

Integration of EndNote Online in Information Literacy Instruction Designed for Small and Large Chemistry Courses

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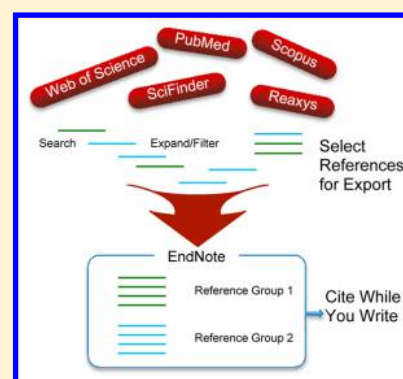
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S Supporting Information

ABSTRACT: The blended model for information literacy instruction described in this article introduces students not only to efficient techniques for finding scientific literature and properties of chemical compounds, but also to managing this information with a bibliographic management program (EndNote Online). The model blends face-to-face instruction with online tutorials posted on a LibGuide page prepared for each course. A graded online assignment designed in SurveyMonkey was used to assess student learning. During the instruction, students learned to find literature in Google Scholar, PubMed, Scopus, SciFinder, and Web of Science. They also searched for properties of chemical compounds in ChemSpider, PubChem, Reaxys, and SciFinder using a chemical name, molecular formula, CAS Registry Number, or by drawing a molecular structure. The results from the assignments showed that students learned how to find literature and chemical property information efficiently and use a bibliographic management program to store, organize, share, and cite references. This article presents the implementation of the model in two small (40–60 students) and one large (380–460 students) undergraduate chemistry courses. The information literacy instruction described in this article was carried out in more than 20 undergraduate and graduate courses at the University of Maryland College Park. It provided more than 5000 students with versatile skills that they can use throughout their college education and even later in their professional life. The design of the model and its implementation was a result of a close collaboration between the chemistry librarian and the course instructors.

KEYWORDS: First-Year Undergraduate/General, Second-Year Undergraduate, Upper-Division Undergraduate, Cheminformatics, Curriculum, Computer-Based Learning, Hands-On Learning/Manipulatives, Internet/Web-Based Learning



INTRODUCTION

With science becoming more interdisciplinary and complex and the volume of publications growing so quickly, it is becoming increasingly difficult for students and researchers to find and manage scientific information efficiently. Management of scientific information includes how students and researchers perform a search, narrow down results, export references to a bibliographic management program, and insert citations in a Word document. Teaching students how to find chemical information and manage scientific literature more efficiently could help them use such transferable skills not only in a particular course but throughout their college education and later in their professional life.¹

Information literacy instruction has been a major responsibility of chemistry librarians for decades and many articles describe how such programs were introduced in the chemistry curriculum.^{2–8} Two recent books, “Chemical Information for Chemists: A Primer”⁹ and “The Future of the History of Chemical Information”¹⁰ include chapters written by experts in chemical information who share their vision of the field and its future. They also provide practical information, which can be very useful to anyone who teaches chemical information or wants to learn more about the chemistry resources.

A new book, “Managing Scientific Information and Research Data,”¹¹ by one of the authors of this article looks at science information literacy from a broader perspective and in the context of the new technologies and the higher expectations from education. It discusses the new roles that academic librarians could play in supporting education and research in their institutions and how the new areas of eScience, data literacy, data management, and Electronic Laboratory Notebooks (ELNs) can become essential elements of information literacy instruction in the future.

Students are often uncertain which resources they should use to find scientific information. During the instruction, students should be provided with information and comparisons of the resources^{12–14} covered in class, so that they can choose the most suitable one. Many resources now are integrated on platforms that allow searching two or more specialized databases at the same time from one access point.¹⁴

Chemical information instruction conducted in undergraduate courses usually involves educating students about

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the general library resources and how to find scientific literature and chemical property information. College students, though, have to write papers and cite literature, which requires using a bibliographic management program to do it efficiently. While the libraries offer workshops on such tools, these events are detached from the curriculum and rarely attract undergraduate students. Bibliographic management programs are sometimes mentioned during library instruction sessions, but this is not enough for students to learn how to use them in practice. There are almost no reports in the literature on incorporating a bibliographic management program as part of chemical information instruction. One article described the incorporation of the reference management program Zotero into a chemical literature course for the purpose of developing proper citation habits in students.¹⁵

In the past few years, new models of instruction such as flipped and blended formats have been adopted by instructors.¹⁶ The model presented in this article uses a blended format that includes both a face-to-face instruction and online materials and resources. Its main concept is based on the understanding that students need to be introduced to strategies and tools that will allow them to not only find and filter scientific information but also organize and manage this information more efficiently. This article presents results from the implementation of the model in two small (50–60 students) and one large (380–460 students) undergraduate chemistry courses. The close collaboration between a librarian and course instructors was essential for the success of this model.

■ GENERAL DESIGN

In this model, a bibliographic management program (EndNote Online) is positioned as a central component of the information literacy instruction. Students learn how to use the basic features of this tool in “real life” situations. They perform searches in the literature databases, filter results to make them more manageable, export citations to their EndNote libraries, organize references in groups, create bibliographies, and insert citations in papers they are writing. Finding properties of chemical compounds by using a chemical name, molecular formula, CAS Registry Number, or by drawing a structure is another integral area covered by the instruction.

The model was developed and implemented in more than 20 undergraduate and four graduate courses, as well as in honors and Professional Writing Program courses. The number of students in all courses where this model was implemented was more than 5000.

Assessment of student learning and obtaining feedback from students are important components of an instruction,^{17–19} as they help improve the instruction design. Since most of the students were using the resources for the first time, it was important to allow them to practice the new skills through an online assignment, in which the questions included detailed instructions. The level of sophistication of the instruction and the assignment was the same for the three courses, because the students in these courses had not received information literacy instruction before. The questions on the assignment were tailored to the specific course.

The objectives for the instruction model reported and the skills that students were expected to learn are outlined in Boxes 1 and 2, respectively.

Box 1. Objectives for the Information Literacy Instruction Model

Design a model for information literacy instruction that reflects student needs, satisfies the educational requirements of the discipline, and can be adapted to different courses.

Gradually implement the model in courses at all levels.

Generate interest and enthusiasm in students for learning and using the science resources.

Assess student learning and feedback and modify the model, as needed.

Aim at improving student overall standing and retention.

Box 2. Skills That Students Learned from the Instruction

Collect, organize, share, and manage citations with a bibliographic management tool.

Find, filter, and manage scientific literature.

Compare resources and select the best option for finding literature.

Insert citations in Word documents.

Distinguish scientific documents (research paper vs review article).

■ ELEMENTS OF THE BLENDED INFORMATION LITERACY MODEL

The blended information literacy information model includes face-to-face instruction sessions, online resources, and assessment of student learning. Before coming to class, students had to create accounts for SciFinder and EndNote Online.

Face-to-Face Instruction Sessions

The face-to-face instruction was performed during regular lab periods for 50 min. The sessions for the small courses (CHEM 277 and CHEM 425) were conducted by the librarian (Svetla Baykoucheva), while the sessions for the individual sections of the large course (CHEM 272) were taught by TAs who were trained by her.

Online Components

LibGuide. A LibGuide²⁰ was used for the instruction to provide access to resources, handouts and other instructional materials, as well as to the online assignment. Individual LibGuide pages were created for each course and can be viewed under the tab “Course materials”. The LibGuide course pages and the instructional materials were updated for each semester.

Handouts. Handouts were created for each course to provide detailed instructions on how to use the resources. They were also very helpful to students when doing the assignments because they were based on specific examples relevant to the course and preselected by the instructor. A sample handout is included in the [Supporting Information](#).

Online tutorials helped students understand how to use the resources.

Online assignments are discussed under [Assessment of Student Learning](#). Examples of assignment questions are included on pp 3–12 in the [Supporting Information](#).

Assessment of Student Learning

The assessment of student learning and evaluation of the feedback from students are important parts of the instruction design. Students had to complete an online assignment in SurveyMonkey. A link to the assignment was provided on the

course LibGuide page.²⁰ The results from the assignments were exported to Excel spreadsheets and were analyzed on an individual and group level. The assignment was graded and the grade was included in the total grade of the student for the course.

The assignments included questions related to general search strategies, features of EndNote, and specific questions that required students to search the databases and find the correct answers. The questions fall into the following main categories:

- General questions (the differences between a research article and a review; basic principles for narrowing down search results; using wild cards (for example, an asterisk))
- Basic features of EndNote Online
- Finding and filtering literature
- Finding property information using a chemical name, CAS Registry Number, or drawing a molecular structure.

Some of the questions required finding information in one database and using it to search for other information in another database. Other questions allowed students to apply skills for searching the databases and using EndNote.

The instruction and the assignment also included elements that were specific to the course and the needs of students in preparing reports and doing lab work. Examples of the questions used in the online assignments are included in the [Supporting Information](#). The main goals of the assignment are presented in [Box 3](#).

Box 3. Assignment Goals

Train students, step-by-step, to perform complex searches for finding literature and property information in different databases, and practice the strategies they were shown in class at their own pace.

Assess student learning outcomes (assignment grades were included in the final course grades of the students).

Assess students' ability to successfully follow complex instructions and force them to perform the searches.

Obtain feedback from students about the instruction, the assignment, the instruction format, and the usefulness of the resources.

Assess students' skills for using a bibliographic management program (EndNote Online).

Resources Covered in the Instruction

The resources included in the instruction (shown in [Box 4](#)) were the most important science databases that allowed finding literature and property information. They included both free (Google Scholar, PubChem, PubMed, and ChemSpider) and subscription-based databases (Merck Index Online, Reaxys, SciFinder, Scopus, and Web of Science).

EndNote Online (www.myendnoteweb.com) was used as an example of a bibliographic management program,²¹ but other similar tools (e.g., Mendeley, Papers, RefWorks, Zotero, and Readcube) were also mentioned during the instruction. More detailed evaluation and comparison of these programs is available elsewhere.^{22,23} The training on EndNote allowed students to quickly learn how to use the program. After getting familiar with its basic features, students performed searches in each of the databases, narrowed down results by different criteria and categories, and exported selected references to their EndNote libraries.

Box 4. Resources Covered in the Instruction

EndNote Online (Bibliographic management tool)

Literature databases:

- Google Scholar (free)
- PubMed (free)
- SciFinder (paid subscription)
- Scopus (paid subscription)
- Web of Science (paid subscription)

Chemical property databases:

- ChemSpider (free)
- PubChem (free)
- Reaxys (paid subscription)
- SciFinder (paid subscription)
- Merck Index Online (paid subscription)

PubMed (www.ncbi.nlm.nih.gov/pubmed) (from the U.S. National Library of Medicine of the National Institutes of Health) is a free biomedical resource.¹³ It is based on the MEDLINE database.^{12,14} Students had to do a search using the advanced (MeSH indexing) features of PubMed, to find only articles that were specifically devoted to the topic they were searching literature for.

Reaxys (www.reaxys.com) (from Reed Elsevier) is a large database that incorporates several databases for chemical property information, as well as a patent database.²⁴ It provides significantly more information on properties of chemical compounds than PubChem and ChemSpider, as it combines several large chemistry databases. While SciFinder also has these capabilities, structure searching has been demonstrated to students only in Reaxys.

SciFinder (www.cas.org/products/scifinder) allows searching for literature, patents, dissertations, conference proceedings, and properties of chemical compounds. It searches simultaneously two large literature databases (the Chemical Abstracts database (CAplus) and MEDLINE).¹⁴ It also provides access to the Registry File, the largest chemical substance database with property information.

Scopus (www.scopus.com) (Elsevier) is a very large database¹² that was introduced in this model in the fall semester of 2014.

