

APPENDIX A  
**Instrumentation**  
*End-of-the-semester Article Exercise*

**Begin re-reading the short scientific article you chose at the start of the semester.**

1) Diet and Nutrition

Slimming for slackers

01 October 2005

NewScientist.com news service

Bijal Trivedi

<http://www.newscientist.com/channel/being-human/mg18825191.900-slimming-for-slackers.html>

2) Health and Disease

Confusion in the joints: If the immune system becomes confused, it can turn against the body's own tissues, causing destructive diseases such as rheumatoid arthritis. Are bacteria to blame?

04 May 1991

New Scientist

Julie Clayton

<http://www.newscientist.com/article/mg13017675.700-confusion-in-the-joints-if-the-immune-system-becomesconfused-it-can-turn-against-the-bodys-own-tissues-causing-destructivediseases-such-as-rheumatoid-arthritis-are-bacteria-to-blame.html>

3) DNA / Genetics

Transgene escape! - but no one has called out the guards

By Doug Gurian-Sherman of the Centre for Food Safety

04 February 2007

The Bioscience Resource Project

<http://www.bioscienceresource.org/commentaries/article.php?id=7>

4) Your Environment

In microbe, vast power for biofuel

By Steven Mufson

18 October 2007; Page D01

The Washington Post

<http://www.washingtonpost.com/wp-dyn/content/article/2007/10/17/AR2007101702216.html>

After carefully re-reading the article you chose in February, write 1000-1200 words to address the following points including if your initial response has changed or remained the same.

Start by summarizing the article e.g. what is the science issue/question that is being addressed? Then...

1. Describe the author's perspective(s). Is there more than one point of view presented?
2. How are the various perspective(s) supported?
3. Are data used to support the perspective(s)? If so, describe the data and how they are used?
4. How might societal factors have influenced the perspective(s)? Explain.
5. What is/are the conclusion(s) of the article, and how accepted are they among the scientific community?
6. Do you agree with one or more of the perspectives, if so which one and why? If not also explain why not.

\*Questions taken from Sadler, Chambers, and Zeidler (2004).

Sadler, T. D., Chambers, F. W., & Zeidler, D. L. (2004). Student conceptualizations of the nature of science in response to a socioscientific issue. *International Journal of Science Education*, 26(4), 387-409.

*Anonymous End-of-the-semester Evaluation on Laboratory Experience Instrument*

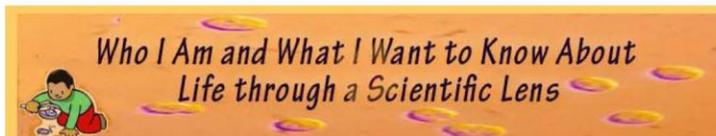
Question 1	I am more confident in my ability to read scientific information.			
strongly agree	agree	somewhat agree	disagree	strongly disagree
Question 2	Explain your response above.			
Question 3	I am more confident in my ability to find information about popular scientific issues.			
strongly agree	agree	somewhat agree	disagree	strongly disagree
Question 4	Explain your response above.			
Question 5	I am more confident in my ability to discuss popular scientific issues.			
strongly agree	agree	somewhat agree	disagree	strongly disagree
Question 6	Explain your response above.			
Question 7	The individual project helped me to learn more about how science relates to my life.			
strongly agree	agree	somewhat agree	disagree	strongly disagree
Question 8	Explain your response above.			
Question 9	The individual project engaged my interest.			
strongly agree	agree	somewhat agree	disagree	strongly disagree
Question 10	Explain your response above.			
Question 11	The group project helped me to learn more about how science relates to my life.			
strongly agree	agree	somewhat agree	disagree	strongly disagree
Question 12	Explain your response above.			
Question 13	The group project engaged my interest.			
strongly agree	agree	somewhat agree	disagree	strongly disagree
Question 14	Explain your response above.			
Question 15	What laboratory activity did you learn the most in?			
Question 16	Why?			
Question 17	What laboratory activity did you enjoy the most?			
Question 18	Why?			
Question 19	The laboratory activities increased my interest in science.			
Question 20	Explain your response above using a specific example.			
Question 21	What laboratory activity did you enjoy the least?			
Question 22	Why?			
Question 23	This course gave my opportunities to reflect upon my own values and belief about popular scientific issues.			
strongly agree	agree	somewhat agree	disagree	strongly disagree
Question 24	Explain your response above.			
Question 25	Would you recommend this class to others?			
strongly agree	agree	somewhat agree	disagree	strongly disagree
Question 26	Why or why not?			

