Research & Writing
for high school and college students

the Internet Public Library

Need to write a research paper?

Want to do an A+ job without going totally NUTS?

Here's help!

Step by Step - guide to researching and writing a paper

Info Search - finding things in cyberspace and your library

Links - to great online resources for research and writing

This is your printable copy of an online resource provided by:

the Internet Public Library

http://www.ipl.org/teen/aplus/

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Step by Step Research & Writing

Why the Step by Step Approach?

There's a ton of information available online about writing papers for college classes, mostly provided by college and university writing departments. But when your political science or biology or economics instructor assigns you a research paper, writing the paper is only half the battle.

Before you can start writing, you have to

- explore the subject to find a topic,
- locate relevant information,
- analyze the issues and
- organize your arguments.

These activities take more time and require different skills than the final step--writing the paper. And many students haven't had a lot of formal training in how to do research and prepare information for writing a "research paper."

Librarians provide a lot of help to students in the exploring, finding and organizing phases of their writing projects. They've done research on how students approach these tasks, how they feel while they're doing them, and what kinds of activities lead to a successful research paper (Kuhlthau, 1993 and 1994).

The paper is your final *product*, but a research paper involves an extensive *process* before you can generate the product. The Step by Step section will guide you through this process from getting the assignment to writing the paper.

A+ is the goal!

Step 1 - Getting Started

Goal: Preparing for the assignment and getting ready to choose a topic.

Feelings: Don't be surprised if you feel like many people do as they get started--worried about the amount of work ahead of you and a bit unsure of yourself. You might even feel a little excitement, anticipating the project! Or maybe not.

Hey wait a minute! *Why should I care about how I'm feeling during this whole process? There's an old saying, "Misery loves company." If you know how other students feel as they go through the research and writing process and you feel about the same way, you'll know your project is right on track!*

Thoughts and Actions: Follow the steps below to get an idea of things you should be *thinking about* and *doing*, and some of the *strategies* which will help. Note the type of information search you should be doing at this stage.

Info Search

Your information search at this stage involves getting a "bird's eye" view of possible topics, browsing for ideas and finding out what kind of sources (print, electronic and internet) might be available to you on various topics.

1.1 Understand the assignment

Read over the instructions for the assignment to make sure you fully understand what the instructor has in mind and on what basis you will be graded. The Roane State Community College OWL (Online Writing Lab) (Henley, 1996) describes some common types of research papers as:

Report	Sometimes, a teacher will assign topics or give students a range of topics to choose from and ask that the students write a research paper on the topic. This type of research paper is really a form of individual study. The measure of success is how well the student can conduct research, analyze and organize the information and communicate it clearly in written form. Frequently, reports require an oral presentation to the class as well.
Issue Analysis	A research paper may highlight a particular issue or problem in a field of study. The paper may focus on analysis of the issue and its solutions, possibly from both historical and current perspectives. The posture of the writer is frequently

that of a neutral observer more than an advocate for a particular position. The success of the paper is often based on how completely and clearly the writer has identified the key aspects of the issue and their significance to the field to which they relate.

Advocacy or Persuasion

A research paper may involve taking a stand on an issue and defending it against opposing points of view. The student will research the issues and read others' arguments for and against. The paper will anticipate and deflect arguments against the position, while presenting supporting evidence in favor of the position. Success will depend on how persuasively the paper makes its case and defends against possible opposition.

There's also a quick reference list of different types of papers with short descriptions of each type at the Houston Community College Systems Library, available at its Web site, (http://www.hccs.cc.tx.us/Library/TipSheets/-Essay.html). See also our links (p 51) to *Common Types of Papers* and *Papers on Special Subjects* for articles on the unique aspects of various types of essays and research papers.

Be sure you understand what kind of a paper you've been asked to write, since the approach you'd take could be vastly different, depending on the purpose of the paper and the expectations of your instructor!

1.2 Consider the process you'll use

The paper is your final *product*, but a research paper involves an extensive *process* before you can generate the product. If you focus too quickly on the end product, you may miss some of the important research steps and find yourself writing a paper without enough understanding of the topic to do an A+ job.

Browse over the rest of the steps suggested in this manual to get an idea of the process and think about how you'll approach each step. Start a journal or notebook and begin jotting notes about not only "what" you plan to do but also "how" you plan to do it.

For a quicker overview of similar research steps, and why they're important, see "Steps in the Research Process," (Hord, 1995 B) at the HCCS Libraries' Web site (http://www.hccs.cc.tx.us/Library/Center/Lobby/Steps.html).

1.3 Set your deadlines for each step of the assignment

Ideally, you will have at least four weeks from the date it's assigned to complete a research paper of 7 or 8 pages (2,000 to 2,500 words). Shorter papers requiring fairly simple research (4 or 5 pages - 1,500 words) may not require four weeks' "lead time," while a 15 page or longer paper might be a semester-long project.

The page *Scheduling Your Project* (p. 8) will help you set time deadlines for yourself.

1.4 Think about possible topics

The word "topic" is used variably by many teachers of writing and research to mean anything from the very general "subject matter" to the very specific "thesis statement." In this manual, the term **topic** is broadly defined, while **focus** means a narrower perspective on the topic, and **thesis** statement is the main point of your paper, which cannot be determined until after research and analysis is complete. Look over *Step 2, Discovering a Topic*, and *Step 3, Looking for and Forming a Focus* for more information about these distinctions.

1.5 Info Search - browse, read, relax

Start by thumbing through the textbooks or course pack for the class in which your paper was assigned. Browse the table of contents, chapter headings and subheadings, to get an overview of the subject matter. Visit your library and browse in the catalog and reference room to find out what sources are held by the library which may relate to your class. Browse some of the subject-indexed sources on the internet with the same purpose. The *Info Search* section of this manual (p. 20) will help you learn how and where to browse.

Your objective in this step is to get a "bird's eye view" of the general subject matter, to give your brain some ideas to work on while you're getting ready for the step of choosing a topic.

1.6 Relate your prior experience and learning

The process of successful research and writing involves building on what you know. You don't need to know *a lot* about a subject in order to use it as your topic, but choosing one you're totally unfamiliar with could be a mistake. It may take so much time and effort to become informed about the subject that you don't really have time to get into the depth required by your assignment.

1.7 Jot down your questions and ideas about possible topics

Use your notebook to starting recording questions which interest you or ideas for possible topics. If you're researching a paper for a 20th century American history class, write down questions you wonder about:

- Why did the stock market crash in 1929?
- Who was the worst 20th century American President?
- Did the Cigarette Smoking Man from X-Files really kill JFK?

You'll end up with a list of ideas and musings, some of which are obviously ridiculous and not reasonable topics for your paper, but don't worry about that at

this point. Think about things which interest you and which build upon some experience or knowledge you have or build upon things you're presently learning in class.

Also see the links to *Reading Techniques and Journal Writing* (http://www.ipl.org/teen/aplus/linksplanning.htm#reading) for tips on how to use a journal to help you in researching and writing a paper.

1.8 Brainstorm, alone and with others

Toss ideas around in your mind. Bounce ideas off of your classmates, your teacher or (heaven forbid) your siblings and parents, to get their reactions and ideas. Many times another person will have a fresh perspective you might not have thought of, or something they say will trigger an idea for you.

Scheduling your project

A time crunch could be one of your biggest challenges in completing a successful research paper. Take the time now to plan your deadlines--it will help you get going and tell you when to wrap up one step and move on to the next.

	**Step by Step Research & Writing**	**Percent of Time***	**Date you will finish this step**
	**Step 1** - Getting started: planning the process	**5%**	
	**Step 2** - Discovering and choosing a topic	**10%**	
	**Step 3** - Looking for and forming a focus	**20%**	
	**Step 4** - Gathering information: detail research	**25%**	
	**Step 5** - Preparing to write	**10%**	
	**Step 6** - Writing and revising	**30%**	

*Suggested times for each step

The suggested percentages of time are to give you an idea in general how you may want to divide up your time between now and the time your paper is due. As you can see, the research steps are projected at 60% of the total time, while writing is 40%. Depending on how complex your topic is and how much you know about it at the beginning, your time could be more or less heavily weighted toward research versus writing.

As you work through the Step by Step approach, you will find that you'll need time for reading and research at almost every step. This means a trip to the library, or an internet session on your computer, so be sure to plan enough time for those activities. Also, the whole process works best if you have time for reflection, thinking--time for you to put the project aside and "sleep on it." If you possibly can, build these times into your schedule. Your paper will be a better product and you are likely to be happier with the whole process.

Step 2 - Discovering and Choosing a Topic

Goal: Discovering and choosing a topic for your research.

Feelings: You may feel confused, adrift in a sea of information. You may be anxious to pick a topic and "get on with it." Once you've made a choice, you'll probably feel elated and excited - for a while, at least!

Thoughts and Actions: Follow the steps below to get an idea of things you should be *thinking about* and *doing*, and some of the *strategies* which will help. Note the type of information search you should be doing at this stage.

Info Search

Your information search at this stage might be viewed as "surveying the territory." Instead of the birds' eye view you took at first, picture yourself piloting a helicopter, at times soaring over the landscape, then hovering for awhile over an interesting area and maybe even dipping down for a closer look.

2.1 Info Search - read for overview of various topics

Use the notes you've made and the thinking you've done so far to select some areas for general reading. Use the library's reference room--encyclopedias, dictionaries, almanacs--to get an overview of possible topics (even if your instructor has told you that you can't use an encyclopedia as a reference--that's not important at this stage).