Web of Science (<http://webofknowledge.com/WOS>) (Thomson Reuters) is a large interdisciplinary database.¹² It is based on the Science Citation Index and is currently part of Web of Knowledge. This database has been used in all courses and during all semesters. Exporting references from Web of Science to EndNote is very easy, because these resources are provided by the same vendor and work well together. Narrowing down results by publication year was emphasized for Web of Science, because, by default, the years are arranged by the number of documents published each year, rather than chronologically. To have the years arranged chronologically, users have to select the "Alphabetical" option.

Details about features of the databases covered in the instruction are included on pp 1–2 in the [Supporting Information](#).

■ IMPLEMENTATION OF THE MODEL

In this paper, we describe the implementation of the information literacy instruction model in three chemistry undergraduate courses: CHEM 272, CHEM 277, and CHEM 425 ([Table 1](#)). [Table 2](#) shows the sequence of laboratory chemistry courses at the University of Maryland College Park.

Table 1. List of Courses Discussed in the Article

Course	Course Size	Semesters	Sections	Students
CHEM 272 ^a	380–460	3	20–22	1,379
CHEM 277 ^b	40–50	7	2	329
CHEM 425 ^c	50	10	5	500
All students				2,750

^aGeneral Bioanalytical Chemistry Laboratory (for nonmajors).

^bFundamentals of Analytical and Bioanalytical Chemistry Laboratory (chemistry and biochemistry majors). ^cInstrumental Methods of Analysis.

Table 2. Sequence of Laboratory Chemistry Courses at the University of Maryland College Park

Course Number (nonmajors/ majors)	Course Level
CHEM 132/177	General Chemistry Laboratory I
CHEM 232/237	Organic Chemistry Laboratory I
CHEM 242/247	Organic Chemistry Laboratory II
CHEM 272/277 ^a	General Bioanalytical Chemistry Laboratory
CHEM 425 ^a	Instrumental Methods

^aCourses discussed in this paper.

CHEM 272/277 are General Chemistry II Laboratories offered in the fourth semester of the introductory chemistry sequence. This is the final course before upper level chemistry courses in the major (CHEM 425) and the last chemistry course for nonmajors unless students opt to take biochemistry. The CHEM 272 course is for nonmajors and has a large enrollment of pre-health students. CHEM 277 is for chemistry and biochemistry majors. These courses are unique in that many of the experiments have a bioanalytical focus. Students attend one 50 min lecture each week to prepare for the upcoming experiment in addition to the 3-h lab period (CHEM 277 has two 3-h meetings a week). Each week students are asked to complete a post-lab report that requires presentation and analysis of data collected and answering questions relating to theory or concepts involved in the experiment. Many of the exercises in CHEM 272 and CHEM 277 involve finding scientific information such as physical constants of compounds (density, pK_a) or relevant literature to learn more about a particular technique (spectrophotometry, titrations).

CHEM 425 is an instrumental methods of analysis course, a senior level course required by all chemistry and biochemistry majors. It is a four-credit course and fulfils the requirement for the analytical chemistry part of the curriculum. It has both lecture and laboratory components. In the laboratory, students have on average 6–12 h of hands-on experience operating research-grade instrumentation.

Students taking this course have to complete laboratory procedures described in a laboratory manual, but they are also encouraged to come up with original experimental protocols as the final course assignment. In both cases, student work success is directly related to their familiarity with physical and chemical properties of chemicals and the instrumentation setup. In that regard, student ability to pool together literature resources and be able to cite references becomes of critical importance.

The lab portion of the course involved writing 10–11 comprehensive lab reports that were based on the data collected during 6 h of lab work. Part of the lab report was interpretation of the results from a theoretical standpoint and required extensive use of literature to compare the results and find plausible explanations.

Finding information on physical and chemical properties of chemical compounds as well as information on limitations of the analytical methods was also important for general understanding of the experimental setup and was needed later to write a comprehensive “Materials & Methods” section of the report.

Face-to-Face Instruction

The librarian (Svetla Baykoucheva) did this instruction for the smaller courses (CHEM 277 and CHEM 425) and graded the assignments. The face-to-face sessions for the large course (CHEM 272), which was divided into 20–22 sections, were conducted by teaching assistants (TAs) who were trained by the librarian how to cover the material and grade the assignments. In the spring semester of 2014, these sessions took place in computer rooms and students did their assignment immediately after the face-to-face instruction session. In the next two semesters, the sessions of the sections were held in lecture rooms where students brought a laptop or tablet to the instruction.

During the first part of the face-to-face instruction, students were introduced to different publication formats (e.g., research paper, review article, conference proceedings) and some basic principles of searching for literature such as expanding a search using a “wild card”, or narrowing down results by time period, document type, and other criteria.

After getting familiar with the basic features of EndNote, students were shown how to perform an online search in PubMed directly from EndNote. This was followed by demonstrating different strategies for performing efficient searches in the literature databases, exporting references to EndNote, organizing and sharing references, creating a bibliography, inserting citations in a Word document, and formatting citations in a particular style.

A major part of the face-to-face instruction was devoted to strategies for finding properties of chemical compounds in several databases by using a chemical name, molecular formula, CAS Registry Number, or by drawing a structure (in Reaxys and SciFinder).

More details about the features of the databases covered in the face-to-face instruction are included on pp 1 and 2 in the [Supporting Information](#).

Grading

The following grading system for the assignments was used (the numbers in parentheses are those of the correct answers): A (9–10), B (8), C (7), and F (<7) [Tables 3–5](#) show the assignment results for the three courses.

Table 3. Distribution of Grades for an Information Literacy Assignment in an Undergraduate Course for Chemistry Nonmajors (CHEM 272) for Three Consecutive Semesters

Course	A	B	C	F	Students ^a
2014 Spring	332	32	5	4	373
2014 Fall	306	55	25	9	395
2015 Spring	311	61	50	9	431

^aMore than 97% of students enrolled in the courses submitted the assignment.

The skills for using EndNote and creating bibliographies were evaluated by including questions in the assignment that required students to perform a search in a database, filter the results, export references to their EndNote libraries, create a bibliography with these references, and copy and paste this

Table 4. Distribution of Grades for an Information Literacy Assignment in an Undergraduate Course for Chemistry Majors (CHEM 277) in 6 Semesters

Course	A	B	C	F	Students ^a
2012 Fall	20	3	0	0	23
2013 Spring	28	11	0	4	43
2013 Fall	34	11	1	6	51
2014 Spring	18	5	1	1	25
2014 Fall	43	3	0	0	46
2015 Spring	19	3	0	1	23

^aAll students enrolled in the courses submitted the assignment.

Table 5. Distribution of Grades for an Information Literacy Assignment in an Undergraduate Chemistry Course (CHEM 425)

Course	A	B	C	F	Students ^a
2011 Fall	24	8	9	3	44
2013 Fall	37	4	2	0	43
2014 Spring	39	6	3	1	49

^aAll students enrolled in the courses submitted the assignment.

bibliography in a box in the online assignment. A screen capture from SurveyMonkey (Figure 1) shows that 366 students in CHEM 272 have responded to such question and have created a bibliography. Examples of assignment questions are included in the Supporting Information.

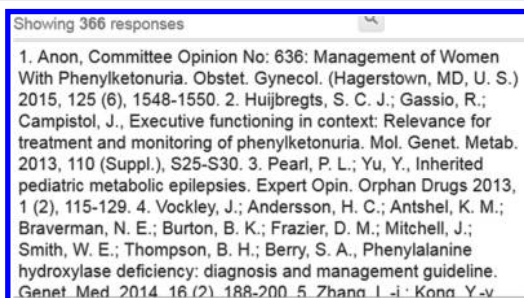


Figure 1. Screen capture from an assignment in SurveyMonkey showing responses to a question which required performing searches in SciFinder, filtering the search results, exporting references to EndNote Online, and using the latter to create a bibliography with these references. Students had to copy and paste the bibliography they have created in a box in the online assignment. The screen capture is from an assignment for chemistry course CHEM 272. It shows that 366 students have responded to this question. Reproduced with permission from SurveyMonkey.

Feedback from Students

Some of the questions on the assignment were used to obtain feedback from students about the instruction, the assignment, and to rank the resources. For example, students were asked to rank the resources covered during the instruction, by their usefulness. Reaxys and SciFinder were ranked as the most useful ones by many students. A significant number of students chose EndNote as the most useful resource. Learning how to draw chemical structures to find properties of chemical compounds was mentioned by many students as the most important information they had learned from the instruction.

Examples of feedback about the instruction and the assignment are shown in Figure 2.

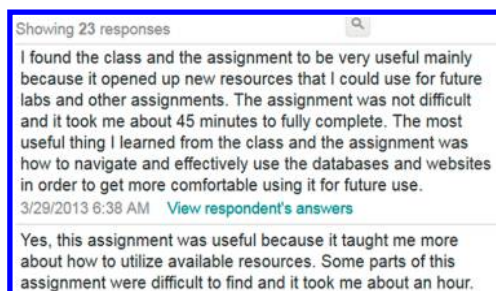


Figure 2. Screen capture from an assignment in SurveyMonkey showing responses from students enrolled in CHEM 277 during the 2015 spring semester to a question about the instruction and the assignment. Reproduced with permission from SurveyMonkey.

More examples of student feedback are included in the Supporting Information.

DISCUSSION

In most cases reported in the literature, information literacy instruction programs introduced in chemistry courses cover only one database, SciFinder.²⁵⁻²⁷ The instruction models reported in the literature, even those designed for organic chemistry courses,²⁸ often do not include structure searching, which would have been very useful to students in such courses. Our model trained students on a much broader range of skills, including structure searching, than the instruction models reported in the literature before.

On the basis of feedback, learning how to draw molecular structures and find property information in SciFinder and Reaxys was of highest importance to students. EndNote was also ranked as one of the most useful programs. Students considered the skills they have learned to be very useful for their success not only in the particular course, but also in other science courses they were currently taking or will be taking in the future. They found them also essential when performing research.

The model presented in this article was first introduced in a senior chemistry course (CHEM 425). Students in that course had not been provided with such instruction earlier and their information literacy skills were quite basic. Many students who were involved in this training expressed regrets that they had not been exposed to these resources much earlier in their college education. After the model was implemented in the earlier courses CHEM 272 and CHEM 277, most of the students taking CHEM 425 were already familiar with most of the resources. Then, the content of the instruction for CHEM 425 was adjusted to reflect the competency level of the students and the specific requirements for the course.

The benefits of the instruction for students were multifold. The hands-on experience was very useful for students, because they were more engaged in the lecture and could perform the searches alongside the live demonstration to be sure they were able to use the databases. Another benefit of the face-to-face instruction was that the students could ask questions of the TA or the librarian. Students were also advised to contact the librarian while writing their papers, and many students chose to use this opportunity.

Because of the complexity of chemical information,²⁹ instruction in a chemistry course, especially in a large one, presents significant challenges.³⁰ The most important factor for the success of our model was the collaboration between the course instructors and the librarian who worked closely

together in designing and planning the content, logistics, and assessment elements of the instruction. Because of the large number of students who were accessing the databases and EndNote at the same time (all face-to-face sessions were performed in 1 week at the beginning of the semester), the librarian and the instructors had to resolve together any problems. The instructors valued the collaboration with the librarian and relied on her for selection of the resources and how these resources will be introduced to students.

One of the challenges that many academic librarians experience is convincing teaching faculty to include information literacy instruction in their courses. Demonstrating that information literacy instruction will benefit students is the most important factor in changing this attitude. Expanding information literacy to include bibliographic management and other new areas of interest to students and researchers might require reskilling of librarians³¹ who need to have working knowledge of these technologies. It also inevitably challenges the current concept of science information literacy and how librarians can contribute to it.²³

Our future plans are to create a more coordinated program for gradually introducing students in different science courses to more and more sophisticated tools and approaches for finding and managing scientific information and avoid duplication of effort and repetition of content.

