LIBRARY RESEARCH GUIDELINES

INTRODUCTION

In the scientific literature, information can be obtained from the following two types of sources:

Primary sources present new facts based on experimentation that is current at the time of publication. Since the research is current, they help guide further research by other scientists. Primary literature presents original research in the form of scientific journal articles, conference proceedings, technical reports, dissertations and these. Of these sources, you are most likely to find and use journal articles, either traditional hard copy journals or those you will find online.

Primary sources are also referred to as peer-reviewed sources since they are published in a scientific journal only after several prominent scientists in a particular field have reviewed and approved the manuscript. This means that the author is required to have his “peers” (the prominent scientists) review, critique, and accept the contents of that article as sound scientific work before it is published. Not all submitted scientific articles are accepted by an investigator’s peers and even if accepted, not all peer-reviewed articles are necessarily great science.

Be especially careful to avoid non-peer reviewed material when searching the web. Examples of articles that are not peer reviewed would include an article in Discover magazine, an article from a lab’s web page, etc. If you are not sure if an article is peer reviewed, ask a librarian or me. Reading peer reviewed research articles is not easy.

Primary sources typically follow a standard format that includes the following sections: abstract, introduction, materials and methods, results, discussion, and references. These articles are authoritative because they are based on experimentation and have been reviewed by scientists familiar with the area being researched.

Secondary sources combine primary source information derived from many authors, many labs, many experiments, often over many years and arrange it chronologically or scientifically. Secondary sources are also referred to as review articles and can include annual reviews, review articles in science journals, textbooks and books. Review articles are written by a prominent scientist who has summarized and discussed current research on a particular topic. In order to write the article, the scientist did not accumulate any new experimental data. Instead they performed a literature search, similar to what you are doing and summarized all of the current experiments related to that topic. They typically are published less frequently as peer-reviewed articles but are authoritative reviews of experimentation performed in a scientific area up to the date of publication.

Review articles can be very useful, since they can provide you with much needed background information about a field with which you may not be familiar. Secondary sources, because they compile information from previously peer-reviewed primary sources are not typically peer-reviewed and lack the standard format found in primary sources.

DEVISING A LITERATURE RESEARCH STRATEGY

The following suggestions will help you identify primary and secondary sources and devise a research strategy. Start by finding review articles on your topic to gain detailed knowledge of a topic, to learn about the historical development of a topic and to become familiar with major researchers in an area. It is often helpful to start your research by searching a database for an annual review or a review article on your topic since these sources may have been published more recently than a textbook or book. A review article will present an overview of a topic using summaries of experimental data from the many primary sources it references. The suggested databases for secondary sources are a good place to start, however, all of the databases listed as primary source databases can be used for searching for secondary sources by specifying that you are searching for a review.

Once you understand the basic outline of your topic, you may search for primary sources in a number of ways.

• You may use some of the primary references listed in the reference list of the review articles you have read. However, since review articles on a particular topic are written infrequently, these primary sources may be not be the most recent primary sources available.
• You may search the suggested databases using a search strategy based on an author’s name that is listed frequently in the references found in the review. Note: the head of a lab (whose name you should search) is generally the last name in a reference. It can easily be identified since it will recur often in a list of references.
• You may search the suggested databases using a search strategy based on the name of the senior author of a review (first or last author) since they are an expert on the topic and likely have published many primary sources.
• You may search the suggested databases using a search strategy based on a key word (see below)
• Once you find the latest primary source of information, use its list of references as sources of additional information, especially sources listed in the introduction since these will be broader in scope.
Devising a Database Search Strategy:
The following is a guide to help you organize a Boolean search strategy. The approach should be used in planning your literature search for electronic resources.

Step 1: State Your Topic In One Or Two Sentences:
EXAMPLE: What information is available about the effect of temperature on cardiac output?

Step 2: Break Your Topic Into Key Ideas Or Concepts:
EXAMPLE: CONCEPT 1: temperature AND CONCEPT 2: cardiac output

Step 3: Consider Other Terms To Describe Your Concepts:
EXAMPLE: CONCEPT 1: temperature OR temp OR season OR climate
CONCEPT 2: cardiac OR heart OR heart rate OR muscle

Step 4: Combine Like Or Synonymous Terms Using "Or"
EXAMPLE: temperature OR temp

Step 5: Narrow Your Topic By Using The "And" Operator To Combine Your Concepts:
EXAMPLE: temperature AND cardiac AND output AND diving

Step 6: Two terms, if they form phrase can be enclosed by parentheses.
EXAMPLE: “cardiac output”

Scientific Databases Available on the Lehman Library Website
(http://www.ship.edu/Library/Databases)

Note: All databases can be searched through the library website from on or off campus using your Ship ID. However, the speed can be slow from off-campus for databases such as ACS and SciFinder.

Primary Source Databases

Academic Search Complete
- Most cross-disciplinary database
- >50% of the articles are available immediately online
- Contains articles on natural sciences, social sciences, humanities, business and education

Access Science
- McGraw Hill Encyclopedia of Science & Technology, online
- Contains authoritative articles in all major areas of science and technology.

Agricola
- Over 3.6 million records covering every major agricultural and related biological subject.
- Coverage from 1970 - present.
- Contains records of articles, theses, patents, software, and technical reports.