Explore CD-ROM tools in your library, like newspaper and magazine indexes, searching with key words representing your topic ideas. Explore the internet by using several of the resources organized by subject. The *Info Search* section of this manual (p. 20) will help you learn how and where to find these resources.

Remember to keep your concept of topic rather broad at this stage--you can look for a focus later, after you know something about the topic. Read the article "Narrowing Your Essay Topic," from the University of Victoria, (http://webserver.maclab.comp.uvic.ca/writersguide/Pages/EssayNarrowTopics.html) for some specific examples of broader and narrower topics. Also consider framing your topic as a question, as recommended by the HCCS Libraries in "The Art of Research Questions" (http://www.hccs.cc.tx.us/Library/Center/Lobby/Question.html).

2.2 Continue thinking and jotting down questions and ideas in your notebook

As you read, ideas and questions may strike you - write them down, or you'll lose track of them. Look for issues which interest you, which arouse your curiosity or your passion (no, not that kind of passion, unless it's a human sexuality course). Consider the audience for your research paper: what kinds of things have been discussed in class that seemed to interest the class and the instructor? What kinds of issues were touched upon but could use further study and elaboration?

Here is advice from Colgate University on this process:

> *Write down all the ideas that occur to you--the brilliant insights, the stupid questions, the complaints, the emotions, the reactions, the things you're reminded of--everything. (Typically these ideas will crowd into your head as you write out your answers to the prewriting tasks. Instead of pushing them aside, forgetting them, or telling yourself that they are irrelevant, write them down. Later you may find relevance to things that at first seemed immaterial.) (http://www2.colgate.edu/diw/model.html)*

Also see the links to *Planning and Starting the Writing Process* (p. 52), especially the *Ideas* section and *Reading Techniques and Journal Writing*.

2.3 Info Survey - what print and electronic resources are available?

When you've narrowed your choices down, make a quick survey of the research resources which will be available to you on each potential topic. How much information seems to be available in your library's catalog? If it's a current topic, is there information in newspaper and magazine indexes and are those newspapers and magazines held by your library? Is there much authoritative information on your topic on the internet? Is the available information slanted to one side of an issue versus another? How much work will it take to get the information you need if you choose a particular topic?

2.4 Try different topics on for "size"

The topic you choose should "fit" in several important respects: your interests and knowledge, the purpose of the assignment, the type of paper (report, issue, argument), the length of the paper. Don't worry too much about having a broad topic at this point--in *Step 3* you'll be looking for a focus to narrow the topic down to a manageable size for research and writing. Look for topic ideas at Researchpaper.com (http://www.researchpaper.com/) or in your library. Ask the reference librarian if the library has books of suggested topics like *10,000 Ideas for Term Papers, Projects, Reports & Speeches* (Lamm, 1995).

Step 3 - Looking for and Forming a Focus

Goal: Exploring your topic, finding and forming a focus for your research.

Feelings: You're probably still feeling uncertain, even though you have a topic. As you root around in your topic, you may have your darkest hour in the whole process, feeling threatened by the choice of a focus--what if you pick the "wrong" one? Try to tolerate these feelings. Once you choose a focus, you should start to feel some optimism and confidence. You may even have an "Aha!" experience, but don't worry if you don't--there's not an "Aha!" in every A+ paper.

Thoughts and Actions: Follow the steps below to get an idea of things you should be *thinking about* and *doing*, and some of the *strategies* which will help. Note the type of information search you should be doing at this stage.

Info Search

Now that you have a topic, you need to learn about it! Instead of piloting a helicopter over the landscape, you're now on the ground. Picture your topic as a square mile of land. Your task is to explore it, which will require going around, over and through it several times to see what's there, looking at it from different perspectives.

3.1 Info Search - exploring your topic

Before you can decide on a focus, you need to explore your topic, to become informed about the topic, to build on your knowledge and experience. You'll be locating books, articles, videos, internet and other resources about your topic and reading to learn! You're looking for an issue, an aspect, a perspective on which to focus your research paper.

This is the first step in which you'll probably be checking books out of the library. Encyclopedias won't be much help here. You're looking for treatments of your topic which are either more comprehensive or more specific than an encyclopedic treatment, with various authors' summaries, analyses and opinions. But, until you've chosen a focus, you're not really on a mission of gathering information. If you gather information on the topic as a whole, you'll waste a lot of time doing it and have way too much to sort through when you are ready to write your paper. Resist the temptation to “gather” until you've chosen a focus.

Now you'll be using the library's online catalog, online indexes and the Web search engines along with the reference room and the subject-based Web directories. Learn how in the *Info Search* section (p. 20).

3.2 Info Search - preliminary note taking

As you read, start taking notes of what you're learning about your topic--concepts, issues, problems, areas where experts agree or disagree. Keep track of the bibliographic references for the information you're using, and write down a note or two of what's contained in the book, article, Website, etc. There's nothing more frustrating than knowing you read something earlier about a particular point and not being able to locate it again when you decide it's something you need.

Find out what kind of citations are required by your instructor and make sure you're recording what you'll need to do your bibliography. See links to *Citing Sources* (p. 52).

3.3 Purposeful thinking about possible focuses

While you're learning about your topic, intentionally look for possible focuses in the material. You could spend enormous amounts of time reading, especially about an interesting topic, without being any closer to a focus unless you purposefully keep that goal in your mind while you read.

3.4 Choosing a focus or combining themes to form a focus

Try your choices of focus on for "size" as you did your topic. Which ones fit the assignment, the size, scope and type of the paper? Think about which of your possible focuses has the best chance for making a successful A+ paper. If you find several themes within your topic which each are too small to support the entire paper, can they be combined to form a focus?

If you haven't yet read the online linked articles on

- *Ideas* (http://www.ipl.org/teen/aplus/linksplanning.htm#ideas)
- *The topic* (p. 52)
- *Thesis statement* (p. 52)

browse through them to get suggestions for focusing and narrowing your topic.

Step 4 - Gathering Information

Goal: Gathering information which clarifies and supports your focus.

Feelings: Many people feel interested and challenged at this stage. The agonizing part of choosing *what* to research is over and the task of *finding* the specific information you need is more like solving a puzzle or going on a treasure hunt. If any part of this process is going to be *fun*, this is the part.

Thoughts and Actions: Follow the steps below to get an idea of things you should be *thinking about* and *doing*, and some of the *strategies* which will help. Note the type of information search you should be doing at this stage.

Info Search

Your information search at this stage is focused and specific, and you're keeping a careful record of what you find. Instead of the square mile of land to explore, you've roped off half an acre. You're walking it systematically, bending down now and then to pick up something and chuck it in your backpack, then recording in your notebook what you found and where you found it.

4.1 Info Search - finding, collecting and recording

This is the step most people think of when they think of "library research." It's a hunt for information in any available form (book, periodical, CD, video, internet) which is pertinent to your chosen focus. Once you know the focus of your research, there are lots of tools and strategies to help you find and collect the information you need.

Your information search should be focused and specific, but pay careful attention to serendipity (finding, by chance, valuable things you weren't even looking for). Keep your mind open to continue learning about your focused topic.

Now is the time to carefully record your sources in the bibliographic format required by your instructor. Every piece of information you collect should have bibliographic information written down before you leave the library. See the links to *Citing Sources* (p.) for information on how and when to use quotation, paraphrase and summary and how to conform to the required styles of citation in different fields of study. You should also pay attention to the quality of the information you find, especially if you're using information you find on the internet. See the linked articles about *Interpretation and Evaluation of Information* (http://www.ipl.org/teen/aplus/linksother.htm#interpret).

Now is also the time to learn the details of using search engines. Many of the sources you will want to use are online, whether in the library or on the internet. See the *Info Search* section (p. 20) and specifically the *Skills for Online Searching* article (p. 40).

4.2 Think about clarifying or refining your focus

As you gather information about your focused topic, you may find new information which prompts you to refine, clarify, extend or narrow your focus. Stay flexible and adjust your information search to account for the changes, widening or narrowing your search, or heading down a slightly different path to follow a new lead.

4.3 Start organizing your notes

Start organizing your notes into logical groups. You may notice a gap in your research, or a more heavy weighting to one aspect of the subject than what you had intended. Starting to organize as you gather information can save an extra trip to the library. It's better to find the gap now instead of the night before your paper is due (obviously!).

Look through the articles linked under *Organizing Information* (p. 52), which includes taking notes, outlining and organizing by mapping, cubing, etc.

4.4 Think about what your thesis statement will be

The thesis statement is the main point of your paper. The type of thesis statement you'll be making depends a lot on what type of paper you're writing--a report, an issue analysis, an advocacy paper or another type. As you gather specific information and refine your focus, intentionally look for a main point to your findings. Sometimes, a thesis emerges very obviously from the material, and other times you may struggle to bring together the parts into a sensible whole. The tricky part is knowing when to stop gathering information--when do you have enough, and of the right kind? Seeking a main point as you research will help you know when you're done.

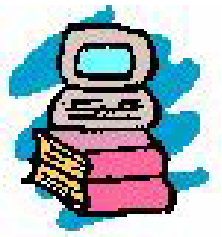
Read the linked articles on *Thesis statement* (p. 52) for guidance.

Step 5 - Preparing to Write

Goal: Analyzing and organizing your information and forming a thesis statement.

Feelings: You may feel uncertain where to start or overwhelmed by information, but you also probably see a glimmer of "light at the end of the tunnel" that encourages you.

Thoughts and Actions: Follow the steps below to get an idea of things you should be *thinking about* and *doing*, and some of the *strategies* which will help. Note the type of information search you should be doing at this stage.