■ ASSOCIATED CONTENT

■ Supporting Information

The Supporting Information is available on the ACS Publications website at DOI: [10.1021/acs.jchemed.5b00515](https://doi.org/10.1021/acs.jchemed.5b00515).

Features of databases covered in the instruction, examples of assignment questions for CHEM 272 and CHEM 277, and a sample handout for CHEM 272 and CHEM 277 (PDF, DOCX)

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Notes

The authors declare no competing financial interest.

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(31) Brewerton, A. Re-Skilling for Research: Investigating the Needs of Researchers and How Library Staff Can Best Support Them. *New Rev. Acad. Libr.* **2012**, *18* (1), 96–110.

Supporting information for the paper

Integration of EndNote Online in Information Literacy Instruction Designed for Small and Large Chemistry Courses

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Sample handout for CHEM 272/CHEM 277	13

FEATURES OF DATABASES COVERED IN THE INSTRUCTION MODEL

EndNote Online (EN) (www.myendnoteweb.com)

- Comparing different bibliographic management programs.¹
- Downloading the EN browser toolbar and the Plug-in for Microsoft Word
- Searching databases from EN and importing into EN references from databases
- Organizing and managing references
- Sharing references with others
- Creating bibliographies
- Inserting citations in Word documents

ChemSpider (www.chemspider.com)

Finding chemical and physical properties using a chemical name or molecular formula

PubChem (<http://pubchem.ncbi.nlm.nih.gov>)

Finding chemical and physical properties using a chemical name or molecular formula

PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>)

- Searching for journal articles using the advanced (MeSH Indexing) option
- Filtering results by refining them by entering additional keywords (e.g., “adverse effects”), publication year, and document type (e.g., review)
- Exporting selected references from PubMed to EN

Reaxys (www.reaxys.com)

- Finding properties (e.g., melting point, bioactivity/toxicity properties) of chemical substances using a chemical name, CAS Registry Number, or molecular formula
- Drawing a molecular structure and finding properties of the chemical compound(s) corresponding to this structure

SciFinder (www.cas.org)

- Choosing an option for references to be retrieved

After performing the search (for example, on **aspirin and cancer**), users are asked to choose from the following options:

- (1) ... references were found containing "aspirin and cancer" as entered
- (2) ... references were found containing both of the concepts "aspirin" and "cancer"
- (3) ... references were found containing either the concept "aspirin" or the concept "cancer"
- (4) ... references were found containing the concept "aspirin"
- (5) ... references were found containing the concept "cancer"

In the case of the search mentioned above, the terms “aspirin” and “cancer” could have been written in a reverse order, as “cancer and aspirin.” The appropriate option in this case would be option #2, “... references were found containing both of the concepts "aspirin" and "cancer." This option considers the individual words as separate concepts. A concept is broader than a research topic. It allows retrieving documents in which the particular key words might not have even been mentioned, but the indexers have added them to the records of documents, if they are related to the topic. For example, the index term that SciFinder uses for “cancer” is “neoplasm,” which is a broader concept. Another example is when a search on the drug Lipitor is performed. Lipitor is a cholesterol-inhibiting drug. It belongs to the group of statins. Even if a document on Lipitor had not mentioned the word Statins, the indexers will add it to the record of this document. The “concept” feature makes the search more comprehensive, as it takes into account synonyms and other terms that the user and the authors might have not thought about to use to perform the search. SciFinder will help users with relevant answers should they choose the first options.

- Removing duplicates (SciFinder searches simultaneously two large databases, CAPlus, and MEDLINE², which cover some of the same sources.³)
- Refining results by adding more keywords, narrowing down to specific publication year(s), and document type (review article)
- Analyzing results by index term, author, and source title
- Exporting selected references to EN
- Finding properties (e.g., melting point, bioactivity/toxicity properties) of chemical substances using a chemical name, CAS Registry Number, and molecular formula, or by drawing a molecular structure

Scopus (www.scopus.com)²

- Narrowing down results by adding more key words or limiting them by publication year
- Finding journals that have published the highest number of articles on the topic
- Finding authors who have published the highest number of articles on the topic.
- Exporting selected references to EN

Web of Science (WoS) (www.webofknowledge.com)²

- Using a “wild card” such as an asterisk (*) to expand a search
- Refining results by subject areas, adding more key words, limiting search results by document type (for example, review) or to particular publication year(s)
- Exporting references to EN

EXAMPLES OF ASSIGNMENT QUESTIONS AND STUDENT RESPONSES

Assignments were designed in SurveyMonkey. Detailed questions allowed students to practice what they learned during the face-to-face sessions. Some of the questions required students to give feedback about what they thought about the instruction and the assignment. Other questions provided information about student's familiarity with the resources before the instruction. Students had to rank the resources covered during the instruction, based on how useful they could be for their current and future studies and research.

All screen captures are reproduced with permission from SurveyMonkey

General questions on basic strategies for performing searches and refining results

Example 1: Expanding and refining search results (Figure 1).

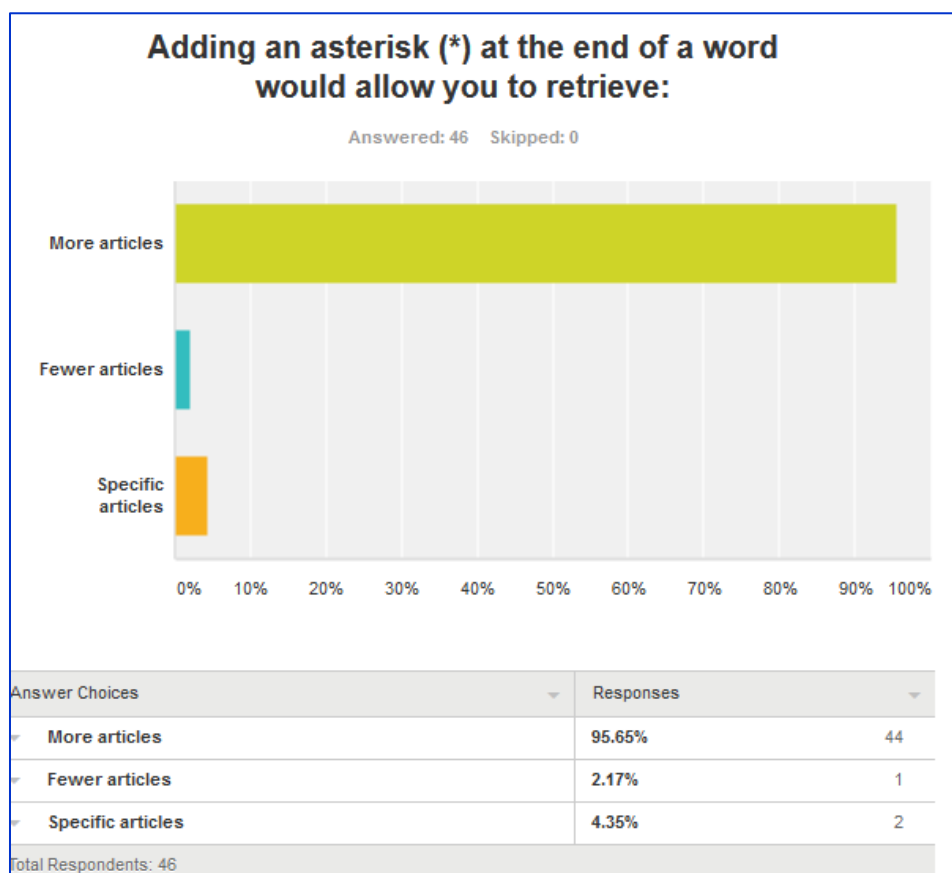


Figure 1. Screen capture from an online assignment in SurveyMonkey showing responses from students in a section of a large chemistry course (CHEM 272) to a question about using a “wild card” such as an asterisk.

Example 2. Strategies for refining search results (Figure 2).

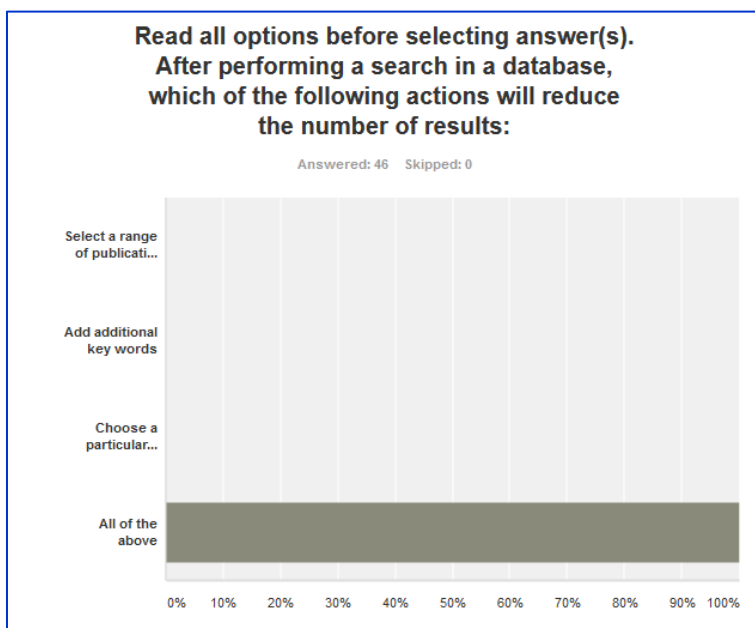


Figure 2. Screen capture from an online assignment in SurveyMonkey showing responses from students in a section of a large chemistry course (CHEM 272) to a question about refining results from a literature search.

Questions related to EndNote Online (EN)

Example 3. Importing references from databases into EndNote Online (Figure 3).

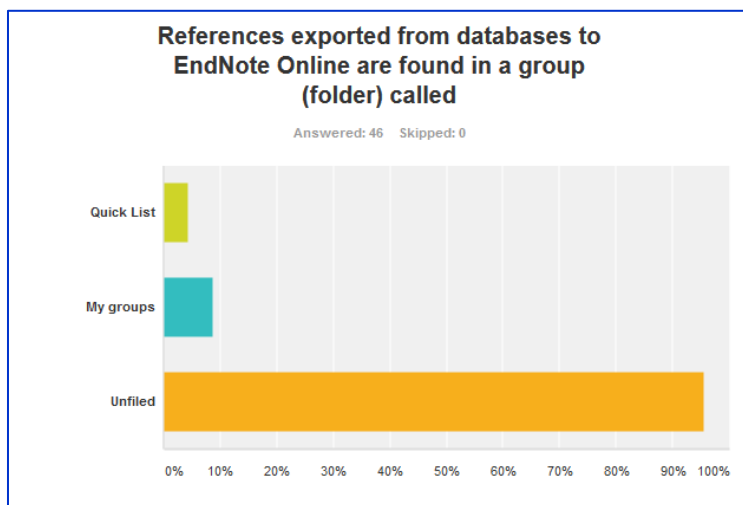


Figure 3. Screen capture from an online assignment in SurveyMonkey showing responses from students enrolled in a chemistry course (CHEM 425) to a question about where references exported directly to databases are found in EndNote Online.

Example 4: Downloading the EndNote Browser Toolbar and the Microsoft Word Plug-In (Cite While You Write, CWYW) (Figure 4).

