used in jobs” underscore a one-dimensional and misunderstanding of geography.

Second, given this school year and my class in particular was for many their first introduction to geography, the students essentially had no ideas about geographic reasoning and how to use it to solve problems. For the initial survey, 40% of the

respondents stated that they did not know anything about geographic reasoning. Other unsophisticated responses dealt primarily with location: finding a good vacation spot, exploring new places, hiking, help when moving, and map reading. Most of the participants could not explain how someone would use geographic reasoning. Bill, Harry, and Hermione provided the most nuanced responses during their initial interviews. Bill and Harry linked geographic reasoning to using geography or geographic clues to solve problems and Hermione discussed using geographic reasoning to resolve geopolitical issues and solve military problems. Fred, George, Ginny, and Rob struggled to convey any awareness of geographic reasoning. George and Ginny reported that they did not know anything about geographic reasoning. Fred related geographic reasoning to reading maps and Ron understood geographic reasoning to understanding culture through gathering facts.

Third, when first given a geographic reasoning task (in the form of the two Baseline SLO map analysis assessments, the literacy Baseline SLO and the first geographic oriented written task) the students struggled. Period 2 averaged 55% on the baseline “Where?”, 25% on the baseline “Why There?”, 34% on the baseline literacy, and 54% on the first written task. Period 4 averaged 62% on the baseline “Where?”, 25% on the baseline “Why There?”, 18% on the baseline literacy, and 43% on the first written task.

Students’ lack of subject matter knowledge and geographic reasoning was reflected in the baseline SLO assessments and the first geography oriented written task. The students seemed to lack the cognitive schemas necessary to solve problems. On these assessments they treated each map separately, missing the cognitive pieces to tie them

together and see a bigger picture, thus missing the opportunity to develop an understanding of others and, in turn, themselves.

The End of Year SLO “Analyzing World Maps: Where?” and “Why There?” maps, the Literacy Assessment, and the Second Geographic Oriented Written Task demonstrated significant growth in student scores and growth in their geographic reasoning. Period 2 averaged 73% (11 percentage point increase), 69% (44 percentage point increase), 69% (36 percentage point increase), and 76% (23 percentage point increase) respectively. Period 4 averaged 78% (23 percentage point increase), 65% (40 percentage point increase), 61% (44 percentage point increase), and 75% (30 percentage point increase) respectively.

Lastly, the second set of scores, together with the second retrospective interviews indicates students’ greater proficiency in understanding the assessment questions and requisite map interpretation. The results also point towards a somewhat deeper reserve of geography subject matter knowledge. The students demonstrated some growth in terms of their geographic reasoning and general understanding of geography. The increased subject matter knowledge coupled with the organizing structure of geography as a discipline suggest that the students began to develop neophyte cognitive schemas with which to recall information and bring to bear on solving geographic problems.

Foremost, the students seemed to develop a better understanding of geographic causality, or how geographic phenomena such as climate, access to water, precipitation, soil quality, availability of resources impact humans. The students also understood the Agricultural Revolution and relationship that concepts such as efficiency and an improved diet had to population growth, food surpluses, and the development of

government and recreation. In other words they began to “see meaning in the arrangement of space” and “relations between people, places, and environments” as manifested through the geographic subject matter of “The World in Spatial Terms”, “Places and Regions”, “Human Systems”, the “Environment and Society”, and the “Uses of Geography” (Geography Education Standards Project, 1994, p. 34)

Through increased subject matter knowledge the students exhibited greater facility using maps together to better triangulate their interpretations. Emergent spatial and ecological perspectives augmented their richer geographic understanding. While still far from a profound understanding of self and others, the students made connections between the environment and human activity, starting to unravel geographic causality and impact. I think it can be argued that continuing along this trajectory, and perhaps incorporating geographic investigations that follow the lead of history education, is likely to lead to better understandings about geography and geographic reasoning. However, as thinking like a geographer is essentially foreign to many students, the teacher needs to scaffold throughout.

In the next Chapter I turn my attention to the remainder of both the student and teacher research questions with respect to my experiences teaching geography from a more disciplinary approach. This approach exposes many challenges that educators at all levels face when attempting to implement this approach. Lastly, I will discuss the possible implications of employing a more disciplinary approach with various stakeholders within the teaching and learning community including classroom teachers, administrators, teacher educators, and policy makers.

CHAPTER 6

FABLES AND REFLECTIONS ON GAP TECTONICS

Introduction

I once saw a coffee mug with a cartoon that implied middle school teachers are immune to hell because of the nature of teaching preteen students. While I found it funny at the time, I did not truly appreciate the humor until the past several years prepared me for this research study. Middle school students seem generally unmotivated by the simplicity of typical elementary school culture and pedagogy while lacking the attention spans of their older compatriots. In other words, they are too old for circle time and too young for lecture time, caught in the existential middle much like Alice Cooper's protagonist in the seminal song "18". Moreover, they unabashedly communicate when something is boring either through their words or actions. The students' developmental station as geographic novices (Downs & Liben, 1991; Leinhardt, Stanton, & Bausmith 1998; Vosniado & Brewer, 1992), coupled with increased demands for rigor and accountability manifested through various testing regimes, puts teachers in a challenging position. Further complicating matters, a significant corpus of extant research literature documents the efficacy of disciplinary approaches to teaching and learning. Much of the literature points to a gap between disciplinary practices and secondary school pedagogy.

When I first conceptualized this study I saw my placement on both sides of that gap as an opportunity, a vantage point in which to close that gap, even if just a little. Straddling that gap is a good, albeit challenging, place from which to operate. In fact, it affords me the Janus-like opportunity to fuse the disciplinary epistemology with secondary school pedagogy tempered in the chaotic and challenging cauldron of middle

school. The two forces of disciplinary epistemology and secondary school pedagogy create tension especially when set against the backdrop of an accountability environment. In fact, this environment exacerbates the tension—with implications for all. Stout (2004) astutely stated that “Teachers must balance the need to move briskly through the content requirements reflected by these standards, while ensuring student learning through sound instructional practices that serve the needs of their population of students” (p. 128). Is it possible for students to learn geography and geographic reasoning through a more disciplinary approach?

My work over the 2014-2015 school year demonstrated that it was certainly possible for the students involved in this study within the context of my classroom to learn geography and geographic reasoning. The foremost issues that surfaced during the study were (a) time constraints due to a crowded curriculum, conjoining the disciplinary structure of geography as manifested through the *Geography for Life* (1994) project to the local curriculum, and (b) finding materials commensurate with both *Geography for Life* and curriculum I was charged to teach. Additionally, I wanted materials that not only matched well but actually encompassed quality pedagogy. I did not want to settle for lifeless lessons that fit into the standards and local curriculum. In this chapter I discuss the prominent issues of the investigation and subsequent pedagogic choices during the study that address the teacher research questions. Next, I discuss the implications for the various stakeholders in secondary education through the lens of my teacher research questions. Finally, I conclude with possible future studies and overall impressions/thoughts.

Limitations

DR: Ok. That's pretty smart. Any suggestions you have for me, for the next time we do this? Not the interview but the task. We'll do a similar task. Anything that would make it go smoother, anything like that?

George: Uh, not have us write an essay.

The interview clip above illustrates two things: potential obstacles to teacher research and the importance of relationships when teaching and doing teacher research. George speaks his truth; he does not like to write essays. While candid and honest, his response may show an aversion to disciplinary based assessment.

Contextual Limitations

Perhaps one of the most challenging aspects of this study was negotiating time and schedules. Preparing for the study required an enormous amount of time and careful planning that involved trying to integrate various teaching resources with the local curriculum (detailed in Chapter 4). Additionally, a packed curriculum coupled with copious formal testing and typical middle school interruptions required tremendous flexibility and juggling of schedules. Endocitt Hills tested for eight school days to administer PARCC and MAP assessments. The student services department conducted three separate lessons for a district wide career initiative called Naviance, all during social studies classes. Naviance is a comprehensive college and career readiness program for secondary school students that helps connect academic achievement to post-secondary goals. Naviance lessons required the entire class period each time. As a result of these constraints too much time passed between the first geography oriented written task and

think-aloud verbal protocols including the first round of retrospective interviews. The time delay was several weeks and I required almost two weeks to conduct all of the interviews.

Taking several weeks between administration of the first written task and the subsequent interviews may have impacted the student answers and ability to recall exactly their thoughts. I allowed each student to review all of their materials including the actual task answers and evidence before and during the interviews. There were a few times in which students seemed to have a bit of trouble recollecting their ideas, but overall they appeared, through looking back, to experience minimal difficulty. Realizing the potential pitfalls in waiting too long to interview students I used a few sub days and conducted all of the think-aloud verbal protocols and retrospective interviews over two days immediately after administering the second geography oriented written task.

I made the pedagogic choice to delay the administration of the first geography oriented written task. As a result, I believe that the initial data were not as pure as they could have been had I administered the written task earlier in the year. However, I think that including the SLO data, especially the “Why There?” assessment in the study mitigates any true skewing of the data. The “Why There?” assessment was another geographic reasoning heuristic and served as yet another data point; plus, the students’ first written task answers revealed similar results with the “Why There?” assessment: unsophisticated geographic reasoning.

Originally I had planned on conducting a second survey. While I thought about it towards the conclusion of the study, I decided against it due to time and logistical issues. Administering the second geography written task close to the end of the school year

reduced the time available to conduct a second survey. Moreover, teachers had already booked the computer lab for large portions of this time. Conducting a second survey would most likely have resulted in richer and more direct data vis-à-vis any changes in student thinking. However, I think data from the various interviews, student written work, and classroom discussion allows me to extrapolate and draw some general conclusions. The positive changes in the students' geographic reasoning and their deeper understanding of geography (detailed in Chapter 5) points towards a different understanding of geography than indicated during the initial survey. Initially students exhibited a simplistic view of geography conflating it with history, describing it as social studies, or taking their cue from the class title and presuming geography is cultural studies. The following two journal entries trace the arc of my perception of their thinking:

Given all of the work that we are doing in terms of disciplinary geography – working to understand the structure of it and the three elements of the standards (content, skills, and perspectives), I wonder a few things. Firstly, are they “getting it”? Meaning: are they understanding geography better or perhaps even more than they would just sticking to the curriculum and teaching more traditionally. Also, do they have a better understanding of what geography actually is? Given the work we have been doing I would speculate that the answer to the first question is a tentative yes. It seems that way but I will need to see how they do on the assessment portions. As to their understanding of geography, I think so. I have introduced quite a bit of the different elements of geography from the physical (creation of physical features such as mountains and how the sun impacts seasons and climate), cultural (elements of culture such as religion and language),

population (reasons for migration – push and pull factors), historical (the development of civilizations and the whole Agricultural Revolution), and the interaction between people and their environment (how they react to and alter it). I imagine that they would have to see geography as something deeper, more sophisticated than their initial ideas. (Researcher Journal 3/19/2015)

The results on the End of Year SLO assessments seem very encouraging thus far. Their answers to the “Where?” and “Why There?” assessments seem a lot better than the previous assessments. I will know more once I finish grading them and can compare. I quick perusal though shows longer and more on-topic answers. It also seems that many are starting to see geography in a more accurate nuanced way. Some comments from classroom discussions suggest that geography is no longer just cultural studies, social studies, or history. Some have even hinted at how geography can serve to help us understand history. When discussing the “Leftovers” simulation Jeffrey and Ellen commented that the droughts greatly impacted whether or not they survived. That gave me an opening to comment on how the geography matters. It is part of the equation along with decisions made based upon that geography. Perhaps the biggest change is reflected in their better understanding of the interaction between Earth (physical) and people (culture). Daisy’s comments about how geography helps to determine what everyone wears to school and produce that is in season hints that they seem to be getting it. (Researcher Journal 5/20/15)

While neither entry encompasses all of the students (Odele, Kusa, Rumi, Bob, DeSean, Pete, Peter, Davon, and Chrissie rarely participated in classroom discussion), I feel that I got a broad sense of their evolving perspectives.

One of the other obstacles to teaching from a disciplinary stance was aligning the structure of the discipline to the local curriculum. I spent a considerable amount of time combing through both *Geography for Life* (1994) and the local curriculum. *Geography for Life* did not line up particularly well with the curriculum. As mentioned in Chapter 5, the local curriculum document is not effectively a geography course. It is more a social studies class that places a large emphasis on history. Once I aligned the two documents I needed to figure out what resources I could utilize to facilitate my stance.

Given the amount of time, effort, and energy required to teach from this perspective, I wondered if I could just teach more directly towards the assessment. In other words, why not just tell the students how civilizations developed including the factors and circumstances. Perhaps I could achieve the same results without all of the energy expenditure. The refrain from assessment people within the district is that if the assessment is good then it is okay to teach to the test. It is also possible that teaching through a more traditional approach might yield similar if not better results. I did not employ a quasi-experimental design to compare the results of groups receiving different approaches. That was not the intention of this study though. Perhaps. However, I believe something gets lost. While students' numerical scores might be similar and some students might have benefitted from direct instruction in terms of parroting back the right answers, this seems myopic and shortsighted to me. Such an approach sacrifices long-term gains for short-term success.

In my capacity as a soccer coach for a very competitive youth girl's team I understand my job to be player development rather than number of wins. Power (2014) provides several clear examples of youth coaching selection bias. Oftentimes evaluators and coaches select the biggest, strongest, fastest players because they stand out and can dominate and influence the game with their advanced physical prowess. In fact, they do not need to sharpen their skills and soccer IQ because they can rely on their physicality. Once everyone goes through puberty and the physical playing field levels out, the smarter and technically superior players thrive. The clubs and teams that recognize this emerge as better quality teams than the ones that look for the immediate result, often overlooking quality players because of their late development. These coaches mortgage the future for the present success. In soccer, as in school, the stakes get higher as everyone gets older. When we as educators go for the immediate test results rather than teach students how to think and solve problems we are guilty of the same mistakes.

The data presented in Chapter 5, especially the interviews with the primary informants, underscore this point. The students demonstrated increased skill at combining evidence from the maps, while being cognizant of conflicting data in order to more accurately complete the task. Additionally, their developing spatial and ecological perspectives reveal a deeper understanding of geography. Simply memorizing facts and information may yield corresponding results but most likely would not bear the same richness of qualitative data.

If deeper understanding of our world and human decision-making is the goal, rather than short-term assessment passing, then logic dictates that pedagogy should support this process. Research, in general, and subject-specific cognitive development

theory shed light on this. Bruner (1977) encouraged teaching students the elements of a discipline's structure conjoined with the "special strategies of inquiry that are employed by specialists" (reprinted in Kohn, 1966, p. 408) so as to foster thinking from an internal disciplinary point of view. This more inductive approach, where students learn the tools of a field with the intention of analyzing and constructing their own meaning, rather than "learning" the prepackaged conclusions of others (textbooks, experts in the field, and teachers) relates closely with a Piagetian, and later Vygotskian, approach to education.

Anderson and Leinhardt (2002) showed that disciplinary experts solved geographic problems much more successfully than different types of novices. The experts were able to access a host of cognitive schemas to generate solutions to problems. The novices lacked such structures and were circumscribed by the symbolic representation itself and could not call upon any rules to relate the problem to real-life. Simply memorizing situation specific content may provide short term-success (assessment) but would not create the cognitive structure necessary for problem solving once the context changed. It is akin to learning algorithms in mathematics but not having the underlying conceptual understanding to apply the algorithm in varying circumstances.

Copious research exists supporting the effectiveness of inquiry approaches to learning as a means to developing profound understandings. Researchers, particularly in history education, found that this approach aids in the retention of learning as well. Historic knowledge then becomes more meaningful than a set of names, dates, and events on a test. Geographic awareness matures into the relational understanding of phenomena and processes, both natural and people-made, as opposed to place-name recognition and elementary characteristics of location on the surface of the Earth. The Newtonian-like

thread that weaves through human decision-making becomes more accessible. Much of the present literature and research in learning theory and history education underscores Bruner's pedagogic theories (e.g., Bain, 2005; Bruner, 1977; Downs & Liben, 1991; National Research Council, 2005; Seixas, 1996; VanSledright, 2002, VanSledright, 2004; Wineburg, 2001).

Although shortcomings in geography education result from various sources, the lack of a structural, disciplinary approach has “tried the patience, killed the interest, stifled the imagination, and insulted the intelligence of the learners” (Muessig, 1987, p. 515) while only providing fragmented understandings, skills, and concepts. Muessig (1987) asserted that educators need to aid children in thinking geographically as a means to promote geographic literacy. A disciplinary approach facilitates what the authors of *Geography for Life* (Geography Education Standards Project, 1994) define as a geographically informed person. This, again, points to the disconnect or gap between disciplinary geography, with its focus on geographic reasoning, and school geography, with its focus on facts (Downs, 1994; Gersmehl, 1992; Gregg & Leinhardt, 1994; Harper, 1990; Muessig, 1987; VanSledright & Limon, 2006).

Planning to teach from a disciplinary stance is, however, challenging and requires a large investment of time. Unfortunately, I doubt whether this could be packaged and sold as a resource kit, although curriculum and resource retailers certainly try. With the standards movement in vogue these days, social studies retail catalogues are awash with materials “based on” or “aligned” with the national standards. I perused a multiplicity of catalogues and sources looking for a silver bullet to use in the study—or just some materials to incorporate. While I located many such resources none of them lined up with

the district curriculum and, quite frankly, were pretty traditional in scope. I found a lot of prepackaged PowerPoint presentations containing hundreds of slides. How could young students, especially middle school age, possibly sit through a steady diet of that? The best I found was the Zombie Based Geography program detailed in Chapter 3. Moreover, teaching contexts vary so much that prepackaged programs are seldom a good fit. There are simply too many factors that influence the appropriate choice of materials. Stout (2004) raises important questions for pre-packaged historical investigations that apply to geographic reasoning, or any classroom situated in disciplinary ontology. In his work he questions the appropriateness of a kit designed for one set of circumstances being used in different environments. Would the primary source documents he selected work similarly or less effectively with another group of students? He also wonders how different reading/writing skills and prior knowledge might impact the effectiveness of a static kit. Stout probes and questions how different teachers as mediators of a prepackaged kit might interpret and implement it differently, potentially with less promising results. Teacher content knowledge and disciplinary skills are the lens and delivery mechanism for any instruction. Different abilities yield different results. Conceivably, this variance may have led Bednarz (2003) to conclude that in Texas she found little implementation of either the form or function of the geography standards.

Stout's (2004) research does not lend itself to commercialization and reproduction. That does not preclude other teachers and teacher-researchers from mining his work for their own practice. Similarly, my study, situated within the specific context of my classroom during the 2014-2015 school year for Periods 2 and 4, faces the same generalizability constraints. However, Donmoyer (1975) reframes the traditional

paradigm of generalizability into more of a reference point for practitioners and researchers to see into other contexts with the possibility of incorporation into their own work. I envision my study giving practitioners and researchers a glimpse into my classroom practice and possibly a way to integrate a more disciplinary pedagogy of geography into their own practice.

A limitation with the data was that I did not have a comparison group from either my own classroom or that of my partner 6th grade teacher. Unfortunately, the document that we both uploaded to the online assessment software was in chart form and not disaggregated. As a result I was unable to compare student results on the geographic reasoning tasks.

Personal Limitations

Practitioner research begs several concerns: my own vested interest in trying to “prove” my ideas, focusing on the positive elements and overlooking the negative, and students feeling free to express their ideas rather than telling me what I wanted to hear. I address these concerns in reverse order.

As stated in Chapter 2: trust underpins all good relationships. I worked to establish a culture of trust and vulnerability in order to take appropriate risks. This began on the first day of school and continued until the last. On the first day of every new unit, I dressed in clothing appropriate to the location and began each lesson deconstructing each item of clothing. I also set relationship ground rules at the beginning of the school year. I asked the students to make a deal with me: that I would be honest with them if they would be honest with me. I let them know that sometimes honesty is hard and sometimes people have to say things that may be potentially hurtful. I let the students know that it

was okay to say something they thought I might not like. The opening slice of dialog with George illustrates the value of relationships. George felt perfectly comfortable letting his teacher know that he did not want to write any essays. Student answers to my questions during interviews coupled with classroom dialog suggest that the culture of the classroom was one of open dialog.

This, though, does not guarantee complete honesty. The teacher researcher can set the climate but must also constantly check blind spots. I brought the participants into the research process allowing them access to the collected data and spoke with them informally throughout the study. Tending to focus on the positive while ignoring the negative in an effort to make my study and perspective look good seems to come from a lack of awareness to blind spots. One blind spot that was discovered was leading the students too much during parts of the retrospective interviews. I decided to not include data directly resultant from these interactions. Furthermore I included as thick a description as possible so that both readers and participants of this study can spot and question blind spots.

The vantage point gained from practitioner research and intimate knowledge of the context and participants outweighs perceived advantages of positivistic objectivity. The practitioner researcher is afforded the ability to develop trusting relationships with the participants. Regardless of research paradigm and ontological stance, researchers cannot step outside of their cultural frame of reference and context (Richardson & St. Pierre, 2008).

Implications of Using a Disciplinary Approach to Teaching Geography

Teaching geography from a more disciplinary approach has significant consequences for stakeholders across the education landscape.

Implications for Classroom Teachers

Practitioner research cannot only inform classroom teachers about the value of a more disciplinary approach to geography instruction including an emphasis on geographic reasoning, but should also inspire confidence to light their own candle. Geography education research is at its infancy with a paucity of research grounded in the classroom. One of the goals of this study was to see what would happen to both students and teachers if students completed geography oriented tasks. I detail the findings for students in Chapter 5, but I found some interesting things happening to me as the teacher during this study. I conclude this section with some next step recommendations for teachers wishing to leverage their own practice through this study.

In Chapter 3 I attempted to answer the first two teacher research questions and detail my findings:

1. What are the teacher researcher's perspectives/understandings of geography?
2. What are the teacher researcher's perspectives/understandings of geographic reasoning?

In Chapter 4 I attempted to answer the middle two research questions and also detail my findings:

3. Given data from a geographic reasoning task, what does the teacher researcher do? How does the teacher researcher use the data to inform instruction?
4. How does the teacher researcher measure geographic reasoning? How does the teacher researcher foster geographic reasoning?

In this section I summarize answers to the first four questions and attempt to answer the remaining two teacher research questions:

5. How does the teacher researcher think about their teaching of geographic reasoning?
6. How does the teacher researcher's thinking about geography change?

When I first started teaching social studies 17 years ago, my understanding of geography was rudimentary and I lacked an understanding of the concept of geographic reasoning. In fact, I had never heard of it until I began my graduate studies. I presumed that geographic reasoning consisted of solving problems using geography. Interestingly enough this seems similar to some student perspectives. Over the years my understanding evolved to thinking of geography as the study of physical and human characteristics and how they impact the relationship between earth and the people on it. After a pilot study I conducted several years ago to fulfill requirements for a Qualitative Methods course and over the course of this study I began to truly embrace the salient part of this definition, the impact of the relationship between earth and its people. We are inextricably linked to earth, regardless of what certain politicians and climate change deniers claim, in a Newtonian dance that shapes both. I also came to believe that geographic reasoning is the analysis of that relationship. Understanding how earth and people impact each other and

the ability to employ that awareness is crucial to understand human decision-making and ultimately to understand self. Of course there exist many perspectives and lenses through which to understand the world. This emerging understanding of geography and geographic reasoning drove my pedagogy throughout this study. I felt duty bound to bring everything in the curriculum back to this concept of relationship and impact. This choice further exacerbated the time tension as it required much discussion but I felt it necessary.

The first geography oriented written task and the SLO baseline assessments generated rich diagnostic data. From the analysis of student answers it became abundantly clear that the students lacked certain abilities with respect to geographic reasoning. Specifically they struggled with a shortage of requisite content knowledge and an ability to use multiple pieces of data to inform plausible geographically informed answers to geographic questions. I used that understanding pedagogically in an effort to add to their novice content knowledge and ways in which they could utilize that information. This also required much time as I did not want to fall back on the traditional transmission model and just tell the students the important information. Doing that would seem to fall into the situation Bednarz (2003) found in Texas schools when teachers tried to implement the *Geography for Life* standards. One has to wonder if the teachers just used the standards but neglected the skills and perspectives. So, my teaching became an exercise in melding activities designed to get the students moving and experiencing the curriculum with a constant referring back to the relationship between earth and people. I also needed to adapt the “Zombie Based Geography”. Even though it was supposedly

aligned with geography content knowledge it lacked the zest requisite for middle school students and a substantive interpretation of geographic reasoning.