Info Search

Don't turn in your library card yet. Be prepared to go back to your information sources to fill in any gaps you find as you analyze and organize your information prior to writing.

5.1 Analyze and organize your information

The word "analyze" means to break something down into its parts. A meaningful analysis identifies the parts and demonstrates how they relate to each other. You may have information from different sources which examines different aspects of your topic. By breaking down the information, you may be able to see relationships between the different sources and form them into a whole concept.

When you're trying to make sense of the information coming out of your research process, you often have to look at it from different perspectives and sometimes have to step back and try to get a "big picture" view. Some ways to do this are to try out different organization patterns: compare and contrast, advantages and disadvantages, starting from a narrow premise and building on it, cause and effect, logical sequence. There are many tools to use in analyzing and organizing research findings, such as webbing, outlining, cubing, mapping--see the linked articles on *Organizing Information* (p. 52).

5.2 Construct a thesis statement and try it on for "size"

Before beginning to write the paper, write the thesis statement. Boil down the main point of your paper to a single statement. Hamilton College (Williams) gives this explanation of the thesis statement:

> *A well-written thesis statement, usually expressed in one sentence, is the most important sentence in your entire paper. It should both summarize for your reader the position you will be arguing and set up the pattern of*

> *organization you will use in your discussion. A thesis sentence is not a statement of accepted fact; it is the position that needs the proof you will provide in your argument. Your thesis should reflect the full scope of your argument--no more and no less; beware of writing a thesis statement that is too broad to be defended within the scope of your paper.*

The article from which this quote is taken also gives some excellent examples of thesis statements for papers in various disciplines. See the Hamilton College article and others in the Links section for *Thesis statement* (p. 52).

Another way to summarize the nature and function of the thesis statement is that it is a single sentence, usually in the first paragraph of the paper, which:

- declares the position you are taking in your paper,
- sets up the way you will organize your discussion, and
- points to the conclusion you will draw.

5.3 Weed out irrelevant information

Guess what. Now that you have all those wonderful notes and citations from your research, you're going to have to get rid of some of them! No matter how profound and interesting the information is, if it doesn't relate to and support the thesis you've chosen, don't try to cram it into the paper--just sigh deeply and set it aside. You'll have an easier time writing if you do this weeding before you start.

5.4 Info Search - fill in the gaps

Once you've identified which of your research notes you'll use, you may see some gaps where you need an additional support for a point you want to make. Leave enough time in your writing plan for an extra trip to the library, just in case.

Step 6 - Writing the Paper

Goal: Writing, revising and finalizing the paper.

Feelings: When your paper is finished, you may feel satisfaction, *or* dissatisfaction, depending on how you feel about the end product. You'll probably feel a sense of relief and the strong urge to take a nap--go ahead, you deserve it!

Thoughts and Actions: Follow the steps below to get an idea of things you should be *thinking about* and *doing*, and some of the *strategies* which will help. Note the type of information search you should be doing at this stage.

Info Search

Get to know the OWLs - the Online Writing Labs - from universities all over the country. Many colleges have put information online to help both the students enrolled in writing courses and students who have to research and write for other courses. The OWLs' online handouts cover almost every conceivable aspect of writing, from grammar and punctuation to choosing a title for your paper.

6.1 Think about the assignment, the audience and the purpose

To prepare for writing, go over once more the requirements of the assignment to make sure you focus your writing efforts on what's expected by your instructor. Consider the purpose of the paper, either as set forth in the assignment, or as stated in your thesis statement--are you trying to persuade, to inform, to evaluate, to summarize?

- Who is your audience and how will that affect your paper?
- What prior knowledge can you assume the audience has on the topic?
- What style and tone of writing are required by the audience and the assignment--informal, scholarly, first-person reporting, dramatized?

Read the linked articles that discuss *Audience and Tone* (http://www.ipl.org/-teen/aplus/linkswritingstyle.htm#audience). Also, look at the articles about the structure and purpose of different kinds of papers--*Common Types of Papers* and *Papers on special subjects* (p. 51)--to make sure your writing goals are clear to you.

6.2 Prepare an outline

Try to get a "model" outline for the type of paper you're writing, or look at examples of good papers to see how they were organized. The Roane State Community College OWL (Henley, 1996) gives an example of an outline for a paper written to describe a problem:

- **Introduction**
    - **Statement of the Problem**
    - **Thesis Sentence**
- **Body: Paragraphs 1 and 2**
    - **History of the Problem (Include, perhaps, past attempts at solutions. Work in sources.)**
- **Body: Paragraphs 3 and 4**
    - **Extent of the Problem (Who is affected? How bad is it? Work in sources.)**
- **Body: Paragraphs 5 and 6**
    - **Repercussions of the Problem (Work in sources.)**
- **Body: Paragraphs 7 and 8**
    - **Future solutions (not necessarily your own. More sources.)**
- **Conclusion**
    - **Summarize your findings**

There are a lot more model outlines and instructions for preparing outlines available in books and at the OWLs. See the links under *Organizing information* (p. 52) for lots of articles on outlining and other ways to organize your paper.

6.3 Write the rough draft -- visit the OWLs

Here's where the Online Writing Labs excel--there are many dozens of great articles on every aspect of writing your paper. The *Links to Online Resources* pages (p. 51) have classified these by topic so that you can browse easily and pick out articles you want to read. The entire *Links for Writing* section will be helpful, and specifically the sections on:

- Title, introduction and conclusion
- Writing style and technique
- Grammar and punctuation

6.4 Know how to use your source materials and cite them

See the section *Citing sources* on the Links page (p. 52). There's also a nice section on using sources in the middle of another article entitled “Writing a General Research Paper” (http://www2.rscc.cc.tn.us/~jordan_jj/OWL/Research.html) from the Roane State Community College OWL (Henley, 1996). The section, "What Happens When the Sources Seem to be Writing My Paper For Me?" describes how to break up long quotations and how to cite an author multiple times without letting the author take over your paper, and it links to both the MLA and the APA style requirements for partial quotations, full quotations, indented quotations, in-text quotations, and paraphrasing.

6.5 Have others read and critique the paper

Read your paper out loud, to yourself. See if the arguments are coherent, logical and conclusive when read aloud. Have several experienced people read and critique your paper. If your school has a writing lab, use the tutors or helpers there as critics. If your only choice is other students, make sure they're A students!

See the linked articles on *Critiques and peer review* (http://www.ipl.org/teen/-aplus/linksrevising.htm#critiques).

6.6 Revise and proofread

See the "Revision Checklist" section of the article *The Research Paper* (http://www.chesapeake.edu/Writingcenter/respaper.html) from Chesapeake College. The checklist asks some general questions to help you step back and take a look at the overall content and structure of the paper, then drills down to paragraphs, sentences and words for a closer examination of the writing style.

Almost all the OWLs have very large sections on grammar, sentence and paragraph structure, writing style, proofreading, revising and common errors. Browse some of the larger OWLs like Purdue University and University of Victoria and see the linked articles on *Revising and rewriting* (p. 52).

Congratulations! You made it through all the steps to researching and writing an A+ paper. We hope your instructor agrees!

Info Search

Where’s the information?

Searching for information today is both easier and harder than it was when your only choice was the library and its massive card catalog. More information is available than ever before, and you can access information from across the country or around the world. But finding what you want requires more skill on the part of the researcher, mainly because the human intermediaries--the reference librarian and the skilled cataloguer/indexer--are largely absent from cyberspace.

This means that you, the researcher, need to understand where information is most likely to be found, how it's organized and how to retrieve it effectively using computerized search tools. The reference librarian is an invaluable resource to help teach you and advise you, but won't be there when you're searching Yahoo at midnight on the weekend before your paper's due.

Here are several articles to get you started:

- **Learning to Research in the Library (p. 21)**
- **Learning to Research on the Web (p. 35)**
- **Skills for Online Searching (p. 40)**
- **Information Found--and Not Found--on the Web (p. 43)**
- **Search Strategy: Getting a Broad Overview of a Subject (p. 47)**
- **Search Strategy: Finding Specific Information (p. 49)**

Learning to research in the library

Get to know your library

The resources available to you will vary a lot depending on whether you're using an academic library at a large university, a public library in a large (or small) community, or a high school library. Find out early in your research project what resources your library has, by visiting and taking a tour, if possible. Some college libraries offer an online tour of the library or a self-guided tour using handouts in addition to tours guided by librarians.

Many people who use libraries don't make full use of the reference collection except for the encyclopedias, while reference librarians have spent large amounts of money and time in developing wonderful reference collections for research. See *Reference Sources in Libraries* (p. 29) to see a small sample of the kind of information may be hiding in your library's reference room.

Libraries build their collections based on what they think their patrons will need, so the collections of reference materials, fiction and non-fiction will differ between a public and an academic library. Be aware of what kind of collection you're working with, and make arrangements to visit a different library if necessary.

Learn to browse - understand the classification scheme in your library

A library's classification scheme is a system by which books are organized to be placed on the shelves. Browsing the shelves is an important step when you're trying to get ideas for your research project, so it's worth the effort to become familiar with your library's system.

Most libraries in the U.S. use either the Dewey Decimal system or Library of Congress system, while Britain uses the UDC and other countries use various systems. All of the systems attempt to "co-locate" books with similar subject matter. In a smaller library, many times you can bypass the catalog as a starting point and go directly to the shelves for a first look at your topic, so long as you have a chart of the classification scheme as a guide.