*Student Lab Quiz*

This lab quiz is to test your understanding of what it means to look at life through a scientific lens.

We have talked about how scientific knowledge distinguishes itself from other ways of knowing through its empirical standards, logical arguments, skepticism, and subjectivity to change as new evidence becomes available. We have also discussed the human endeavor of science, which encompasses the value peer review, truthful reporting about the methods and outcomes of investigations, as well as being influence by society, culture, and personal beliefs. Based upon **what you have learned in this course** respond to the following questions:

1. Explain whether the scientific process is linear or circular? Justify your answer with a specific example.
2. In what ways is scientific knowledge different from other ways of knowing?
3. Discuss the relationships/connections of science and human endeavors?

Student Journal Instrument

I come from a family...  
 My culture plays (a role or no role) in...  
 I am aspiring to be (or I am not sure what I am aspiring to be but I am interested in)...  
 I have always found science to be... because...  
 I have an interest in what scientists know about (with relationship to microbes)...  
 This is relevant to my life because...



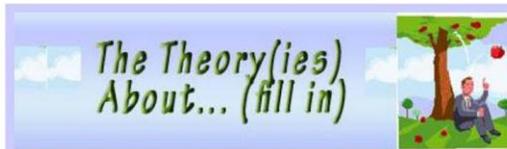
In looking back at my initial scientific interest I realize...  
 I have learned... about my initial scientific interest  
 I still have questions about...  
 My initial opinion about this topic was...  
 After understanding more about... I find myself (agreeing or disagreeing) with my initial beliefs because...

Individual Project Instrument



Define a question / problem to address (3pts)...

This is your testable question you want to know more about. This question must relate to microbes and some phenomena that you find interesting. This question must not have too many variables (only one or two underlying causes).



Define the current **scientific theory (theories)** surrounding this topic of interest (3pts)...

Theories and facts are not the same. Theories describe, explain, or model observable physical phenomena (facts). Theories have the characteristics of being tentative and subject to corrections, but are not just opinions or personal beliefs. Theories are validated by their ability to predict physical events; where as opinions or beliefs need not fit this criterion.



Summarize / make conclusions about your assimilated knowledge (3pts)

What stance do you take and



Discuss the current knowledge = facts / physical phenomena (3pts)...

Facts are observable physical phenomena, objective, and verifiable by multiple observers.



Describe the opinions and beliefs that surround the unknown variables of your question (3pts)...

Describe two alternative views about your identified question. These are peoples' opinions or beliefs about the interpretation of the observable phenomena



References... you will be required to have several references to get any research project points

Group Project Instrument

# Microbes & Society Group Project on



## Our Question

### Our Question

Here you need to describe the "proposed question" that is the focus of your project



## Why it is important...

### Why it is important

Here you need to explain why this is an important/relevant question

## Background Information

Background Information including knowledge = facts / physical phenomena



## Our Answer

### Your Answer to the Proposed Question

In this section briefly describe/explain your answer to the topic question including:

1. a clear indication of your position on the question
2. support for your position
3. alternative points of view and any limitations



## Additional Resources

### Additional Resources

Here provide a list of resource for individuals who would like to further explore the proposed question.



## We Would Teach This Material

### How I would Teach this Material

In this section do the following:

Describe which upper elementary to high school grade (e.g. grades 5-10) that your learning exercise / experiment material have been developed for.

Explain or describe how you would address each of 5-Es components:

- . Engagement
- . Exploration
- . Explanation
- . Extension
- . Evaluation

## References...

### References

Cite your references here and throughout your poster.