This study led me to conclude that geography instruction must encompass all three elements of *Geography for Life*. Teaching the content is not enough. A more holistic approach including the subject matter (content), geography skills, and geographic perspectives facilitates student understanding of geography as a discipline (Gersmehl, 2005), in contrast to the archipelago knowledge mentioned previously in this paper. Taught in isolation the subject matter becomes discrete, static “facts” devoid of meaning. The subject matter, skills, and perspectives form the geography lattice. Missing one part impacts the structure and impedes development. To accomplish this, teachers would have to understand the connections between the three elements and methods that would augment incorporating them into their practice. Ambitious teachers could immerse themselves in the extant geography literature, possibly seek university courses, or hopefully attend future professional development opportunities.

This work tentatively suggests some next steps for teachers daring enough to teach from a more disciplinary stance. A good place to start might be *Geography for Life* and *Teaching Geography* (Gersmehl, 2005). *Geography for Life* offers the starting point for an ontological shift requisite to teach geography in an academically honest fashion. Perhaps *Geography for Life* will impact others as much as it did for me and break down teacher resistance to change. If the conceptual framework shifts then perhaps the pedagogy will follow. Experienced and quality teachers have their favorite activities and topics. Understanding geography as a discipline and geographic thinking may provide a framework or bigger picture that may lead them to alter the content or what they ask

students to do while still using their favorite practices. Once teachers have a basic understanding of the epistemology of geography *Teaching Geography*, the activities utilized in this study can serve as somewhat of a blueprint for bringing *Geography for Life* into the classroom.

During this study it seemed that getting students out of their seats and interacting with each other and the curriculum stimulated them, especially the students who demonstrated low motivation and low achievement. The students who demonstrated high motivation and low achievement also seemed to profit from the communities of practice in which they exchanged and explained ideas with other classmates. While communities of practice also positively impacted the low motivation, low achievement students I would suggest some more scaffolding of larger, more abstract concepts such as the development of an economy or certain geographic skills. For instance, the skills of asking geographic questions and analyzing geographic information seemed to present some difficulty. Furthermore, some map reading skills such as latitude/longitude and scale could have used some more scaffolding and individual practice. Kenny, Odette, and DeSean could possibly have benefitted from more scaffolding and individualized attention. I would also recommend that ambitious teachers spend some time on teaching writing through geography. I did not spend a lot of instructional time critiquing and deconstructing their writing. Odele's situation captures this well: she scored an 83% on the final "Why There?" map analysis assessment but only a 68% on the second writing task. The data suggest Odele demonstrated the ability to work with and integrate multiple maps but struggled to more clearly articulate an argument for her ancient civilization locations on the second written task. In short, teachers looking to incorporate more

disciplinary oriented geography into their practice need to be mindful of their pedagogic practices. The data tentatively suggest that the more motivated groups of students (high motivation, low achievement group; high motivation, high achievement group) were quite responsive. The other two groups were responsive and overall improved their geographic reasoning and content knowledge but not to the same extent. Furthermore, the low motivation, low achievement student group could have benefitted from more individualized attention and interventions.

Of course teachers would need to adapt and modify for their own contexts. Lastly, I would encourage teachers to constantly ask how geographic phenomena impact human decision-making. Always bring it back to how humans act within and react to the world around them.

Implications for Students

In Chapter 5 I attempted to answer the first four student research questions and detail my findings:

1. What are student perspectives/understandings of geography?
2. What are student perspectives/understandings of geographic reasoning with respect to solving problems?
3. Given a geographic reasoning task, what do students do?
4. How do students reason with geography?

In this section I summarize the answers to the first four student research questions and attempt to answer the remaining two student research questions:

5. How do students think about their reasoning with geography?
6. How does student thinking about geography change?

At the beginning of both the school year and this study students mainly envisioned geography as map reading with the practical application of wayfinding and cultural studies. Perhaps the course name (Geography and World Cultures) contributed to the cultural connection. Student understanding was simplistic and incomplete. Several students conflated geography with history. Consequently many students did not have much of a perspective on geographic reasoning indicating that they never heard of it before. Furthermore the students did not seem to think too much about their geographic reasoning. The students that ventured more solid perspectives than “I don’t know” often believed that geographic reasoning helped people find out what happened in the past or some version of wayfinding. The vast majority of students lacked understanding of the reciprocal and interconnected relationship between Earth, its processes and phenomena, and other life.

When faced with geographic reasoning tasks the students struggled. Their subject matter deficits and lack of geographic schema prohibited the students from reasoning with geography. They often treated each piece of geographic evidence as separate data, reasoning only within one map at a time. Over time, though, most students experienced growth. The evidence I collected suggests a deepening understanding of geography and geographic reasoning in terms of subject matter knowledge, geographic skills, and the two (ecological and spatial) perspectives. The evidence also points to the development of emergent cognitive schemas such as geographic causality and interdependence.

As their understanding of geography and geographic reasoning grew the students were able to think more about their geographic reasoning. The primary participants, through questioning, were able to articulate how they combined maps in order to locate

their civilizations in places favorable for the development of civilizations. All of the primary informants demonstrated the ability to combine evidence from the various maps and explain their thinking except Ginny. She combined the information but when asked about it she replied “Um, not really.” The other primary informants explained in detail how they used information from the climate, physical feature, and vegetation map to inform their answers.

Bill, George, Harry, and Hermione all were able to explain how they handled conflicting information in order to decide the best place to locate their ancient civilizations. Fred stated that he found no conflicting information. Ginny pointed out a conflict between the vegetation map and the physical feature map but was unable to explain how she integrated that particular conflict into her placement of the ancient civilizations. Ron was able to identify a potential conflict but required questioning to articulate his thoughts.

It seems that some of the primary participants were better able to think about their geographic reasoning and George, Harry, and Hermione were also able to point to activities that fostered their own reasoning. George highlighted the scavenger hunts as something that required him to “use all the stuff we know” and that “you have to be able to figure it out kind fast.” Harry believed that the scavenger hunt activities, the leftovers simulation, and the hunting and gathering simulation helped him in his geographic reasoning task. Hermione thought that the scavenger hunts and the hunting and gathering simulation helped her sort out the geography reasoning task.

Student thinking about geography changed significantly from the beginning of the school year. At the beginning of the year students expressed unsophisticated and often

erroneous ideas of geography and geographic reasoning. The assessment and interview data suggest an evolving and expanding conception of geography. Harry and Hermione justified their second written task through long, detailed explanations that indicate more understanding of geography and geographic reasoning. Bill's written answers to the End of Year SLO "Why There?" and Literacy assessments displayed significant maturing of his thinking about geography. Fred, George, Ginny, and Ron struggled to verbalize their thinking as detailed or as clearly. Their marked improvement on all of the assessments and writing tasks imply a change in thinking. Their thinking about geography developed as well. However, they seemed to lack the metacognitive maturation that Bill, Harry, and Hermione experienced.

As explained previously in the limitations section, I did not administer an end of the year survey that asked for student definitions of geography and geographic reasoning. The concluding survey would have provided data with which to compare to the initial survey. Perhaps when compared to the data from the initial survey, the potential changes would directly corroborate the data gathered from the various assessments, tasks, and interviews.

VanSledright (2004, P. 232) points out that good historical thinkers are "tolerant of differing perspectives" and "skilled at detecting spin, hype, snake-oil sales pitches, disguised agendas, veiled partisanship, and weak claims." Even though historical thinking is grounded in chronology and geographic thinking is concerned more with spatial distribution, the same holds for good geography thinkers. Skilled geographic thinkers are thoughtful, critical consumers of information able to see through falsely constructed ethnocentric arguments and understand the geographic antecedents of

contemporary issues in exploited places and with exploited people. Disciplinary thinking within the right hands (Molin & Grubbstrom, 2013) seems to promote a more just, fair way of interpreting the world. Disciplinary thinking is an important type of reasoning that is not just for the professionals in the field. It is a critical and thoughtful way of perceiving the world important to the general population to be cultivated in elementary and middle school.

Implications for Administrators

Teaching from a disciplinary stance presents potential challenges with regards to school-based administrators. Administrators may see instruction through the lenses of their own schooling. Chances are their school experiences with geography and social studies in general came from a more traditional teacher-directed paradigm that favors content coverage and fact transmission. Hopefully, administrators embracing newer, more progressive approaches to curriculum, instruction, and assessment work with their teachers as curriculum/instructional gatekeepers (Kelley, 2014) to ensure that more disciplinary approaches are brought to bear on pedagogy. Administrators can familiarize themselves with geography as a discipline through a study of the standards, easily accessible on line or through *Geography for Life*. Unfortunately, some administrators may balk at the time currently required to teach geography from a disciplinary stance.

Central office administrators would need to support ambitious teachers by providing access to materials and opportunities to mold existing materials to local curriculum. Forward thinking administrators with grounding in the research literature could also provide local teachers in the district summer curriculum writing time for workshop wages to create materials supporting both the Common Core and disciplinary

approaches to content and pedagogy. In fact, a group of teachers, myself included, created the SLO geography reasoning assessments used in this study. Furthermore, administrators could supply financial backing to attend summer institute workshops. Unfortunately most of these summer programs lie in the field of history education. Geography education has not yet reached the same level of attention.

Professional development could also now be aligned with current research in social studies education rather than static best practices devoid of disciplinary grounding. Expert-novice research (Anderson & Leinhardt, 2002) shows that experts not only possess deeper subject matter knowledge but also have knowledge organized and stored cognitively that facilitates quick retrieval and application. Experts performed significantly better than novices on discipline specific problem solving and used domain specific representations as a tool to reason about real-life phenomena. Novices, on the other hand, reasoned within the representation itself and had considerable difficulty moving back and forth between the representation and real-life objects (Chi et al., 1981). Harris and Bain (2010) speculated that subject specific professional development helped develop useful cognitive schemes for teaching world history. Given these findings, administrators and districts can more creatively allocate their resources than to typical professional development offerings. They can bring in disciplinary experts with a sophisticated understanding of disciplinary concepts to work with content teachers on problem solving skills and disciplinary based habits of mind. This would require commitment and flexibility, as one or two sessions would not suffice.

Not only can they offer a menu of workshops and conferences but can provide incentives and avenues for teachers to enroll in geography courses or programs at local

colleges and universities designed specifically for practitioners. The Teaching American History grant partners the history department of one university, the education department of another university, and local school districts through a cohort model. This provides an example that other disciplines such as geography could emulate. District professional development and curriculum offices can target their professional development to specific disciplines in terms of content and pedagogy through programs like the Teaching American History grant. Professional development not grounded in specific content areas tailored to their audience tends to elicit and propagate the cynical side of teacher in-service development. Targeted professional development could be built around practitioner research studies straddling the gap between research and practice.

Both school-based and central office administrators can offer flexible scheduling and financial means for teachers to collaborate with professionals in the field either through local government organizations or universities. Collaborating with professional and research geographers can potentially influence teacher practice. With increased content knowledge and epistemological comfort with geography, teachers can incorporate this acquired knowledge into their practice. These teachers can then lead professional development sessions targeted to their specific content area. Perhaps, some of these connections coupled with administration support might lead to research collaboration between university-based professionals and classroom teachers. This integration of academy and secondary school can conceivably close the gap between the two and, ultimately, help students.

Finally, central office curriculum and instruction departments need to provide a curriculum that matches disciplinary geography. It makes no sense to talk about the

efficacy of such a perspective backed up by research in other fields without curriculum alignment. Subsuming geography to general social studies courses with history-centric curriculum impeded teaching geography in an academically honest manner. As such, geography serves too many masters and there simply is not enough time to treat it appropriately. Furthermore, burdening the teacher with too many disciplines diffuses attention and limits their time to ontologically embrace geography (Gregg & Leinhardt, 1994; Muessig, 1987). Additionally, geography subject matter must be taught through geography skills and the geographic perspectives to foster geographic reasoning.

Implication for Teacher Educators

Anderson and Leinhardt's 2002 study raises some serious questions for teacher education programs. Of their study sample, preservice social studies teachers fared worst among the participants in their experiment studying geographic reasoning. Participants consisted of seven geography experts, seven geography majors with at least two cartography classes, seven undergraduate geography majors enrolled in their first cartography class, and nine preservice secondary social studies teachers halfway through their internship. Typical social studies education programs seem to focus much more heavily on history and political science. Little time is spent on geography and geography education. The sheer scope of social studies as a field and practical day-to-day classroom issues such as management restricts the depth and time spent on any one specific discipline within social studies. Moreover, methods courses are sometimes delegated to secondary school teachers or graduate assistants. These teachers may not understand epistemological concerns of the field while the graduate assistants may be more grounded in the research literature but lack the content background. Oftentimes new teachers begin

their journey ill-equipped to teach what they were hired to teach. In fact, in order to become certified in the state of Maryland to teach social studies I needed to take just one undergraduate geography class. After graduating from a Masters Certification program, I was hired to teach geography and world culture.

With a wealth of resources at their disposal, institutions that prepare teachers can work to integrate the professionals with the professional educators. Perhaps faculty from the geography department and secondary education could join forces to teach prospective educators. Also, perhaps teacher education departments could form partnerships similar to the Teaching American History Grant and bring together disciplinary content experts, educational researchers, and either practitioners or preservice education majors to collaborate on joint projects designed to increase epistemological and pedagogic practices. This melding of epistemological and pedagogical experts could possibly shift the current model of teacher education. Harris and Bain (2010) suggest a lab course in which prospective teachers “see” the pedagogical moves their instructors make in order to explicit content knowledge required to teach their subject from a disciplinary orientation.

Mark Stout (2004) makes an insightful point about teacher education programs when stating that

These programs should also encourage inquiry on the part of the students as they participate in their field experiences. While some schools encourage a component of practitioner research, this should become a necessary part of the final student internship experience. This research should be directly associated with their field experiences, and might be targeted toward student-centered learning experiences

or inquiry-based teaching methods that replicate the work of real social scientists and historians. By associating this practitioner research to the content-based teaching strategies rather than generic ones, these prospective teachers can begin to see the complex relationships that influence the use of teaching methods that place the interpretation of history and social science in the hands of their students. Requiring students to engage in practitioner research also offers the opportunity to enhance the legitimacy of these methods with them and with their mentor teachers. (p. 146)

This recommendation can be adapted to geography as well. Prospective teachers could complete practitioner research around geographic reasoning.

It must be noted however, that teacher education programs work with what they are given and are often called upon to unwind and undo years of educational calcification. The best way to impact and develop epistemological and ontological orientations is throughout an individual's education. This allows teacher education programs to build upon pre-existing novice schemas (National Research Council, 2005; Vosniado & Brewer, 1992). Starting individuals early with complex geographic symbolism (Piaget & Inhelder, 1956) can be scaffolded appropriately for developmental abilities (Downs & Liben, 1991). Leinhardt, Stanton, and Bausmith (1998) found that constructing maps cooperatively at young ages aided in the development of cognitive structures through a socialization process similar to what Lave and Wenger (1991) describe.

Implications for Policy Makers

In education, assessment often drives instruction. In order to shift teaching and learning to a more disciplinary orientation focused on teaching students to develop the habits of mind of professionals in the field, assessment must mirror disciplinary practices nationally and locally. During the No Child Left Behind (NCLB) era, many colleagues altered their teaching practices to reflect the newly minted assessments. Unfortunately, those assessments often encouraged regurgitation of discreet factual information divorced from the epistemic processes and deeper thinking germane to the disciplines assessed. I see the same shift with the PARCC assessments. In contrast, assessments that ask questions based upon geographic thinking and content aligned with *Geography for Life* can potentially influence pedagogy through similar questions and approaches.

Assessing students on their geographic reasoning might persuade teachers to incorporate more activities in their classrooms that involve developing geographic reasoning. Assessing students on their spatial and ecological perspectives might also sway practitioners to develop those through instruction. In fact, assessments aligned with disciplinary practices will provide teachers and school districts instructional targets and incentives that may shape pedagogy (Stout, 2004). This, however, requires significant ontological shifts at many different levels. A change in assessment, in turn, may serve to drive professional development that deepens teachers' subject matter and pedagogic content knowledge (Shulman, 1986).

Markets often determine what materials (textbook and lesson) publishing companies will most likely produce to support new assessment formats and content. One need only peruse social studies publishing catalogues over the last decade to see their

responsiveness to shifting policy. For many years the five themes of geography dominated all geography materials. Now the national standards reflected in *Geography for Life* dominate the pages. Unfortunately, the quality has not caught up to the quantity.

And last, policy makers including National Geographic and the National Council of Social Studies could make funds available for geographic research in education and geography education. National Geographic at one point in time funded summer geography institutes for teachers to improve geography content knowledge. More ecologically grounded practitioner research coupled with professional geographer and geography education faculty collaboration would serve to enrich the paltry corpus of research in geography education, hopefully providing insight for teachers to actually teach in a more disciplinary approach to geography.

Summary

Throughout this study I attempted to detail what happens when a classroom teacher incorporates a more disciplinary approach to teaching geography to 6th graders from diverse backgrounds. One common theme was the multiplicity of factors impacting teaching geography from this stance, such as time constraints imposed by a crowded curriculum, limited materials, and various assessment regimes. While pre-packaged kits from publishing companies might mitigate some of the time spent developing materials and help teachers whose disciplinary knowledge is limited, the complex nature and dynamics of classroom life often preclude the efficacy of these generic materials. Furthermore, existing materials rarely match local curriculum or use engaging and progressive pedagogic methods. Quite frankly, they rely heavily on teacher transmission via PowerPoint. Until local curricula line up better with a disciplinary perspective and

free geography from the fetters of social studies, the onus will fall squarely on the classroom teacher to provide quality materials.

With curriculum in its current state, most teachers will have to weigh the benefits and limitations of a disciplinary approach to teaching geography to determine how they will proceed. Based upon my experiences in teaching geography through a more disciplinary approach, teachers will need to make sure that they factor in all the elements of geography as a discipline. *Geography for Life* (1994) weaves together three strands to form a lattice designed to support geography learning and geographic reasoning. Subject matter, geographic skills, and geographic perspectives make up the elements of geography. The subject matter represents a distillation of essential knowledge. The skills help to generate and understand the subject matter and the perspectives shape how the subject matter and skills are to be considered. Teaching just one or two of the three facets leaves an incomplete understanding. In fact, the authors of *Geography for Life* state that, “Mastering any single component of geography is *not* equivalent to mastering geography. All three—subject matter, skills, and perspectives—are necessary to being geographically informed. None can stand alone” (p. 30).

Deciding to teach geography from a disciplinary perspective gives rise to implications for teachers, administrators, teacher educators, and policy makers. Teachers face many issues when deciding to incorporate a disciplinary stance including time considerations and resource acquisition and integration. Administrators need to provide flexible scheduling and potential financial incentives in order to make possible quality professional developmental opportunities during the school day to connect teachers to outside experts and fellow travelers. Administrators can also provide access to further

epistemological and pedagogic education through partnerships with area research institutions and professional organizations. Teacher educators can develop research oriented and professional relationships with practitioners, incorporating their work into methods courses and teacher preparation programs. Teacher educators may also form partnerships with local school districts and either their disciplinary departments or within other research institutions such as the Teaching American History Grant program. Policy makers should align curriculum and assessment with disciplinary methods and content incorporating questions that challenge students to demonstrate geographic reasoning. Lastly, policy makers control the purse strings and should supply sufficient funding for progressive and effective professional development that addresses geography content and pedagogy.

Future Studies

In this study I established that students can learn to reason with geography through the use of multiple sources of geographic evidence in order to construct an argument and solve basic geographic problems. However, curriculum, time constraints, and a desire to teach tested content may negatively impact teaching from a more disciplinary stance. I believe that this study represents the tip of the iceberg. Students can learn to think more like a geographer and employ geographic reasoning. Future studies could more thoroughly or closely examine specific teaching methods such as simulations, hands on learning, or competition and their direct impact on learning or engagement. Future studies can also focus more specifically on the integration of all parts of the geographic lattice, in other words, the three elements of geography. The precious few studies (see Bednarz, 2003) focus exclusively on the actual standards (content) and their

implementation rather than integrating the skills and perspectives with the content. Other studies may bring professional geographers into classroom research and potentially look at the intersection of geography epistemology and learning. Professional geographers bring knowledge and experience that few teachers possess. Teachers bring knowledge that professional geographers may lack. Joining these two worlds could potentially benefit both with teachers helping to translate difficult theories or concepts and professional geographers providing the nuanced habits of mind and cognitive schemas. The combination of disciplinary and pedagogic experts may yield valuable data in terms of teaching and learning geography.

Further studies of this type might be done which measure student achievement on standardized tests in geography by teachers using a more disciplinary approach. These results could then be compared with the results of students learning through more traditional means. A quasi-experimental study could be conducted in which either a practitioner researcher compares two classes learning the same content but with two different methods. One group of participants would learn the content through a more disciplinary-oriented pedagogy based upon *Geography for Life*. The other group would learn the content through more traditional methods. This might allow the researcher to make some claims comparing the different approaches including potential insight into the more effective method. Another quasi-experimental study could have one group learning geography content based solely upon *Geography for Life* and the other group would learn content based upon the local school district curriculum. This may generate data of interest to curriculum design and possibly strengthen (or weaken) the case for stand-alone geography classes based upon academic geography.

These studies should attempt to investigate both student learning and teaching methods. While there is still much to learn about how students understand geography and whether the use of disciplinary approaches do lead to deeper understandings, there is also much to learn about how best to teach students how to do this. Future studies should focus on both student learning and the methods that teachers employ to guide their students to understanding.

There currently exists a proliferation of history education studies looking at process and product as well as the teaching of history and historical thinking (Bain, 2000; Barton & Levstik, 2004; Grant, 2003; Kelly, 2014; Stout, 2004; VanSledright, 2004; VanSledright, 2011; Wineburg, 2001). Geography education has a lot of room to grow and a long way to go before catching up. The field is wide open. The purpose of this study was to see what would happen if I introduced students to disciplinary geography and geography oriented tasks. Other studies could plumb the depths of geography education by looking at how students learn geography, not just understanding maps as symbolic representations, and teachers teach geography including linking teaching to NAEP scores. A quasi-experimental study comparing NAEP scores between groups of students receiving different instructional methods might shed light on the efficacy of disciplinary practices and how students learn good geography.

Another possible study might replicate Harris's (Harris & Bain, 2010) 2008 study in which she researched teacher thinking with and about world historical events. Harris asked 10 teachers (four preservice social studies teachers and six in-service teachers) to organize a stack of cards with eighteen historical events and concepts into what she called a "big historical picture" by arranging the cards on a large piece of paper, adding

appropriate labels, and drawing connecting lines to give the events meaning. She asked all participants to complete the task twice: once for their own understanding and once to structure the events for instructional purposes. This allowed Harris to analyze the participants cognitive process as they discussed their moves. A similar study with geography teachers and preservice social studies teachers might yield similar results and make explicit teachers' cognitive maps of geography.

Conclusion

My work on this study has led me to believe that teaching geography from a disciplinary perspective is possible. The students learned geography content and skills while developing their geographic perspectives. However, several significant challenges exist such as time, resources, incorporation of a variety of teaching activities, and teacher understanding of geography. Teachers would require support from various education stakeholders.

In true Newtonian fashion, this journey towards good geography greatly impacted my views on geography and geographic reasoning. My own understandings on geography and geographic understanding significantly changed and aligned with a disciplinary view expressed in the academic literature. Student perspectives of geography and geographic reasoning also matured as reflected in their improved assessment results and second round of interviews. I always believed that geographic reasoning was attainable for young learners and this study suggests that young learners can increase their understanding and ability to reason significantly. Using this study as a lamp and a mirror (Johnson, 2006), I reflected upon my own teaching. In the past my teaching seemed much like a series of loosely connected activities centered on the curriculum. The curriculum

was the main thread woven throughout my teaching. Other threads such as social justice and being a citizen of the world complemented the curriculum. Using the data generated from the various geographic reasoning assessments and tasks to inform my instruction and pedagogic decisions, I traced the trajectory of student understanding. Applying the discipline of geography manifested through *Geography for Life* moved the curriculum from foreground to background. I still made sure that I followed it and tried to align everything to it, but my conceptual framework as informed by student data became the main thread. This provided more continuity to my teaching. I no longer felt that my lessons loosely related to each other as the curriculum moved from geography to history to modern world culture. The curriculum became the servant rather than the master.