Remember, though, that a book can have only one location in a library. Some books cover more than one subject and the cataloguer has to choose one place to locate the book. Also, non-book materials such as videos and films, will be located in a different section of the building and could be missed by simply shelf-browsing the book collection.

See our charts summarizing the Dewey Decimal Classification System (p. 25) and the Library of Congress Classification System (p. 27).

Learn how online library catalogs work

A library catalog is a listing of all the items held by a particular library. A cataloguer examines the item (book, video, map, audio tape, CD, etc.) and decides how it will be described in the library's catalog and under what subject it will be classified. When the item is entered into the library's online catalog database, information is entered into different fields, which are then searchable by users.

Library catalogs usually treat a book as a single "item" and catalog it that way, even if it might be a book of poetry or a book of essays by different authors. You can't find a reference to a particular poem in the library catalog, nor to a particular essay within a book of essays. The same is true of magazines, journals and newspapers. The library catalog will tell you if the library keeps a particular periodical in its collection, but will not list all the articles within the periodical, nor will it necessarily even list all the issues of the periodical which are kept. There are other publications in the reference room which will help you retrieve these individual items, but usually not the library catalog (see *Find out how to search for journals and newspapers* section, p. 23).

Most catalogs are searchable by author, title, subject and keyword. Some of the important things you need to know about the information in those fields is discussed below. An excellent tutorial for using a typical academic library catalog system can be found at the University of Wisconsin-Parkside Library. It's intended for their students, so has some references to entering "fill in numbers" from an answer booklet. Just ignore that part and work through the tutorial, which is *Unit 2-Using the Library Catalog* (http://www.uwp.edu/library/unit2/) of the library's "Information Skills and Literacy Workbook." The entire series of Parkside's tutorial units and another outstanding tutorial from the Houston Community College System are linked at *Library Tutorials* (http://www.ipl.org/teen/aplus/linksother.htm#library).

Searching the catalog by subject and keyword

The subject field of a catalog record contains only the words or phrases used by the cataloguer when assigning a subject heading. If the library is using Library of Congress Subject Headings (LCSH), for example, the subject heading for a book about how playing football affects the players' bodies would probably be assigned the subject heading "Football--physiological aspects." Unless you type in that entire phrase as your search term, you won't find the book by searching the subject field.

Subject field searching can be very helpful, but you must find out how the subject you're looking for is worded by using the subject manuals or getting help from the reference librarian. Once you zero in on an appropriate subject heading, a search in the catalog will give you a list of all the items in the library's collection categorized under that heading, so you can browse the collection

online. Note also that most items are classified under one or two *very specific* subject headings, rather than under many subjects.

The keyword field of a library catalog generally searches several fields in the database record--the author, title, and description fields. The description is any information about the catalogued item which may have been entered by the cataloguer. *This is not the full text of the book, nor is it an abstract (summary) of the book but rather a short paragraph containing information the cataloguer thought would be helpful to a user*. This is *not* like searching for keywords in an indexed database like Alta Vista on the internet, where every word in a document has been recorded.

For this reason, keyword searching alone could miss an item pertinent to your research project if the keyword you use was not included in the short paragraph written by the cataloguer. It's best to use a combination of keyword searching and subject-field searching to make a comprehensive search of the library catalog.

Searching other libraries' catalogs

There are lots of library catalogs on the internet--but so what? You can search the catalog of a library in Timbuktu, but that doesn't get you the book. Remember that library catalogs do not have full text of books and documents but are just a database with descriptions of the library's holdings. There are a few, and will be more, actual online libraries where you can go to read or search full text documents. Just don't confuse these special resources with a library catalog, which is very different. See *Reference Sources on the Web* (p. 51) for links to online books.

Find out how to search for journals and newspapers at your library

Most libraries have either print, CD-ROM, or online (either in the library or sometimes on the Web) indexes of magazine, journal and newspaper articles (referred to as periodicals) available for users. Some of these are abstracts of the articles, which are short summaries written to describe the article's contents in enough detail so that a reader can decide whether or not to seek out the full text. Some of these sources may be in the form of full text, where the entire articles have been entered into the database.

The databases will include particular periodicals published within a span of time (for example, a popular newspaper index goes back 36 months for certain major newspapers). Know what the database you're searching contains and whether it's represented as abstract or full text. Get some pointers from the reference librarian about how to search that particular database, and build on what you've learned about search syntax and search techniques from *Skills for Online Searching* (p. 40).

Note that these resources, whether print or digital, contain information about periodicals which may not be held by your library. If the database does not have full text articles, you may find an article right on point to your topic, but that particular newspaper or journal may not be in your library's collection. There are ways to get these articles, the fastest ways involving paying a fee to a company in the business of providing articles to researchers! Check out your options with the reference desk if you need an article that's not in your library's collection.

Bibliography surfing

Web surfing is finding an interesting Web page and then using the hyperlinks on that page to jump to other pages. If you find the first page interesting, chances are you'll also be interested in the pages the author has chosen to link to.

Librarians and researchers have been doing this for a long time, in the print medium. It's a valuable tool for identifying sources on your chosen topic.

What you do is use the bibliography provided at the end of an encyclopedia article, journal article or book that you've found particularly pertinent to your topic and follow the bibliographic references much as you would hyperlinks on the Web. Since you're locating items which influenced the author of the original article and to which he or she referred, they're likely to be "on point" to your topic. Then use the bibliography at the end of *those* cited articles to find even *more* items, and so on.

Consult the reference librarian for advice

Several times above, you've been advised to consult the reference librarian. Reference librarians can help save you a lot of time because they know their library's collection very well--both the reference collection and the nonfiction collection--and can often tell you "off the top of their heads" whether or not the library has a particular item you're looking for. They are also skilled searchers, both of the library's catalog and of online resources such as CD-ROM, online databases and the internet. In addition, they're trained in teaching others to use these resources and are glad to do so.

Learn about search syntax and professional search techniques

To be successful at any kind of online searching, you need to know something about how computer searching works. At this time, much of the burden is on the user to intelligently construct a search strategy, taking into account the peculiarities of the particular database and search software. The section on *Skills for online searching* (p. 40) will get you started.

Dewey Decimal Classification System

000 Generalities	100 Philosophy and Psychology
010 Bibliography 020 Library & information sciences 030 General encyclopedic works 040 Unassigned 050 General serials & their indexes 060 General organizations & museology 070 News media, journalism, publishing 080 General collections 090 Manuscripts & rare books	110 Metaphysics 120 Epistemology, causation, humankind 130 Paranormal phenomena 140 Specific philosophical schools 150 Psychology 160 Logic 170 Ethics (moral philosophy) 180 Ancient, medieval, Oriental philosophy 190 Modern Western philosophy
200 Religion	**300 Social sciences**
210 Natural theology 220 Bible 230 Christian theology 240 Christian moral & devotional theology 250 Christian orders & local church 260 Christian social theology 270 Christian church history 280 Christian denominations & sects 290 Other & comparative religions	300 Sociology and anthropology 310 General statistics 320 Political science 330 Economics 340 Law 350 Public administration 360 Social services; associations 370 Education 380 Commerce, communications, transport 390 Customs, etiquette, folklore
400 Language	**500 Natural sciences & mathematics**
410 Linguistics 420 English & Old English 430 Germanic languages German 440 Romance languages French 450 Italian, Romanian languages 460 Spanish & Portuguese languages 470 ltalic languages, Latin 480 Hellenic languages, Classical Greek 490 Other languages	510 Mathematics 520 Astronomy & allied sciences 530 Physics 540 Chemistry & allied sciences 550 Earth sciences 560 Paleontology, paleozoology 570 Life sciences 580 Botanical sciences 590 Zoological sciences

Dewey Decimal Classification System (cont.)

600 Technology (Applied sciences)	**700 The Arts**
600 General technology 610 Medical sciences and medicine 620 Engineering & allied operations 630 Agriculture 640 Home economics & family living 650 Management & auxiliary services 660 Chemical engineering 670 Manufacturing 680 Manufacture for specific uses 690 Buildings	710 Civic & landscape art 720 Architecture 730 Plastic arts, sculpture 740 Drawing & decorative arts 750 Painting & paintings (museums) 760 Graphic arts, printmaking & prints, postage stamps 770 Photography & photographs 780 Music 790 Recreational & performing arts
800 Literature & rhetoric	**900 Geography & history**
810 American literature 820 English & Old English literatures 830 Literatures of Germanic languages 840 Literatures of Romance languages 850 Italian, Romanian literatures 860 Spanish & Portuguese literatures 870 Italic literatures, Latin 880 Hellenic literatures, Classical Greek 890 Literatures of other languages	900 World History 910 Geography and travel 920 Biography, genealogy, insignia 930 History of the ancient world 940 General history of Europe 950 General history of Asia, Far East 960 General history of Africa 970 General history of North America 980 General history of South America 990 General history of other areas

Library of Congress Classification System

A - General Works	**M - Music**
AE - Encyclopedias AI - Indexes AN - Newspapers AP - Periodicals	ML - Literature of Music MT - Musical Instruction
B - Philosophy, Psychology	**N - Fine Arts**
B-BD - Philosophy BF - Psychology BH - Esthetics BJ - Ethics BL-BX - Religions, Mythology	NA - Architecture NB - Sculpture & Related Arts NC - Graphic Arts ND - Painting NK - Applied Arts NX - The arts in general
C - History (Auxiliary sciences: archaeology, genealogy, etc.)	**P - Language and Literature**
(various)	PA - Classical Philology PB-PH - Modern European Languages PJ-PL - Oriental Languages PQ - Romance Literatures PR - English Literature PS - American Literature PT - German Literature
D - History (except America)	**Q - Science**
DA - Great Britain DC - France DD - Germany DK - Russia DS - Asia DT - Africa	QA - Mathematics QB - Astronomy QC - Physics QD - Chemistry QE - Geology QH - Natural History QK - Botany QL - Zoology QM - Human Anatomy QP - Physiology QR - Bacteriology

Library of Congress Classification System (cont.)