American Chemical Society Publications (ACS)**
- Covers all fields of chemistry including biochemistry, although only a few journals are biochemical.
- Contains full text of journals and magazines published by the American Chemical Society including

Biological Abstracts**
- Index to journals in biology and the life sciences
- Contains abstracts of articles and links to full-text in other databases, when available

CHEMLIBnetBASE
- Covers chemistry books published by the CRC Press and its subsidiaries
- Contains the full-text contents of >400 chemistry books

CHEMnetBASE
- Covers chemistry and physics
- Contains important chemistry encyclopedias and dictionaries, such as the Handbook of Chemistry and Physics
CINAHL
- Authoritative resource for nursing and allied health professionals, students, educators and researchers.
- Provides indexing for 2,960 journals from the fields of nursing and allied health.
- Contains more than 1,000,000 records dating back to 1981.

EBSCOhost**
- Covers journals of general academic interest, business, health and science
- Contains options to search specific sub-databases including the following databases from this listing:
  - Academic Search Complete
  - Agricola
  - Biological Abstracts**
  - CINAHL
  - GreenFILE
  - Health Source: Consumer Edition
  - MEDLINE**

GreenFILE
- Covers all aspects of human impact to the environment from scholarly, government and general-interest titles
- Covers global warming, green building, pollution, sustainable agriculture, renewable energy and recycling

Health Source: Consumer Edition
- Good place to start a research project by familiarizing yourself with a health related topic.
- Covers information on health topics including medical sciences, food sciences and nutrition, sports medicine and general health
- Contains full text for over 190 journals as well as abstracts and indexing for over 205 general health publications

JSTOR**
- Includes general science, biology and ecology
- Contains the full text of articles from scholarly journals

LexisNexis Academic
- An online full-text source of news from more than 7,000 English-language newspapers and magazines, including the Associated Press, The New York Times, and CNN. Updated daily.
- Browse the full-text of medical journals and newsletters providing information on drug interactions, cancer, poison, disease, trauma, and medical administration. Update varies (monthly or weekly).
- Coverage of the medical and health journals varies.
- Search bibliographic information from the National Library of Medicine for more than 3500 worldwide clinical and research journals dating back to 1966. Updated weekly.

MEDLINE**
- Covers the National Library of Medicine's comprehensive life sciences and biomedical database
- Contains abstracts for 15 million articles in 30,000 journals published worldwide and links to 650,000 full-text articles

ScienceDirect**
- Covers science, management, social sciences, psychology, and education
- Contains full text of subscribed journals from Elsevier Publishing; table of contents of each issue available

SciFinder**
- Excellent source of scientific primary sources
- Access is only through a personal username and password registered to individuals (see instructor or librarian)

**These are excellent databases for searching for primary and secondary sources of information on biochemical topics.

T. Frielle
Research
SECONDARY SOURCE DATABASES

Annual Reviews
- Indexes annual reviews throughout the natural sciences, many with full text through Academic Search Complete
- Contains full-text of recent annual reviews of the life sciences including Annual Review of
  Analytical Chemistry
  Biochemistry
  Biomedical Engineering
  Biophysics
  Cell and Developmental Biology
  Chemical and Biomolecular Engineering
  Ecology, Evolution, and Systematics
  Entomology
  Food Science and Technology
  Genetics
  Genomics and Human Genetics
  Immunology
  Marine Science
  Medicine
  Microbiology
  Neuroscience
  Nutrition
  Pathology: Mechanisms of Disease
  Pharmacology and Toxicology
  Physiology
  Phytopathology
  Plant Biology

Trends series:
- Series of monthly reviews that publish in a range of areas across the biological sciences.
  Trends in Biotechnology
  Trends in Biochemical Sciences
  Trends in Pharmacological Sciences
  Trends in Cell Biology
  Trends in Genetics
  Trends in Endocrinology and Metabolism
  Trends in Immunology
  Trends in Microbiology
  Trends in Molecular Medicine
  Trends in Neuroscience

National Institutes of Health (NIH) (www.nih.gov)
- Good place to start a research project by familiarizing yourself with a health related subject.
- Not necessarily useful for finding primary, scientific sources.

Scientific American Archive Online
- Covers current events in science
- Contains all articles from Scientific American magazine - January 1993 to present

SAVING OR PRINTING PRIMARY AND SECONDARY SOURCE ARTICLES FROM DATABASES
When you have found a primary or secondary article using your database search, you should be able to save it as a pdf document or print a hard copy. If you cannot save or print directly from the database listing,
- copy the journal title, volume, page and date
- go to the Library’s journal listing page
- find the journal, go to the listings for that journal
- paste the article information into the search fields
- the article should appear with a pdf icon and a print option
- click on the icon to download the electronic file or use the print option to print a hardcopy

DATABASE SEARCHING
Be very careful about the following when searching databases:
- Choose your search terms wisely…not too broad and not too narrow.
- Be aware of the general content of each database (see above).
- Choose your database wisely so that you are not limited nor are you swamped with too many citations. For example, the following databases were searched using “g protein coupled receptors” as a keyword.
  - ACS Journals 12,759 citations the limited number of ACS biochemistry journals may underrepresent a particular biochemical topic
  - Medline 27,977 citations
  - SciFinder 67,974 citations
  - Google Scholar 2,100,000 citations Google Scholar is a tempting database to use but it is based on the number of times a reference is cited, not on its content.