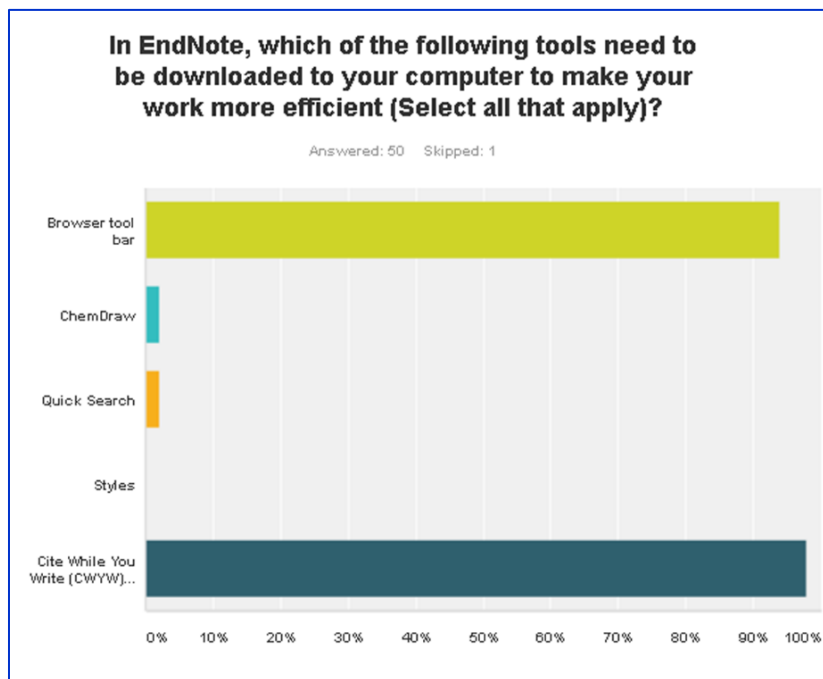


Figure 4. Screen capture from an online assignment in SurveyMonkey showing responses from students enrolled in CHEM 277 to a question (outlines in Example 4) about installing the EndNote Browser Toolbar and the Microsoft Word Plug-in.

Example 5. Exporting references from SciFinder to EndNote Online (EN) and creating a bibliography.

1. Perform a search in SciFinder using the following terms:
phenylketonuria and child
2. Select the following option:
...references were found containing both of the concepts "phenylketonuria" and "child"
3. Refine results by document type, selecting Review
4. Refine results by Publication year to the period from 2005 to 2015
5. Remove duplicates (Tools menu)
6. Select the first 5 references from the results list and export them to your EN library
7. Find the references in the UNFILED group and add them to a new group that you name "Phenylketonuria"
8. Format a bibliography with the references in this group using the ACS Style, as shown in the Handout.
(Hint: (1) Click on Select favorites to add the ACS Style to your favorites and select this style from the pull-down menu next to "Bibliographic style"; (2) Select the group "Phenylketonuria" (for "Bibliography"); (3) RTF ("File format"); (4) Click on "Preview and Print.")
9. Copy the bibliography and paste it in the text box below.

Searching for literature and filtering search results

Example 6. Selecting the ‘concept’ option for references in SciFinder (Figure 5).

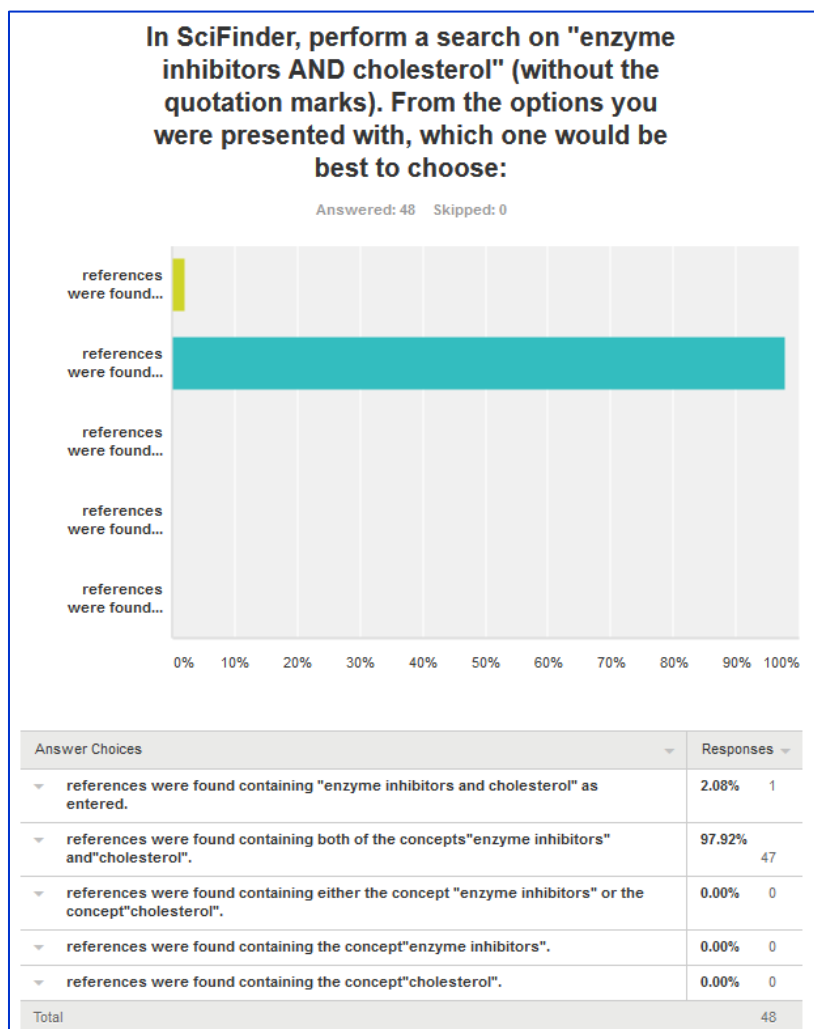


Figure 5. Screen capture from an online assignment in SurveyMonkey showing responses from students in a chemistry course (CHEM 277) to a question about selecting the “concept” option for references in SciFinder.

Example 7. Performing literature searches in SciFinder and refining results by Document Type (Review) and Publication Year.

Perform the following search in SciFinder: diet and phenylketonuria. On the next screen, select the following option:

...references were found containing both of the concepts "diet" and "phenylketonuria."

From the Tools menu, select “Remove duplicates.” Refine your results by adding an additional key word: click on the Refine tab and enter the word “child” in the dialog box. Refine your results to Reviews (Hint: click on the Refine tab, select “Document type” and check the box

next to “Review”) Refine your results by Publication year to the time period from 2000 to 2005. How many reviews were published during that period?

Example 8. Analyzing the search results in SciFinder by index term (Figure 6)

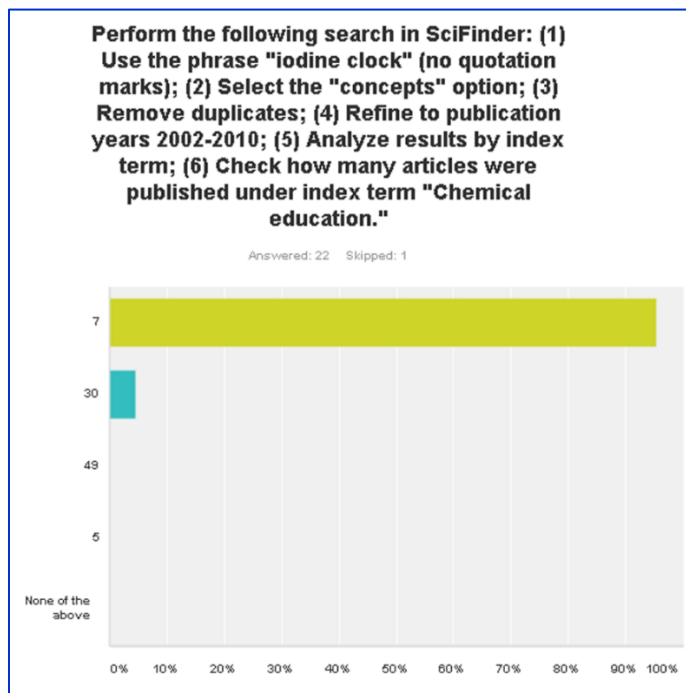


Figure 6. Screen capture from an online assignment in SurveyMonkey showing responses from students in CHEM 277 to a question requiring performing a search in SciFinder, refining the results and analyzing them by index term.

Example 9. Perform a search for literature in PubMed using the *Advanced* feature (MeSH Indexing) (Figure 7).

1. Click on the link for the “Advanced” option
2. Type “enzyme inhibitors” in the first box; select “MeSH Major Topic” from the pull-down menu on the left of this box; click on “Show index list” on the right of the box; double click on “Enzyme inhibitors.”
3. In the second box, type “cholesterol;” from the pull-down menu on the left of this box, select “MeSH Term;” click on “Show index list” on the right of the box; double click on “cholesterol.”
4. Perform the search and limit the results by time period (Hint: click on Custom and select the following time period: 1/1/2009-12/31/2010)
5. Limit results to “Review.” How many review articles were published during this time period?

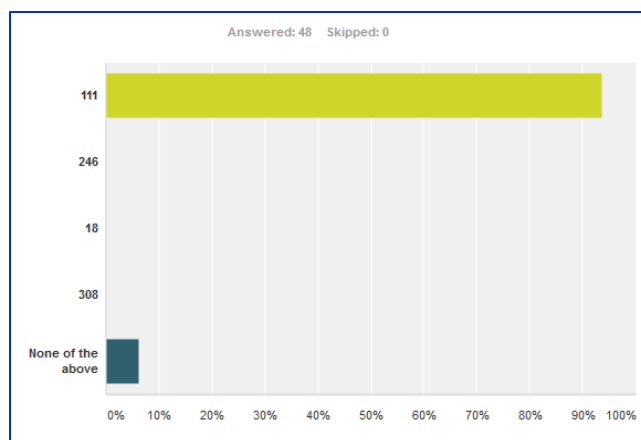


Figure 7. Screen capture from an online assignment, showing responses from students in CHEM 277 to a question (outlined in Example 9) requiring performing an advanced search in PubMed and narrowing down results by Publication Year and Document Type (Review).

Example 10. Searching for literature and filtering results in *Web of Science* (Figure 8).

In Web of Science, type "alcohol dehydrogenase" in the first box. Narrow down your results by entering the word "purification" in the box under "Refine results" and click on the search button next to this box. Refine the results to "Research area" by checking the box next to "Biochemistry and Molecular Biology" and clicking on "Refine." Which organization has published the highest number of articles on this subject?

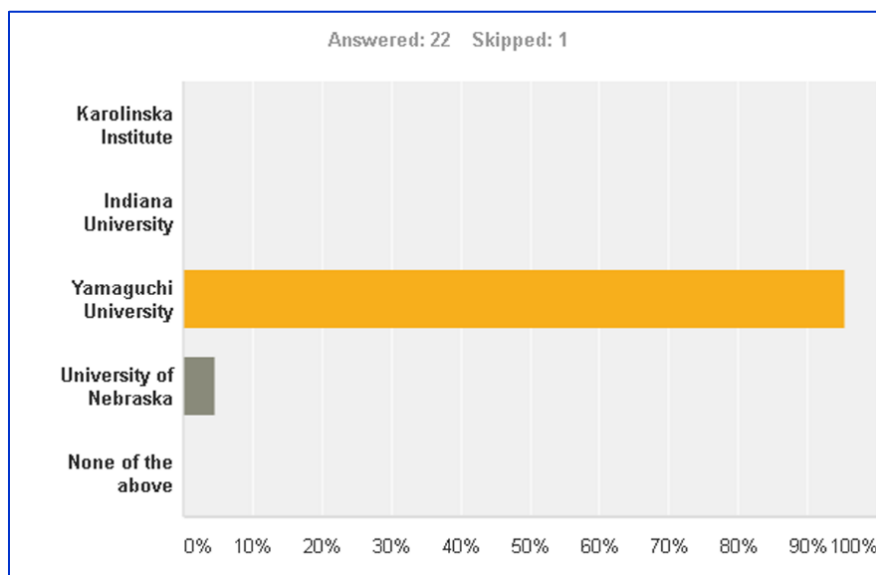


Figure 8. Screen capture from an assignment in SurveyMonkey showing responses from students in CHEM 277 to a question requiring performing a search in Web of Science, refining results by entering additional key words, limiting them to a particular research area, and finding out which institution has published the highest number of documents on this topic.