This focus translated to increased student learning. Reasoning with geography improved as students applied deeper subject matter and developing geographic perspectives to bear on geographic evidence. Their sharpened geographic skills aided in problem solving. Student thinking about geography matured from the beginning of the school year. The findings in this study suggest a fledgling perspective oriented towards the interconnectedness of the physical and human worlds. Throughout the school year, but towards the latter half, students began to articulate ideas showing the interconnectedness of the physical and human world.

In discussions about culture and civilizations through the school year students were able to better use geography to explain human decisions and the development of culture. Students also demonstrated an improved ability to make connections between cultures through environmental factors of trade. Seeing what Ford (1987) called models, students were better able to predict the locations of civilizations and see connections

between seemingly disparate cultures. The climate skits that students developed displayed the connections of places around the world based on climate. Their culture collages and subsequent discussion revealed some of the impact that physical phenomena have upon culture and the connections that places around the world share.

Geography provided the lens students peered through to understand the spatial and ecological connection between physical phenomena such as resources, physical features, and climate and human decisions and cultural differences. Perhaps a candle was lit, enabling me to now answer the seemingly rhetorical question posed in the opening paragraph. I asked, “What does geography call one to know or, deeper still, understand?” Well, geography calls one to understand the interconnectedness of everything. Geography provides the lens.

Appendix A

Unit I: Our Earth

Overview:

Geography is the study of physical and human characteristics and how they impact the relationship between Earth and the people on it. It is essential that students develop the skills that will enable them to observe patterns, associations, and spatial order. Many of the capabilities that students need to develop geographic skills are termed critical thinking skills. These involve inferring, analyzing, judging, hypothesizing, generalizing, predicting and decision-making. These have applications to all levels of geographic inquiry in which students can build competencies in applying geographic skills to geographic inquiry. Culture and experience shape belief systems, which in turn influence people's perceptions of places and regions throughout their lives. It is essential that students appreciate the diverse values of others in a multicultural world and to engage in accurate and sensitive analysis of people, places, and environments.

Enduring Understandings:

- Using geographic tools to understand human settlement patterns and development.
- Geography influences how people live and work on earth in order to get what they need.
- People are affected by environmental, social, and cultural concerns.

Essential Questions:

- What is geography?
- How do maps and other geographic tools allow geographers to gain information?
- How is geography used to understand where things are and why they are there?
- How does geography impact the actions of people and how do people impact the earth?
- How do the earth's processes of rotation and revolution have an effect on the interaction of people and earth?
- How does culture influence the way people live on earth?

Content Framework:

Topic	Learning Outcomes	Vocabulary	Key Concepts
Geography	<ol style="list-style-type: none">1. Define the term <i>geography</i> and give examples how it is used to understand the world around us.2. Develop and use mental maps to organize	<ul style="list-style-type: none">• Geography• Geographer• Region• Archipelago• Coast• Delta• Peninsula• Plateau• Topography	<ol style="list-style-type: none">1. The five themes of geography are used to organize the study of geography.2. Landforms and water bodies show how the earth is shaped.3. Mental maps represent ever changing summaries of spatial knowledge and serve as indicators of how well people know the spatial

	<p>information about people, places, and environments in a spatial context.</p> <p>3. Define, locate, and compare major landforms and water bodies on the earth.</p> <p>4. Identify the purposes of maps and their key components.</p> <p>5. Describe how the Earth's rotation causes night and day and the Earth's revolution causes the change in seasons.</p> <p>6. Identify and describe the factors that affect climate.</p> <p>7. Describe the earth's climatic zones and climatic regions/biomes.</p>	<ul style="list-style-type: none"> • Island • River • Bay • Tributary • Canal • Gulf • Lake • Ocean • Strait • Climate • Vegetation 	<p>characteristics of places. People develop and refine their mental maps through personal experience and through learning from teachers in the media.</p> <p>4. Thematic maps are used to present data, physical maps are used to show earth's features and political maps are used to show political features such as cities and countries.</p> <p>5. Components of a map are symbolic representations used to understand and read maps and to locate places.</p> <p>6. Climate is affected by factors of geography and earth's movements.</p> <p>7. There are five major climate regions/biomes.</p>
Culture	<p>8. Identify and analyze elements of culture such as religion, language, arts, food/diet, clothing and others. .</p>	<ul style="list-style-type: none"> • Culture 	<p>8. Elements of culture affect the daily life of people on earth.</p>

Unit IV: Asia

Overview:

Studying specific regions allows learners to develop an understanding of spatial perspectives, and examine changes in the relationship between peoples, places and environments. Through a more formal study of history, students continue to expand their understanding of the past and are increasingly able to apply the research methods associated with historical inquiry and make connections with present and future decisions. The study of people, places, and environments enables us to understand the relationship between human populations and the physical world. Culture and experience shape belief systems, which in turn influence people's perceptions of places and regions

throughout their lives. It is essential that students appreciate the diverse values of others in a multicultural world and to engage in accurate and sensitive analysis of people, places, and environments.

Asia is the world's largest continent. From Arctic areas in northern Siberia, to the world's highest mountains in the Himalayas, to tropical rainforests in Southeast Asia, it is home to diverse cultures, enormous populations of people, and a wide range of climatic regions. China is the world's largest nation in terms of population, and has a rich history that is linked to the history of many other nations. India is the world's second largest nation, and occupies most of the Indian Sub-Continent. Intense conflict over political ideologies, economic interests, and religions continues to present challenges to the nations of Asia.

Enduring Understandings:

- Decisions concerning the allocation and use of economic resources impact individuals and groups.
- Knowledge of the past helps one understand the continuum of human civilization.
- Regions are defined by unifying characteristics.
- The physical environment affects the settlement and population patterns of a region.
- Culture is both a unifying and divisive force in human relations.

Essential Questions:

- How does geography, climate and natural resources of Asia influence the way people live in and adapt to this region?
- How does religion affect the way of life of people in Asia, traditionally and in today's changing societies?
- How have the achievements of ancient civilizations in Asia contributed to the societies of today?
- How do countries in Asia deal with industrialization and rapid population growth?

Content Framework:

Topic	Learning Outcomes	Vocabulary	Key Concepts
Geography	<ol style="list-style-type: none"> 1. Identify Asia's relative location in the world. 2. Identify the various geographic regions within Asia and describe the characteristics that make them distinct regions. 3. Describe the major geographic and climatic characteristics for a selected region in Asia. 4. Describe how geographic 	<ul style="list-style-type: none"> • Subcontinent • Himalayas • Monsoons • Tsunami • Archipelago 	<ol style="list-style-type: none"> 1. The countries in this area of study are divided into Central Asia, South Asia, East Asia, and Southeast Asia. 2. Geographic, seasonal and climatic changes have an influence on how people live and thrive in this region. 3. Asia is made up of mainland and many island nations, with archipelagos located along the Eastern and Southeastern regions.

	location, physical features, and natural resources influence the economic development of Southern, Eastern and Southeastern Asian nations.		
History	<ol style="list-style-type: none"> 5. Describe and analyze the cultural characteristics and achievements of the civilizations in South Asia and East Asia. 6. Describe the effects and influence of empires on culture and development in South Asia and East Asia. 		<ol style="list-style-type: none"> 4. Civilizations that developed in South Asia were along the Indus River Valley due to geographic characteristics that would allow human settlement and development. 5. Empires that developed in India and China and empires that conquered these regions have had an influence in shaping the history and culture of South and East Asia. 6. Major achievements of the Chinese dynasties from the Shang, Qin, Han-for example the Silk Road, Great of China, engineering, and others. 7. Major effects of British colonialism on Indian culture included changes in the economy, language, education and other social aspects.

Appendix B

Research Questions Matrix

Research Question	Target Concept & Definition	Data Source	Data Collection Method
What are student perspectives/understandings of geography and geographic reasoning?	<p>Definition Geography: the study of place and human-environment interaction (Gregg & Leinhardt, 1994)</p> <p>Geographic Reasoning: the process of weaving together five core elements – landscapes, maps, hypothesis, processes, and models – to create an argument or case (Ford, 1984)</p> <p>Importance of geography literacy: importance of a geographic perspective to critical thinking and as a way of knowing.</p>	<ul style="list-style-type: none"> • Student written responses to survey questions. • Student verbal responses to taped interview questions. 	Initial survey, interviews: qualitative
Given a geographic reasoning task, what do students do?	<p>Geographic Skills: acquiring geographic information, analyzing geographic information, and answering geographic questions including map reading and interpretation and synthesis</p> <p>Understanding Organizing Concepts of Geography: the World in Spatial Terms and Human Systems</p> <p>Geographic Perspectives: spatial reasoning, ecological</p>	<ul style="list-style-type: none"> • Student written responses to geographic oriented written task (pre-assessment). • Student written responses to geographic oriented written task (post-assessment). • Student verbal responses to taped think-aloud protocol. • Student verbal responses to taped retrospective interviews. 	Pre-assessment, post-assessment, think-aloud, retrospective interviews: qualitative and quantitative
How do students reason with geography? Not meant in the sense of well or poorly, but how do they use the evidence/resources to inform their answers.	<p>Geography Skills: analyzing geographic information and answering geographic questions</p> <p>Geographic Perspectives: spatial reasoning, ecological</p>	<ul style="list-style-type: none"> • Student written responses to geographic oriented written task (pre-assessment). • Student written responses to geographic oriented written task (post-assessment). 	Pre-assessment, post-assessment, think-aloud, retrospective interviews: qualitative and quantitative

		<ul style="list-style-type: none"> • Student verbal responses to taped think-aloud protocol. • Student verbal responses to taped retrospective interviews. 	
How do students think about their reasoning with geography?	Metacognition: thinking about their thinking	<ul style="list-style-type: none"> • Student verbal responses to taped think-aloud protocol. • Student verbal responses to taped retrospective interviews. 	Think-aloud, retrospective interviews: qualitative
How does student thinking about geography change?	Metacognition: thinking about their thinking	<ul style="list-style-type: none"> • Student verbal responses to taped think-aloud protocol. • Student verbal responses to taped retrospective interviews. 	Think-aloud, retrospective interviews: qualitative
What are the teacher researcher's perspectives/understanding of geography?	<p>Definition Geography: the study of place and human-environment interaction (Gregg & Leinhardt, 1994)</p> <p>Geographic Reasoning: the process of weaving together five core elements – landscapes, maps, hypothesis, processes, and models – to create an argument or case (Ford, 1984)</p> <p>Importance of geography literacy: importance of a geographic perspective to critical thinking and as a way of knowing.</p>	<ul style="list-style-type: none"> • Student written responses to survey questions. • Student verbal responses to taped interview questions. • Teacher journal 	Initial survey, interviews, Teacher researcher journal entries: qualitative and quantitative
What are the teacher researcher's perspectives/understandings of geographic reasoning?	<p>Geographic Skills: acquiring geographic information, analyzing geographic information, and answering geographic questions including map reading and interpretation and synthesis</p> <p>Understanding Organizing Concepts of Geography: the World in Spatial Terms and Human Systems</p> <p>Geographic Perspectives: spatial reasoning, ecological</p>	<ul style="list-style-type: none"> • Student written responses to geographic oriented written task (pre-assessment). • Student written responses to geographic oriented written task (post-assessment). • Student verbal responses to taped think-aloud protocol. • Student verbal 	Pre-assessment, post-assessment, think-aloud, retrospective interviews, collected work, Teacher researcher journal entries: qualitative and quantitative

		<p>responses to taped retrospective interviews.</p> <ul style="list-style-type: none"> • Teacher researcher journal • Classroom discussion 	
Given data from a geographic reasoning task, what does the teacher researcher do? How does the teacher researcher use data to inform instruction?	<p>Geography Skills: analyzing geographic information and answering geographic questions</p> <p>Geographic Perspectives: spatial reasoning, ecological</p>	<ul style="list-style-type: none"> • Student written responses to geographic oriented written task (pre-assessment). • Student written responses to geographic oriented written task (post-assessment). • Student verbal responses to taped think-aloud protocol. • Student verbal responses to taped retrospective interviews. • Teacher researcher journal 	Pre-assessment, post-assessment, think-aloud, retrospective interviews: qualitative and quantitative
How does the teacher researcher determine geographic reasoning? How does the teacher researcher foster geographic reasoning?	<p>Geography Skills: analyzing geographic information and answering geographic questions</p> <p>Geographic Perspectives: spatial reasoning, ecological</p>	<ul style="list-style-type: none"> • Student verbal responses to taped think-aloud protocol. • Student verbal responses to taped retrospective interviews. • Collected work • Classroom discussion 	Pre-assessment, post-assessment, think-aloud, retrospective interviews, collected work: qualitative and quantitative
How does the teacher researcher think about his teaching of geographic reasoning?	Metacognition: thinking about his thinking	<ul style="list-style-type: none"> • Teacher researcher journal 	Teacher researcher journal: qualitative
How does the teacher researcher's thinking about geography change?	Metacognition: thinking about his thinking	<ul style="list-style-type: none"> • Teacher researcher journal 	Teacher researcher journal: qualitative

Appendix C

Initial Survey

1. What is geography?
2. What are your thoughts/feelings about geography in general (like/dislike, etc.)? Explain.
3. What are your thoughts/feelings about geography as a school subject (like/dislike, etc.)? Explain.
4. How would you describe your own knowledge about geography? Please explain.
5. Is it important to study geography? Why/Why Not. What are their benefits?
6. How does geography impact people lives and society (or explain why it doesn't)?
7. Geographers use a term called reasoning/thinking. What do you think this means? Explain.
8. How can people use geographic reasoning in their lives? Explain (if you believe they cannot, explain that).
9. How do you feel about tests in school?
10. Describe the types of questions typically asked of you on tests or other assessments.

Appendix D

Interview Questions: Student

Personal Background

1. Please introduce yourself.
 - Name
 - Age
 - Gender
2. How do you like 6th grade?
 - Positives
 - Negatives
3. How does 5th grade compare to 6th grade?
 - School attended
 - Amount of work
 - Teachers
 - Social
 - Number of students in general/classes
 - Subjects
4. Without using names, tell me about a good teacher you had.
 - What made them a “good” teacher?
5. Without using names, tell me about a bad teacher you had.
 - What made them a “bad” teacher?
6. What classes are you taking now?
7. Which ones do you like? Why?

Epistemology

8. Speaking of classes, I am interested in finding out your opinions, thoughts, and experiences with geography (all information will be kept private). How would you define geography?
9. Why do you think we study geography?
10. Is geography important for people to learn? Why/Why not?
11. How might people use geography in their lives?

12. Is geography important to you? Why/why not?
13. In what ways do you use geography in your life?
14. What are possible ways that you might use geography (as you get older) in your life?
15. In what ways does geography influence human decision making?
16. What do you learn in geography class?
17. What does it mean to think like a geographer?

Pedagogy

18. How do I teach geography?
 - What do you actually do in geography class?
19. What kinds of classwork assignments do I give you in a typical geography class?
20. What are you typically assigned for homework in geography class?
21. How do I determine if you understand the material?
 - Written
 - Oral
22. What has been difficult for you in geography class?
 - Assignments
 - Concepts
 - Amount of work
 - Other
23. Describe a typical geography class period.

Appendix E

Geography-Oriented Written Task#1

Name: _____ Date: _____ Block: A B C D E

Geographic Reasoning / Civilizations Pretest

Directions: *Please complete all parts of this assessment. Your essay responses require well-organized written responses. Make sure you read each task/question carefully and understand what you are being asked to do. You will receive two grades one for me to determine your geographic reasoning and another based upon your effort and writing so please consider this as you write.*

Part I

The El Museo del Barrio has decided to also create an exhibit showing geographic reasoning or thinking. They now want you to generally predict where civilizations develop and explain why based upon the factors contained in the evidence used for Part I. In short, answer the following question: **What geographic factors determine where civilizations develop?** Be sure to use specific examples and details to support your answer.

Task: Use the provided evidence (three different types of maps) in order to determine and explain where two ancient South American civilizations might have begun. You are looking for the best possible locations based upon the evidence. This is hypothetical, and meant to demonstrate your reasoning with maps.

Step One (Examination)

~examine provided maps using organizer

Step Two (Reasoning)

~relate map to task

Step Three (Explanation)

~once you have made your choice, **label** the provided blank map (**writing #1 and #2 on it**) where you think the two civilizations were located

~then, using specific details from the maps, explain your answer below

Appendix F

Geography-Oriented Written Task#2

Name: _____ Date: _____ Block: A B C D E

Geographic Reasoning / Asia Post-test

Directions: *Please complete all parts of this assessment. Your essay responses require well-organized written responses. Make sure you read each task/question carefully and understand what you are being asked to do. You will receive two grades one for me to determine your geographic reasoning and another based upon your effort and writing so please consider this as you write.*

Part I

The Smithsonian museum has entered into a partnership with local schools that study world geography. The museum is opening a new exhibit to highlight ancient Asian civilizations. Your task is to use the provided evidence in order to hypothesize where the two ancient South Asian civilizations began. Once you have decided **label** the provided blank map (e.g., **civilization one and civilization 2 or just #1 and #2**) and then answer the following question: **Based upon the provided evidence and any prior knowledge, where did the two ancient South Asian civilizations develop?** Be sure to use specific examples and details to support your answer.

Part II.

The Smithsonian has decided to also create an exhibit showing geographic reasoning or thinking. They now want you to generally predict where civilizations develop based upon the factors contained in the evidence used for Part I. In short, answer the following question: **What factors determine where civilizations develop?** Be sure to use specific examples and details to support your answer.

Appendix G

Think-Aloud Verbal Protocol

Name

Title of Map

What can you learn from this
map?

Please put your pencil down and think about how came to your answers
above.

How does the information on
this map impact your answer to
the task?

**Task: Locate two possible
locations for ANCIENT South
Asian civilizations**

Please put your pencil down and think about how came to your answers
above.

Appendix H

Geographic Reasoning Retrospective Interview

1. What were your general impressions of this task? (What did you think about this exercise?)
2. Were the directions and expectations clear? (Explain)
3. Describe the level of difficulty of this task on a scale of 1-5 (1 being the easiest, 5 being the most difficult) (Explain).
4. What type of knowledge do you think this measured? (What was “tested”?)
5. Did prior knowledge impact your answer? If so, how?
6. What data did you find important in making your decisions? What data did you find unimportant in making your decisions?
7. How did you combine information from the maps? Use specific examples if possible.
8. Did the maps provide any conflicting data? If so, what was it? How did you make sense of the conflicting data?
9. What suggestions do you have for administering this task in the future?
10. What questions do you have of me?

Appendix I

Geographical Reasoning Rubric

Where? Why there? Where else? What are the consequences?

Criteria	Place, Regions, & Culture (H-EI)	Spatial Patterns & Movement (HP)	Location	Use of Geographic Tools	Claim	Evidence
4	Thoroughly analyzes the physical and human geographic characteristics of places.	Thoroughly analyzes the physical and human factors that impact environments, movement, and settlement patterns.	Accurately places and organizes information about people, places, and environments in a spatial context.	Accurately interprets maps and other geographic representations to understand and communicate information.	Formulates plausible interpretation or claim based on the evaluation of evidence found in a variety of geographic sources	Justifies claims using appropriate, direct evidence from a variety of geographic sources.
3	Analyzes the physical and human geographic characteristics of places.	Analyzes the physical and human factors that impact environments, movement, and settlement patterns.	Accurately places and organizes information about people, places, and environments in a spatial context for the most part.	Interprets maps and other geographic representations to understand and communicate information with reasonable accuracy.	Generates a reasonable interpretation or claim based on the evaluation of evidence found in selected geographic sources	Justifies claims using some appropriate, direct evidence from a variety of geographic sources.
2	Shows some analysis of the physical and human geographic characteristics of places.	Shows some analysis of the physical and human factors that impact environments, movement, and settlement patterns.	Places and organizes information about people, places, and environments in a spatial context with minimal accuracy.	Interprets maps and other geographic representations to understand and communicate information with minimal accuracy.	States an interpretation or claim that may or may not be based on evidence found in selected geographic sources	Justifies claims using generalizations, or using limited appropriate direct evidence.

1	Shows little or no analysis of the physical and human geographic characteristics of places.	Shows little or no analysis of the physical and human factors that impact environments, movement, and settlement patterns.	Erroneously places and organizes information about people, places, and environments in a spatial context.	Erroneously interprets maps and other geographic representations.	Does not state an original claim or interpretation	Does not justify or support claims using appropriate direct evidence.
---	---	--	---	---	--	---

Appendix J

Unit Matrix and Data Collection Table

Curriculum: Our Earth/N. Africa and SW Asia	Learning Activity	Element of Geographic Reasoning	Data Collection	Research Questions Addressed
Define the term <i>geography</i> and give examples how it is used to understand the world around us.	<ul style="list-style-type: none"> • Presentation/Discussion on structure of geography as a discipline • Analyze Dr. Edward Snowden maps and discuss how geography can help solve problems. • Introduction to “Zombie Geography” graphic novel <u>Dead Reckon</u> and jigsaw of professional geography descriptions • Zombie Based Geography Project #1 lesson 1: Intro to Geography • Geographic thinking written task #1 • Student Learning Outcome Baseline Assessments (political map, physical map, “Where?” and “Why There?” Performance Assessments, “Thoughtful Application” Argument Writing 	Geography Element 1 (Subject Matter): The World In Spatial Terms Geography Skill 5 (Geography Skills): Answering Geographic Questions Spatial Perspective (Geographic Perspectives)	<ul style="list-style-type: none"> • Student responses captured in initial survey • Student responses to Edward Snowden map analysis activity/discussion • “Geographer Question Design” exit ticket • Interviews with main informants • Student responses to geographic thinking written task • Think-aloud verbal protocol with main participants • Teacher researcher observations and journal • SLO Baseline Assessments 	<ul style="list-style-type: none"> • What are student perspectives/understandings of geography? • What are the teacher researcher’s perspectives/understandings of geography? • What are student perspectives/understanding of geographic reasoning with respect to solving problems? • Given a geographic reasoning (thinking task), what do students do? • Given data from a geographic reasoning task, what does the teacher researcher do? • How does the teacher researcher use the data to inform instruction? • How do students think about their reasoning with geography? • How does the teacher researcher think about his teaching of geographic reasoning? • How do students reason with geography? • How does the teacher

				<p>researcher determine geographic reasoning?</p> <ul style="list-style-type: none"> How does the teacher researcher foster geographic reasoning?
<p>Develop and use mental maps to organize information about people, places, and environments in a spatial context.</p>	<ul style="list-style-type: none"> Students will create mental maps of their neighborhoods including local resources Map of classroom 	<p>Geography Element 1 (Subject Matter): The World in Spatial Terms Geography Standard 2 (Subject Matter): How to use mental maps to organize information about people, places, and environments in a spatial context Geography Skill 3 (Geography Skills): Organizing Geographic Information Spatial Perspective (Geographic Perspectives)</p>	<ul style="list-style-type: none"> Student mental maps of their neighborhood Classroom maps from “Gold Rush” activity 	<ul style="list-style-type: none"> What are student perspectives/understandings of geography? How does the teacher researcher think about his teaching of geographic reasoning?
<p>Define, locate, and compare major landforms and water bodies on the earth.</p>	<ul style="list-style-type: none"> Students working in groups will match up word, definition, and picture of land/water features and speculate how each feature impacts human decision-making and/or culture 	<p>Geography Element 2 (Subject Matter): Places and Regions Geography Standard 4 (Subject Matter): The physical and human characteristics of places Geography Skill 2 (Geography Skills): Acquiring Geographic Information Ecological Perspective (Geographic Perspectives)</p>	<ul style="list-style-type: none"> Student notes to “Landscape Lingo” (vocabulary chart) Student responses to “Landscape Lingo” quiz Teacher Researcher observation of discussion 	<ul style="list-style-type: none"> What are student perspectives/understandings of geography? How does the teacher researcher determine geographic reasoning? How does the teacher researcher foster geographic reasoning? How does the teacher researcher think about his teaching of geographic reasoning?
<p>Identify the purposes of maps and their key components.</p>	<ul style="list-style-type: none"> Students will identify different types of maps through a gallery walk and answer questions about which type of map is best used in various scenarios 	<p>Geography Element 1 (Subject Matter): The World in Spatial Terms Geography Standard 1 (Subject Matter): How to use maps and other</p>	<ul style="list-style-type: none"> Student responses to gallery walk discussion and answers to map use questions Teacher researcher observation of discussion 	<ul style="list-style-type: none"> What are student perspectives/understandings of geography?

