Overview

- Finding Information: Library website, full-text articles, subject databases, search strategy
- Evaluating Information: Peer-review vs. Popular sources, CRAAP
- Using Information: Literature reviews, Citations, Copyright
How do researchers share information?
Research Cycle of Information

The Research Cycle

- Lab notebooks, Grant proposals
- Develop an idea
- Present preliminary research
- Report Research
- Publish Research
- Popularize
- Generalize
- Encyclopedias, Textbooks
- Magazines, Newspapers
- Conference papers
- Technical reports, Theses
- Journal Articles
Scientists communicate new research findings through a variety of sources.

Over time, information from these sources is synthesized into new types of sources to meet different types of needs.
Can you name some popular and peer review sources in the sciences?

Peer Review in 3 minutes
https://youtu.be/rOCQZ7QnoNo
Practice

Can you give examples of each and define?

<table>
<thead>
<tr>
<th>Primary Sources</th>
<th>Secondary Sources</th>
<th>Peer-Review</th>
<th>Popular</th>
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# Examples of Sources

<table>
<thead>
<tr>
<th>Primary Source</th>
<th>Secondary Source</th>
<th>Peer-Review Scholarly literature</th>
<th>Popular journalism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviews</td>
<td>Books</td>
<td>Nature</td>
<td>The New York Times</td>
</tr>
<tr>
<td>Newspaper articles</td>
<td>Magazines</td>
<td>Proceedings of the National Academy of Sciences</td>
<td>National Geographic</td>
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<tr>
<td>Original documents</td>
<td>Encyclopedias</td>
<td>IEEE</td>
<td>Newsweek</td>
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<tr>
<td>Speeches</td>
<td>Journal articles</td>
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Cline Library

http://library.nau.edu
REU Research Guide

http://libraryguides.nau.edu/reu-astronomy

Astronomy for REU Students

Literature Reviews and Library Resources

Get started
Services @ Cline Library
Search for books
Identify databases
Construct your search
ADS search tips
Get full-text
Manage citations

Science and Engineering Librarian

Naomi Bishop Fitzpatrick
Email Me

Scienctific Communication

Scientists share new research findings primarily through journal articles but also through conference papers, technical reports, and dissertations and theses.

Over time, information from these sources is synthesized into new types of sources to meet different types of needs.

Books and textbooks
Wikipedia articles
Regular magazines and trade journals
Review articles

Start your research

Perform a thorough review of the literature on your topic:

Identify the most appropriate databases to search.
### Astronomy Articles

<table>
<thead>
<tr>
<th>Database</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>ADS (Astrophysics Data System)</strong></td>
<td>The most comprehensive physics and astronomy article database. SAO/NASA Astrophysics Data System (ADS) includes three bibliographic databases: Astronomy and Astrophysics, Physics and Geophysics, and arXiv e-prints.</td>
</tr>
<tr>
<td><strong>Web of Science</strong></td>
<td>Citation database of scholarly articles spanning the sciences, social sciences, arts, and humanities. Indexing goes back to 1900. This database can also search for articles that cite a particular work or author.</td>
</tr>
<tr>
<td><strong>Scopus</strong></td>
<td>Citation database of scholarly articles, books, and conference proceedings spanning the sciences, technology, medicine, social sciences, arts, and humanities.</td>
</tr>
<tr>
<td><strong>Journals</strong></td>
<td>[<a href="http://library.nau.edu/journals/by">http://library.nau.edu/journals/by</a> subject/physast](<a href="http://library.nau.edu/journals/by">http://library.nau.edu/journals/by</a> subject/physast)</td>
</tr>
</tbody>
</table>
AIP conference proceedings from 01/19/2000 to 1 year ago in Academic Search Complete

Annual review of astronomy and astrophysics 2006-present http://www.annualreviews.org/loi/astro

Astronomical journal from 1998 to present in IOP Publishing Current Journals Archive
Google Scholar

Cline Library

Library Home  Research Help  Services  Faculty Services  General Information  Special Collections

Articles & Databases  Journals  Books  Movies & Music  Google Scholar  Research Guides

Search Google Scholar
Search Google Scholar to find scholarly articles across disciplines.