Example 11. Searching for literature and filtering results in *Scopus* (Figure 9).

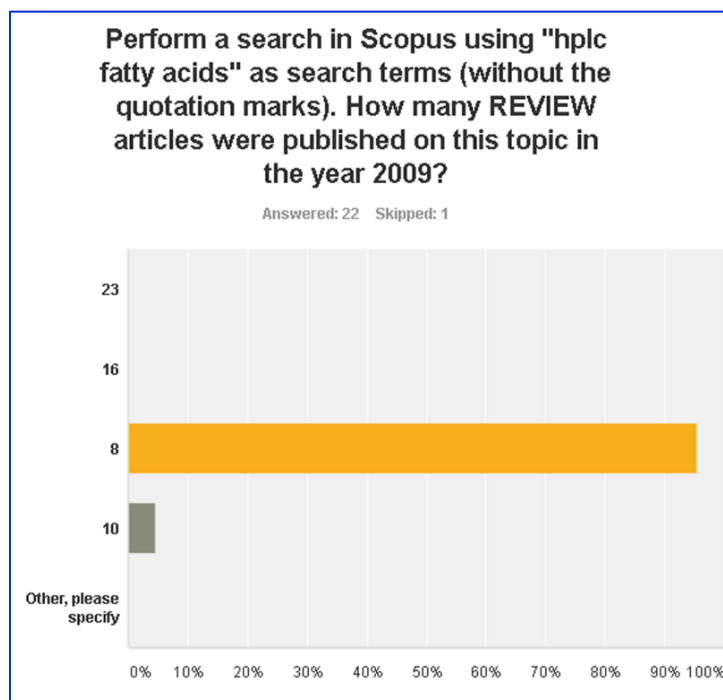


Figure 9. Screen capture from an online assignment, showing responses from students in CHEM 277 to a question requiring searching Scopus for literature and refining results.

Finding information about properties of chemical compounds

Example 12. Finding the CAS Registry Number of a chemical compound in SciFinder. In SciFinder, go to "Explore"—"Substance identifier" and type "aspirin." Sort by "CAS Registry Number." Which of the following is the correct CAS # for aspirin?

- 216-40-08
- 123-64-79
- 50-78-2
- 89-24-563

Example 13. Finding properties of chemical compounds in Reaxys. In Reaxys, click in the box "Names and Formulas" and type "phenylalanine" for chemical name. In the column "Available data," click on "Physical properties" and then on "Melting point." What is the melting point (in degrees Celsius) that was reported in an article authored by Edwards et al.?

- 256
- 276
- 249
- 321

Example 14. Finding properties of chemical compounds in SciFinder and using the information to find other properties in Reaxys (Figure 10).

1. In SciFinder, under Substances, click on Substance Identifier and enter the following CAS Registry Number: 462-08-8.
2. Find the molecular structure of the compound corresponding to it.
3. Draw its structure in Reaxys (www.reaxys.com):
Click on Structures and Reactions and select Substances. Double click in the window and draw the structure exactly as it was shown in SciFinder. If you have a problem opening the drawing window (it is Java-based), click on "Structure editor" at the bottom of this window and select Dotmatics Elemental.
4. Perform the search.

Which of the following properties WAS NOT listed among the Bioactivity/Ecotox properties of the first substance you have retrieved?

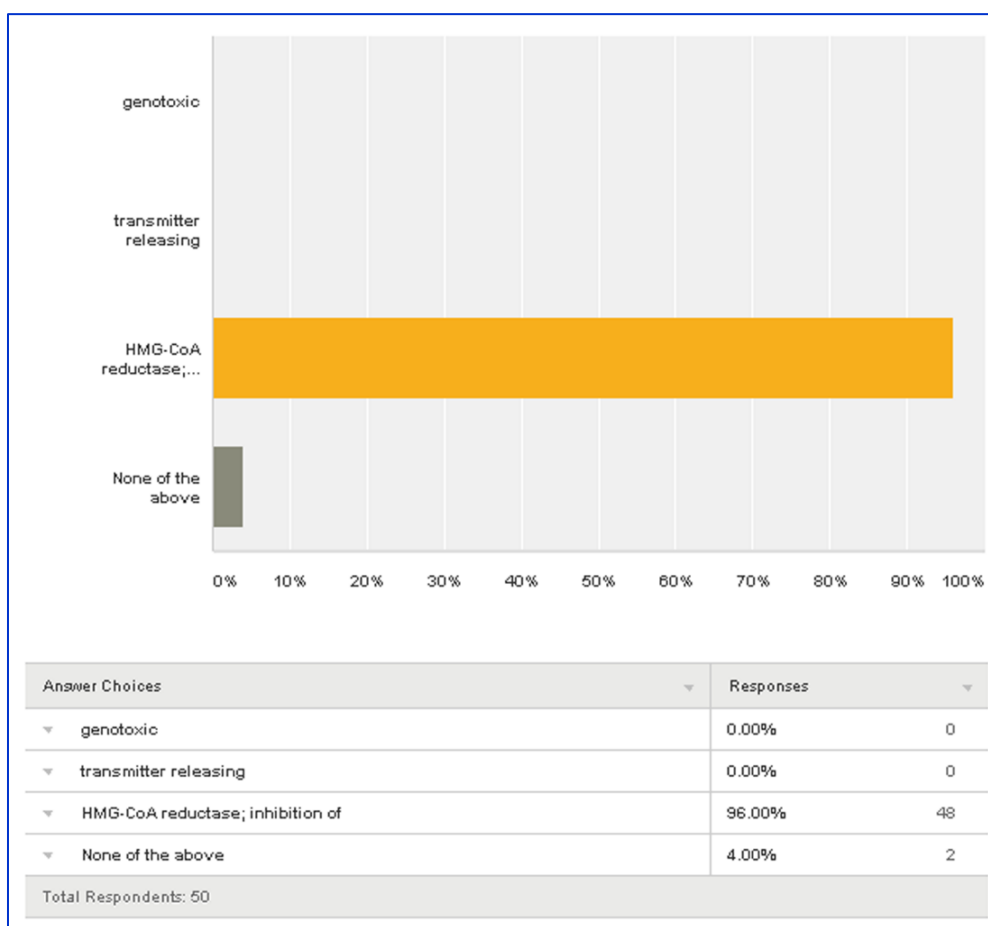


Figure 10. Screen capture from an online assignment in SurveyMonkey, showing responses from students in CHEM 425 to a question (shown in Example 13), which required finding a molecular structure of a chemical compound in SciFinder, drawing its structure in Reaxys, and finding which of the Bioactivity/Ecotox properties listed under the question was not associated with this compound.

Example 15. Finding properties of chemical compounds in *ChemSpider* (Figure 11).

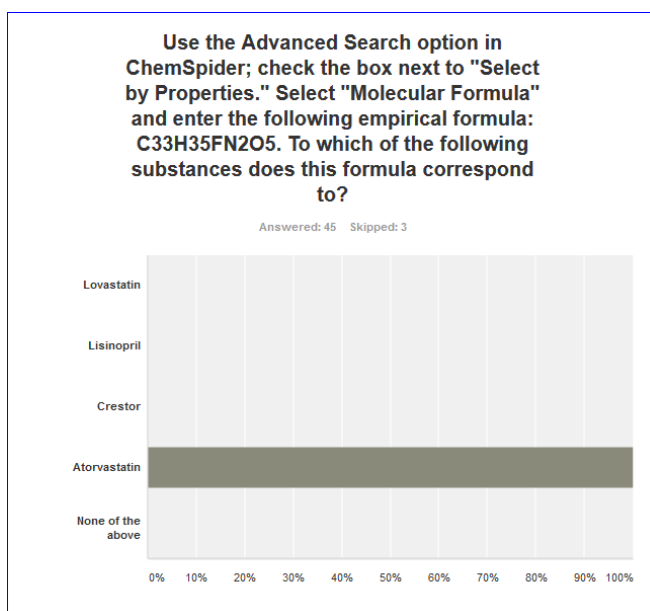


Figure 11. Screen capture from an online assignment in SurveyMonkey, showing responses from students in CHEM 277 to a question that required using a molecular formula in ChemSpider to find the name of the corresponding to it chemical compound.

Example 16. Finding properties of chemical compounds in PubChem (Figure 12).

In PubChem, find property information for 3-Aminopyridine. Which of the following numbers corresponds to the molecular weight (in g/mol) of this compound as listed under "Computed Properties" in the "Chemical and Physical Properties" section

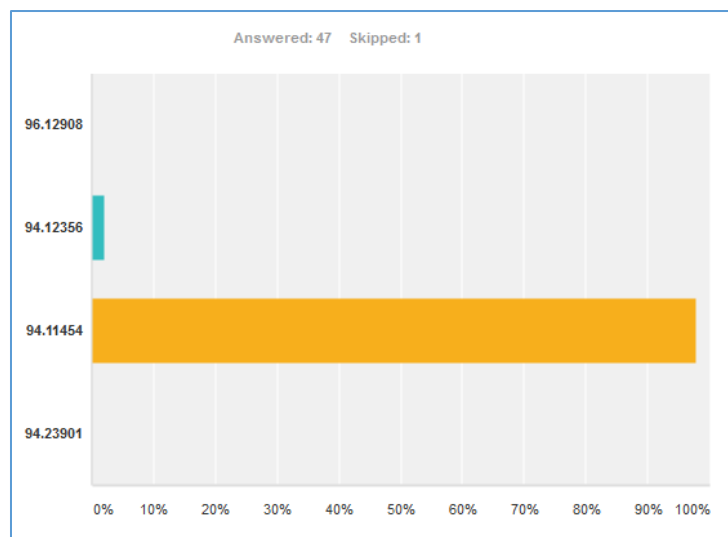


Figure 12. Screen capture from an online assignment in SurveyMonkey showing responses from students in CHEM 277 to a question that required finding the molecular weight of a chemical compound in PubChem.

Questions aimed at obtaining feedback from students about instruction, assignment, and resources

Example 17. Feedback from students about the resources covered during the instruction (Figure 13).

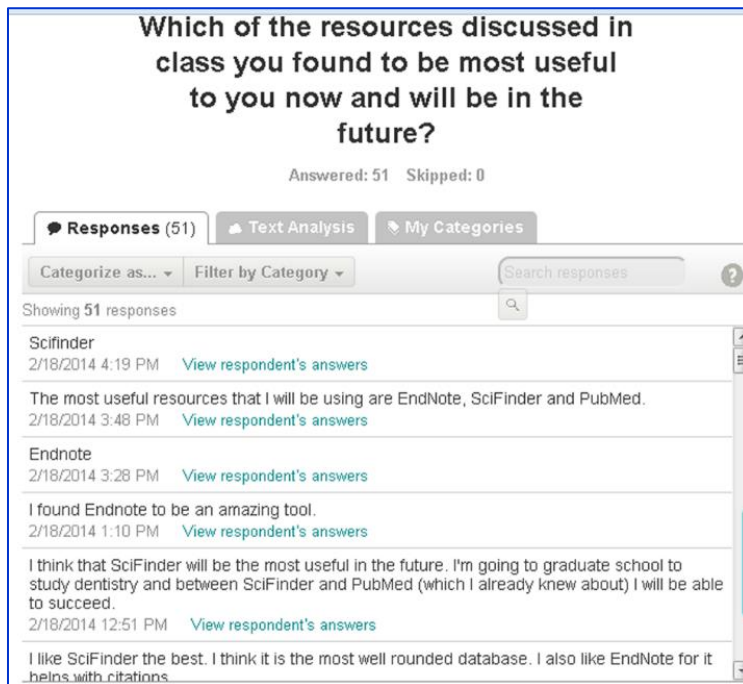


Figure 13. Screen capture from an online assignment in SurveyMonkey showing responses from students in CHEM 425 to a question about the resources covered during the instruction.