E-F - America and U. S.	**R - Medicine**
F1-F970 - United States F1201-F3899 - Latin America	(various)
G - Geography, Anthropology	**S - Agriculture**
G-GF - Geography, Travel, Atlases GN - Anthropology, Ethnography GR - Folklore GV - Sports	(various)
H - Social Sciences	**T - Technology & Engineering**
HA-HJ - Economics HM-HQ - Sociology HX - Communism, Socialism, Anarchism	(various)
J - Political Science	**U - Military Science**
K - Law	**V - Naval Science**
L - Education	**Z - Bibliography & Library Science**

Reference Sources in Libraries

Here are some resources typically used by reference librarians and often found in library reference rooms. If you don't find something in your library--ask. Sometimes these are kept behind the reference desk if the reference librarians tend to consult them frequently. Note that many of these resources are available as both books and CD-ROMs. Which version your library has will depend on budget, technology and convenience decisions by the library. This listing is a very small sample of many thousands of reference books.

Almanacs, yearbooks and handbooks

Almanacs, yearbooks and handbooks are often single volumes which summarize large amounts of facts about things like people and organizations, current and historical events, countries, statistics, and popular culture items like sports, entertainment, zip codes. They can frequently provide quick answers to factual questions, but aren't useful for extensive research. Yearbooks are issued by encyclopedia companies and provide a quick update to events occurring during that year. Handbooks usually are focused on a particular subject, while almanacs are broader in scope.

Britannica Book of the Year.

Chicago: Encyclopaedia Britannica, 1938- . Annual.

Issued every year, this update to Encyclopaedia Britannica has an overview of the year's important events. Your library may subscribe to E.B. online so that you can get the entire encyclopedia and its current events coverage on the Web from the library's computers.

Facts on File: World News Digest with Index.

New York: Facts on File, 1940- . Weekly.

Current events are indexed by person's name, place names and subjects. Because it's issued weekly, you can often find very up-to-date information, whereas yearbooks and almanacs are only issued annually at most. May also be online on NEXUS or on CD-ROM in your library.

Information Please Almanac: Atlas and Yearbook.

New York: Houghton Mifflin, 1947- . Annual.

Facts, tables of statistics, information about popular culture and events, with detailed table of contents and index.

McGraw-Hill Yearbook of Science and Technology.

New York: McGraw-Hill, 1962- . Annual.

Subject-based yearbook of current events in science and technology.

The Oxford Companion to American Literature.

James D. Hart. 5th ed. New York: Oxford University Press, 1983. 896 p.

This handbook serves as a comprehensive guide to American literature, including historical aspects, writers' biographies, awards, societies and trends.

The Statesman's Year Book.

Edited by John Paxton. New York: St. Martin's Press, 1864- . Annual.

A section on international organizations, then a listing for individual countries containing statistical information and facts about political and economic aspects of the country (like welfare and education systems, financial institutions, diplomatic missions and so on).

The World Almanac and Book of Facts.

New York: Funk & Wagnalls, World Almanac, 1868-1976, 1886- . Annual.

Similar to *Information Please Almanac* but presented in a more formal style - facts, tables of statistics, information about popular culture and events, with detailed table of contents and index. May also be on CD-ROM in your library.

Biographical sources

Reference sources with biographical information may provide a brief summary of data about a person, fairly detailed information about a person, or references (citations) to other short or full-length biographies written about the person. Brief summaries are usually found in biographical dictionaries, while other biographical sources and some encyclopedias may have more detailed information. Some cover living people and some dead people, a few cover both.

Biography and Genealogy Master Index.

2d ed. Detroit: Gale, 1980- . Annual. [Also on CD-ROM]

There are no actual biographies here but citations telling where to find biographies, whether short summaries or full-length books.

McGraw-Hill Encyclopedia of World Biography.

12 vols. New York: McGraw-Hill, 1973.

Specifically designed to meet the needs of high school and college students by choosing to cover people who are frequently featured in the curriculum. Features people who are living as well as dead, and the biographical information is quite detailed. Study guides in the last volume identify important people who were associated with particular historical events or issues.

Webster's New Biographical Dictionary.

Springfield, Mass.: Merriam-Webster, 1988. 1130 p.

Summarized biographies of important people of the past, source for quick facts.

Who's Who, 1994.

London: Adam and Charles Black, 1994. 2120 p.

International version with brief biographical information for living people.

Who's Who in America, 1995.

49th ed. 3 vols. New Providence, NJ: R.R. Bowker/Reed Reference Publishing, 1994.

One of many "Who's Who" and "Who Was Who" sources offered by several different publishing houses. Some focus on ethnic groups, some on historical figures, some on groups such as artists or politicians. Check your library to see which sources are available.

Dictionaries

Standard dictionaries give an alphabetical list of words and their definitions, but there are several useful variations also classified as dictionaries. Thesauri contain synonyms and antonyms (opposites) but usually don't define the words. Dialect and slang dictionaries present words and definitions not necessarily found in standard dictionaries. There are also dictionaries of abbreviations and acronyms and dictionaries of quotations. We haven't listed specific examples here, because you'll probably just want to browse your library's collection. These general dictionaries are usually shelved near each other in the reference room. There are also quite a few dictionaries available in CD-ROM and on the Web.

Encyclopedias

Encyclopedias traditionally provide comprehensive coverage of an entire area of knowledge. There are general encyclopedias and subject encyclopedias, and they differ as to the level of detail provided and the complexity of the writing. Encyclopedias are good for fact-finding, getting general background information about a subject or starting a research project. The many CD-ROM encyclopedias contain much of the same information as the print volumes, as well as being searchable and giving you the ability to print out text and pictures. The CD-ROM versions and the many subject-based encyclopedias are not separately listed here--check with your library's reference department to see what they have available. At this writing, complete encyclopedias are not available for free on the Web.

Academic American Encyclopedia.

21 vols. Danbury, Conn.: Grolier, 1993.

Presents fairly brief articles on specific topics, with a clear, concise writing style. More factual information than broad overviews of large subject areas.

Collier's Encyclopedia.

24 vols. New York: Macmillan, 1993.

One of the "big three" adult encyclopedias typically found in public and academic libraries. Scholarly and comprehensive coverage.

Encyclopedia Americana.

International ed. 30 vols. Danbury, Conn.: Grolier, 1993.

Another of the "big three" mixes shorter articles with long articles broad in scope. In length and scholarship, compares to *Britannica*.

New Encyclopaedia Britannica.

15th ed. 32 vols. Chicago: Encyclopaedia Britannica, 1993.

Considered by many to be the premier English-language general encyclopedia. The writing is scholarly and therefore sometimes difficult to understand in a subject area with which you're unfamiliar. Articles in the *Micropaedia* are short and fact-filled, while the *Macropaedia* has long articles surveying broad aspects of a topic. Very extensive list of bibliographic references at the end of each article so you can find additional information.

World Book Encyclopedia.

22 vols. Chicago: World Book, 1993.

Aimed at students, this is very widely used in both public and school libraries. Coverage is provided for all subjects in the U.S. school curriculum, and articles have lots of cross-references to other articles within the encyclopedia and to outside sources. Study guides help to organize research on various topics. This is an excellent place to start when you're totally unfamiliar with a subject area.

Indexes and abstracts

Indexes and abstracts supplement the library catalog as described by Bopp and Smith (1995):

> *Users may come into a library, consult the main catalog, and falsely assume they have searched the entire contents of the library. The catalog may confirm the holdings of a periodical [magazine or journal] but not its contents; a poetry collection but not individual poems; the title of an author's collected works but not the individual work; newspapers but not individual news stories. Indexes and abstracts are created and become extremely useful tools to more fully reveal detailed resources not covered in the more general catalog.*

For most research papers at the college level, you'll want to look for scholarly journal articles about your chosen topic. Indexes are the tools you'll use for this purpose, and if you're lucky, your library will have some indexes either loaded in the online library catalog or available on CD-ROM. Searching indexes is different than searching the library catalog, however, because indexes don't use the same subject classifications as the library catalog. Some indexes provide

books of "descriptors" to help you search for key words and key concepts by which the items have been indexed.

Be aware that indexes will contain items not held at your library, because they are prepared by commercial companies that index a particular group of periodicals or works regardless of where they may be held. A periodical index is most useful if it contains abstracts--brief summaries of the articles. Abstracts make it easier to tell if the article is relevant to the subject of your research.

Other reference tools

Statistics and Government documents

Government documents are available free of copyright and certain publishers compile and index them for use by libraries and other researchers. The volume of documents produced every day by the U.S. government is almost beyond imagining, and the system of numbering documents is unique and unlike the rest of the library's classification system. In addition to laws, regulations and agency documents, the government produces a lot of statistics for public release.

Many academic and public libraries have a lot of government documents and statistics and the various indexing tools you need to be able to locate and retrieve them. A lot of these are available on CD-ROM or in online databases within the library. Quite of bit of this information is being made available on the Web as well. Finding both government documents and statistical information can be a real challenge. A trip to the reference desk is probably the quickest way to zero in on what you need.