Search
Think about keywords
Search Terms: Physics AND 2015 “Nobel Prize”
Put phrase in quotes
Use AND all caps to search for two things together
Think of other related terms
Refine search
Gray literature is information that is not published in mainstream formats, i.e. journals or monographs. It is not typically indexed in databases and can therefore be challenging to find. Traditionally, gray literature includes:

- Technical reports
- Dissertations & theses
- Patents
- Some conference proceedings
- Government information
- Many other publications such as preprints, white papers, internal newsletters
Why is grey literature important?

- **Depth and Breadth:** A thesis may contain data that is never included in the journal article that is ultimately published using its findings. In other cases, a broader view may be what is wanted, in which case a government factsheet or institutional newsletter targeted to a lay audience may meet the searcher's need. It is also important to note that, due to various forms of publication bias, including positive results bias and time lag bias, studies with negative results are far more likely to be found in gray literature than in mainstream publications.

- **Timeliness:** Results of studies may appear in gray literature 12 to 18 months before being published via traditional channels.

- **Flexibility:** Rather than waiting years for the publication of a revised edition, authors, editors, and Web content creators can update information when needed, a factor that reinforces the timeliness of gray literature.

- **Accessibility:** Although governments and industries often restrict the readership of certain types of gray literature (classified or proprietary information, for example), there is also a great abundance of gray literature that is freely available to all, either in print or on the Web.
Evaluating Sources

CRAAP

Currency
Relevance
Authority
Accuracy
Purpose

What is the date when the website last updated or revised?

Does the information answer your research question?

Is it entirely about your topic or just a few sentences?

Who is the author?

What qualifications does the author or group responsible for the website have?

Is the website bias or objective?

Is there contact information?

What is the purpose of the website?

Would you trust this website? Why? Why not?
Literature Reviews

- Understand topic
- Develop ideas
- Demonstrate Knowledge
- Find Relationships and links between existing ideas and research
Studies that build or respond to major works

Research Published on Topic
Developing and connecting ideas.
Selective or Comprehensive Reviews
Collect, Read, critically evaluate, analyze, and organize relevant information on topic
* Follow citation trail (cited by, related articles)
* Describe and summarize each article
* Highlight Key concepts and papers
* Compare and contrast papers
* Discover Relationships between papers
* Identify major themes and concepts, critical gaps, and disagreements
Critical Reading Questions

to ask when reading and interpreting scholarly articles

* What is the source (journal) of the article?
* Was the article peer reviewed?
* Who are the authors and what are their affiliations?
* What is the main subject of the study?
* What was the problem(s) investigated?
* What is purpose of rationale for the study?
* Who or what constituted the sample of population?
* What was the design of the study?
* What are the statistical analyses used?
* What are the results?
* Are the results clear?
* Did the results answer the identified questions?
* Do the results seem valid?
* Are the interpretations of the results consistent with design and analysis?
* Are the results consistent with findings from similar studies?
* What do the results mean to medicine and health care, to health care workers and patients?
* Can the results be applied to your practice or research?
Your Review

* Includes your own thoughts and ideas
* Reviews existing literature
* Discusses major themes and concepts on topic
* Identify gaps or disagreements
* Bibliography or citation of sources
## Citations

http://libdiy.lib.nau.edu/diy/using-and-citing-sources

<table>
<thead>
<tr>
<th>Need to cite</th>
<th>Don’t Need to Cite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideas from an article, book. Webpage, TV show, etc.</td>
<td>Your own observations, life stories, conclusions, etc.</td>
</tr>
<tr>
<td>When you copy exact words</td>
<td>Your own artwork, images, audio, or video</td>
</tr>
<tr>
<td>Images, Illustrations, graphs, audio, video, etc that you use</td>
<td>Commonly accepted information (facts-i.e. pollution is bad for the environment)</td>
</tr>
<tr>
<td>If you didn’t make it, cite it</td>
<td>If you made it or it is commonly accepted information, don’t cite</td>
</tr>
</tbody>
</table>
Questions?

* Email me Naomi.Bishop@nau.edu to set up an appointment with me at Cline Library