Example 18. Did you find this instruction and the assignment useful? (Figure 14)

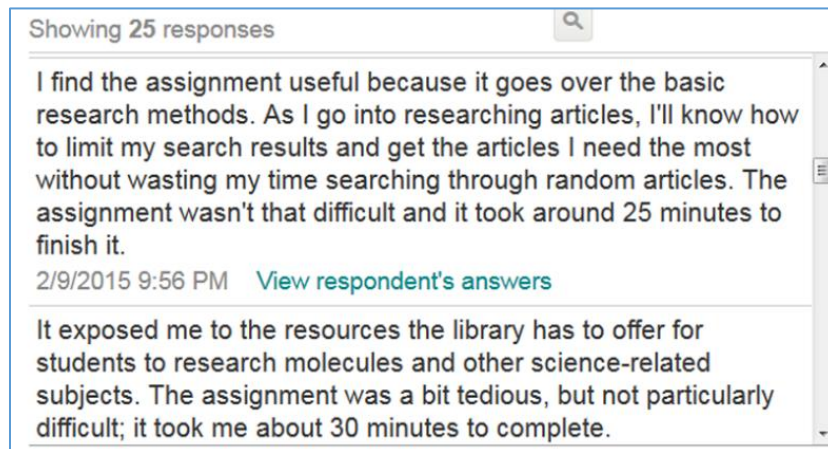


Figure 14. Screen capture from an online assignment in SurveyMonkey showing responses from students in CHEM 272 to a question about the instruction and the assignment.

Finding and Managing Scientific Information

Svetla Baykoucheva (sbaykouc@umd.edu)

Research Guide: <http://lib.guides.umd.edu/chemistryresources>

The screenshot shows the University of Maryland LibGuides interface. At the top, the University of Maryland logo and 'LIBRARIES GUIDES' are displayed. The breadcrumb trail reads: UMD Libraries / LibGuides / Subject Specific Guides / Finding and Managing Scientific Information and Research Data / CHEM 272. The main title is 'Finding and Managing Scientific Information and Research Data'. On the left, a navigation menu includes 'Home', 'Course materials' (with sub-items for CHEM 611, CHEM 425, CHEM 277, CHEM 272, GEMSTONE TEAM BREATHE, and GEMSTONE TEAM GOLD), 'Bibliographic Management', and 'Managing Research Data'. Below this is a 'Subject Specialist' section featuring a photo of Svetla Baykoucheva and an 'Email Me' button. The main content area is divided into three sections: 'General Information' with links for 'Handout', 'Create an account for SciFinder', 'Create an account for EndNote Online', and 'Install EndNote browser tool bar and Word plug-in'; 'UMD Library Resources' listing 'University of Maryland Libraries' and 'White Memorial Chemistry Library'; and 'Finding Scientific Information' with sub-sections for 'Finding Literature' (listing Google Scholar, PubMed, ScienceDirect, Scopus, SciFinder, and Web of Science) and 'Finding Property Information' (listing ChemSpider, CRC Handbook of Chemistry & Physics, PubChem, Reaxys, and SciFinder).

[Create an account for SciFinder](#)

[Create and account for EndNote Online](#)

Difference between a **Research article** and a **Review article**

A research article reports data obtained in the lab. It includes a Materials & Methods section (also called “Methods” or “Experimental”) that describes how the experiments were performed. A review article discusses published research articles. It usually DO NOT have an experimental section.

Library Resources

UMD Libraries Web page: <http://www.lib.umd.edu>

White Memorial Chemistry Library: <http://www.lib.umd.edu/chemistry>

Literature databases

- [Google Scholar](#)
- [Engineering Village](#)
- [EBSCO / Academic Search Premier](#)
- [PubMed](#)
- [SciFinder](#)
- [Scopus](#)
- [Web of Science](#)

Property information databases

- [ChemSpider](#)
- [CRC Handbook of Chemistry & Physics](#)
- [NIST Chemistry WebBook](#)
- [PubChem](#)
- [Reaxys](#)
- [SciFinder](#)

EndNote Online

- Creating an account for EndNote Online (formerly, EndNote Web): www.myendnoteweb.com
- Other bibliographic management programs:
 - EndNote (software)
 - [Mendeley](#)
 - [Papers](#)
 - [RefWorks](#)
 - [Zotero](#)
 - [Readcube](#)

[Install the EndNote Browser Toolbar and the Microsoft Word Plug-In](#)

Collecting references with EndNote Online

Certain data and screens included herein are derived from the Web of Science[®] and EndNote[®] prepared by THOMSON REUTERS[®], Inc. (Thomson[®]), Philadelphia, Pennsylvania, USA: © Copyright THOMSON REUTERS[®] 2015. All rights reserved.

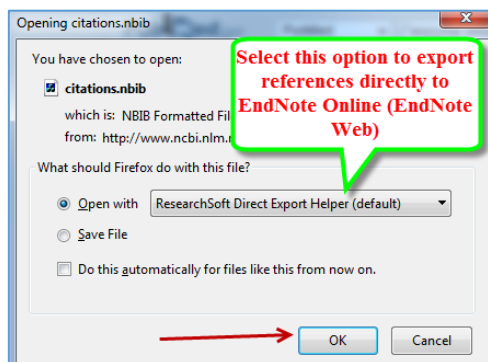
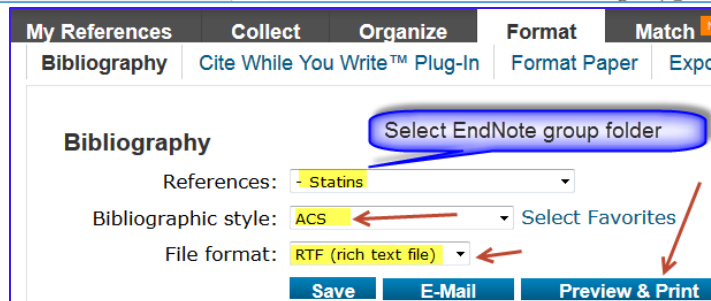
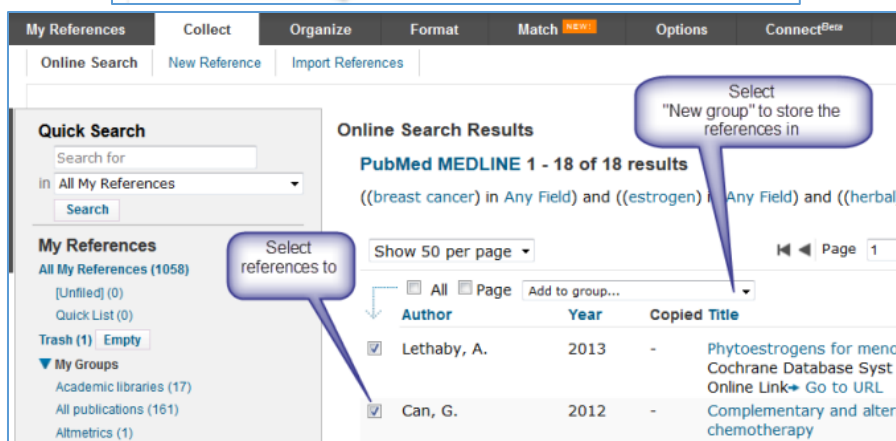
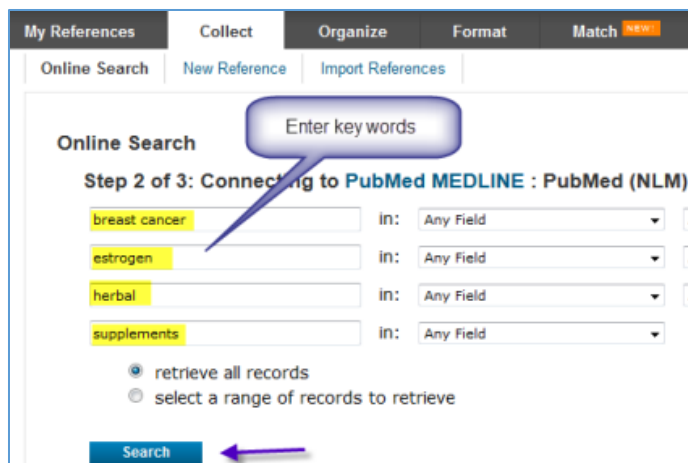
New Reference: allows creating a record manually; when clicking on the *Capture* tab in the browser EndNote toolbar, this form is automatically filled out for the article displayed on your computer.

Searching databases from EndNote Online

Collect—Online Search: allows searching databases (e.g., PubMed) and library catalogs directly from EndNote Online

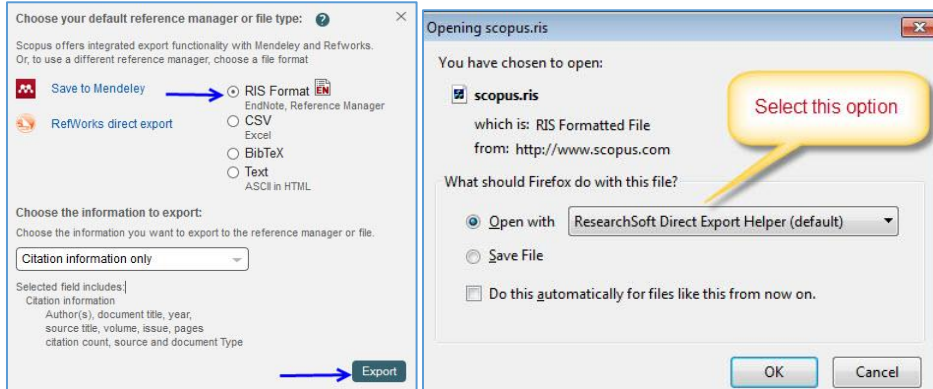
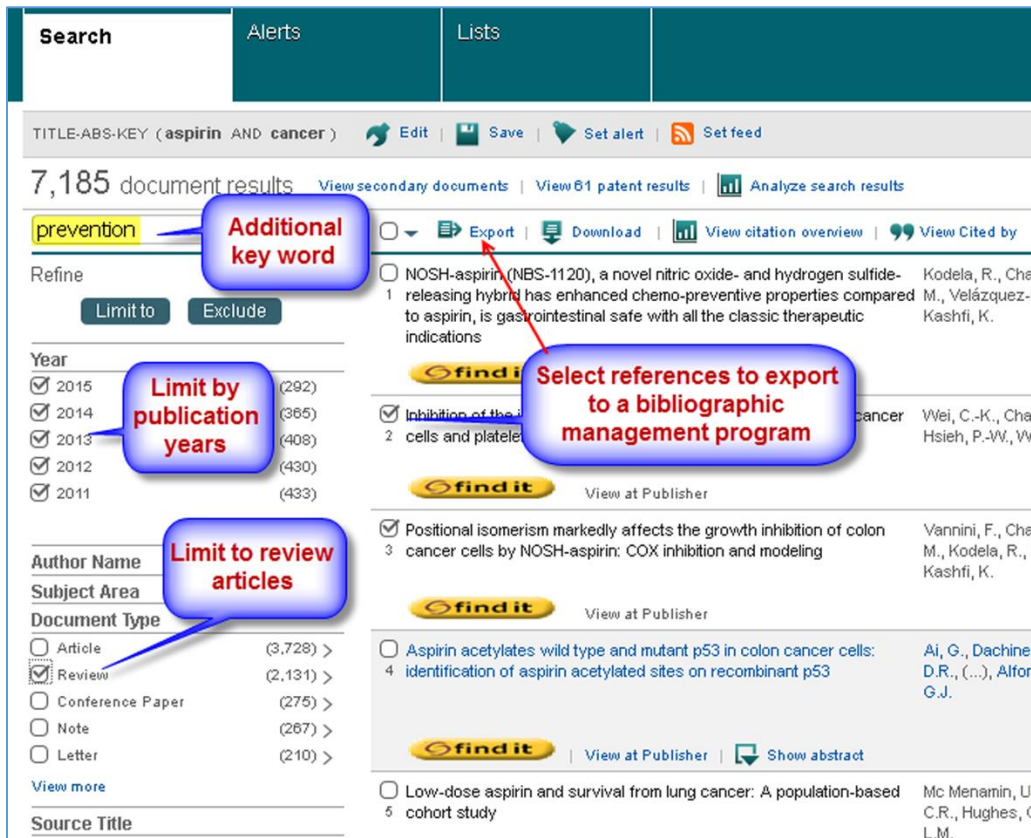
This screenshot shows the 'Collect' tab in the EndNote Online interface. The top navigation bar includes 'My References', 'Collect', 'Organize', 'Format', 'Match', and 'Options'. A 'Quick Search' box is visible on the left. The main area is titled 'Getting Started' and contains a 'Find' icon and instructions: 'Collect references by searching online databases or importing your existing collection.' Below this are three options: 'Search an online database', 'Create a reference manually', and 'Import references'. A 'Connect' button is also present. A callout bubble points to the 'UNFILED' group in the 'My References' list, stating 'References exported from databases are found in the UNFILED group'. Another callout bubble points to the 'Store references in groups' option. A third callout bubble points to the 'Online Search' button in the 'Collect' sub-tab, with the text 'Select database filter'.