Geographic information

Atlases and maps are the main sources of geographical information in libraries, though many encyclopedias and dictionaries have maps which may be sufficient for your purpose. There are different kinds of specialized atlases much as there are different kinds of dictionaries. Some atlases contain statistics such as population, economic factors, weather, and other facts. There are historical or thematic atlases which show the world at certain dates or during certain events, such as wars.

Bibliographies

Bibliographies are lists of works--books or shorter works--which help identify sources where information can be found. You might want to find additional works by a certain author or works on a certain subject. There are hundreds of different kinds of bibliographies compiled for different purposes, and your reference librarian can let you know which ones might be useful in the topic area of your research. Remember that a bibliography will tell you a work exists, but it

may not be held by your library. If you find an interesting item in a bibliography, consult your library's catalog to see if it's available in the collection.

Learning to research on the Web

Cyberspace is not like your library

Librarians have a weird sense of humor. This is now an old joke: **The internet is like a library with no catalog where all the books get up and move themselves every night...** This was the state of the internet up until 1995 or thereabouts. Finding anything on the internet required comic strip characters like Archie, Veronica and Jughead, and generally *you* were the one who ended up feeling like a jughead when you rooted around for hours and still came up dry.

The new joke is: **The internet is like a library with a thousand catalogs, none of which contains all the books and all of which classify the books in different categories--and the books *still* move around every night.** The problem now is not that of "finding anything" but finding a particular thing. When your search term in one of the popular search engines brings back 130,000 hits, you still wonder if the *one* thing you're looking for will be among them.

This can be an enormous problem when you're trying to do serious research on the internet. Too much information is almost worse than too little, because it takes so much time to sort through it to see if there's anything useful. The rest of this section will give you some pointers to help you become an effective internet researcher.

Get to know the reference sources on the internet

Finding reference material on the Web can be a lot more difficult than walking into the Reference Room in your local library.

The subject-classified Web directories described below will provide you with your main source of links to reference materials on the Web. In addition, many public and academic libraries, like the Internet Public Library, have put together lists of links to Web sites, categorized by subject. The difficulty is finding Web sites that contain the same kind of substantive content you'd find in a library. See the links to *Reference Sources on the Web* (p. 51) for a list of some Web-based reference materials, but please read *Information found--and not found--on the Web* (p. 43) to understand why it's different from using the library.

Understand how search engines work

Search engines are software tools that allow a user to ask for a list of Web pages containing certain words or phrases from an automated search index. The automated search index is a database containing some or all of the words appearing on the Web pages that have been indexed. The search engines send out a software program known as a spider, crawler or robot. The spider follows hyperlinks from page to page around the Web, gathering and bringing information back to the search engine to be indexed.

Most search engines index all the text found on a Web page, except for words too common to index, such as "a, and, in, to, the" and so on. When a user submits a query, the search engine looks for Web pages containing the words, combinations, or phrases asked for by the user. Engines may be programmed to look for an exact match or a close match (for example, the plural of the word submitted by the user). They may rank the hits as to how close the match is to the words submitted by the user.

One important thing to remember about search engines is this: once the engine and the spider have been programmed, the process is totally automated. No human being examines the information returned by the spider to see what subject it might be about or whether the words on the Web page adequately reflect the actual main point of the page.

Another important fact is that all the search engines are different. They each index differently and treat users' queries differently (how nice!). The burden is on the searcher to learn how to use the features of each search engine. See the links to *Search Engines* (p. 51) and to sources which have done evaluations of the various features of Web directories and search engines (http://www.ipl.org/-teen/aplus/linksother.htm#interpret).

Read an excellent article about search engines:

“Searching the Internet Part I: Some Basic Considerations and Automated Search Indexes” in *InterNIC News*, September 1996, by Jack Solock (Solock 1996 A) at:

http://rs.internic.net/nic-support/nicnews/archive/september96/enduser.html

Also see the *Web and internet tutorials* (http://www.ipl.org/teen/aplus/-linksother.htm#web) for additional online articles.

Know the difference between a search engine and a directory

A search engine lets you seek out specific words and phrases in Web pages. A directory is more like a subject catalog in the library--a human being has determined the main point of a Web page and has categorized it based on a classification scheme of topics and subtopics used by that directory. Many of the search engines have also developed browsable subject catalogues, and most of the directories also have a search engine, so the distinction between them is blurring.

Jack Solock, Special Librarian at InterNIC Net Scout, classifies Web directories into categories based on the amount of human intervention. The categories he uses are subject catalogs, annotated directories and subject guides.

A subject catalog classifies Web pages into subject categories and uses excerpts from the Web page as a short description. An annotated directory divides sites by subject but also contains analysis of the site by an editor, librarian or subject

specialist, who writes a description to assist the user. A subject guide attempts to provide a selection of sites relating to a particular subject which represent high quality resources, thus representing the highest level of human intervention of the three types because it involves building a collection of sites to represent a subject area.

Mr. Solock categorizes the following resources:

Yahoo, BUBL and Galaxy as *subject catalogs*,

Magellan, Lycos Top 5%, and InterNIC Directory of Directories as *annotated directories* and

Argus Clearinghouse and the WWW Virtual Library as *subject guides*.

Read his article, "Searching the Internet Part II: Subject Catalogs, Annotated Directories, and Subject Guides" at http://rs.internic.net/nic-support/nicnews/-oct96/enduser.html for more good information about directories (Solock 1996 B).

See the links to *Web directories* (p. 51) and to sources which have done evaluations of the various features of Web directories and search engines (http://www.ipl.org/teen/aplus/linksother.htm#interpret).

Consult the reference librarian for advice

Reference librarians can often be of great help in planning your internet research. Just as they know their library's collection, they probably have done a lot of research on the internet and know its resources pretty well. They're also skilled at constructing search terms and using search engines, and they're trained to teach others how to search.

Learn about search syntax and professional search techniques

To be successful at any kind of online searching, you need to know something about how computer searching works. At this time, much of the burden is on the user to intelligently construct a search strategy, taking into account the peculiarities of the particular database and search software. The section on *Skills for online searching* (p. 40) will help.

Learn some essential browser skills

Know how to use your browser for finding your way around, finding your way back to places you've been before and for "note-taking" as you gather information for your paper. A large part of effective research on the Web is figuring out how to stay on track and not waste time--the "browsing" and "surfing" metaphors are fine for leisure time spent on the Web, but not when you're under time pressure to finish your research paper. Lots of colleges have Netscape tutorials - see *Web and internet tutorials* (http://www.ipl.org/teen/-

aplus/linksother.htm#web) for links which will supplement the information below.

URLs

Understand the construction of a URL. Sometimes a hyperlink will take you to a URL such as http://www.sampleurl.com/files/howto.html. You should know that the page "howto.html" is part of a site called "www.sampleurl.com." If this page turns out to be a "not found" error, or doesn't have a link to the site's home page, you can try typing in the location box "http://www.sampleurl.com/" or "http://www.sampleurl.com/files/" to see if you can find a menu or table of contents. Sometimes a file has been moved or its name has changed, but the site itself still has content useful to you--this is a way to find out.

If there's a tilde (~) in the URL, you're probably looking at someone's personal page on a larger site. For example "http://www.bigsite.com/~jonesj/home.html" refers to a page at www.bigsite.com where J. Jones has some server space in which to post Web pages.

Navigation

Be sure you can use your browser's "Go" list, "History" list, "Back" button and "Location" box where the URL can be typed in. In Web research, you're constantly following links through to other pages then wanting to jump back a few steps to start off in a different direction. If you're using a computer at home rather than sharing one at school, check the settings in your "Cache" or "History list" to see how long the places you've visited will be retained in history. This will determine how long the links will show as having been visited before (i.e., purple in Netscape, green in the A+ site). Usually, you want to set this period of time to cover the full time frame of your research project so you'll be able to tell which Web sites you've been to before.

Bookmarks or favorites

Before you start a research session, make a new folder in your bookmarks or favorites area and set that folder as the one to receive new bookmark additions. You might name it with the current date, so you later can identify in which research session the bookmarks were made. Remember you can make a bookmark for a page you haven't yet visited by holding the mouse over the link and getting the popup menu (by either pressing the mouse button or right clicking, depending on what flavor computer you have) to "Add bookmark" or "Add to favorites." Before you sign off your research session, go back and weed out any bookmarks which turned out to be uninteresting so you don't have a bunch of irrelevant material to deal with later. Later you can move these bookmarks around into different folders as you organize information for writing your paper--find out how to do that in your browser.

Printing from the browser

Sometimes you'll want to print information from a Web site. The main thing to remember is to make sure the Page Setup is set to print out the page title, URL, and the date. You'll be unable to use the material if you can't remember later where it came from.

"Saving as" a file

Know how to temporarily save the contents of a Web page as a file on your hard drive or a floppy disk and later open it in your browser by using the "file open" feature. You can save the page you're currently viewing or one which is hyperlinked from that page, from the "File" menu or the popup menu accessed by the mouse held over the hyperlink.

Copying and pasting to a word processor

You can take quotes from Web pages by opening up a word processing document and keeping it open while you use your browser. When you find text you want to save, drag the mouse over it and "copy" it, then open up your word processing document and "paste" it. Be sure to also copy and paste the URL and page title, and to record the date, so you know where the information came from.

Be prepared to cite your Web references

Find out what form of bibliographic references your instructor requires. Both the MLA and APA bibliographic formats have developed rules for citing sources on CD-ROM and the internet. Instructions for citing electronic sources are available at many libraries, including the Purdue University Online Writing Lab (http://owl.english.purdue.edu/Files/110.html).