	<ul style="list-style-type: none"> Students will identify missing map elements through a gallery walk of incomplete maps Zombie Based Geography Project #1 Lesson 2: Different Types of Maps & Lesson 3: Map elements Students will complete a series of “skill builders” through team competition Geography Alive! Chapter 1 text reading that matches skill builders Zombie Based Geography Project #1 Lesson 4: Intro to Spatial Reasoning, Lesson 5: Structures, Lesson 6: Relationships, Lesson 7: Processes, & Lesson 8: Using Maps to Answer Questions and Show Data 	<p>geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective</p> <p>Spatial Perspective (Geographic Perspectives)</p>	<ul style="list-style-type: none"> Student answers to formative assessment map components Zombie Based Geography written work Video-tapes Lesson Zombie Based Geography Lessons Student written responses to “skill builder” competition Teacher researcher observation of “skill builder” competition 	
Describe how the Earth’s rotation causes night and day and the Earth’s revolution causes the change in seasons.	<ul style="list-style-type: none"> Teacher demonstration with globe and overhead lamp Students will complete a series of “skill builders” through team competition Geography Alive! Chapter 2 text reading that matches skill builders 	<p>Geography Element 1 (Subject Matter): The World in Spatial Terms</p> <p>Geography Element 3 (Subject Matter): Physical Systems</p> <p>Geography Standard 1 (Subject Matter): How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective</p>	<ul style="list-style-type: none"> Student written responses to “skill builder” competition Teacher researcher observation of “skill builder” competition Discussion during overhead 	<ul style="list-style-type: none"> What are student perspectives/understandings of geography? How does the teacher researcher determine geographic reasoning? How does the teacher researcher foster geographic reasoning? How does the teacher researcher think about his teaching of geographic reasoning?

		Geography Standard 7 (Subject Matter): The physical processes that shape the patterns of Earth's surface Geography Skill 2 (Geography Skills): Acquiring Geographic Information Ecological Perspective (Geographic Perspectives)		
Identify the purpose of the Global Grid and determine how this helps humans make sense of location on the Earth's surface.	<ul style="list-style-type: none"> Students will complete a series of "skill builders" through team competition focusing on latitude and longitude Geography Alive! Chapter 2 text reading that matches skill builders 	Geographic Element 1 (Subject Matter): The World in Spatial Terms Geography Standard 1 (Subject Matter): How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective Spatial Perspective (Geographic Perspectives)	<ul style="list-style-type: none"> Student responses to "skill builders" competition Teacher researcher observation of "skill builder" competition Student responses on formative and summative assessment Latitude/Longitude 	<ul style="list-style-type: none"> What are student perspectives/understandings of geography? What are student perspectives/understandings of geographic reasoning with respect to solving problems? What are the teacher researcher's perspectives/understandings of geographic reasoning?
Explain why there are 24 time zones, give examples why time zones are useful, and be able to calculate time differences.	<ul style="list-style-type: none"> Students will analyze time zone maps and solve scenarios involving air travel and time zone change 	Geographic Element 1 (Subject Matter): The World in Spatial Terms Geography Standard 1 (Subject Matter): How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective Spatial Perspective (Geographic Perspectives)	<ul style="list-style-type: none"> Student responses on time zone handout Student responses on formative and summative assessment 	<ul style="list-style-type: none"> What are student perspectives/understandings of geography?
Identify and describe the factors that affect climate.	<ul style="list-style-type: none"> Students will discuss the impact of latitude and 	Geographic Element 3 (Subject Matter): Physical	<ul style="list-style-type: none"> Teacher researcher observation 	<ul style="list-style-type: none"> What are student perspectives/understandings of geography?

	longitude on human decision-making and culture as well as other factors that impact climate	Systems Geography Standard 7 (Subject Matter): The physical processes that shape the patterns of Earth's surface Geography Skill 2 (Geography Skills): Acquiring Geographic Information	<ul style="list-style-type: none"> Classroom discussion 	gs of geography? <ul style="list-style-type: none"> What are student perspectives/understandings of geographic reasoning with respect to solving problems? How does the teacher researcher determine geographic reasoning? How does the teacher researcher foster geographic reasoning? How does the teacher researcher think about his teaching of geographic reasoning?
Describe the Earth's climatic zones and climatic regions/biomes.	<ul style="list-style-type: none"> Geography Alive! Chapter 2 Climate Reading and Notes Student created "Climate Broadcasts" 	Geographic Element 3 (Subject Matter): Physical Systems Geography Standard 8 (Subject Matter): The characteristics and spatial distribution of ecosystems on Earth's surface Geography Skill 4 (Geography Skills): Analyzing Geographic Information Ecological Perspective (Geographic Perspectives)	<ul style="list-style-type: none"> Teacher Researcher observation of "Climate Broadcasts"/discussion 	<ul style="list-style-type: none"> How does the teacher researcher determine geographic reasoning? How does the teacher researcher foster geographic reasoning? How does the teacher researcher think about his teaching of geographic reasoning?
Identify and analyze elements of culture such as religion, language, arts, food/diet, clothing and others	<ul style="list-style-type: none"> Culture Collage using National Geographic Magazine Pictures 	Geographic Element 2 (Subject Matter): Places and Regions Geographic Element 4 (Subject Matter): Human Systems Geographic Element 5 (Subject Matter): Environment and Society	<ul style="list-style-type: none"> Student Culture Collages Teacher Researcher observation Classroom Discussion 	<ul style="list-style-type: none"> What are student perspectives/understandings of geography? How do students reason with geography? How does the teacher researcher determine geographic reasoning? How does the teacher

		Geography Standard 4 (Subject Matter): The physical and human characteristics of places Geography Standard 10 (Subject Matter): The characteristics, distributions, and complexity of Earth's cultural mosaics Geography Standard 15 (Subject Matter): How physical systems affect human systems Geography Skill 1 (Geography Skills): Asking Geographic Questions Ecologic Perspective (Geographic Perspectives)		researcher foster geographic reasoning? <ul style="list-style-type: none"> How does the teacher researcher think about his teaching of geographic reasoning?
Identify the relative location of the Middle East and North Africa in the world, and describe the characteristics that make it a region.	<ul style="list-style-type: none"> Regions within our classroom activity and discussion Students will analyze relative location of North Africa and SW Asia through maps and describe the various regions it may contain Scavenger Hunt: Political and Physical Features of N. Africa & SW Asia 	Geographic Element 1 (Subject Matter): The World in Spatial Terms Geographic Element 2 (Subject Matter): Places and Regions Geography Standard 3 (Subject Matter): How to analyze the spatial organization of people, places, and environments on Earth's surface Geography Standard 5 (Subject Matter): That people create regions to interpret Earth's complexity Spatial Perspective (Geographic Perspectives)	<ul style="list-style-type: none"> Student responses to scavenger hunt Student responses to summative assessment Teacher researcher observation Video taping of in-class activities Classroom discussion 	<ul style="list-style-type: none"> What are student perspectives/understandings of geography?
Explain how geographic factors influence the development of civilizations in the Nile River Valley,	<ul style="list-style-type: none"> Zombie Based Geography Project #4 Lesson 6: Human Environment Interaction 	Geographic Element 1 (Subject Matter): The World in Spatial Terms Geographic Element 4	<ul style="list-style-type: none"> Student responses to debriefing questions for each simulation Teacher researcher 	<ul style="list-style-type: none"> What are student perspectives/understandings of geography? What are student

along the Tigris and Euphrates Rivers, and the eastern region of the Mediterranean Sea.	<ul style="list-style-type: none"> • Hunting and Gathering simulation: students simulate hunter/gathers and farmers to determine food production efficiency • “What Good are Leftovers?” simulation: students simulate Neolithic farmers to see how a surplus impacts settlement and development of civilizations 	<p>(Subject Matter): Human Systems</p> <p>Geographic Element 5 (Subject Matter): Environment and Society</p> <p>Geographic Element 6 (Subject Matter): The Uses of Geography</p> <p>Geography Standard 1 (Subject Matter): How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective</p> <p>Geography Standard 3 (Subject Matter): How to analyze the spatial organization of people, places, and environments on Earth’s surface</p> <p>Geography Standard 12 (Subject Matter): The processes, patterns, and functions of human settlement</p> <p>Geography Standard 15 (Subject Matter): How physical systems affect human systems</p> <p>Geography Standard 17 (Subject Matter): How to apply geography to interpret the past</p> <p>Geography Skill 1 (Geography Skills): Asking geographic questions</p> <p>Geography Skill 4 (Geography Skills):</p>	<p>observation of simulations and debriefing discussions</p> <ul style="list-style-type: none"> • Audio taping of simulations • Student responses to writing assignment about the changes in Neolithic villages 	<p>perspectives/understandings of geographic reasoning with respect to solving problems?</p> <ul style="list-style-type: none"> • How do students reason with geography? • How does the teacher researcher determine geographic reasoning? • How does the teacher researcher foster geographic reasoning? • How does the teacher researcher think about his teaching of geographic reasoning?
---	---	---	---	---

		Analyzing geographic information Geography Skill 5 (Geography Skills): Answering geographic questions Ecological Perspective (Geographic Perspectives)		
Recognize the chief characteristics of a civilization.	<ul style="list-style-type: none"> Use of GRAPES model to determine chief characteristics of civilizations. Students will apply model to various pictures and write about characteristics of civilizations 	Geographic Element 2 (Subject Matter): Places and Regions Geographic Element 4 (Subject Matter): Human Systems Geographic Element 5 (Subject Matter): Environment and Society Geographic Element 6 (Subject Matter): The Uses of Geography Geography Standard 4 (Subject Matter): The physical and human characteristics of places Geography Standard 10 (Subject Matter): The characteristics, distributions, and complexity of Earth's cultural mosaics Geography Standard 14 (Subject Matter): How human actions modify the physical environment Geography Standard 17 (Subject Matter): How to apply geography to interpret the past	<ul style="list-style-type: none"> Student responses to GRAPES debriefing Student responses to formative assessment Interviews with main informants Think-aloud verbal protocols with main participants 	<ul style="list-style-type: none"> What are student perspectives/understandings of geography?
Describe and analyze the cultural development and the major achievements of the	<ul style="list-style-type: none"> Text reading in <u>Ancient World</u> text, graphic organizer and essay 	Geographic Element 2 (Subject Matter): Places and Regions	<ul style="list-style-type: none"> Student responses to formative and summative assessments 	<ul style="list-style-type: none"> What are student perspectives/understandings of geography?

ancient civilizations of this region.	<ul style="list-style-type: none"> • Student Learning Outcome Mid-Year Assessments (political map, physical map, “Where?” and “Why There?” Performance Assessments, “Thoughtful Application” Argument Writing • Geographic written task #2 	<p>Geographic Element 5 (Subject Matter): Environment and Society</p> <p>Geographic Element 6 (Subject Matter): The Uses of Geography</p> <p>Geography Standard 4 (Subject Matter): The physical and human characteristics of places</p> <p>Geography Standard 15 (Subject Matter): How physical systems affect human systems</p> <p>Geography Standard 17 (Subject Matter): How to apply geography to interpret the past</p> <p>Geography Skill 1 (Geography Skills): Asking geographic questions</p> <p>Geography Skill 4 (Geography Skills): Analyzing geographic information</p> <p>Geography Skill 5 (Geography Skills): Answering geographic questions</p> <p>Ecological Perspective (Geographic Perspectives)</p>	<ul style="list-style-type: none"> • SLO Mid-Year Assessment • Student responses to geographic written task #2 • Interviews with main participants • Verbal think-aloud verbal protocols with main participants 	<ul style="list-style-type: none"> • What are student perspectives/understandings of geographic reasoning with respect to solving problems? • Given a geographic reasoning task, what do students do? • How do students reason with geography? • How do students think about their reasoning with geography? • Given data from a geographic reasoning task, what does the teacher researcher do? • How does the teacher researcher use data to inform instruction? • How does the teacher researcher determine geographic reasoning? • How does the teacher researcher foster geographic reasoning? • How does the teacher researcher think about his teaching of geographic reasoning? • How does student thinking about geography change? • How does the teacher researcher’s thinking about geography change?
---------------------------------------	---	---	--	---

Appendix K
First Impressions/Assumptions

Name: _____ Date: _____ Block: 1 2 3 4 5

Directions: We often form first impressions, most of these are filtered through our own eyes (our experiences). Answer the following questions based on what you see, hear, and sense.

1. What is Mr. R wearing? What are your thoughts about this? What are you thinking about him because of this?

2. After listening to the first music selection, what are you **NOW** thinking about this and about Mr. R?

3. After listening to the second music selection, what are you **NOW** thinking about this and Mr. R?

4. After listening to the last music selection, what are you **NOW** thinking about this and Mr. R?

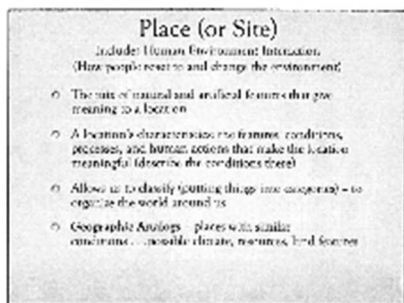
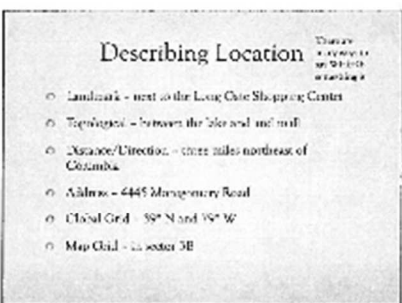
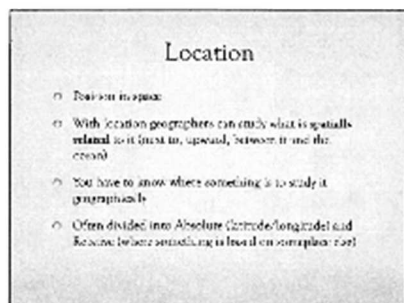
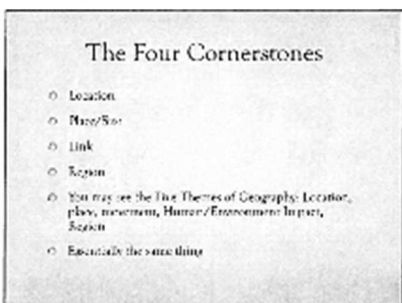
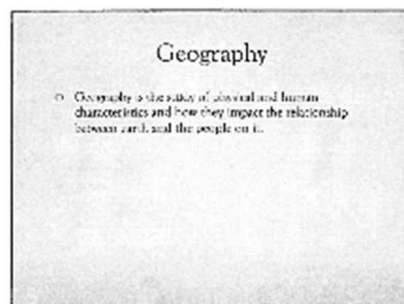
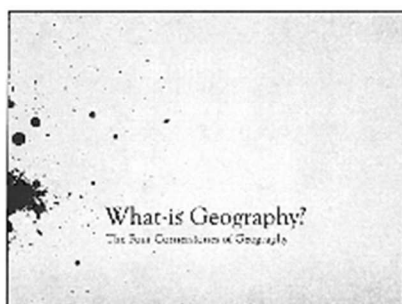
5. An assumption is something that we believe without any proof. What were our assumptions of Mr. R? What are they based on?

6. Is it fair to make assumptions about people, places and things? Why or why not?

7. What implications does this have for studying other people, places, and cultures?

Appendix L

Four Cornerstones of Geography Presentation



Value Judgements

- Learning how to evaluate efficiency, fairness, and equity
 - When to buy a ticket, or a hotel, or a car
- Nothing = the absence of disaster (no armed robbery)
 - People can refuse to make loans to some people
 - Choosing their business partners
 - They are "bad", don't do this
- Good = the presence of a good thing (corporate)
 - and their suppliers, workers, and investors
 - Agree understanding of the flow of goods, services, and money is essential to success in formulating a plan about institutional level, and on the quality, and on the level of

Appendix M

Mapping a London Epidemic

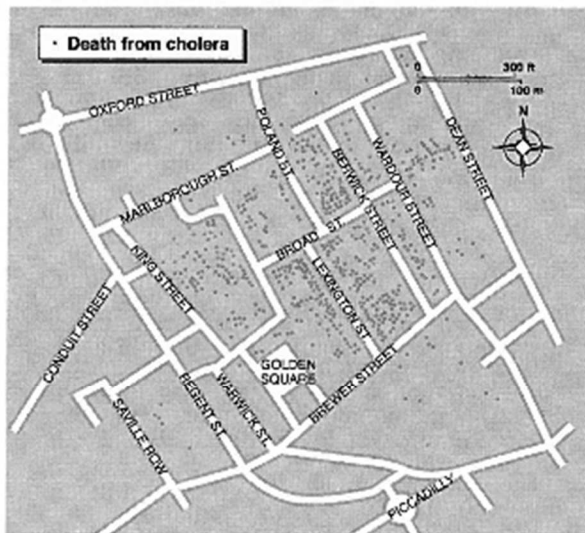
Name _____ Date _____

Mapping a London Epidemic

Part 1. Read the text and use the map to answer questions 1 and 2.

In 1854, in a single ten-day period, 500 people suddenly died in London, England. And they all died of the same illness in a single section of the city. The cause of death was determined to be cholera, a severe infection of the small intestine. What was the source of this disease? How was it spreading? A physician named John Snow was determined to find out.

Dr. Snow began by drawing a map of the afflicted part of the city, a district called Soho. On this map he marked the home of each victim with a dot. This produced a map similar to the one below.



1. What does each dot represent? _____
2. Describe the patterns shown on the map. Where are most of the cholera deaths concentrated?

© 2014 National Geographic Society

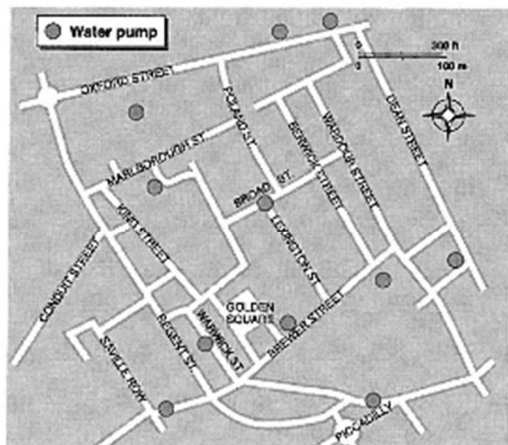


NatGeoEd.org

Mapping a London Epidemic, continued

Part 2. Read the text and use the map below and the map from Part 1 to answer questions 3-5.

Thinking that drinking water might be carrying the deadly germs, Dr. Snow drew a map of the pumps that supplied Soho's drinking water. At the time, running faucets and tap water were not available in the home. In some neighborhoods of London, people drew water from a local pump and carried it to their homes.



3. Look at the information on both maps. Which pump do you think might have had cholera-infected water? Why? Write your answer. Then mark the location of this pump on the first map.

Dr. Snow convinced the London authorities to turn off the suspected pump. The number of cholera deaths immediately declined, almost to zero.

4. Why would Dr. Snow have combined the information on the two maps into one map to present his findings to authorities?

5. Why might cholera deaths have occurred among people who lived farther away from the "killer pump"?

Appendix N

Geographer Interview

Geographer Interview

Master

Name: _____ Date: _____ Per: _____

GEOGRAPHER INTERVIEW

How Do Real People Use Geography?

Read an interview of a real person who uses geography in his or her career. Answer the following questions based on the interview. Be ready to share your answers and ideas!

1. What is his or her job title?
2. How does this person use geography?
3. What kinds of questions does this person try to answer?
4. What tools does this person use?
5. Would you want this person on your team of zombie apocalypse survivors? Why?

GEOGRAPHER INTERVIEW

Julie Bassuk, Makers Architecture, Seattle, WA

Read an interview of a real person who uses geography in his or her career. Answer the questions on your **Geographer Interview Analysis** sheet. Be ready to share your answers and ideas!

1) What is your job title?

My title is Co-Managing Partner of MAKERS Architecture and Urban Design LLP and I am the current Chair of the Seattle Design Commission. I am a Planner, sometimes called an "Urban Planner," "City Planner," "Land Use Planner," or "Facility Planner."

2) How would you describe what you do?

I do a lot of different things. I help cities transform neighborhoods, ports manage waterfronts, and organizations develop campuses. The common theme is that I work with my clients to create a "vision" of what is desired in the future and then make a plan to get there.

3) How do you work with geography? What kinds of questions do you try to answer? What problems do you try to solve?

For each project I build a series of maps to show existing conditions, problems, and opportunities, answering questions like the ones below:

Existing Conditions

- Who lives and works in the area?
- Where are the houses, schools, stores, and businesses?
- Where are people going? On foot? On bikes? In cars? On the bus?
- Where are the parks and playgrounds? Natural forests, wetlands, or streams?
- Are there any beautiful views in the neighborhood?

Issues and Opportunities

- Where isn't it safe or fun to walk or bike?
- Where are more houses, schools, stores, or businesses needed?
- Where should there be more places to play? Walk the dog? Get to school?

4) Why is geography important to you?

Geography is important to me for three reasons—it helps me understand projects, communicate ideas, and get people to work together.

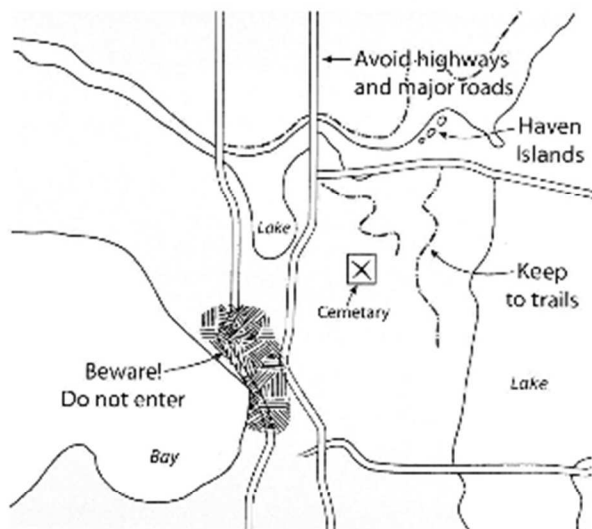
5) What kinds of geographic maps or tools do you use in your work?

Typically in my office, we start our background research on the Internet using Google Maps.

- Create a system to fairly distribute resources between the safe havens.
- Reduce dependence on resources that require trips outside the safe havens.
 - Establish "urban agriculture" on rooftops, hanging from walls, behind fortress walls, etc.
 - Develop a sustainable, renewable source of energy harnessing solar, wind, water, ground source heat, etc.
 - Focus on bicycle and other non-fuel dependent methods to move people around the safe haven network.
- Prevent zombie kills. Employ "zombie prevention through environmental design", or "ZPTED" principles to create safe places. For example, if zombies are attracted to loud noises, strategically place loud noise making devices to lure zombies away from safe havens, essential resources, and access routes.

E. **Play it Safe.** Prevent future zombie outbreaks.

- Develop a ZERP (Zombie Emergency Response Plan).
- Learn to recognize early stage outbreaks and identify, map, and limit exposure to conditions that lead to outbreaks.



GEOGRAPHER INTERVIEW

Yuko Caras, King County, WA

Read an interview of a real person who uses geography in his or her career. Answer the questions on your Geographer Interview Analysis sheet. Be ready to share your answers and ideas!

1) What is your job title?

Senior GIS Analyst (it is more like GIS specialist now for the work wise).

2) How would you describe what you do?

Currently I work with the Solid Waste, Parks and Airport department for the King County. I make paper maps, interactive online maps and do analysis depend on what my clients want.

3) How do you work with Geography?

Overlay different information on top of each other and find answers.

4) Why is Geography important to you?

Some things are difficult to conceptualize but easy to understand when you actually see it. Geography makes it easy to understand spatially and lead to making a good decision.

5) What kinds of Geographic questions do you try to answer?