This screenshot shows the 'Online Search Step 1' interface. The top navigation bar includes 'My References', 'Collect', 'Organize', 'Format', 'Match', 'Options', and 'Connect'. The 'Online Search' sub-tab is active. The main area is titled 'Online Search Step 1' and contains the instruction 'Select database or library catalog connection.' Below this is a dropdown menu with 'PubMed (NLM)' selected and a 'Connect' button. A callout bubble points to the 'Connect' button with the text 'Select PubMed (NLM)'. To the right, a list of 'Member of: University of Maryland - College Park Campus' is shown, including 'PubMed (NLM)', 'Purdue U-Calumet', 'Purdue U-North Central', 'Purdue U-W Lafayette', 'Queen Margaret U Coll', 'Queen Margaret U-Edinburgh', 'Queen Mary U of London', 'Queens U Charlotte', and 'Queens U'. A 'Copy to Favorites' button is visible below the list, with a callout bubble pointing to it. To the right of the list is a 'My Favorites' section with 'PubMed (NLM)' and 'U Maryland-College Park' listed. Below this is a 'Remove from Favorites' button. At the bottom, there are instructions for 'Add to my list (25 limit)' and 'Remove from my list'.



Important: References directly exported from databases will be found in the **UNFILED** group in EndNote Online. Click on this group, select the references and move them out of the UNFILED group by putting them in a “New group” or in an existing group.

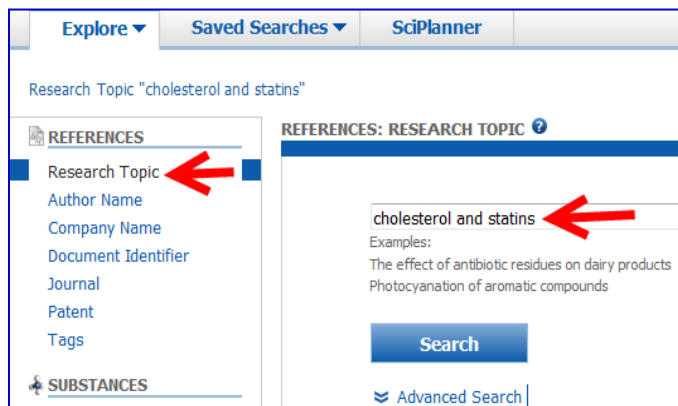
Searching Scopus



Images reused from Elsevier's Scopus database, December 13, 2015

Searching SciFinder for literature (Perform a search on “cholesterol and statins”)

Screen captures from SciFinder are used with the permission of the Chemical Abstracts Service (CAS), a division of the American Chemical Society (December 13, 2015).



Important: Select the option “references were found containing both of the concepts...”
SciFinder will help you with relevant answers should you choose the first options, “...as entered.”

Research Topic "cholesterol and statins" > references (17626) > refine "2010-2013" (5700) > remove 1608 references (4092) > refine "Review" (937)

REFERENCES **Remove duplicates**

Analyze Refine Categorize Sort by: Accession Number

2 of 937 References Selected

Select references for export

1. **The promises of PCSK9 inhibition** Full Text
By Petrides, Francine; Shearston, Kate; Chatelais, Mathias; Guilbaud, Florian; Melhac, Olivier; Lambert, Gilles
From Current Opinion in Lipidology (2013), 24(4), 307-312. | Language: English, Database: CAPLUS
Purpose of review: In the past 10 years, the LDL receptor inhibitor proprotein convertase subtilisin kexin type 9 (PCSK9) has emerged as a validated 500 publications published in print or online before March 2013 and indexed on PubMed. Recent findings: All published in 2012, phase I and II clin reach their target goals, without severe or serious ...

2. **Influence of improving high-density lipoprotein level on female patients with coronary heart disease** Full Text
By Niu, Jinjin; Hu, Gang
From Xinxueguan Bingxue Jinzhan (2013), 34(2), 286-289. | Language: Chinese, Database: CAPLUS
High-d. lipoprotein **cholesterol** (HDL-C) levels is of vital importance in women patients with coronary heart disease (CHD). Esp. in postmenopausal HDL-C level can reduce women in menopause transition probability of the occurrence of CHD. This paper reviews the effect of HDL-C level in impro that the nicotinic acid, **statins** and bater kind of combined...

3. **Controlling Cholesterol Synthesis beyond 3-Hydroxy-3-methylglutaryl-CoA Reductase (HMGCR)** Full Text
By Sharpe, Laura J.; Brown, Andrew J.
From Journal of Biological Chemistry (2013), 288(26), 18707-18715. | Language: English, Database: CAPLUS
A review. 3-Hydroxy-3-methylglutaryl-CoA reductase (HMGCR) is the target of the **statins**, important drugs that lower blood **cholesterol** levels and acts very early in the **cholesterol** synthesis pathway, with ~20 subsequent enzymes needed to produce **cholesterol**. How they are regulated is largely introduce some of the known regulatory mechanisms affecting ...

4. **Treatment of dyslipidemia. Pharmacotherapy** Full Text
By Ohmura, Hirotohi
From Rinsho Eijo (2013), 122(6, Rinjizokan), 820-825. | Language: Japanese, Database: CAPLUS
A review on the dyslipidemia patients who are suitable for drug therapy, drug therapy for lowering LDL **cholesterol**, drug therapy for lowering triglyceride up of drug therapy to avoid adverse effects. Action mechanisms, adverse effects, and clin. application of **statins**, anion-exchange resins, probucol, ...

5. **Dyslipidemia associated with kidney disease** Full Text

Document Type(s)
 Biography
 Book
 Clinical Trial
 Commentary
 Conference
 Dissertation
 Editorial
 Historical
 Journal
 Letter
 Patent
 Preprint
 Report
 Review **Refine**

Exporting references from SciFinder to EndNote Online

Select the references you want to export and click on the “Export” button at the upper right corner of the screen. In most cases, you need to choose the first option under “**Citation Manager**” as shown in the figure below.

Export ?

Export:

- All
- Selected
- Range

For:

Citation Manager

- Citation export format (*.ris)
- Quoted Format (*.bt)
- Tagged Format (*.bt)

If this option does not work, use “Tagged Format.” If you use this option, the references will be downloaded to your computer as a text file. Go to your EndNote library, select the tab “**Collect,**” then “**Import references.**” As shown on the figures below, upload the file that you have downloaded to your computer to the first box (Use Browse). Select SciFinder as an import option and choose where to place these references (e.g., in a New Group).

My References **Collect** Organize Format

Online Search **New Reference** **Import References**

Import References

Importing from EndNote?

File: No file selected.

Import Option:

To:

Browse to find the file with references you downloaded from a database

My References **Collect** Organize Format **Match** Options **Connect**

Online Search **New Reference** **Import References**

Import References

Importing from EndNote?

File: No file selected.

Import Option:

To:

Select SciFinder (CAS)

Member of: University of Maryland - College Park Campus

All:

- RURAL (Informit)
- Russian Acad Sci Bib (OCLC)
- SACat (Sabinet)
- Salud en Español (EBSCO)
- Salud para Todos (EBSCO)
- ScienceDirect
- Scientific Amer Arch (EBSCO)
- SciFinder (CAS)**
- Scirus
- SciSearch (DL)

Add to my list (25 limit):

My Favorites:

- Google Books
- PubMed (NLM)
- SciFinder (CAS)**

Inserting Citations in a Word document: Cite While You Write (CWYW)

- Inserting citations from your EndNote Online library into a Word document
- Downloading plug-ins for Word (a tab for EndNote appears in Word): Go to Help, then to “Browser Toolbars and Plug-ins”

Document1 - Word

FILE HOME INSERT DESIGN PAGE LAYOUT REFERENCES MAILINGS REVIEW VIEW ADD-INS DYMO Label EndNote

Insert Citations Go to EndNote Online Edit Citation(s) Citations

Style: ACS

Update Citations and Bibliography Convert Citations and Bibliography Bibliography

Export to EndNote Preferences EndNote Help

1. Position the cursor where the citation will be inserted

2. Click on the EndNote tab

3. Set up preferences

4. Select citation style

5

6. Type a keyword and select references to insert

Statins are a group of drugs that inhibit the synthesis of cholesterol

REFERENCES

1. Davidson, M. H.; Robinson, J. G., Lipid-lowering effects of statins: a comparative review. *Expert Opinion on Pharmacotherapy* 2006, 7 (13), 1701-1714.

EndNote Find & Insert My References

statins Find

Author	Year	Title
Daneschvar	2015	Do statins prevent Alzheimer's disease? A narrative review
Daneschvar	2015	Do statins prevent Alzheimer's disease? A narrative review
Davidson	2006	Lipid-lowering effects of statins: a comparative review
Kostapanos	2014	Benefit-Risk Assessment of Rosuvastatin in the Treatment of Atherosclerosis and Related Diseases

Creating a bibliography in EndNote Online

My References Collect Organize Format M

Bibliography Cite While You Write™ Plug-In Format Paper Exp

Bibliography

Select a group of references from your EndNote Library

References: - Statins

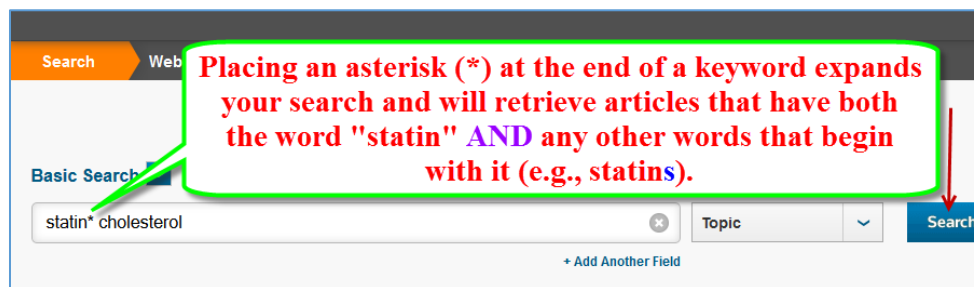
Bibliographic style: Select... Select Favorites

File format: RTF (rich text file)

Save E-Mail Preview &



Searching Web of Science (Search for statin* and cholesterol)



To refine the search, enter additional key words (e.g., "adverse effects") and/or limit the results to review articles as shown in the pictures below:



Searching PubMed for literature (Advanced option)

NCBI Resources How To Sign in to NCBI

PubMed.gov
US National Library of Medicine
National Institutes of Health

PubMed Use the advanced option

PubMed
PubMed comprises more than 24 million citations for biomedical literature from MEDLINE, life science journals, and online books. Citations may include links to full-text content from PubMed Central and publisher web sites.

