



Finding Information for Your Research Paper

Key Info

- Most teachers will require you to find at least three sources of information.
- How to find information:
 - Find and read the general information contained in an encyclopedia, dictionary, or textbook for each of your keywords.
 - Use the bibliographies and sources in everything you read to find additional sources of information.
 - Search periodical indexes at your local library.
 - Search the Internet to get information from an organization, society or online database.
 - Broaden your search by adding words to your search phrases in search engines. Narrow your search by subtracting words from or simplifying your search phrases.
- When you find information, evaluate if it is **good** information:

Good References	Bad References
Come from a credible source	Come from a source with poor credibility
Not too old	Out of date
Not biased	Not objective and fair, biased towards one point of view
Free of errors	Prone to errors
Properly cite the original source of all information	Do not cite where the information came from
Easy for other people to find or obtain	Difficult for others to obtain

How to Find Information

No matter how you do your background research, record your sources and take good notes as you go. Your teacher may be able to offer you some tips.

Library Research

One of the most valuable resources at the library is not a book, but a person. Public librarians, college librarians and certified school librarians are specially trained to teach information literacy. Librarians are excellent sources for organizing research, for teaching how to search, how to read and use citations, how to narrow down web searches, and how to winnow out the good from the bad. Many public libraries also have virtual reference services, where a client can online chat, email or talk on

the phone with a reference librarian. So, be smart; talk to your librarian.

Often the best place to start your background research is by looking up your keywords in an encyclopedia, dictionary, or textbook. Your library may have specialized dictionaries for different topics like science, sports, music, and so on, which offer more complete information than a regular dictionary. Ask your reference librarian to help you.

"Read the background information and note any useful sources (books, journals, magazines, etc.) listed in the bibliography at the end of the encyclopedia article or dictionary entry. The sources cited in the bibliography are good starting points for further research.... By using this technique of routinely following up on sources cited in bibliographies, you can generate a surprisingly large number of books and articles on your topic in a relatively short time" (Engle 2003).

You can also check the subject headings of books and articles as you look them up in the library catalog. Check to see if other books in the same subject area contain relevant information.

Periodicals are printed material like magazines and newspapers. Depending on your topic, they may also contain useful information. You can look up your keywords in a printed index such as the Reader's Guide to Periodical Literature, which covers popular magazines. Your library may have a number of periodical indexes in both printed and online forms. Check with your reference librarian.

One little-known fact about public libraries is that they often pay for online resources that are generally inaccessible to the public. Using computers at the library, or sometimes by logging on at home with your library card number, you can gain access to information unattainable in any other way.

In addition, branch libraries are part of a larger library system. Although your neighborhood library may be physically tiny, it has access to all the resources of the whole city or county library system. Interlibrary loans of books and documents is also possible. Many libraries have loan agreements with other libraries out of county, out of state or out of country. Tell your librarian the book you want and he or she can probably obtain it for you.

Internet Research

There are two primary ways to search for information on the Internet. The first is to use a search engine such as Google or Yahoo!:

- <http://www.google.com> (<http://www.google.com>)
- <http://www.yahoo.com> (<http://www.yahoo.com>)

Search engines try to index everything on the Internet. The second way to search is using a subject portal. Subject portals list just a small portion of the information on the Internet, but the sites listed have been checked for relevance. Two popular subject portals are:

- [Librarians' Index to the Internet](http://lii.org/) (<http://lii.org/>)
- [WWW Virtual Library](http://vlib.org) (<http://vlib.org>)

You can begin by entering your keywords one at a time to search for information in search engines and subject portals; however, this will probably bring up too much irrelevant information. See "Finding Too Much or Too Little Information" below for how to improve your search results.

If you want some advanced tips on using the Internet to find information, here are two good sites. There is valuable information here even for people who think that they are good at Internet searching.

- <http://www.lib.berkeley.edu/TeachingLib/Guides/Internet/FindInfo.html>
(<http://www.lib.berkeley.edu/TeachingLib/Guides/Internet/FindInfo.html>) A tutorial offered by the Teaching Library at the University of California at Berkeley.
- [Librarians' Index to the Internet: Internet Guides and Search Tools](http://lii.org/pub/topic/netsearch). (<http://lii.org/pub/topic/netsearch>) Check out the tips in

"Internet Searching."

To do an internet search for books containing information about a specific science fair project, the Science Fair Project Index (developed by the Akron Summit Public Library) is a great place to start. The Index is designed to allow the user to locate a particular experiment by the general topic; by keywords in the experiment title or book information; by grade level; by the materials or equipment employed; or by the principle demonstrated.

- <http://www.akronlibrary.org/scifair/> (<http://www.akronlibrary.org/scifair/>)

Before you begin Internet research, review the Science Buddies [Internet Safety Guide](http://www.sciencebuddies.org/science-fair-projects/project_ideas/Internet_Safety.shtml) (http://www.sciencebuddies.org/science-fair-projects/project_ideas/Internet_Safety.shtml) with your parents. This guide offers many important tips to help you stay safe online, such as:

- Email addresses, user account names, and screen names should never include your name, birthday, name of your school, or any combination of personally identifiable information.
- Don't assume blogging is private. It's possible for search engines to pick up the information you post. If you publish photos or links to private websites on your blog, you also reduce your level of protection. Check out your blog host's setting options to find out if you can turn off some of these features, and be cautious of what you post on your blog.
- Never allow a stranger to join a buddy list, a chat, or an IM conversation.

Finding Too Much or Too Little Information

If you are finding too much information, for example pages and pages of irrelevant hits on Google or a periodical index, you need to narrow your search. You can narrow your search by borrowing some of the terms in your research questions. For example, let's imagine that searching on "milk" brings up too much irrelevant information about cows. Here are the research questions we listed having to do with milk:

- What is the composition of milk, Pepsi, and water?
- What are the properties and characteristics of milk, Pepsi, and water?

Try searching on:

- milk composition
- milk properties characteristics

This will narrow your search, and hopefully give you more relevant results.

If you aren't finding enough information, you need to simplify your search. Let's imagine that searching on "measuring spiciness" isn't finding what you want. Try searching on:

- measure spiciness
- spiciness
- spice

Most online search engines and periodical guides have instructions about how to narrow and broaden searches. Read the instructions! (Sorry, do we sound like your teacher?) Here are some places to find additional information:

- <http://www.google.com/help/refinerearch.html> (<http://www.google.com/help/refinerearch.html>) This is where Google talks about how to improve your searches.
- [Librarians' Index to the Internet: Internet Guides and Search Tools](http://lii.org/pub/topic/netsearch). (<http://lii.org/pub/topic/netsearch>) Check out the tips in "Internet Searching."

Too Complicated or Too "Babyish" Information

Sometimes the information you find will be relevant, but either too complicated given your science background or too babyish. This is a problem that we all experience. Just keep looking and ask for advice if you're really stuck.

Your Goal

Never forget, the goal of your searching is to find information to answer the research questions you asked about your topic. Don't stop looking until you have sources that will answer your questions! Be sure to ask for help from mentors, parents, and teachers if you're having trouble.

A Checklist for Evaluating References

What Makes a Good Reference?	For a Good Reference, You Should Answer "Yes" to Every Question
Does your reference come from a credible source?	Yes / No
Is your reference current?	Yes / No
Is your reference objectively written, not biased towards one point of view?	Yes / No
Is your reference free of errors?	Yes / No
Does your reference properly cite its original sources?	Yes / No
Is the reference easy for other people to find or obtain?	Yes / No

You can find this page online at: http://www.sciencebuddies.org/science-fair-projects/project_finding_information.shtml



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