Analysis is interesting. One of my projects on and off has been estimating an amount of debris due to large earthquakes in the area. Solid waste department needs to plan temporary debris dumping stations when big earthquakes hit the area. One part is to find property we can place debris and the other part is to figure how much debris we will have due to an earthquake. We found where the temporary debris managing locations would be considering landscape, environmental restrictions, accessibility and capacity. We also have a software/system to estimate how much building debris will be produced by inputting epicenter and magnitude of earthquake.

6) What kinds of Geographic maps or tools do you use in your work?

Predominantly ESRI software in King County. (GIS)

7) How do you decide which tools to use?

Depends on your resources and questions. There are open source GIS and free for use and share. If you are making simple maps or doing simple analysis, this is probably fine. If you are doing analysis, you do need some sort of GIS software, either ESRI's ArcMap or open source. If you are making a sophisticated map, you probably use some graphic software (i.e. Adobe Illustrator) after making a simple map and export to those formats to tweak.

8) How would your skills help you in the event of a zombie apocalypse?

You do need to understand the characteristics of zombie first. What they can do and what they can't. Once you have all that information, you can create a layer for each piece of information. For example, knowing how fast they move each day will create a buffer from where they are for each day until they get to you. The more information you have, the more accurate your map will be. I could overlay all those layers spatially and see where is the last place they reach and head there. Also I could place any objects to slow them down along the way, or place a barricade to protect unharmed area before they come (because I will know how long it will take them to get there).



GEOGRAPHER INTERVIEW

Mary Ullrich, King County, WA

Read the interview of the real person who uses geography in his or her career. Answer the questions on your Geographer Interview Analysis sheet. Be ready to share your answers and ideas!

1) What is your job title?

GIS Specialist

2) How would you describe what you do?

I take information that has some sort of geographic component like an address or coordinates and analyze it to answer questions and then put the results on a map.

3) How do you work with Geography?

Geography is a way to study patterns on our Earth. We have data sets that represent features located in King County. They range from things we can see like manholes, sign posts, roads, sewer lines, and building foot prints to things we can't see like parcel boundaries, sewer district boundaries, and school district boundaries. These data sets have location information that allows us to pin them to the Earth in a known place with a dimension. They also have attributes detailing size, length, name, and anything else we are interested in collecting about those features. Once these data sets are complete, I can start asking questions and analyze the resulting patterns.

4) Why is Geography important to you?

I majored in Geography because it was so interesting. While I did learn how to make a good map, the focus of the program was learning about the patterns that exist on our planet. *Physical Geography:* why do deserts and rain forests occur where they do? *Cultural Geography:* why do humans utilize land and resources in one part of the world differently than those in another part of the world. And how does that affect the planet? *Economic Geography:* Where's the best place for a certain business? How are we using resources to meet our needs? Is growth good? I like what wiki.answers.com has to say about geography and why it is important: It helps us to know things around us and how to utilize them. It helps us to know places on earth. It helps us to choose a career for living. It helps us to understand the way of life of other people.

5) What kinds of Geographic questions do you try to answer?

Some examples are: Where do the people who speak Korean live? Where are all the 5 year-olds? Where do the people using the park and ride lots live? What is the percentage of rural population in the school districts in King County. Where is the best place to put a wastewater treatment plant? Which areas in King County don't have access to healthy food? Who needs to be alerted to an upcoming construction project. Which roads meet the criteria for evacuation routes? Which properties are vulnerable to a flood? Which sewer lines are letting storm water in to the system and what is the best way to fix this? Where are the vulnerable people and what is the best way to get them out in case of a flood? What's the best place for a coffee shop?

6) What kinds of Geographic maps or tools do you use in your work?

I use a specialized software program called ArcGIS that lets me collect and manipulate data; query and analyze the data to answer questions; and it has a pretty good mapping component so I can display the results of my analysis on a map. This program also has an online version that I'm starting to learn. Also I utilize Microsoft Office tools like Excel and Access. Finally I do some programming using a language called Python.

7) How do you decide which tools to use?

It depends on what I'm doing. Generally, I use ArcGIS for all my work. However, if I'm doing a lot of tabular analysis I'll use Access. If I have a repetitive task I'll build a model in ArcGIS and then transfer it to Python to make it possible to run in the background. People like spreadsheets and often I have to transfer data to and from Excel, depending on what is needed.

8) How would your skills help you in the event of a zombie apocalypse?

Since my work requires a computer, my skills would be most useful in a planning phase. A few years ago King County planned for a possible imminent disaster. The Howard Hansen Dam was compromised and the event of a major flood on the Green River was a reality. We spent several months helping folks around King County identify what resources and people were at risk and how to mitigate that risk. We identified where people with disabilities were and figured out evacuation routes for them, we identified properties at risk and installed sand bags to protect them, we made maps identifying areas of greatest risk and evacuation routes so folks would have paper copies available when needed. The State Department of Transportation brought in small platforms so they could raise their equipment above flood level without having to move it.

For the zombie apocalypse I'd want to know where the zombies are and how fast they are moving; what areas are defensible and will provide the resources I need to survive (food, water, shelter); how I would get to those areas; who has the supplies I need like weapons, food, maps, compasses, fuel, etc while I travel to those areas. I'd also like to know who offers survival classes including weapons training, wilderness survival, and how to keep a vehicle running on chewing gum and wire.

GEOGRAPHER INTERVIEW

*Roger White, Dept. of Geography,
Memorial University of Newfoundland*

Read the interview of the real person who uses geography in his or her career. Answer the questions on your Geographer Interview Analysis sheet. Be ready to share your answers and ideas!

1) What is your job title?

Honorary research professor

2) How would you describe what you do?

Mostly I develop computer based models of geographical systems, working with a team at the Flemish Institute for Technological Research in Belgium. I develop and test the models, while the people I work with program them and prepare data necessary to run them.

What are these models?

Most of them predict the future changes in land use in cities and regions. Some of the more recent ones also predict the changing locations of where people live and work. Examples of output maps are shown below. These predictions are spatially very detailed; often the resolution is 100 or 200 metres. These models are being used in Belgium, Ireland, The Netherlands, France, and Puerto Rico, among other places.

I also supervise graduate students (mostly PhD level) at my home university, Memorial University of Newfoundland in Canada, and co-supervise graduate students at several other universities in Canada, Belgium, The Netherlands, and France. I used to teach urban, economic, and theoretical geography at Memorial University.

3) How do you work with Geography?

I try to create a new way of doing geography. Geography is a very old field, going back at least to Ptolemy, who devised the first scientific map projection. But geographers have mostly been content to describe the world by writing about it, mapping it, or photographing it from the air or from space. When we look at the geography of the earth—the agricultural areas, the location of the cities, the way they grow, the changes in the transportation networks as the years go by, we must wonder what causes these patterns, and the changes in them that we see over the years. Theoretical geography seeks to explain the processes that generate the geography that we live in. If we understand the processes, then we can predict what the geography of our world will be like in the future. Not only that, we can predict the effect of some of our actions. For example, if we build a new highway connecting two cities, how will that change the pattern of growth in the region over the next 25 years? Do we like the long term effects of the road? Would the impact be better if it were built following a different route? Or if it were not built at all? The models help us make better decisions by giving us some idea of what the long term impacts of our projects will be. If we don't like the predicted effects, we can change the plan.

4) Why is Geography important to you?

Geography is important to me because I want to understand why the world is the way it is. Also, I want to be able to provide tools that will be useful for planners and other decision makers who are intervening in a practical way with actions that will affect the future geography for better or worse.

5) What kinds of Geographic questions do you try to answer?

I try to answer the basic geographical questions of why things are where they are, whether they will stay there, and if not, where will they move to. Being able to answer these questions allows many practical problems to be solved. For example, being able to predict where growth will occur permits us to know where we will need to build infrastructure like roads, schools, and hospitals. It also allows businesses to plan where they can most profitably locate new facilities like power centers, supermarkets, or coffee shops.

We sometimes develop geographic modelling tools for other kinds of systems. For example, we have developed a model of the lobster fishery which can be used to test the impact of possible regulations. This is more efficient than testing the regulations by imposing them and then seeing what their effect is.

6) What kinds of Geographic maps or tools do you use in your work?

I use maps of many sorts as inputs to the models: maps of the topography (digital elevation map), maps of transport networks (roads of various categories, commuter rail, light rail transit), land use and land cover maps, zoning maps, population density maps, employment maps, etc. Many of these maps are generated or pre-processed using a GIS (Geographical Information System). For testing the models, I use several types of pattern analysis tools (statistical techniques), as well as fractal analysis. All of these maps and tools are used in our work of creating new geographical tools that can be used by businesses, transportation engineers, urban planners, and emergency response personnel.

7) How do you decide which tools to use?

We use whichever tools we can find that allow us get the results we want. How do we find them? We do Google searches. We go to conferences and workshops and talk to others to keep up to date on new tools that are being developed. Frequently we must develop our own tools because no one else has yet done so. For example, we have developed several new statistical tools for pattern analysis of maps so that we can better understand the performance of the models we are developing.

8) How would your skills help you in the event of a zombie apocalypse?

We've never had the thrill of working with an actual zombie apocalypse. But in collaboration with a team at Los Alamos National Labs we did once work with a disaster scenario for Los Angeles, where the city was destroyed by a mega-earthquake on an unknown fault. In this project we got together with a group of seismologists who with supercomputers could predict the pattern of destruction in the LA area in real time, and the resulting scenarios were fed to representatives of the utilities (gas, electric, water), Caltrans (freeways and traffic), and local emergency response organizations. Our geographical software was used to let the

participants practice coordinating their responses so that they could learn to work together rather than at cross purposes. It was also used to show how, in the longer term, the pattern of development in the LA area could be guided to lessen the impact of a giant earthquake. Zombies would be an interesting add-on to the software, since they would multiply rapidly in a disaster situation, and diffuse rapidly to cause problems even in relatively undamaged areas.



The greater Dublin area: Predicted population density in the year 2050.



Predicted land use in Belgium, 2060.

Name: _____

Date: _____

Per.: _____

GEOGRAPHER QUESTION DESIGN

Show That You Can Think Like a Geographer!

You have heard some examples of the real questions people try to answer with geography. Create your own question about the world. Explain why you would like to ask that question. Decide which kinds of geographic tools you would use to answer this question. Explain why you would use those tools. Remember: Try to think of a question that requires geographic concepts to find an answer.

1. What question would you try to answer using geographic concepts?

2. Why would you choose this question?

3. What tools would you use to help find answers for this question?

4. Why would you choose these tools?

Appendix O
Landscape Lingo

Term	Definition	Example and Possible Geographic Impact	Drawing
1.	a narrow strip of land connecting two larger pieces of land	Example: Impact:	
2.	a piece of land surrounded by three sides of water	Example: Impact:	
3.	a large body of salt water (larger than a bay) along a curved coastline	Example: Impact:	
4.	a narrow strip of water connecting two larger bodies of water	Example: Impact:	
5.	a large stream of FRESH water, which drains an area of land and flows into another river or body of water	Example: Impact:	
6.	a chain of mountains bordered by lowlands or separated by other mountains	Example: Impact:	
7.	a stream or river that flows into a larger stream or river	Example: Impact:	
8.	land completely surrounded by water	Example: Impact:	
9.	an area of sea enclosed by a wide stretch of coastland (usually brackish water)	Example: Impact:	
10.	a protected body of deep water sheltered/protected from storms used for shipping	Example: Impact:	

Term	Definition	Example and Possible Geographic Impact	Drawing
11.	a large, level or mainly level area of elevated land with one steep side	Example: Impact	
12.	the land between hills or mountains, usually containing a stream	Example: Impact	
13.	a man-made channel filled with water used for irrigation, navigation, or drainage	Example: Impact	
14.	the triangular deposit of fertile soil at the mouth of a river or inlet	Example: Impact:	
15.	the point where a river ends and empties into an ocean or sea	Example: Impact:	
16.	the place where a river begins	Example: Impact:	
17.	a long passage of water that connects two larger bodies of water or separating a mainland and an island	Example: Impact:	
18.	an inland body of water usually of considerable size	Example: Impact:	
19.	a point of land that extends into an ocean or sea	Example: Impact:	
20.	the land along an ocean or sea	Example: Impact:	

Term	Definition	Example and Possible Geographic Impact	Drawing
21.	a small area of land that is higher than the land around it	Example: Impact:	
22.	a large expanse of fairly flat land, usually with few trees	Example: Impact:	
23.	a highly elevated usually rocky area of land mass with steep or sloping sides	Example: Impact:	
24.	a narrow passage of water used for shipping and navigation	Example: Impact:	
25.	any one of the seven largest land masses surrounded by ocean	Example: Impact:	
26.	any of the Earth's five largest bodies of salt water	Example: Impact:	
27.	a nation or area of land which is politically controlled by one government	Example: Impact:	
28.	A large area of land with little or no moisture or vegetation	Example: Impact:	
29.	a fertile spot in the desert, watered by irrigation or underground springs	Example: Impact:	
30.	a group of islands	Example: Impact:	

Appendix P

Different Types of Maps

Master

Different Types of Maps

DIFFERENT TYPES OF MAPS

What Are the Different Types of Maps Geographers Use?

Geographers definitely use maps, but there are *different kinds of maps*. Read on below to learn about different maps and their uses.

Some Maps Geographers Use



©OpenStreetMap contributors, CC BY-SA

Physical Map

A *physical map* shows the **features** of an area, such as mountains, rivers, and lakes.

These maps usually use color to show the different landforms.

The map on the left is a physical map of the United States. In this map you can see mountains ranges, rivers, lakes, and oceans.

Road Map

A *road map* shows major highways, airports, cities, railroad tracks, and local points of interest.

Road maps are most suitable for people who are trying to figure out driving directions. Road maps can have different **scale**, showing all the streets in a city or even all the highways in a country.



©OpenStreetMap contributors, CC BY-SA

The map above is a road map of Washington, DC. It shows some of the major roads and locations.

©2013 Interact - www.teachinteract.com

Outbreak! Zombie Based Geography - Teacher Guide 42

Different Types of Maps

Master



Political Map

A *political map* shows countries, borders, or major cities.

This kind of map doesn't usually show physical features like mountains. A political map of the U.S. would show state boundaries, capitals, and major cities.

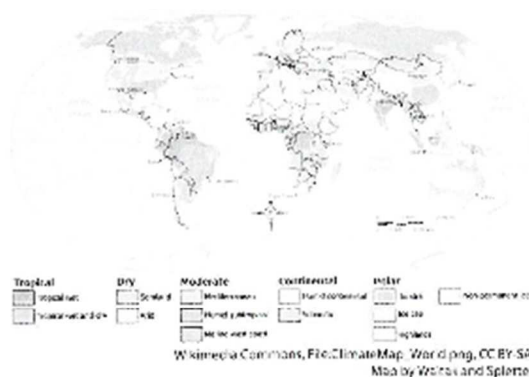
The map above is a political map of the world. It shows country names and borders.

Climate Map

A *climate map* shows the **average weather** of a region.

These maps show the different type of climate a region may have. A common way to classify climates is to use average precipitation and temperature.

The map on the right is a climate map of the world. In this map you can see regions of the world divided into several different climates, designated by color.



Wikimedia Commons, File:Topographic-Relief-perspective-sample.jpg, CC BY-SA,
Map by Kibinsid.

Topographical Map

A *topographical map* includes **contour lines** to show the **elevation** or height of an area.

The closer together the contour lines are, the steeper the land is.

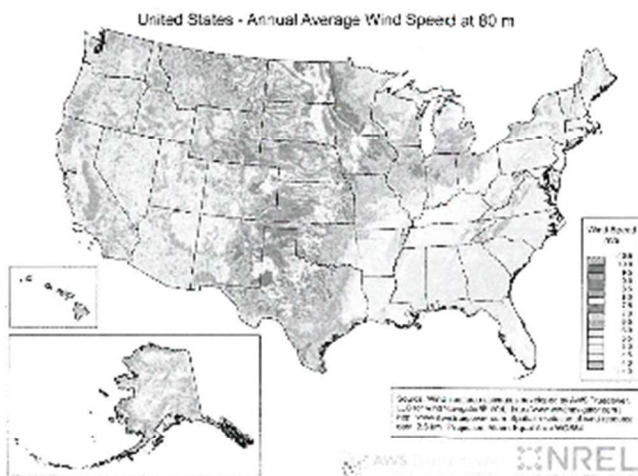
The map on the left is a topographical relief map of Stowe, VT. Stowe is a popular destination for skiing. With this map you can distinguish steep hills from flatter land.

Resource Map

A resource map shows the distribution of various **resources**.

Resources (such as minerals, lumber, agriculture) are not distributed equally around the world. Resource maps help to show the amount of resources in an area.

The map on the right is a wind resource map of the United States. This map shows the average wind speeds for an entire year. Colors show the different amount of wind an area gets. This would be useful for placing tall wind turbines to generate electricity.



©Bill Rankin, www.radicalcartography.net. CC BY SA 3.0

Economic Map

An economic map shows information about **wealth** and money.

Just as how resources are not distributed equally, wealth or money is not distributed equally either.

The map on the left is an economic map of the United States. This map shows the amount of money in different regions. The data or information to make this map came from the U.S. Census Bureau. The Census Bureau does a big survey (the census) of all U.S. citizens every 10 years.

Appendix Q

Map Gallery Notes

Map Gallery Notes

Master

Name: _____ Date: _____ Per.: _____

MAP GALLERY NOTES

Take Notes On Each of the Maps You Observe

As you travel around to each map, try to identify the *map elements* it uses, the *purpose* of the map, and the *type of map* it is. *Be ready to discuss your notes.*

Random Notes:

Map #1

1. Draw some of the common *symbols* this map uses.
2. Do you think this map uses accurate size (*scale*)?
Yes No Not Really
3. Can you tell which way is North (*direction*)?
Yes No Not Really
4. Is there a *legend* or *key*?
Yes No Not Really
5. What is the *purpose* of this map?
6. What *type of map* do you think this is?

Map #2

1. Draw some of the common *symbols* this map uses.
2. Do you think this map uses accurate size (*scale*)?
Yes No Not Really
3. Can you tell which way is North (*direction*)?
Yes No Not Really
4. Is there a *legend* or *key*?
Yes No Not Really
5. What is the *purpose* of this map?
6. What *type* of map do you think this is?

Map #3

1. Draw some of the common *symbols* this map uses.
2. Do you think this map uses accurate size (*scale*)?
Yes No Not Really
3. Can you tell which way is North (*direction*)?
Yes No Not Really
4. Is there a *legend* or *key*?
Yes No Not Really
5. What is the *purpose* of this map?
6. What *type* of map do you think this is?

Map #4

1. Draw some of the common *symbols* this map uses.
2. Do you think this map uses accurate size (*scale*)?
Yes No Not Really
3. Can you tell which way is North (*direction*)?
Yes No Not Really
4. Is there a *legend* or *key*?
Yes No Not Really
5. What is the *purpose* of this map?
6. What *type* of map do you think this is?

Map #5

1. Draw some of the common *symbols* this map uses.
2. Do you think this map uses accurate size (*scale*)?
Yes No Not Really
3. Can you tell which way is North (*direction*)?
Yes No Not Really
4. Is there a *legend* or *key*?
Yes No Not Really
5. What is the *purpose* of this map?
6. What *type* of map do you think this is?

Map #6

1. Draw some of the common *symbols* this map uses.
2. Do you think this map uses accurate size (*scale*)?
Yes No Not Really
3. Can you tell which way is North (*direction*)?
Yes No Not Really
4. Is there a *legend* or *key*?
Yes No Not Really
5. What is the *purpose* of this map?
6. What *type* of map do you think this is?

Map #7

1. Draw some of the common *symbols* this map uses.
2. Do you think this map uses accurate size (*scale*)?
Yes No Not Really
3. Can you tell which way is North (*direction*)?
Yes No Not Really
4. Is there a *legend* or *key*?
Yes No Not Really
5. What is the *purpose* of this map?
6. What *type* of map do you think this is?

Name: _____ Date: _____ Per.: _____

MAP USE QUESTION ASSIGNMENT

Which Map Would You Use to Answer These Questions?

Read the scenarios below. Determine *which type of map* you would use to help you solve the problem. *Explain your answers.*

1. You need to plan a delivery route for a trucking company that delivers furniture. What kind of map do you use and why?
2. You are buying some land to build a house. You want to make sure that the land is not too steep to build on. What kind of map do you use and why?
3. It is the zombie apocalypse and you are trying to find a location to rebuild a city. You want to make sure you will enjoy the weather all year round. What kind of map do you use and why?
4. You are gathering intelligence for the CIA. You are required to describe the landforms of a country. What kind of map do you use and why?
5. It is still the zombie apocalypse and you are still trying to find a location to rebuild a city. You want to make sure you choose somewhere that has all the resources you need. What kind of map do you use and why?
6. You are planning a trip to another continent. You want to see which countries you might be able to visit on your trip. What kind of map do you use and why?

Appendix R
Geography Alive!: Chapter 1

GEOTERMS 1

Read Sections 1.1 and 1.2. Then create an illustrated dictionary of the Geoterms by completing these tasks:

- Create a symbol or an illustration to represent each Geoterm.
- Write a definition of each term in your own words.
- Write a sentence that includes the Geoterm and the word *map*.

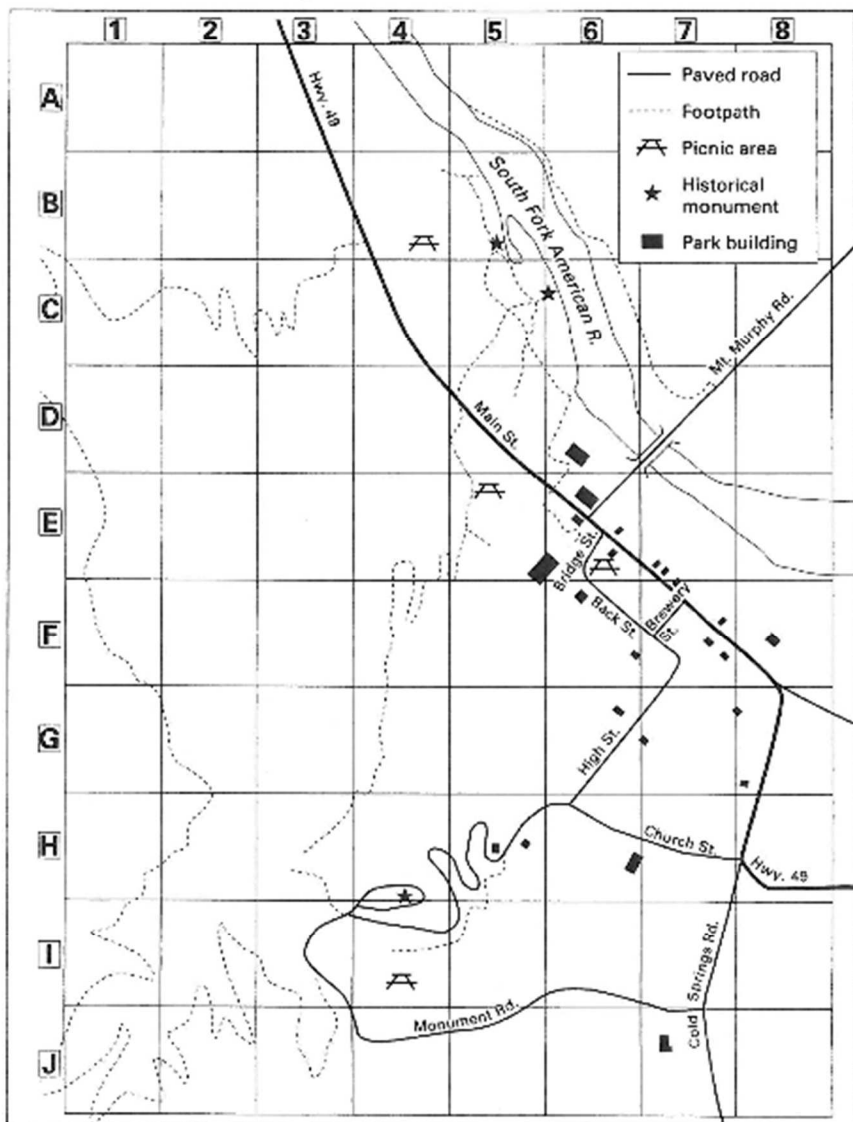
Geoterm and Symbol	Definition	Sentence
absolute location		
distortion		
map projection		
relative location		

READING NOTES 1

1.3 Map Titles and Symbols

Label the map. Follow the directions on the cards your teacher gives you.