PubMed Commons
Featured comment - Aug 21
Disparities in cancer screening: Health Behaviour Research Centre Journal Club discusses participatory approach.
1.usa.gov/1MHVG6x

NCBI Resources How To Sign in

PubMed Home More Resources Help

PubMed Advanced Search Builder YouTube Tutorial

enter key word

Builder

Select 'enzyme inhibitors'

- enzyme inhibitors (196204)
- enzyme inhibitors/administration and dosage (9407)
- enzyme inhibitors/adverse effects (15104)
- enzyme inhibitors/agonists (12)
- enzyme inhibitors/analogs and derivatives (14)
- enzyme inhibitors/analysis (7387)
- enzyme inhibitors/anatomy and histology (11)
- enzyme inhibitors/antagonists and inhibitors (113)
- enzyme inhibitors/biosynthesis (204)
- enzyme inhibitors/blood (2283)

Check Index list to see if the term is a MeSH Major Topic

Article types Summary 20 per page Send to: **Filters: Manage**

Search results

Items: 1 to 20 of 4963 Selected: 2

[Ezetimibe plus a Statin after Acute Coronary Syndrome.](#)

1. Singh JS, Struthers AD, Lang CC. N Engl J Med. 2015 Oct 8;373(15):1475-6. doi: 10.1056/NEJMc1509363#SA6. No abstract available. PMID: 26444741

[Ezetimibe plus a Statin after Acute Coronary Syndromes.](#)

2. Richard T, Lelubre C, Vanhaeverbeek M. *Journal of Intensive Care Medicine*. 2015 Oct 8;373(15):1475-6. doi: 10.1056/NEJMc1509363#SA6. No abstract available.

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Download 2 citations.

Limit by publication year

Text availability: Abstract, Free full text, Full text

PubMed Commons: Reader comments, Trending articles

Publication dates: 5 years, 10 years

Titles with y terms

Allosteric inhibi
redu [Chem C
Steroidamide

Images from the PubMed database at www.ncbi.nlm.nih.gov/pubmed/ as seen on December 13, 2015.

Finding properties of chemical compounds in SciFinder by chemical name

Screen captures from SciFinder are used with the permission of the Chemical Abstracts Service (CAS), a division of the American Chemical Society (December 13, 2015).

The screenshot shows the SciFinder search interface. At the top, there are tabs for 'Explore', 'Saved Searches', and 'SciPlanner'. Below the tabs, the text reads 'Substance Identifier "aspirin" > substances (1)'. On the left, there are two main sections: 'REFERENCES' and 'SUBSTANCES'. Under 'SUBSTANCES', there are several options: 'Chemical Structure', 'Markush', 'Molecular Formula', 'Property', and 'Substance Identifier'. The 'Substance Identifier' option is highlighted in yellow, with a red arrow pointing to it. On the right, there is a search box containing the word 'aspirin', with a red arrow pointing to it. Below the search box, there is a 'Search' button, also with a red arrow pointing to it. The search box also contains the text 'Enter one per line. Examples: 50-00-0, 999815, Acetaminophen'.

The screenshot shows the SciFinder search results for 'aspirin'. The top navigation bar reads 'Substance Identifier "aspirin" > substances (1) > 50-78-2'. Below this, there are buttons for 'Get References', 'Get Reactions', and 'Get Commercial Sources'. The main content area is divided into two columns. The left column shows a list of substances, with '50-78-2' highlighted in yellow. A callout box points to this number with the text 'Click on the CAS Registry Number to find properties'. Below the list is a chemical structure of aspirin (Benzoic acid, 2-(acetyloxy)-). The right column shows the 'SUBSTANCE DETAIL' page for '50-78-2'. It includes the following information: 'CAS Registry Number 50-78-2', 'C₉H₈O₄', 'Benzoic acid, 2-(acetyloxy)-', 'Molecular Weight 180.16', 'Melting Point (Experimental) Value: 135 °C', 'Boiling Point (Experimental) Value: 197-200 °C | Condition: Press: 7 Torr', 'Density (Experimental) Value: 1.40 g/cm³', and 'pKa (Predicted) Value: 3.48±0.10 | Condition: Most Acidic Temp: 25 °C'. A red arrow points to the 'Key Physical Properties' link in the left column.

Structure searching in SciFinder

Screen captures from SciFinder are used with the permission of the Chemical Abstracts Service (CAS), a division of the American Chemical Society (December 13, 2015).

Explore Saved Searches SciPlanner

REFERENCES

- Research Topic
- Author Name
- Company Name
- Document I
- Journal
- Patent
- Tags

SUBSTANCES

- Chemical Structure**
- Markush
- Molecular Formula
- Property
- Substance Identifier

REACTIONS

- Reaction Structure

SUBSTANCES: CHEMICAL STRUCTURE

Structure Editor:

Java Non-Java

Click to Edit

Search Type:

- Exact Structure
- Substructure
- Similarity

Show precision analysis

ChemDraw

Launch a SciFinder subst

Import CXF

Search

Advanced Search Always Show

Structure Editor

Draw or change atoms or bonds. Shortcut Keys

Atom Shortcuts

Click here for shortcuts

NH₂

Shortcuts

CH	CH ₂	Me	OMe	Et	OEt	Pr-n	Pr-i
OPr-n	OPr-i	Bu-n	Bu-i	Bu-s	Bu-t		
OBu-n	OBu-i	OBu-s	OBu-t	Ph	o-C ₆ H ₄		
m-C ₆ H ₄	p-C ₆ H ₄	CF ₂	CF ₃	CCl ₂	CCl ₃		
CBr ₂	CBr ₃	Cl ₂	Cl ₃	CHO	CN	C(O)CH ₃	
CO ₂ H	COOH	COSH	CS ₂ H	CSSH	NH		
NH ₂	NH ₃	NO ₂	OH	OPO ₃ H ₂	OSO ₃ H		
PO ₃ H ₂	SH	SO ₂	SO ₃ H				

Close

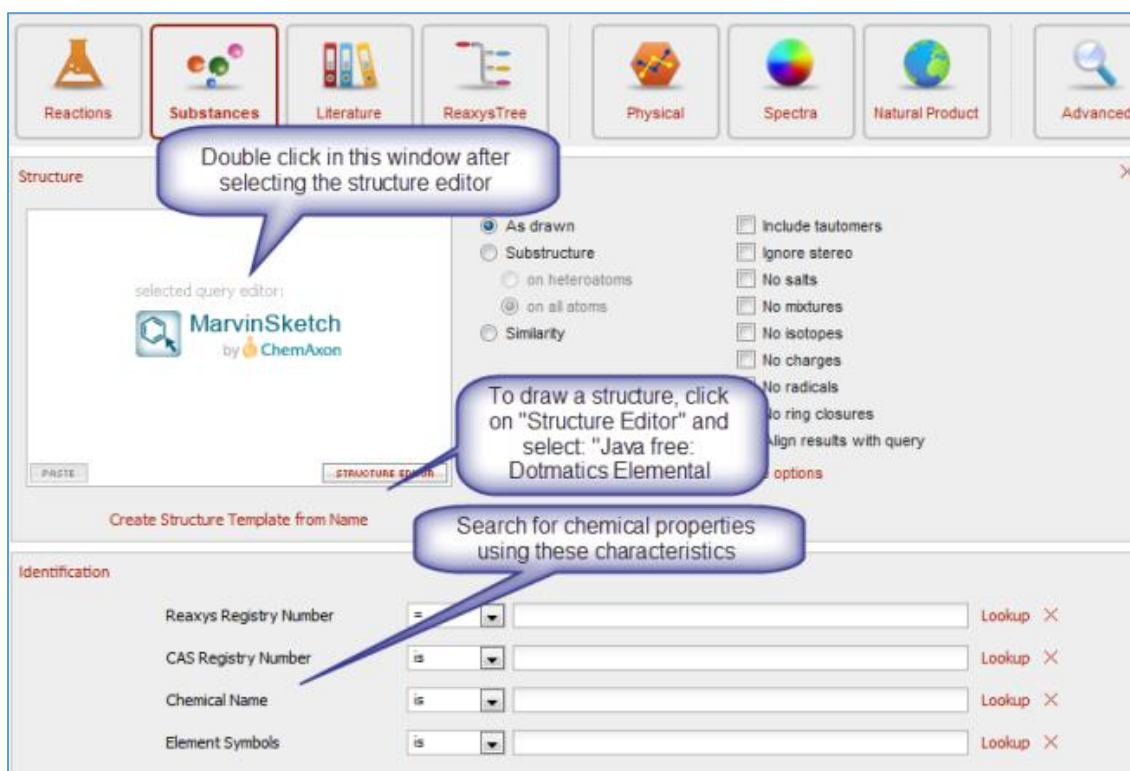
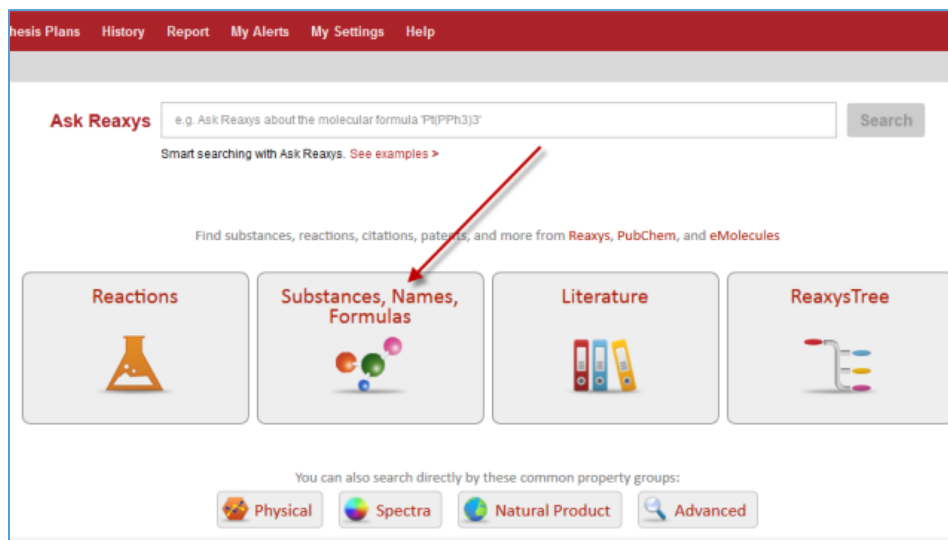
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- Substructure search
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OK Cancel

C₆H₆N₂ 94.12

Finding properties of chemical compounds in Reaxys



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2. Baykoucheva, S., Selecting a Database for Drug Literature Retrieval: A Comparison of MEDLINE, Scopus, and Web of Science. *Science & Technology Libraries* **2010**, 29 (4), 276-288 <http://drum.lib.umd.edu/handle/1903/11411> DOI: 10.1080/0194262X.2010.522946.
3. Baykoucheva, S., Comparison of the Contributions of CAPLUS and MEDLINE to the Performance of SciFinder in Retrieving the Drug Literature. *Issues in Science & Technology Librarianship* **2011**, 66 (Summer), <http://www.istl.org/11-summer/refereed1.html> DOI: 10.5062/F42Z13FT.