Skills for Online Searching

There are many sources on the Web to help you learn search skills. Many of the concepts for using Web search engines also apply to searching online library catalogs and CD-ROMs. This section of the manual will get you started and point you to other online sources where you can learn more.

Learn how search syntax works

Search syntax is a set of rules describing how users can query the database being searched. Sophisticated syntax makes for a better search, one where the items retrieved are mostly relevant to the searcher's need and important items are not missed. It allows a user to look for combinations of terms, exclude other terms, look for various forms of a word, include synonyms, search for phrases rather than single words. The main tools of search syntax are these:

Boolean logic

Boolean logic allows the use of AND, OR and NOT to search for items containing both terms, either term, or a term only if not accompanied by another term. The links below and all the Web search engines "search help" have a lot of good examples of Boolean logic. Tip: NOT can be dangerous. Let's say you want to search for items about Mexico, but not New Mexico, so you use NOT to exclude the word *New* from your retrieved set. This would prevent you from retrieving an article about *New regulations in Mexico* because it contained the word *New*, though that wasn't what you intended.

Wildcards and truncation

This involves substituting symbols for certain letters of a word so that the search engine will retrieve items with any letter in that spot in the word. The syntax may allow a symbol in the middle of a word (wildcard) or only at the end of the word (truncation). This feature makes it easier to search for related word groups, like *woman* and *women* by using a wildcard such as *wom*n*" Truncation can be useful to search for a group of words like *invest, investor, investors, investing, investment, investments* by submitting *invest*" rather than typing in all those terms separated by OR's. The only problem is that *invest** will also retrieve *investigate, investigated, investigator, investigation, investigating*. The trick, then is to combine terms with an AND such as *invest** AND *stock* or bond* or financ* or money* to try and narrow your retrieved set to the kind of documents you're looking for.

Phrase searching

Many concepts are represented by a phrase rather than a single word. In order to successfully search for a term like *library school* it's important that the search engine allow syntax for phrase searching. Otherwise, instead of getting

documents about library schools you could be getting documents about school libraries or documents where the word *library* and *school* both appear but have nothing to do with a library school.

Proximity

This allows the user to find documents only if the search terms appear near each other, within so many words or paragraphs, or adjacent to each other. It's a pretty sophisticated tool and can be tricky to use skillfully. Many times you can accomplish about the same result using phrase searching.

Capitalization

When searching for proper names, search syntax that will distinguish capital from lower case letters will help narrow the search. In other cases, you would want to make sure the search engine isn't looking for a particular pattern of capitalization, and many search engines let you choose which of these options to use.

Field searching

All database records are divided up into fields. Almost all search engines in CD-ROM or online library products and the more sophisticated Web search engines allow users to search for terms appearing in a particular field. This can help immensely when you're looking for a very specific item. Say that you're looking for a psychology paper by a professor from the University of Michigan and all you remember about the paper is that it had something about Freud and Jung in its title. If you think it may be on the Web, you can do a search in Alta Vista, searching for *Freud* AND *Jung* and limit your search to the *umich.edu* domain, which gives you a pretty good chance of finding it, if it's there.

Make sure you know what content you're searching

The content of the database will affect your search strategy and the search syntax you use to retrieve documents. Some of the different databases you'll encounter in your library and online research are:

Representation or summary of a document

If a document has been summarized, like a library catalog entry where certain features like title and author have been recorded along with a sentence or two of description, don't expect to retrieve the document by looking for keywords in the text. A search is only searching what's in the database--the representation, not the document itself. Consult the section on searching the library catalog (p. 22) for further details.

Index and abstract of a document

When a document like a journal article has been indexed and an abstract written, a human indexer has helped organize the document for easy retrieval. He or she

chosen some words, phrases and concepts which represent the subject matter of the document and has attached those to the database record as "descriptors." The specific terms usually come from a book of terms used by that database producer, to promote consistency between indexers.

The indexer, or possibly the author of the article, has written an abstract or summary of the article's content which is included in the database. Again, it's important to realize that you're not searching the entire text of the document but someone's representation of the document. If you can zero in on some of the database's descriptors which accurately describe the topic you're looking for, you can easily retrieve all the articles with the same descriptors. If you do a keyword search in this type of database without checking the permissible descriptors, you're hoping that the indexer will have used your keyword in the summary or that the author will have used it in the title of the article.

Full text of a document

Searching full text documents gives you a good chance of retrieving the document you want, provided you can think of some key words and phrases which would have been included in the text. The problem is retrieving too many documents when you're looking for something particular, because common words and concepts can appear in documents irrelevant to your topic. This is one of the problems with internet search engines which index the full text of Web pages. The more skilled you can become in your use of search syntax, the greater will be your success in finding relevant information in a full text database.

Online resources for learning search skills

Most of what you need to know is covered by several online tutorials listed at *Web and internet tutorials* (http://www.ipl.org/teen/aplus/linksother.htm#web). There is a lot of specific help with search syntax published by each of the search engines, since they all differ in their syntax. See the *Links for Research--Search Engines* (p. 51) for links to the search help pages.

Information found--and not found--on the Web

The dream behind the creation of the Internet [is] the possibility of universal access in a digital age--where any author's work could be available to anyone, anywhere, anytime. The experience of most people, however, is not that the Net contains great works and crucial research information. Instead most of what is there is perceived to be of low value.

The root of the problem is that authors and publishers cannot make a living giving away their work.

Mark Stefik in "Trusted Systems," *Scientific American*, vol. 276, no. 3, March 1997.

How does information get onto the Web anyway?

Until 1994 or 1995, most of the information on the internet (which then migrated to the Web) was posted by scientists, educators, students and the government. Since then, commercial use of the Web has exploded and so has the posting of hobby pages or personal home pages, many of which are posted by the same people who also use the Web for their work at universities or business enterprises.

Scholarly or informative material which might be useful to a researcher gets posted on the Web in a number of ways.

A lot of information is posted by educators as part of their teaching or sharing information with colleagues.

An educator or student with an interest in sharing information may write an article and post it as part of his or her personal web site. Generally, these are unpublished articles--if an article is going to be or has been published in a scholarly journal, the journal may own the copyright and the author can't post it without permission. College professors also post information that they're using for a class. Sometimes if they've authored a textbook, you can find chapters or portions of chapters on a class web site.

College students and, increasingly, high school students post information about projects they've done for classes. If part of the assignment was designing a Website for the information, the information and the site may be quite sophisticated and useful.

Personal pages, pages that people post for their own personal satisfaction, can have surprising value.

This includes hobby pages, home pages, "fan" pages and any other pages posted out of the goodness of someone's heart. The internet has traditionally been a

place for people to share what they know with other interested people, without looking for personal gain. Though there's a lot of commercial activity on the Web now, the tradition of sharing continues among individuals.

There are some outstanding personal pages with good information on such things as astronomy, cooking, ethnic history, medical conditions, auto leasing, you name it. There are "fan" pages with volumes of information on someone's "favorite author" or "favorite movie star." A lot of these are frivolous, but many people are "fans" of classic authors like Edgar Allen Poe or Jane Austen and have posted terrific information about those people and their works.

Since the Web became a hot advertising and public relations medium, many businesses have established sites to promote their company and its products.

These commercial sites provide a lot of good information, because it helps interest people in visiting their site and keeps them coming back. For example, some of the investment companies which sell mutual funds have a lot of general investor-education materials available at their sites, including interactive calculators for computing your retirement needs or college savings needs.

More and more magazines and newspapers are providing excerpts from their current and past issues online,

and some magazines provide additional content related to the current issue which isn't in the print version. (Clever--when you buy the print version and find out there's more at the Web site, you have to go there, and then you get zapped with the advertising banners!) Ok, there's a pattern here. The commercial sites will post information that they think will enhance their online or real world business, build their public relations goodwill, or will draw people to the Web site where they can either make money from advertising or deliver another sales pitch for a product. It's usually pretty interesting stuff, because it's meant to be, and some of it can be useful to a researcher.

It's actually pretty amazing to see some of the huge commercial databases such as phone directories, yellow pages, business locators (complete with door to door directions), stock tickers, and news update services which are available free on the Web. Only time will tell if the companies providing those services feel they are getting enough "bang for the buck" to keep going--no one knows for sure if anybody is making a profit on the Web or getting enough PR value for what they're spending.

There's also a growing list of free e-zines and e-journals, which are published only online, and many of these have excellent information for research.

The government posts a large volume of information,

some statistical, some educational or informative. One of government's most important functions is dissemination of information, and the Web has become a way to get information to those who need it--state and local governments, businesses, taxpayers, educators. The results of government-funded studies are increasingly disseminated via the Web as well as in print, and these are often a great source for research material. The National Park Service, Library of Congress and many other government agencies are using the Web both to fulfill the functions for which they were formed and to promote their agencies' work. For example, a quick search for John Wilkes Booth turns up several nice pages of information from the Park Service at Fords' Theater in Washington, D.C. This information is comparable in scope and reliability to the information you'd get at a library.

Nonprofit organizations provide information relevant to their key issues.

Nonprofits were slower than commercial ventures in upgrading technology and therefore slower to come online with information, but now there's a lot of good material being posted.

Full-text versions of works . . .

whose copyright has expired are being digitized and posted to the Web for public use by some libraries and academic institutions, and many are available online. Many of these are fiction, poetry, drama.

So what's missing? Why can it be so difficult to do comprehensive research on the Web?