Marshall Gold Discovery State Historic Park

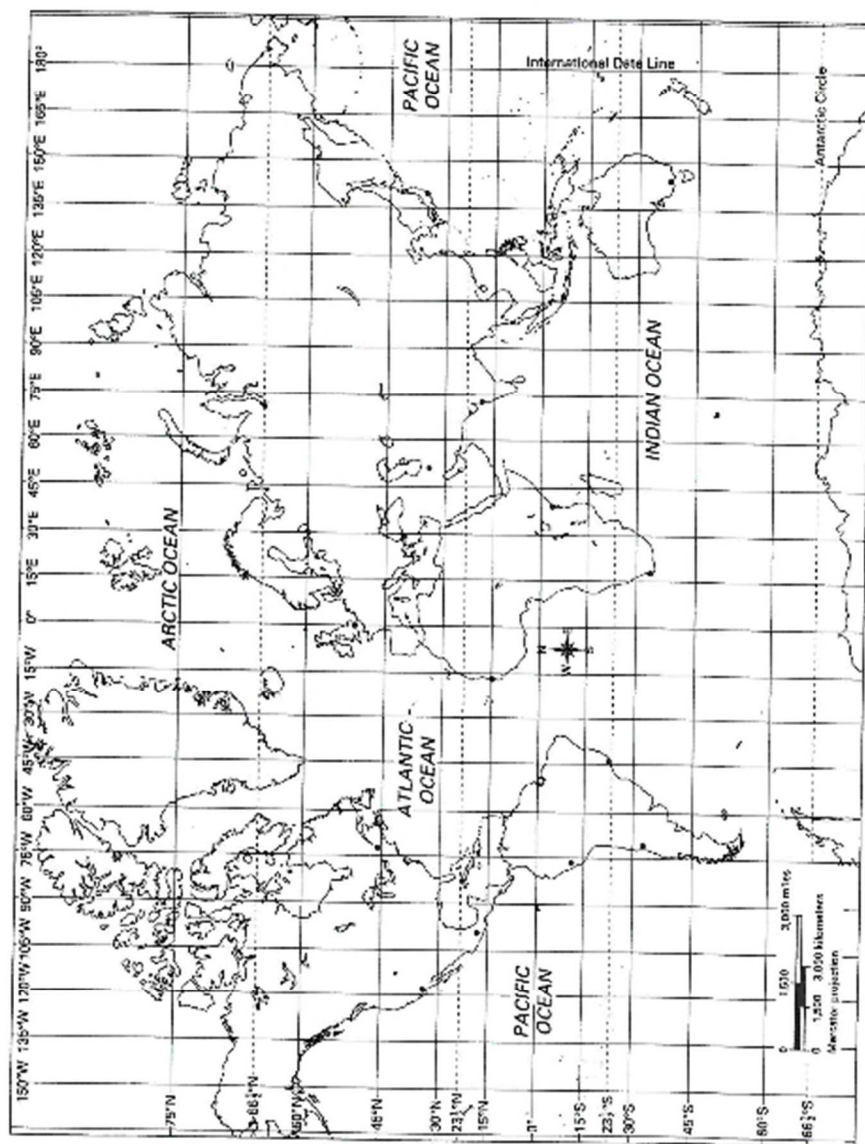


READING NOTES 1

1.4 The Global Grid: Longitude and Latitude

Label the map. Follow the directions on the cards your teacher gives you.

Cities Around the World

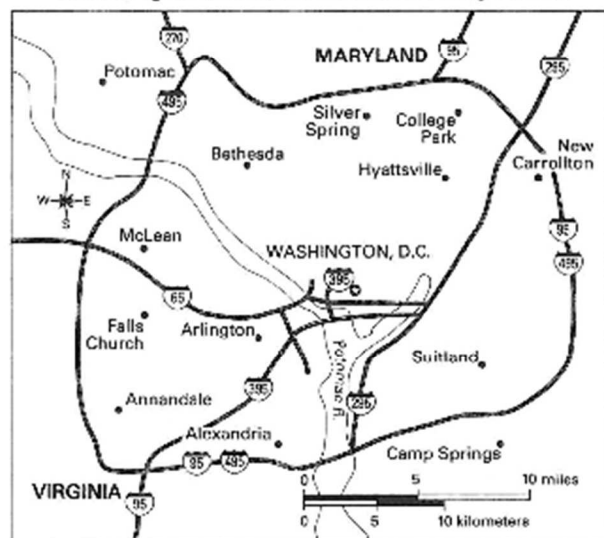


READING NOTES 1

1.5 Dealing with Distances: Map Scale

Label the maps. Follow the directions on the cards your teacher gives you.

Washington, D.C., and Surrounding Areas



Downtown Washington, D.C.

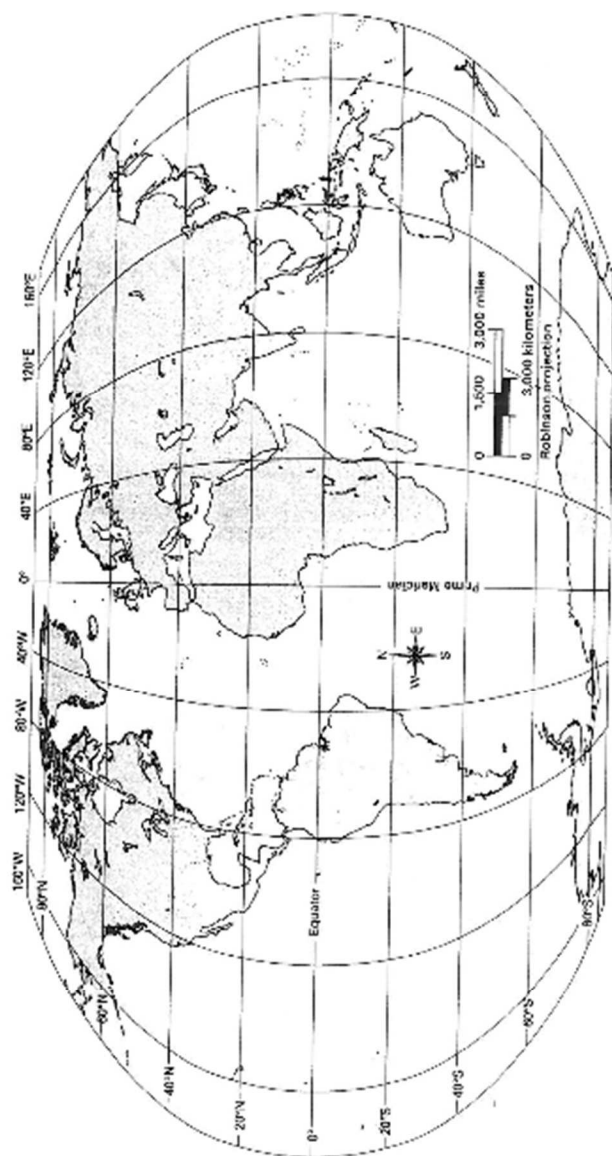


READING NOTES 1

1.6 Hemispheres, Continents, and Oceans

Label the map. Follow the directions on the cards your teacher gives you.

The World



READING NOTES 1

1.8 Showing a Round World on a Flat Map

Label the maps. Follow the directions on the cards your teacher gives you.

The World



The World



The World



The World



Appendix S

Mapping Zombie Attacks

Master

Regional Attack Data

REGIONAL ATTACK DATA

California Zombie Attack Data—Reports for 4 days of Zombie Attacks

This data shows the first 4 days of zombie attacks in California.

Day 1

- One attack in Los Angeles

Day 2

- Five attacks in Los Angeles
- Two attacks in Santa Clarita
- One attack in Anaheim

Day 3

- Twenty-seven attacks in Los Angeles
- Eleven attacks in Santa Clarita
- Seven attacks in Anaheim
- Three attacks in Bakersfield
- Four attacks in Oceanside
- Two attacks in Riverside
- Three attacks in Oxnard

Day 4

- One-hundred and thirty-two attacks in Los Angeles
- Fifty-seven attacks in Santa Clarita
- Forty-two attacks in Anaheim
- Twelve attacks in Bakersfield
- Eighteen attacks in Oceanside
- Eleven attacks in Riverside
- Sixteen attacks in Oxnard
- One attack in Fresno
- Five attacks in San Diego
- Two attacks in Barstow
- Two attacks in Santa Barbara

Northeast Zombie Attack Data—Reports for 4 days of Zombie Attacks

This data shows the first 4 days of zombie attacks in the Northeast U.S.

Day 1

- One attack in New York City

Day 2

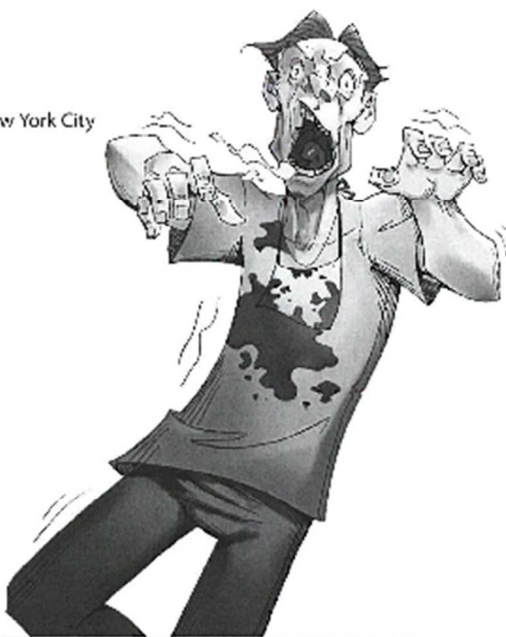
- Five attacks in New York City
- Two attacks in Trenton, NJ
- One attack in Bridgeport, CT

Day 3

- Twenty-seven attacks in New York City
- Eleven attacks in Trenton, NJ
- Seven attacks in Bridgeport, CT
- Three attacks in Philadelphia, PA
- Four attacks in Hartford, CT
- Two attacks in Parsippany, NJ

Day 4

- One-hundred and thirty-two attacks in New York City
- Fifty-seven attacks in Trenton, NJ
- Forty-two attacks in Bridgeport, CT
- Nineteen attacks in Philadelphia, PA
- Eighteen attacks in Hartford, CT
- Eleven attacks in Parsippany, NJ
- Six attacks in Wilmington, DE
- Five attacks in Springfield, MA
- Two attacks in Providence, RI
- One attack in Hazleton, PA



Washington Zombie Attack Data—Reports for 4 days of Zombie Attacks

This data shows the first 4 days of zombie attacks in Washington State.

Day 1

- One attack in Seattle

Day 2

- Five attacks in Seattle
- Two attacks at Seattle-Tacoma International Airport
- One attack in Shoreline

Day 3

- Twenty-seven attacks in Seattle
- Eleven attacks at Seattle-Tacoma International Airport
- Seven attacks in Shoreline
- Three attacks in Federal Way
- Four attacks in Edmonds
- Two attacks in Bellevue
- Three attacks in Tacoma

Day 4

- One-hundred and thirty-two attacks in Seattle
- Fifty-seven attacks at Seattle-Tacoma International Airport
- Forty-two attacks in Shoreline
- Twelve attacks in Federal Way
- Eighteen attacks in Edmonds
- Eleven attacks in Bellevue
- Sixteen attacks in Tacoma
- One attack in North Creek
- Five attacks in Redmond
- Two attacks in Bainbridge

Name: _____ Date: _____ Per.: _____

ZOMBIE ATTACK DATA TRACKING SHEET

Use this form to track the location and number of zombie attacks.

#	City	Connection	Day 1	Day 2	Day 3	Day 4	Total
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
Total Cities Attacked		Total Attacks	Day 1	Day 2	Day 3	Day 4	Total

Appendix T
Geography Alive!: Chapter 2

GEOTERMS 2

Read Sections 2.1 and 2.2. Then create an illustrated dictionary of the Geoterminals by completing these tasks:

- Create a symbol or an illustration to represent each term.
- Write a definition of each term in your own words.
- Write a sentence that includes the term and the word *map*.

Geoterm and Symbol	Definition	Sentence
climate		
economic activity		
landform		
physical feature		

GEOTERMS 2

Geoterm and Symbol	Definition	Sentence
population density		
region		
thematic map		
vegetation		

READING NOTES 2

Read Section 2.4. Write one or two sentences describing the type of thematic map you read about. Then complete the list of climate zones by filling in the missing pieces. Each entry should have a key term, an icon, and a definition.

2.4 Hot, Cold, Wet, Dry: Earth's Climates

A world climate map shows information about

Climate Zones



ice-cap: very cold all year with permanent ice and snow



Mediterranean: warm all year with dry summers and short, rainy winters



tundra:



arid: hot and dry all year with very little rain



_____ : cold, snowy winters and cool, rainy summers



semi-arid:



marine west coast: warm summers, cool winters, and rainfall all year



_____ : hot all year with rainy and dry seasons



_____ : warm, rainy summers and cool, snowy winters



tropical wet:



_____ : hot, rainy summers and mild winters with some rain



highlands:

READING NOTES 2

Read Section 2.5. Write one or two sentences describing the type of thematic map you read about. Then complete the list of vegetation zones by filling in the missing pieces. Each entry should have a key term, an icon, and a definition.

2.5 Trees and Other Plants: Earth's Vegetation

A world vegetation map shows information about

Vegetation Zones



ice cap:



_____ : small trees and bushes adapted to a Mediterranean climate



tundra: treeless plain with grasses, mosses, and scrubs adapted to a cold climate



_____ : trees with broad, flat leaves that are shed before winter



desert: arid region with few plants



_____ : a mix of coniferous and deciduous trees



desert scrub:



coniferous forest:



temperate grassland:



broadleaf evergreen forest: tall trees with large leaves that remain green all year



_____ : grasses and scattered trees adapted to a tropical wet and dry climate



highlands: vegetation varies with latitude and elevation

READING NOTES 2

Read Section 2.7. Write one or two sentences describing the type of thematic map you read about. Then complete the list of economic activities by filling in the missing pieces. Each entry should have a key term, an icon, and a definition.

2.7 Economic Activity: Land and Resources

A world economic activity map shows information about

Economic Activity



hunting and gathering: people hunt animals and gather plants for their food



_____ : using trees to make homes, furniture, and paper



subsistence farming:



trade and manufacturing: buying and selling goods; turning natural resources into things to sell



_____ : farmers raise crops or livestock to sell



nomadic herding:



livestock raising:



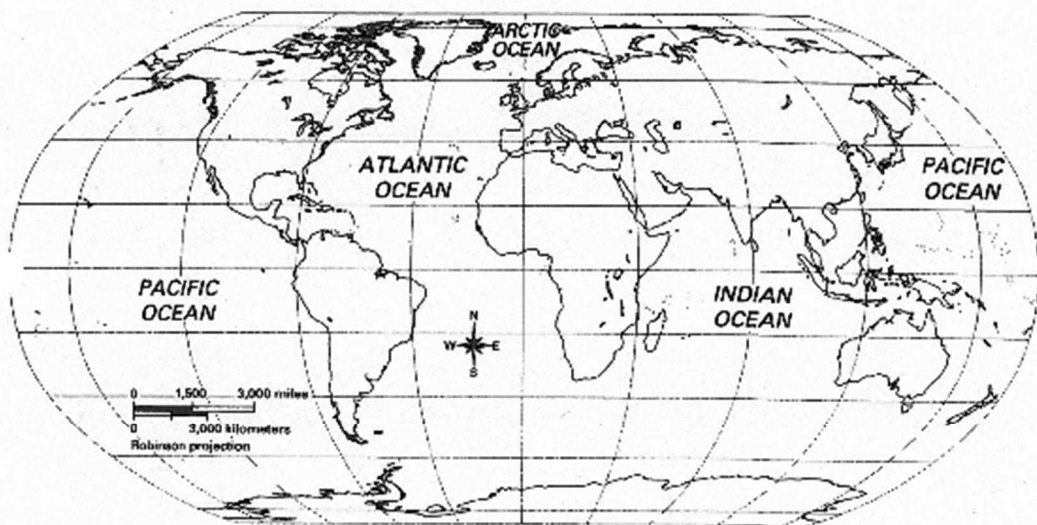
commercial fishing: catching fish in oceans, lakes, and rivers

READING NOTES 2

Read Section 2.8. Write one or two sentences describing the type of thematic map you read about. Then color and label each of the seven world regions.

2.8 Organizing Earth's Surface: Regions

A world regions map shows information about



Appendix U

Hunting and Gathering Simulation

Hunting and Gathering Sheet
Activator 1

Master

Hunting and Gathering Sheet

Card Number	A Clue	B Clue	C Clue	D Clue
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				

Hunting and Gathering Tribal Question and Answer Sheet #1-5

Card Number	Card A	Card B	Card C	Card D
Card 1				
Card 2				
Card 3				
Card 4				
Card 5				
Answer Card 1:				
Answer Card 2:				
Answer Card 3:				
Answer Card 4:				
Answer Card 5:				

Hunting and Gathering Tribal Question and Answer Sheet #6-10

Card Number	Card A	Card B	Card C	Card D
Card 6				
Card 7				
Card 8				
Card 9				
Card 10				
Answer Card 6:				
Answer Card 7:				
Answer Card 8:				
Answer Card 9:				
Answer Card 10:				

Hunting and Gathering Tribal Question and Answer Sheet #11-15

Card Number	Card A	Card B	Card C	Card D
Card 11				
Card 12				
Card 13				
Card 14				
Card 15				
Answer Card 11:				
Answer Card 12:				
Answer Card 13:				
Answer Card 14:				
Answer Card 15:				

Hunting and Gathering Tribal Question and Answer Sheet #16-20

Card Number	Card A	Card B	Card C	Card D
Card 16				
Card 17				
Card 18				
Card 19				
Card 20				
Answer Card 16:				
Answer Card 17:				
Answer Card 18:				
Answer Card 19:				
Answer Card 20:				

Background Essay

1. History began about 5,000 years ago with the invention of writing. The many thousands of years that people lived before that is known as prehistory. Prehistoric people had no cities, countries, organized central governments, or organized religion. With no written records, we learn about these people through the artifacts they left. Artifacts include weapons, pottery, clothing, and jewelry.
2. Archeology is the study of these artifacts to determine how prehistoric people lived. Since we have no direct written records from the people themselves, archaeologists have to make educated guesses concerning their lives.
3. For 2.5 million years, humans lived nomadic lives of hunters and gatherers. This era of human existence was one of continual scarcity. All human energy had to be devoted to daily securing the food necessary to survival. All members of the hunting and gathering community had to be involved in this all-consuming task. Under these conditions, human civilization could not emerge. Before civilization could be created, human beings had to discover a way to secure food in a way that would not require all of their energy. Only on this foundation could civilization be started.
4. Humans who lived just prior to the discovery of civilization were known as Paleolithic people. They lived in small tribes of usually 20–30 people. They had minimal possessions since they were constantly on the move hunting and gathering food. All the people in the tribe participated in finding food. They had little time for anything else.
5. Paleolithic people did develop spoken language and expressed themselves through art, which may have had religious meaning. During this time, humans created tools such as spears and hand axes using stones called flint.
6. In hunting and gathering tribes, all the members knew one another and had daily face-to-face contact for communication. Their laws, called customs, were based on shared understandings about what was allowed and what wasn't allowed. These customs were maintained through the close, daily interaction of the members of the tribe or community and did not need to be written down.
7. The laws of the tribe or community were easily maintained by the fact that all of its members were very familiar with one another. The leaders of these tribes could direct their members through verbal communication. They had no real need for written language.
8. About 10,000 years ago, people learned how to plant seed and tame animals. These discoveries allowed people to farm for the first time. Nomadic people migrated to the fertile plains between the Tigris and Euphrates rivers (in an area known as Mesopotamia) and abandoned their previous ways of life and began to farm.
9. The transition from hunting and gathering to farming is known as the Neolithic Age. Farming in the Neolithic Age allowed people to live in settled communities and have surpluses of food. With surpluses of food, the population of farming communities began to grow.
10. With the discovery of farming, people began to live in farming communities for the first time. They were able to accumulate more possessions than their hunter and gatherer ancestors.

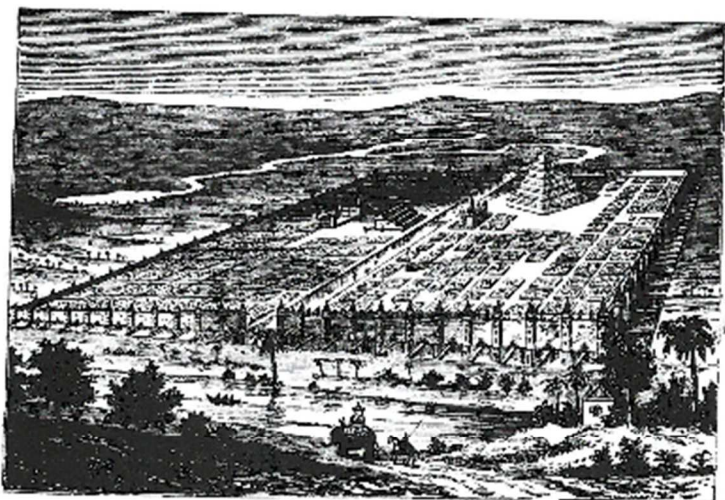
because they were able to stay in one place. They accumulated things like beads, pottery, and other prized objects. To farm successfully, Neolithic farmers had to develop new technologies. They had to protect their crops and invent accurate record systems for their seed. They also needed to measure time accurately so they would know when to plant and harvest. Gradually, they created the first calendar.

11. The first farming villages were usually settled in river valleys. Conditions in river valleys favored farming. Flood waters spread silt (fertilizer) across the valley, keeping it fertile. The animals that flocked to the rivers to drink were another source of food. In addition, rivers presented a regular water supply and a means of transporting goods. Because the condition for farming was so good in river valleys, the population of the small farming villages began to grow. Soon, many of them swelled into cities. This led to the emergence of civilization.
12. Civilizations are complex societies with cities, government, art, architecture, religion, class divisions, and writing systems. All the first civilizations were centered in cities. Since farming provided a surplus of food and an increased population, people were able to specialize in jobs. These people, who did not need to produce food, lived in cities. Here they did the many new jobs which made civilization possible.
13. Cities, for the first time in human history, created communities of strangers. It was not possible for all of the thousands of people who now lived in cities to interact and know one another. On the contrary, any one individual would just interact with and know a fairly small percentage of that city's population. As a result, customs could not be strong enough to maintain the laws necessary to regulate the behavior of the city's population. Since the people of the city did not have day-to-day contact with one another, the laws would have to be transmitted in an entirely new way. This meant the leaders of the city had to rely on something other than verbal communication to make their wishes known. They had to rely on the indirect method of communication of writing to express the city's laws. This led to the development of written laws in civilization.
14. Prior to the advent of cities and civilization, people lived in tight-knit small communities of hunting and gathering tribes or farming villages. All the people of the community knew one another and they were very often related. Their loyalty to their community and its customs and rituals were based on this close relationship, which all members of the community had with one another. When people began to live in cities this closeness that tied individuals to their communities was lost. The size of the city made it impossible to base individual identification with the community upon personal ties. As stated before, in a city of thousands of people this was no longer possible. But personal ties and loyalty was just as necessary for the city as it had been for those small, closer forms of contact. The leaders of the cities had to find a new way to bond its members to the city.
15. One of the most outstanding features of the ancient world was the construction of magnificent buildings in the midst of the city. Each city used these great architectural achievements to help create individual identification with their city (and to frighten those who may be enemies of the city). Great amounts of resources, wealth and labor went into the construction of these magnificent temples and palaces. They were a priority for the leaders so they could send the message they wanted the people they ruled over in the city to hear. They wanted to convey the greatness and power of the city in their great buildings. They wanted the people in the city to identify with the city and to their authority in part through the

magnificent structures within the city walls.



16. The cities leaders sought other ways to bond the people in the city. One of the most common was through organized religion. With its elaborate ceremonies and rituals carried out by professional priests, it helped to create the city's common culture. Like their nomadic ancestors, most ancient peoples were polytheistic. That is, they believed in many gods and goddesses. People appealed to sun gods, river goddesses, and other spirits they believed control natural forces. In ancient religions, priests and worshippers sought to gain the favor of the gods through complex rituals such as ceremonies, dances, prayers and hymns. To ensure divine help, people built temples and sacrificed animals, crops, or sometimes other people to the gods. Sacrifices and other ceremonies required the full-time attention of priests, who had special training and knowledge.
17. Ancient governments taxed the farmers who lived outside the city walls a portion of their crop. This allowed the city to maintain a steady food supply. With the surplus of food maintained by the government, people were able to specialize in jobs for the first time. Not everyone had to be a farmer. Some became artisans, or skilled craftsmen, who made pottery, woven goods, and metal items such as tools and weapons. Cities also had bricklayers who built city walls. Soldiers were needed for protection. Merchants sold goods in the marketplace. Singers, dancers, and storytellers entertained on public occasions. Such specialization made people dependent on one another for their various needs.
18. In cities, social life became more complex. People were ranked according to their jobs. Such rankings led to the growth of social classes. Priests and nobles usually occupied the highest level of an ancient society. They were followed by a small class of wealthy merchants, followed by humbler artisans. Below them stood the vast majority of people, peasant farmers who lived in the surrounding villages and produced food for the city. Slaves occupied the lowest level. Slaves often did the hardest physical labor in the city. Sometimes they came from poor families and sold themselves into slavery to pay off their debts. Others were prisoners captured in war. Since male captives were often killed, women and children made up the largest number of these slaves.
19. The leaders of ancient cities secured the obedience of the city's population through strict laws and rituals. The people of the city were not encouraged or even to dream of questioning the authority of their leaders, priests or accepted ways of doing things. But to a far greater degree than the earlier forms of human association (tribal hunting and gathering, and village based farming) life in cities was dynamic and depended on an injection of innovation to keep the city, and the civilization which rested on it, dynamic and thriving. The introduction of new ways of doing things was essential to the cities further progress. Also, cities found themselves in constant competition with other cities and their civilizations. If those other cities found better ways of doing things it could give them advantages over cities that did not progress. This could lead to the destruction of cities and their civilizations that were slow to progress and change. But the authoritarian structure of the city did not encourage the kind of innovation that led to progressive change. As a result, the needed injection of different ways of doing things most often did not come from within the city itself but through its contacts with cities from other civilizations.
20. Through trade and warfare, the members of different civilizations came into contact with one another. Though their intended purpose was not to learn from one another in these two

activities, the result was that they did. Close contact with peoples from different civilizations meant that these civilizations could not help but to learn from one another. When people of different civilizations came in contact through trade they could not help to learn from one another. They learned how other people did things and the different technologies they used. They learned about their beliefs and religions as well. They brought this knowledge back with them to their cities where it often provided the injection and impetus to change that was necessary to the cities future security and prosperity. This sharing of different ideas and ways of doing things between different peoples through contact is called cultural diffusion.



Appendix V

What Good Are Leftovers?

 **Student Directions** 

THE MESOPOTAMIAN AGRICULTURAL VILLAGE SIMULATION

Focus Questions

- How did having a food surplus impact the way people met their economic wants?
- What new technologies played a role in creating a food surplus?

What does it take to win?

Be the first family in the village to have 20 units of wheat, 10 woolen garments and a mud-brick house to replace that old, rundown, hut you now live in.

What do I do?

You are either a...

Village Clerk. If you are chosen to be a village clerk, you will be in charge of collecting wheat that is eaten, distributing new wheat to families, and exchanging extra wheat for goods like carts and wool garments.

OR you are in a ...

Family Group. If you are in a family group, you might have one of the following three roles. Not everyone will have a special role in the family, but everyone will help make decisions.

Family Leader. You are in charge of making sure everyone is participating and doing his/her job.














Family Trader. You will bring the wheat to the village clerk to exchange for other goods. You will also collect wheat for your family from the village clerk.

Family Recorder. You will keep a careful record of how much wheat your family has, as well as what other goods you have gained through trading.

What happens in each round? Each Round = One Year

In each round your family will receive the wheat you grew that year. You will “eat” twenty units of the wheat. Whatever is left over is surplus and can either be stored in case there is a drought or traded for other goods, such as a cart, woolen garments, or a sickle.

*** Note:** If two families cooperate to dig the canal system, the cost is 15 units per family, and each family will increase production by 20 units. With the village leader’s (teacher) permission, families may send their representatives to negotiate with the representatives of other groups.

EXCHANGE RATES		
RESOURCES	COST	INCREASED PRODUCTION
 SICKLE	2 UNITS OF WHEAT 	5 UNITS OF WHEAT 
 CART	3 UNITS OF WHEAT 	9 UNITS OF WHEAT 
 WOOLEN GARMENT	2 UNITS OF WHEAT 	No INCREASE
 MUD-BRICK HOUSE	20 UNITS OF WHEAT 	No INCREASE
 CANAL SYSTEM	20 UNITS OF WHEAT 	20 UNITS OF WHEAT 

Note:

If two families cooperate to dig the canal system, the cost is 15 units per family, and each family will increase production by 20 units. With the village leader's (teacher) permission, families may send their representatives to negotiate with the representatives of other groups.

Family Journal

FAMILY NAME

(WRITE FAMILY NAME IN BOX ABOVE)

Directions. After trading with the village clerk, record how many wheat units, garments, houses, carts, sickles, or canals your family owns.

Round/ Year	Number of Resources Gained					
	Wheat Units	Woolen Garments	Mud-Brick Houses	Carts	Sickles	Canal Systems
One						
Two						
Three						
Four						
Five						
Six						

Note: The number of rounds played depends on how soon a group wins.

Be the first family in the village to have 20 units of wheat, 10 woolen garments, and a mud brick house to replace that old, rundown, hut you now live in.

Appendix W

SLO Assessment

North Africa and the Middle East: Political

Part I. Directions: Use the provided maps to match each country with its number.

North Africa

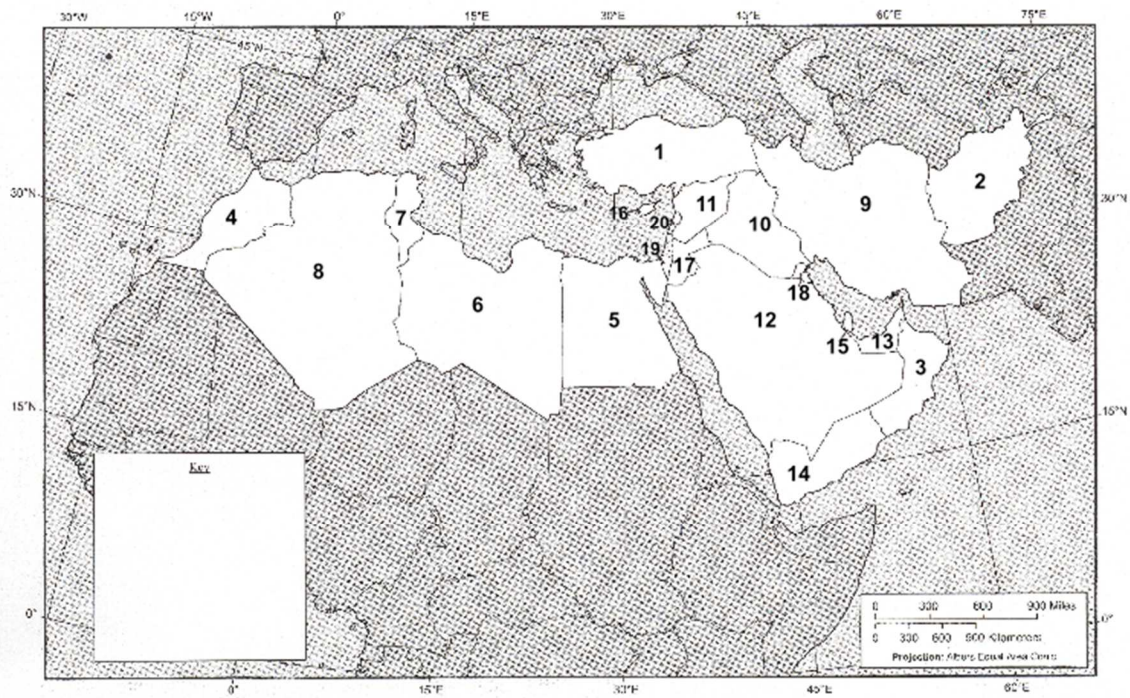
Number	Country	Number	Country
	Algeria		Morocco
	Egypt		Tunisia
	Libya		

The Middle East (Southwest Asia)

Number	Country	Number	Country
	Afghanistan		Oman
	Iran		Qatar
	Iraq		Syria
	Israel		Turkey
	Jordan		Saudi Arabia
	Kuwait		United Arab Emirates
	Lebanon		Yemen

Part II. Color the two regions a different color.

Southwest Asia / North Africa



Source: for outline map: National Council for Geographic Education

Resource Sheet #2

North Africa and the Middle East Map: Physical

Directions:

1. Preview this activity.
2. Look at the outline map. Using a pencil title the map at the top of the page, "Physical Map."
3. Using a brown colored pencil shade in the following mountains on your map:


Zagros Mountains
Caucasus Mountains
Elburz Mountains
Atlas Mountains
Ahaggar Mountains

Using a pencil, label the mountains. Print the names using upper and lower case letters. Add the color brown to your key and label it as mountains.

4. Using a blue pencil label the following bodies of water on your map:

Mediterranean Sea
Atlantic Ocean
Black Sea
Caspian Sea
Red Sea
Persian Gulf
Arabian Sea
Gulf of Aden
Gulf of Oman
Strait of Hormuz
Bab el Mandeb (Strait)

Print the name of oceans using only uppercase lettering. Print the names of straits and seas using upper and lower case letters

5. In the key, label the symbol  "Rivers."
6. Using a blue pencil label the following rivers:

Nile River
Tigris River
Euphrates River

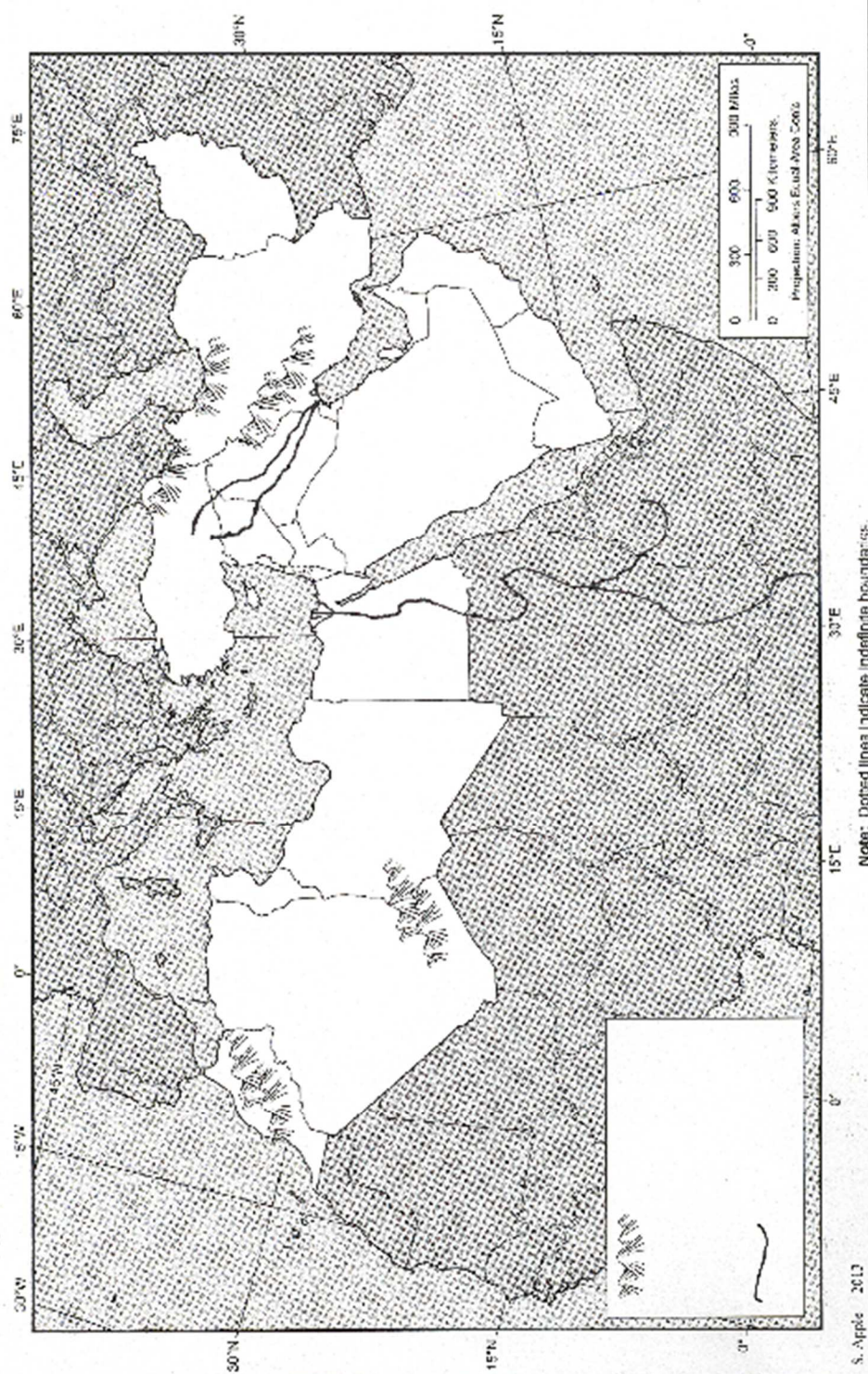
7. Using a pencil label the following land features on your map:

Plateau of Iran
Arabian Peninsula
Sinai Peninsula
Anatolia (Peninsula)

8. Label the components of a map:

Compass
Author
Date
Source

Southwest Asia / North Africa



Source: for online map, National Council for Geographic Education

Analyzing Maps of North Africa and the Middle East

Directions: Use the political, physical, climate, natural resources, and population density maps of North Africa and the Middle East in your atlas to complete the following activities. Be sure to circle the map you used to find your answer.

Part One: Where?

Answer the following questions. Also, circle the type of map you used to find your answer.

1. Name three countries in this region that have another climate besides dry/desert.

Type of map: Political Physical Climate Natural Resources Population Density

2. Name three countries that have areas with no widespread use.

Type of map: Political Physical Climate Natural Resources Population Density

3. Which country in this region has two major rivers?

Type of map: Political Physical Climate Natural Resources Population Density

4. Where in Libya do most people live?

Type of map: Political Physical Climate Natural Resources Population Density

5. Which mountain range acts natural boundary between Iraq and Iran?

Type of map: Political Physical Climate Natural Resources Population Density

Geographic Reasoning Performance Task: Quarter 2 – North Africa and Southwest Asia

6. Locate a *large* country with these features: It has oil deposits along its east coast, nomadic herding takes place here with a low population density, it's entirely located in a dry climate.

Type of map: Political Physical Climate Natural Resources Population Density

Part Two: Why There?

Read and answer the questions using complete sentences. Also, circle the names of the maps you used to find your answer. Be sure to answer all parts of the question.

7. Where are the areas of highest population density found? What climates are found in these areas? What link might there be between climate and population?

Type of map: Political Physical Climate Natural Resources Population Density

8. What country do I live in? The major city in my country has a population density of over 250 people per square mile. I live near a river and practice commercial farming. My country has a mostly dry climate.

Type of map: Political Physical Climate Natural Resources Population Density

9. What two countries have a low elevation and are near rivers? What link might there be between these physical features and economic activity for this area?

Type of map: Political Physical Climate Natural Resources Population Density

10. Along which physical feature are there areas of high population density (over 250 per square mile)? How do physical features help to explain why large amounts of people do live there.

Type of map: Political Physical Climate Natural Resources Population Density

Where in North Africa and the Middle East? Part I

Directions: Use the maps provided to write information about the three locations below (locations A, B, and C.)

	Location A (31° N, 7.5° W)	Location B (37° N, 40° E)	Location C (24° N, 54°E)
Physical Features			
Climate Zones			
Population Density			
Natural Resources			

Geographic Reasoning Performance Task: North Africa and the Middle East

Where in North Africa and the Middle East? Part II

Directions: Examine the three images. Select one visual to investigate. Use the Photo Analysis Aide/Guide to analyze the image and draw conclusions about North Africa and the Middle East

Image _____

Argument Writing

Using the information you learned from the previous activity and the maps you have examined, determine the most logical place in North Africa and the Middle East this photograph was taken. Provide all of the evidence you have found to support your answer. Your written response requires a well-organized paragraph.

Photograph ____ was most likely taken



TA Photograph #3



Author: Rüdiger Meier License:{{GFDL}}{{cc-by-sa}}

Appendix X

Why Mesopotamia? Geography

Name: _____ Date: _____ Block: _____

Directions: Reread the text about Mesopotamia and complete the following graphic organizer using the text and prior knowledge. Then answer the two questions in the space provided or on the back. Some answers may apply to more than one block and some blocks may not apply.

How Geography and Location Led to Civilization

	Location	Climate	Resources
Mesopotamia			
General Advantages in Mesopotamia of . . .			
Specific advantages to being a trade center of . .			
Specific advantages for farming of . . .			

1. Describe at least four factors that led to the development of civilizations along the Tigris and Euphrates Rivers.

Appendix Y

HEI Group Processing

Human-Environment Interaction basically means that humans affect the environment and the environment affects humans. Humans *adapt to*, *depend on*, and *modify* the environment.

Review the handout about Human-Environment Interaction and information we studied for Mesopotamia. **Discuss** as a group to answer the following questions.

1. What are some ways that humans *adapt* to the environment (ancient and modern examples)?
2. What are some ways the humans *depend* on the environment (ancient and modern)?
3. What are some ways that humans *modify* the environment (ancient and modern examples)?

Post-Apocalypse Zombie HEI Exit Ticket

Review how humans modify, adapt to, and depend on the environment. ***Discuss*** how these change after a zombie outbreak. Answer the following questions.

1. How would people ***modify*** the environment after a zombie outbreak?
2. How would people ***adapt*** to the environment after a zombie outbreak?
3. How would people ***depend*** on the environment after a zombie outbreak?

Appendix Z

End of Year SLO: Why? and Why There? Assessments

Resource Sheet 5

Analyzing Maps of Asia

Directions: Use the political, physical, climate, natural resources, and population density maps of Asia in your atlas to complete the following activities. Be sure to circle the map you used to find your answer.

Part One: Where?

Answer the following questions. Also, circle the type of map you used to find your answer.

1. If you sailed east from India along 20° latitude you would come to what country? What are the types of land use in this country?

Type of map: Political Physical Climate Natural Resources Population Density

2. The Mekong River is located on the border of which two countries?

Type of map: Political Physical Climate Natural Resources Population Density

3. Which country in Southeast Asia has an area with a population density of over 250 people per square mile? Name one city located in this country.

Type of map: Political Physical Climate Natural Resources Population Density

4. One of the longest rivers in the world flows from the Plateau of Tibet to the East China Sea. What is the name of this river? Through which country does it flow?

Type of map: Political Physical Climate Natural Resources Population Density

Geographic Reasoning Performance Task: Sub-Saharan Africa

5. Which country in Asia has the lowest population density? What is the overall population density?

Type of map: Political Physical Climate Natural Resources Population Density

6. Which region in Asia has a highland climate? How do physical features help to explain this type of climate?

Type of map: Political Physical Climate Natural Resources Population Density

Part Two: Why There?

Read and answer the questions using complete sentences. Also, circle the names of the maps you used to find your answer. Be sure to answer all parts of the question.

1. Where in Asia does this person live and why do you think so?

"The landlocked country that I live in has a population density of 5-50 per square. It is very hard to use the land here, and the land that we can use is for commercial farming. The elevation ranges from 0-10,000 feet. Parts of my country are tropical, receiving around 40-80 inches of rain per year."

Type of map: Political Physical Climate Natural Resources Population Density

2. Compare the population densities in the western and eastern halves of China. How do physical features and climate help to explain why they are so different?

Type of map: Political Physical Climate Natural Resources Population Density

3. For a travel guide of my country, I write: Our climate is mild seasonal with cold winters and warm summers. Our capital city has over 250 people per square mile and offers attractions of an urban life, like shopping, museums, and entertainment. The northern part of our country offers winter hobbies, like skiing, because of the high elevations. I also include a map of islands that make up my country. Which country am I writing about and why do you think so?

Type of map: Political Physical Climate Natural Resources Population Density

4. What type of land use is found in Bangladesh? How might climate explain why?

Type of map: Political Physical Climate Natural Resources Population Density

References

- Abel, R., & Kullhavy, R. W. (1983). Presentation mode and the use of maps in prose learning. *American Educational Research Journal*, 23, 263-274.
- Anderson, G. (2002). Reflecting on research for doctoral students in education. *Educational Researcher*, 31(7), 22-25.
- Anderson, J. R. (1985). Teaching map skills: An inductive approach. *Journal of Geography*, 84, 25-32, 72-78, 117-122, 169-176.
- Anderson, G. (2002). Reflecting on research for doctoral students in education. *Educational Researcher*, 31(7), 22-25.
- Anderson, G., Herr, K., Nihlen, A., & Noffke, S. (2007). *Studying your own school* (2nd ed.). Thousand Oaks, CA: Corwin Press.
- Anderson, K., & Leinhardt, G. (2002). Maps as representations: Expert novice comparison of projection understanding. *Cognition and Instruction*, 20, 283-321.
- Baier, A. (1994). *Moral prejudices: Essays on ethics*. Cambridge, Mass: Harvard University Press.
- Bain, R. (2000). Into the breach: Using theory and research to shape history instruction. In P. Stearns, P. Seixas, & S. Wineburg (Eds.), *Knowing, teaching, and learning history: National and international perspectives* (pp. 331-352). New York: New York University Press.
- Bain, R. (2005). "They thought the world was flat?" Applying the principles of How

- People Learn in teaching high school history. In National Research Council, *How Students Learn* (pp.179-213). Washington, D.C.: National Academies Press.
- Baker, T. E. (1989, October). *What is the capital of the state of chaos? Geography in the public school curriculum I*. Paper presented at the annual meeting of the National Social Science Association, Arlington, TX.
- Bartz, B. S., (1971). Maps in the classroom. In J. M. Ball, J. E. Steinbrink, & J. P. Stoltman (Eds.), *The social studies and geographic education: A reader* (pp. 90-100). New York: Wiley.
- Bausmith, J., & Leinhardt, G. (1998). Middle-school students' map construction: Understanding complex spatial displays. *Journal of Geography*, 97, 93-97.
- Bednarz, R.S., Tchakerian, V. P., & Giardino, J. R. (1993). Incorporating physical geography into the *Guidelines'* Movement Theme. *Journal of Geography*, 92(1), 35-40.
- Bednarz, S. W. (1989). What's good about alliances? *Professional Geographer*, 41(4), 484-486.
- Bednarz, S. W. (1998). State standards: Implementing *Geography for Life*. *Journal of Geography* 97(2), 83-89.
- Bednarz, S. W. (2003). Nine years on: Implementation of the National Geography Standards. *Journal of Geography*, 102(3), 99-109.
- Bednarz, S. W., Acheson, G., & Bednarz, R. S. (2006). Maps and map learning in social studies. *Social Education*, 70(7), 398-404, 432.
- Bednarz, S. W. & Bednarz, R. S. (2004). Geography education: The glass is half full and it's getting fuller. *The Professional Geographer*, 56(1), 22-27.