What's *not* on the Web--at least not for free--are most of the comprehensive reference works you'd find in a library reference room and nonfiction collection. Why? It costs publishers a lot of money to put together that information and they're in business to sell it--they have nothing else to sell. They're not in the same position as an investment company who can author and publish some free information about investing techniques and then make money by selling you a mutual fund. These book publishers are in the business of selling the information they write or compile and they're not about to give it away by posting it on the Web. The exceptions to this are some dictionaries, almanacs and other single-volume reference works that are easily digitized and where sales of the print product are not seen as threatened by the Web.

Things you're not likely to find on the Web for free:

- encyclopedias (the CD-ROM versions are selling too well)

- index and abstract services (very labor-intensive to produce but are essential to a scholarly researcher looking for journal articles and therefore very profitable to sell to libraries)
- books that are still under copyright
- full-text nonfiction books on scholarly topics
- most scholarly journal articles (this is changing)
- pre-1994 (pre-Web) magazine and newspaper articles (this may change)

If you look at the list of what's *not* on the Web, it covers about 90% of the contents of a college library's collection, both the reference and the circulating collection. It's apparent that researchers still have to spend a good portion of their research time in the library rather than on the Web.

Search strategy: Getting a broad overview of a subject

In the library

To get a broad overview of a subject in the library, you'll read and browse general sources of information discovered using three strategies: reference room browsing, catalog browsing and shelf-browsing.

Let's say you're making your first trip to the library to get ideas for your research paper topic. You've probably thumbed through your course syllabus and coursepack, so you have some references to particular authors, issues or topics which will be covered.

Start in the reference room, with some general sources. For a literature course, you may be reading encyclopedia articles about various authors or looking at biographical dictionaries. For a history or science course, you'll be reading a general encyclopedia or a special subject encyclopedia. To find out what current issues are important in your subject, browse current periodicals. Ask the reference librarian for a recommendation of sources to use for general reading in your subject area.

Search the library's catalog after getting some advice about specific subject headings to use (see *Searching the catalog by subject and keyword* for details, p 22). Browse the list of books and materials held by the library within several different subject headings related to your course. Note how many items are held and whether they are look interesting to you. Are they general or specific? Are they current? Are there any periodicals listed? Are there interesting items other than books?

Look at the subcategories used in the catalog. You can learn a lot about a subject simply by looking at how the it's broken down into subcategories. This will show you what issues the experts who work in this field consider important enough to treat separately.

Last, take a trip to "the stacks" and browse the shelves in your subject area to see what titles are available. The shelf arrangement usually comes from either the Dewey Decimal system (p.25) or Library of Congress (p.27) and will be somewhat different from the subject headings used in the library catalog. On the shelves, books with similar subjects should be located near each other. Use the call numbers of several of the books you found in the catalog to direct you to a particular shelf in the library. Look at the books around that book, even going into different call numbers. Pull some books off the shelf and look through the table of contents and index to get an idea of topics covered and how the topics are organized. Do a little skimming and look for interesting issues or ideas.

On the internet

To get a broad overview of a subject on the internet, browse the subject-classified "Web directories" such as Yahoo, BUBL and Magellan (see *Links for Research -Web directories*, p. 51, for links to these and others).

Note how the subject is broken down into subcategories, to see how information in that subject is organized and what some of the issues are. Be sure to spend some time following the links to examine the pages and sites which have been listed.

Often, it is difficult to determine just how comprehensively a subject is covered by looking at the number of sites. Many thousands of Web pages have little actual content and are mainly links to other pages, which may be links to other pages, and so on *ad infinitum*. Following the links through to actual pages is like browsing the library shelves and pulling books off the shelf to skim the contents.

Run a quick search using one of the search engines. Once you feel you're familiar enough with the subject that you've identified some key words or concepts, use them to do a test search to see what kind of result you get. Look at both the quantity and the quality of the first few pages of hits to get some idea of how easy or difficult it may be to research that subject in more depth on the internet if you choose it as your topic. (See *Links for Research - Search Engines*, p. 51, for links to a number of search engines.)

Search strategy: Finding specific information

In the library

Arrange a consultation with a reference librarian. Once you have done your general reading in a subject area and have chosen a topic for your paper, you need to do some in-depth reading to look for a focus. You need to become informed about the topic. A reference librarian, especially a subject specialist, can point you toward good reading materials, some of which may be reference materials and others of which can be checked out. The search strategy you follow at this stage can then be used for gathering information once you've formed a focus for your research.

Find out what specific subject headings pertain to your topic (there may be several), so you can search the library catalog effectively (see *Searching the catalog by subject and keyword* for details, p. 22).

Ask the reference librarian to recommend journals or periodicals held in the library's collection which are likely to cover your topic the best. You can often use search syntax to restrict your search in a periodical index to certain journals. That way, the articles you find should be in your library's collection and available to you. If you don't find enough material, you may also want to search the periodical index without limiting it to journals in your library, then find out how to get copies of the articles you need.

Search one of the index tools to discover essays or other "less than book length" works on your topic which are included in collections but won't be catalogued individually in the library catalog. There are resources appropriate to specific subjects (i.e., history, literature, science).

Don't overlook non-book materials such as videos, CD-ROMs, films, audio tapes, maps, brochures. These items should be recorded in the library's online catalog.

On the internet

Ask your reference librarian how he/she would approach a search for your topic on the internet. Most reference librarians, especially subject specialists, have done a lot of internet research and may have a pretty good idea of how successful you'll be in researching your particular topic there.

Consult a subject-oriented directory on the internet. Now that you've zeroed on a specific topic, you can find out whether it falls in the categories identified by the people (like Yahoo) who classify sources on the internet. If your topic happens to fit neatly into one of the subcategories used by a directory, you may be able to find links to information simply by browsing the directory.

Choose a search engine and make sure you know its search syntax (see *Skills for Online Searching*, p.40). Do a couple of quick, preliminary searches to test how easy or tough it's going to be to get quality information on your topic. Construct an appropriate search term or phrase and try it. Let the engine search the whole Web and see how many hits you get, then quickly scan the first few pages of hits. Try adjusting your search term using Boolean operators, synonyms or truncation and run it again--count the hits and look at the first few pages.

Evaluate your quick searches. If you get many thousands of hits with the terms you used, and the first few pages of hits have a lot of items unrelated to your topic, then look at the advanced search features of the engine you're using to see if you can focus the search better. In the search engines which also include subject classifications, you may be able to limit your search to a particular subject area. Review your search terms in light of the irrelevant hits to see if you can revise your search terms for a better result.

Redo your search until you've done the best you can. Then start browsing the pages of hits and following the interesting ones. Often if you can find at least one good page that's on point to your topic, it will contain some links to other, similar pages and you'll be off and running.

If you decide to switch search engines, remember to change syntax. Each search engine has its own syntax, so what worked in one won't necessarily work in the others (more details in *Skills for Online Searching*, p.40).

Links to Online Resources

http://www.ipl.org/teen/aplus/links.htm

Go online to link to over a hundred Web pages that will help you with your research and writing project.

Links for Research

Reference sources on the Web

http://www.ipl.org/teen/aplus/referenceweb.htm

A chart of some of the online reference books available free on the Web

Web directories and subject-classified resources

http://www.ipl.org/teen/aplus/linksdirect.htm

Yahoo, Argus, IPL et al

Search engines and their "search help" pages

http://www.ipl.org/teen/aplus/linksengines.htm

Alta Vista, Excite, Lycos et al

Other links for learning to research

http://www.ipl.org/teen/aplus/linksother.htm

Online articles, online library and research instruction

Links for Writing

OWLs on the Web

http://www.ipl.org/teen/aplus/linksowls.htm

Links to Online Writing Labs (OWLs) "handouts"

OWL Handouts by Topic:

Common types of papers

http://www.ipl.org/teen/aplus/linkscommon.htm

Research papers -- persuasive essays -- narrative essays -- cause/effect essays -- how to write summaries -- and more

Papers on special subjects

http://www.ipl.org/teen/aplus/linksspecial.htm

Film, drama and book reviews -- writing about poetry -- scientific and lab reports -- abstracts -- and others

Planning and starting the writing assignment

http://www.ipl.org/teen/aplus/linksplanning.htm

The writing process -- ideas -- journal writing -- overcoming obstacles

The topic

http://www.ipl.org/teen/aplus/linkstopic.htm

Several articles from the OWLs

Title, introduction and conclusion

http://www.ipl.org/teen/aplus/linkstitle.htm

Several articles from the OWLs

Thesis statement

http://www.ipl.org/teen/aplus/linksthesis.htm

Articles from many points of view

Organizing information

http:///www.ipl.org/teen/aplus/linksorganizing.htm

Taking notes -- outlining -- organizing by cubing, mapping and more

Writing style and technique

http://www.ipl.org/teen/aplus/linkswritingstyle.htm

Audience and tone -- logic and developing arguments -- sentences, words and phrases -- paragraphs -- coherence, clarity, conciseness -- transitions -- gender-fair writing -- writing on the computer -- other style and technique issues

Citing Sources

http://www.ipl.org/teen/aplus/linkciting.htm

Paraphrasing, summarizing and plagiarism -- using quotations -- styles of citation

Grammar and punctuation

http://www.ipl.org/teen/aplus/linksgrammar.htm

Links to grammar handbooks

Revising and rewriting

http://www.ipl.org/teen/aplus/linksrevising.htm

How to proofread, edit and revise -- short proofreading and editing checklists -- critiques and peer review

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