- Bluestein, N., & Acredolo, L. (1979). Developmental changes in map-reading skills. *Child Development, 50*, 691-697.
- Boehm, R. G., & Petersen, (1987). Teaching place names and locations in grades 4-8: Map of errors. *Journal of Geography, 86*(4), 167-170.
- Boehm, R. G., & Petersen, Eds. (1997). *The first assessment: Research in geographic education*. San Marcos, TX: The Gilbert M. Grosvenor Center for Geographic Education.
- Bogdan, R. C., & Biklen, S. K. (1998). *Qualitative research for education: An introduction to theory and methods*. Boston: Allyn & Bacon.
- Borke, H. (1975). Piaget's mountains revisited: Changes in the egocentric landscape. *Developmental Psychology, 11*, 240-243.
- Bruner, J. (1977). *The process of education*. Cambridge, MA: Harvard University Press.
- Byford, J., & Russell, W. (2007). The New Social Studies: A historical examination of curriculum reform. *Social Studies Research and Practice, 2*(1), 38-4.
- Castner, H. W. (1990). *Seeking new horizons: A perceptual approach to geographic education*. Montreal: McGill-Queen's University Press.
- Chi, M. T. H., Feltovich, P. J., & Glasser, R. (1981). Categorization and representation of physics problems by experts and novices. *Cognitive Science, 5*, 121-152.
- Cirrincione, J. M., & Decaroli, J. (1977). Developing curriculum for geographic education. In G. A. Manson & M. K. Ridd (Eds.), *New perspectives on geographic education: Putting Theory into practice* (pp. 39-54). Dubuque, IA: Kendall/Hunt.
- Cochran-Smith, M., & Lytle, S. (1993). *Inside/Outside: Teacher research*

- and knowledge*. New York: Teachers College Press.
- Cochran-Smith, M., & Lytle, S. (1996b). The teacher research movement: A decade later. *Educational Researcher*, 28(7), 15-25.
- Cochran-Smith, M., & Lytle, S. (2004). Practitioner inquiry, knowledge, and university culture. In J. Loughram, M. L. Hamilton, V. K. LaBoskey & T. Russell (Eds.), *International handbook of self-study of teaching and teacher education practices* (pp. 601-649). Dordrecht, The Netherlands: Kluwer.
- Cochran-Smith, M., & Lytle, S. (2009a). Constructive disruption: Practitioner research and university culture. In M. Cochran-Smith & S. L. Lytle (Eds.), *Inquiry as stance: Practitioner research for the next generation* (pp. 86-117). New York: Teachers College Press.
- Cochran-Smith, M., & Lytle, S. (2009b). Teacher research as stance. In S. Noffke & B. Somekh (Eds.), *The SAGE Handbook of Educational Action Research* (pp.39-49). Thousand Oaks, CA: SAGE.
- Cochran-Smith, M., & Lytle, S. (2009c). Theorizing and contextualizing practitioner research In M. Cochran-Smith & S. L. Lytle (Eds.), *Inquiry as stance: Practitioner research for the next generation* (pp. 1-186). New York: Teachers College Press.
- Cochran-Smith, M., & Lytle, S. (20011). Changing perspectives on practitioner research. *LEARNIng Landscapes*, 4(2), 17-23.
- Cochran-Smith, M., & Lytle, S. (Eds.). (2009d). *Inquiry as stance: Practitioner research for the next generation*. New York: Teachers College Press.

- Cohen, D. K. (1990). A revolution in one classroom: The case of Mrs. Oublier, *Educational Evolution and Policy Analysis*, 12(3), 327-345.
- Cohen, S. (1988). Geography-public awareness and the public arena. *Social Education* 52(4), 248-250.
- Canagarajah, A. S. (1993). Critical ethnography of a Sri Lankan classroom: Ambiguities in student opposition to reproduction through ESOL. *TESOL Quarterly*, 27(4), 601-626.
- Corbin, J. M., & Strauss, A. L. (2008). *Basics of qualitative research*. Thousand Oaks CA: Sage Publications, Inc.
- Corey, S. (1953). *Action research to improve school practices*. New York: Teachers College, Columbia University.
- Craig, R. P. (May 01, 1996). Student-teacher relationship: A Buddhist Perspective. *The Clearing House*, 69, 5, 285-286.
- Cuban, L. (1991). History of teaching in social studies. In J. Shaver (Ed.), *Handbook of research on social studies teaching and learning* (pp. 197-209). New York: Macmillan.
- Dana, N. F., & Yendol-Hoppey, D (2009). *The reflective educator's guide to classroom research: Learning to teach and teaching to learn through practitioner inquiry* (2nd ed.). Thousand Oaks, CA: Corwin Press.
- Denzin, N, K., & Lincoln, Y. S. (1994). Introduction: Entering the field of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (1-17). Thousand Oaks, CA: Sage Publications, Inc.
- Downs, R. (1985). The representation of space: Its development in children and in cartography. In R. Cohen (Ed.), *The development of spatial cognition* (pp. 323-

- 345). Hilldale, NJ: Lawrence Erlbaum & Associates.
- Downs, R. (1994). Being and becoming a geographer: An agenda for geography education. *Annals of the Association of American Geographers*, 84, 175-191.
- Downs, R., & Liben, L. (1988). Through a map darkly: Understanding maps as representations. *The Genetic Epistemologist*, XV(1), 11-18.
- Downs, R., & Liben, L. (1991). The development of expertise in geography: A cognitive-developmental approach to geographic education. *Annals of the Association of American Geographers*, 81, 304-327.
- Drake, P., & Heath, L. (2011). *Practitioner research at doctoral level: Developing coherent research methodologies*. New York, NY: Routledge.
- Ennis, C. D., & McCauley, M. T. (March 01, 2002). Creating urban classroom communities worthy of trust. *Journal of Curriculum Studies*, 34, 2, 149-172.
- Fenton, E. (1966). *Teaching the new social studies in secondary schools: An inductive approach*. New York: Holt, Reinhart, and Winston, Inc.
- Ford, L. R. (1984): A core of geography: What geographers do best. *Journal of Geography*, 83(3), 102-106
- Gardner, D. P. (1986). Geography in the school curriculum. *Annals of the Association of American Geographers*, 76(1), 1-4.
- Gardner, H. (1990). Commentary on "On education and geographers: The role of cognitive development theory in geographic education" by R. Downs, L. Liben, & D. Daggs. *Annals of the Association of American Geographers*, 80(1), 123-135.
- Gardner, H., & Dyson, V. (1994). Teaching for understanding in the Disciplines-and beyond. *Teachers College Record*. 92(2), 198-218.

- Geography Education Standards Project (1994). *Geography for Life: National Geography Standards*. Washington, DC: National Geographic Society Committee for Research and Exploration.
- Gersmehl, P. J. (2005). *Teaching Geography*. New York, NY: The Guilford Press
- Gersmehl, P. J. (1992). Themes and counterpoints in geographic education. *Journal of Geography*, 91(3) 119-123.
- Gersmehl, P. J., & Andrews, S. K. (1986). Teaching the languages of maps. *Journal of Geography*, 85(6), 267-270.
- Golledge, R. G. (2002). The nature of geographic knowledge. *Annals of the Association of American Geographers*, 92(1), 1-14.
- Golledge, R. G., & Stimson, R. J. (1987). *Analytical behavioral geography*. London: Croon Helm.
- Goswami, D., & Stillman, P. (1987). *Reclaiming the classroom: Teacher research as an agency for change*. Upper Montclair, NJ: Boynton/Cook.
- Goswami, D., & Rutherford, M. (2009). "What's going on here?": Seeking answers through teacher inquiry. In D. Goswami, C. Lewis, M. Rutherford & D. Waff (Eds.), *Teacher inquiry: Approaches to language and literacy research* (pp. 1-11). New York: Teachers College Press.
- Grant, S. G. (2003). *History lessons: Teaching, learning, and testing in U.S. high school history classrooms*. Mahwah, NJ: Lawrence Erlbaum & Associates.
- Grant, S. G., Derme-Insinna, A, Gradwell, J. M., Pullano, I., Lauricella, A. M., &

- Tzetzso, K. (2002). When increasing stakes need not mean increasing standards: The case of the New York state global history and geography exam. *Theory and Research in Social Education*, 30, 488-515.
- Green, J. L. (1984). Does geography have a sound curriculum theory? *The Social Studies*, 75(4), 145-148.
- Gregg, M., & Leinhardt, G (1993). Geography in history: What is the where? *Journal of Geography*, 92(2), 56-63.
- Gregg, M., & Leinhardt, G. (1994). Mapping out geography: An example of epistemology and education. *Review of Educational Research*, 64, 311-361.
- Gregory, A., & Ripski, M. B. (2008). Adolescent trust in teachers: Implications for behavior in the high school classroom. *School Psychology Review*, 37(3), 337-353.
- Grosvenor, G. M. (1995). In sight of the tunnel: The renaissance of geography education. *Annals of the Association of American Geographers*, 85(3), 409-420.
- Guelke, L. (1989). Intellectual coherence and the foundations of geography. *Professional Geographer*, 41(2), 123-130.
- Haggett, P. (1996). Geography into the next century: personal reflections. In E. M. Rawling & R. Daugherty (Eds.), *Geography into the Twenty-First Century* (pp. 11-18). London: Wiley.
- Harper, R. A. (1990). The new school geography: A critique. *Journal of Geography*, 89(1), 27-30.
- Harper, R. A. (1992). The new school geography: At issue: What is geography's contribution to general education. *Journal of Geography*, 91(3), 124-125.

- Harris, L. M., & Bain, R. B. (2011). Pedagogical Content Knowledge for World History Teachers: Bridging the Gap between Knowing and Teaching. *American Educator*, 35(2), 13-16.
- Hart, R., & Berzok, M. (1982). Children's strategies for mapping the geographic-scale environment. In M. Potegal (Ed.), *Spatial abilities: Development and physiological foundations* (pp. 147-169). New York: Academic.
- Helgren, D. M. (1983). Place name ignorance is national news. *Journal of Geography*, 82(4), 176-178.
- Herman, D. (1995). Overcoming geographic innocence in geography education. *Journal of Geography*, 94(5), 527-529.
- Herman, J. W., & Siegal, A. W. (1978). The development of cognitive mapping of large-scale environment. *Journal of Experimental Child Psychology*, 26, 389-406.
- Herr, K. G., & Anderson, G. L. (2005). *The action research dissertation: A guide for students and faculty*. Thousand Oaks, CA: Sage Publications, Inc.
- Hodgkinson, H. L. (1957). Action research -- A critique. *Journal of Educational Psychology*. 31(4). 137-153.
- Howard County Public School System. (2012). Essential curriculum guide for middle school social studies. Ellicott City, MD: Mark Stout.
- Introduction to the classroom-focused improvement process (CFIP). (n.d.). Retrieved May 2, 2014, from MSDE website: <http://mdk12.org/process/cfip/>
- Jackson, P. W. (1986). *The practice of teaching*. New York, NY: Teachers College Press.
- Jacoby, L. L., & Craik, F. I. M. (1979). Effects of elaboration of processing at encoding

- and retrieval: Trace distinctiveness and recovery of initial context. In L. Cermak & F. Craik (Eds.), *Levels of processing in human memory* (pp. 1-21). Hillsdale, NJ: Erlbaum.
- James, P. E. (1962). Geography. In B. Berlson (Ed.), *The social studies and the social sciences* (pp. 42-87). New York: Harcourt, Brace, & World.
- Johnson, B. (1993). Teacher-as-researcher. *ERIC Digest*, ED355205. [Online, available: <http://ericae.net/db/edo.ED355205.htm>].
- Johnston, M. (2006). The lamp and the mirror: Action research and self studies in the social studies. In K. Barton (Ed), *Research methods in social studies education: contemporary issues and perspectives* (pp. 57 – 83). Greenwich, CT: Information Age.
- Johnston, R. J. (1997). *Geography and geographers: Anglo-American human geography since 1945*. Fifth edition. London: Arnold.
- Johnston, R. J. (1998). Fragmentation around the defended core: The territoriality of geography. *The Geographical Journal*, 164(2), 139-147.
- Kaplan, R. G. (1990). *The role of mathematical knowledge in children's understanding of geographical concepts*. Paper presented at the annual meeting of the New England Educational Research Organization.
- Kelly, T. (2014). *Students as investigators, teachers as researchers: Documenting a critical history pedagogy and its impact on diverse learners in a tenth-grade world history classroom* (Unpublished doctoral dissertation). University of Maryland, College Park.
- Kelly, T., & VanSledright, B. (2005). A journey toward wiser practice in the teaching of

- American history. In E. A. Yeager, & O. L. Davis, Jr. (Eds.), *Wise social studies teaching in an age of high-stakes testing: Essays on classroom practices and possibilities* (pp. 183-202). Greenwich, CT: Information Age.
- Kemmis, S. (1980). Action research in retrospect and prospect. Paper presented to the annual meeting of the Australian Association for Research in Education. Sydney, Australia, 1980.
- Kennedy, M. M. (2005). *Inside teaching: How classroom life undermines reform*. Cambridge, Mass: Harvard University Press.
- Kohn, C. F. (1966). The basic concepts of geography and their development in the classroom. In Fenton, E. (Ed.), *Teaching the new social studies in secondary schools: An inductive approach* (pp. 405-415). New York: Holt, Reinhart, and Winston, Inc.
- Kohn, C. F. (1982). Looking back; working ahead. *Journal of Geography*, 81(2), 44-46.
- Kopec, R. J. (1984). Geography: No Where in 1984, ERIC Report #ED 256630.
- Krathwohl, D. R. (1998). *Methods of educational and social science research: An integrated approach, 2nd ed.* New York: Longman.
- Larkin, J., & Simon, H. (1987). Why a diagram is (sometimes) worth ten thousand words. *Cognitive Science*, 11(1), 6-9.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: University of Cambridge Press.
- Lazerson, M., McLaughlin, J.B., & McPherson, B. (1984). New curriculum, old ideas. *Educational Studies: A Journal in the Foundations of Education*, 2, 299-319.
- Lee, P. J. (2005). Putting principles into practice: Understanding history. In M. S.

- Donovan & J. D. Bransford, (Eds.), *How students learn (pp. 31-77)*. Washington, D.C.: The National Academy Press.
- Leinhardt, G., Stainton, C., & Bausmith, J. (1998). Constructing maps collaboratively. *Journal of Geography*, 97, 19-30.
- Levin, M. (1972). Teaching public issues: Some evaluation data from the Harvard project. *Social Education*, 63, 883-889.
- Lewin, K. (1948). *Resolving social conflicts*. New York: Harper and Brothers.
- Liben, L., & Downs, R. (1989). Understanding maps as symbols: The development of map concepts in children. In H. Reese (Ed.), *Advances in child development and behavior* (pp. 145-201). New York: Academic Press.
- Lloyd, R. (1989). Cognitive maps: Encoding and decoding information. *Annals of the Association of American Geographers*, 79(1), 101-124.
- Lorimer, H. (2003). Telling small stories: Spaces of knowledge and the practice of geography. *Transactions of the Institute of British Geographers, New Series* 28(2), 197-217.
- Lortie, D. (1975). *Schoolteacher: A sociological study*. Chicago, IL: The Chicago University Press.
- Molin, L., & Grubbström, A. (2013). Are teachers and students ready for the new middle school geography syllabus in Sweden? Traditions in geography teaching, current teacher practices, and student achievement. *Norsk Geografisk Tidsskrift - Norwegian Journal Of Geography*, 67(3), 142-147.
- Monmonier, M. (1991). *How to lie with maps*. Chicago: University of Chicago Press.
- Morrill, R. (1985). Some important geographic questions. *Professional Geographer*, 37(3), 263-270.

- Moss, P., & Koziol, S. (1991). Investigating the validity of a locally developed critical thinking test. *Educational Measurement: Issues and Practice*, 91(10), 17-22
- Muehrcke, P. C. (1974). Map reading and abuse. *Journal of Geography*, 73(5), 11-23.
- Muessig, R. H. (1987). An analysis of developments in geographic education. *The Elementary School Journal*, 87(5), 520-530.
- National Assessment of Educational Progress (1990). *The Geography Learning of High-School Seniors*. Washington, D. C.: US Department of Education, Office of Educational Research and Improvement.
- National Assessment of Educational Progress (1994). *Geography Assessment Framework*. Washington, D. C.: National Assessment Governing Board.
- National Board for Professional Teaching Standards. (2012). Retrieved from http://www.nbpts.org/userfiles/file/NBPTS_2012%20Guide_021712.pdf
- National Commission on Excellence in Education (1983). *A nation at risk: The imperative for educational reform*. Washington, D.C.: U.S. Government Printing Office.
- National Council for the Social Studies (1993). Defining the social studies. *The Social Studies Professional*, 114, 7.
- National Research Council (1997). *Rediscovering geography: New relevance for science and society*. Washington, DC: National Academy Press.
- National Research Council (U.S.), Donovan, S., & Bransford, J. (2005). *How students learn: History in the classroom*. Washington, D.C.: National Academies Press.
- Pattison, W. D. (1964). The four traditions of geography, *The Journal of Geography* 63(5), 211-216.

- Pattison, W. D. (1970). The educational purposes of geography. In D. G. Kurfman (Ed.), *Evaluation in geographic education* (pp. 17-26). Belmont, CA: Fearon.
- Piaget, J., & Inhelder, B. (1956). *The child's conception of space*. London: Routledge & Kegan Paul.
- Pigozzi, B. W. (1990). *A view on geography and elementary education* (Elementary Subject Center Series No. 18). East Lansing, MI: Michigan State University, Institute for Research on Teaching.
- Pine, G. J. (1981). Collaborative action research: The integration of research and service. Paper presented at the American Association of college Teachers of Education, Detroit, 1981.
- Presson, C. C. (1982). The development of map-reading skills. *Child Development*, 53, 196-199.
- Ramírez, J. A. (2006). Caminante Si Hay Caminos: Toward a Postcritical ESL Approach for Community Colleges. In M. Spaventa (Ed.), *Perspectives on community college ESL: Pedagogy, programs, curricula, and assessment* (Vol. 1, pp. 23-43). Alexandria, VA: TESOL, Inc.
- Richardson, L., & St. Pierre, E. A. (2008). Writing: A method of inquiry. In N. K. Denzin & Y. S. Lincoln (Eds), *Collecting and interpreting qualitative materials* (pp. 473-499). Thousand Oaks: Sage Publications, Inc.
- Ridd, M. K. (1977). On geography. In Manson, G. A., & Ridd, M. K. (Eds.), *New Perspectives on geographic education: Putting theory into practice* (pp. 13-38). Dubuque, IA: Kendall/Hunt.
- Salter, C. L. (1986). Geography and California's educational reform: One approach to a

- common cause. *Annals of the Association of American Geographers*, 76(1), 5-17.
- Salter, C. L. (1989). *History without geography*. Paper presented at the annual meeting of the National Council for Geographic Education, Hershey, PA.
- Sanford, H. (1982). Perceptual problems. In N. Graves (Ed.), *Geographic teaching* (pp. 83-92). Ann Arbor, MI: UNIPUB.
- Savage, T. V., & Armstrong, D. G. (2004). *Effective teaching in elementary social studies*. Upper Saddle River, N.J: Merrill.
- Scarfe, N. V. (1965). *Geography in school* (Geographic education series, no. 5; Geographic education series, no. 5). Normal Ill.: Publications Center, National Council for Geographic Education, Illinois State University.
- Schlichtmann, H. (1985). Characteristic traits of the semiotic system "Map Symbolism." *The Cartographic Journal*, 22(1), 23-30.
- Seixas, P. (1996). Conceptualizing the growth of historical understanding. In D. Olson & N. Torrance, (Eds.), *The handbook of psychology in education*. Oxford, UK: Blackwell.
- Seixas, P. (2001). Review of research on social studies. In V. Richardson (Ed.), *Handbook of Research on Teaching* (4th ed) (pp. 545-565). Washington, DC: American Educational Research Association.
- Shulman, L. (1986). Paradigms and research programs in the study of teaching: A contemporary perspective. In M.C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed.) (pp. 3-33). New York: Macmillan.
- Sirin, S. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research* 75(3), 417-453.
- Smulyan, L. (1984). Collaborative action research: Historical trends. Paper presented at

- the annual meeting of the American Educational Research Association (New Orleans, LA, April 23-27, 1984).
- Spencer, C., Blades, M., & Morsley, K. (1989). Maps and their use: Symbolic sources of information about the environment. In *The child in the physical environment: The development of spatial knowledge and cognition* (pp. 129-158). New York: Wiley.
- Stoddart, D. R. (1986). *On geography and its history*. Oxford: Basil Blackwell.
- Stoddart, D. R. (1987). To claim the high ground: Geography for the end of the century, *Transactions of the Institute of British Geographers, New Series*, 12(3), 327-336.
- Stoll, L. (1992). Teacher growth in the effective school. In, M. Fullan, & A. Hargreaves (1992). *Teacher Development and Educational Change* (pp.104-122). London: The Falmer Press.
- Stout, M. J. (2004). *Students as historical detectives: The effects of an inquiry teaching approach on middle school students' understanding of historical ideas and concepts* (Unpublished doctoral dissertation). University of Maryland, College Park.
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. London: Sage.
- Tuason, J. A. (1987). Reconciling the unity and diversity of geography. *Journal of Geography*, 86(5), 190-193.
- Tyack, D., & Tobin, W. (1994). The “grammar” of schooling: Why has it been so hard to change? *American Educational Research Journal*, 31(3), 453-479.
- Tyner, J. A. (1987). Interactions of culture and cartography. *The History Teacher*, 20(4), 455-464.

- Tversky, B. (1981). Distortions in memory for maps. *Cognitive Psychology*, 13, 407-433.
- Uttal, D. H. 2000. Seeing the big picture: Map use and the development of spatial cognition. *Developmental Science* 3(3), 247-286.
- Valli, L. (1997). Listening to other voices: A description of teacher reflection in the United States. *Peabody Journal of Education*, 72(1), 67-88.
- VanSledright, B. (1996). Closing the gap between school and disciplinary history? historian as high school teacher. *Advances in Research on Teaching*, 6, 257-289.
- VanSledright, B. (2004). What does it mean to think historically and how do you teach it? *Social Education*, 68, 230-233.
- VanSledright, B., & James, J.H. (2002). Constructing ideas about history in the classroom: The influence of competing forces on pedagogical decision making. In J. Brophy (Ed.), *Advances in research on teaching*, Vol. 9 (pp. 263-299). Stamford, CT. JAI.
- VanSledright, B., & Limon, M (2006). Learning and teaching social studies: A review of cognitive research in history and geography. In P. Alexander & P. Winne (Eds.), *Handbook of educational psychology*, (2nd Ed.) (pp.). Lawrence Erlbaum Associates, Inc.
- VanSledright, B. A., & James, J. H. (2002). Constructing ideas about history in the classroom: The influence of competing forces on pedagogical decision making. *Advances in research on teaching*, 9, 263-298.
- VanSledright, B., & James, J.H. (2002). Constructing ideas about history in the classroom: The influence of competing forces on pedagogical decision making. In J. Brophy (Ed.), *Advances in Research on Teaching*, Vol. 9 (pp. 263-299). Stamford (CT). JAI Press.

- VanSledright, B. (2011). *The challenge of rethinking history education*. New York: Routledge.
- Vosniado, S., & Brewer, W. (1992). Mental models of the earth: A study of conceptual change in childhood. *Cognitive Psychology*, 24, 535-585.
- Vuicich, G., & Stoltman, J. (1975). *Geography in elementary and secondary education. Tradition to opportunity* (Report No. SO 007 803). Boulder, CO: ERIC Clearinghouse for Social Studies/Science Education and Social Science Education Consortium. (ERIC Document Reproduction Service No. ED 097 243)
- Vuicich, G., Stoltman, J., & Boehm, R. (1988). The fundamental skills of geography. In S. J. Natoli (Ed.), *Strengthening geography in the social studies* (pp. 72-92).
- Wineburg, S. S. (1991). On the reading of historical texts: Notes on the breach between school and academy. *American Educational Research Journal*, 28(3), 495-519.
- Winn, W. D. (1991). Learning from maps and diagrams. *Educational Psychology Review*, 3(3), 211-247.
- Winn, W. D., & Sutherland, S. W. (1989). Factors influencing the recall of elements in maps and diagrams and the strategies used to encode them. *Journal Of Educational Psychology*, 81(1), 33-39.
- Wolk, S. (2003). Hearts and minds. *Educational Leadership*, 61(1), 14-18.
- Yeager, E. A. (2005). The “wisdom of practice” in the challenging context of standards and high-stakes testing. In E. A. Yeager, & O. L. Davis, Jr. (Eds.), *Wise social studies teaching in an age of high-stakes testing: Essays on classroom practices and possibilities* (pp. 1-9). Greenwich, CT: Information Age Publishing
- Yogev, S., & Yogev, A. (2006). Teacher educators as researchers: A profile of research in Israeli teacher colleges versus university departments of education.

Teaching & Teacher Education: an International Journal of Research and Studies, 22, 1, 32-41.

Zeichner, K., & Noffke, S. (2001). Practitioner research. In V. Richardson (Ed.), *Handbook of research on teaching* (4th ed.), (pp. 298-330). New York: Macmillan.