3

Background Research and Note Taking

Introduction

Now that you have organized some basic ideas of your experiment into a research design table, you may have an idea of what your experiment might look like. Although you have already done preliminary research to get conceptual ideas for your experiment, the next step is to write more formalized background research questions with the goal of learning your topic inside out. This chapter will help you take the information from your research design table, which you completed in Student Handout #2, and categorize that information into background research questions. This chapter will also provide tips on how to identify reliable resources, introduce different methods of note taking and documentation, give suggestions on how to avoid plagiarism, and describe online tools that will help you during the background research phase of your project.

Learning Objectives

By the end of the chapter, you should be able to

1. summarize how background research questions are used to organize note taking,
2. describe background research methods that will give you reliable resources,
3. determine the aspects of what must be organized when conducting background research,
4. explain how to avoid plagiarism, and
5. describe technology tools that increase efficiency of the research process.

Key Terms

Documentation: The practice of referencing or citing previous works within a piece of writing according to an "official" documentation style such as that of the Modern Language Association (MLA) or the American Psychological Association (APA).

Scholarly research: Research and writing performed by an academic (e.g., a *professor*—a person who does research and teaches at a university or college) that is usually based on original research or experimentation.

Writing Background Research Questions

Background research questions must be written in such a way as to cover everything you need to know to conduct the experiment. These questions help you focus on what you really need to know. Research questions are to be written in a general way, not in a way that could be answered in one or two sentences. For example, the question, "What do river otters eat?" is not the best way to word a background research question because it can be answered with just one idea. Although that question is important and needs to be answered to do the experiment, background research questions are more general—for example, "What is needed to care for river otters in captivity?" This research question allows you to answer questions about what otters eat *as well as* what they need to sleep, drink, and swim. It also may bring up environmental issues that you may not have considered.

You should have at least one background research question for each of the following four categories:

1. Entity
    - Specific types that are easily studied
    - Its structure and function
    - Handling/care/safety/ethics within a controlled environment
2. Independent Variable
    - Its structure and function
    - How it can safely and ethically be manipulated
3. Dependent Variable
    - Its structure and function

- How changes can best be measured, recorded, and observed

4. Connections Between the Entity and the Independent and Dependent Variables
    - Learn what is already known about these relationships (i.e., previous research on the topic)

Your background research questions for the river otter study might be something like these questions:

1. Entity
    - What is known about this specific type of river otter?
    - How do zookeepers at your local zoo care for river otters? (Include the genus and species of river otters you saw at the zoo and address safety and ethical issues as part of this question.)
2. Independent Variable
    - How do weather conditions change air temperature and water temperature?
3. Dependent Variable
    - What are common behaviors of river otters? When and why do they behave this way?
    - What methods of observation can be used to record otter behavior? (How can I record otter behavior in my lab notebook?)
4. Connections Between the Entity and the Independent and Dependent Variables
    - How does river otter behavior change as the temperature decreases?
    - How has this topic been studied in the past?

A research project should have between four and six research questions. If you have more than six questions, your questions are likely to be too specific and need to be consolidated. You will probably have two questions about your entity, two about your dependent variable, and one each for the independent variable and the connections between the variables. Don't be discouraged if, in your research, you don't find much, if any, information specifically about

connections between your entity and the variables. That is why you are doing the research project—to look for those connections.

Once the members of a group have written the first draft of background research questions, the draft can be uploaded to Google Docs so that all members have access to it. Your group may decide to distribute different background questions to each group member. That way, time is used efficiently with each member looking for answers to different background questions.

Starting Background Research Early

Although you might think that these introductory steps to the background research process will not take long, think again! Doing the preliminary research, developing good research questions, and writing a high-quality proposal are probably the most challenging parts of doing experimental research. Turning a good research idea into a doable research experiment is not a simple process. You must spend time doing background research to understand the problem you want to address. The time you spend now will make the experimental and writing processes much easier.

(You'll notice that we haven't had a discussion about hypotheses yet (except briefly on pp. 17–18). It is important to become very knowledgeable about your topic *before* writing a hypothesis. You need to know enough to make an educated prediction of the outcome of your experiment.)

Use Student Handout #3, Background Research Questions, on page 54, to begin developing these questions. It is important that your teacher approve these questions. Don't take your teacher's suggestions as criticism. Instead view the teacher approval process as a way to make sure the time you spend researching is well focused.

Identifying Reliable Scientific Resources

To answer the background questions you have developed for your research topic, you'll most likely be looking for resources at a library and online. Locating and obtaining resources from a library has traditionally been the way to determine whether or not a resource is reliable (i.e., accurate and trustworthy). Printed materials at libraries are usually reliable because they have been through an editing and publishing process. Many of these printed materials now have identical online versions that are available through libraries' paid subscriptions to specific databases (from which full-text versions can be downloaded).

For a research project at this level, you are expected to include scholarly research resources. *Scholarly research* is writing done by an academic (i.e., a professor or some other teacher or researcher at a college or university) that

is usually based on original research or experimentation. Scholarly research, usually published in research journals, is highly respected because the writing had to be peer-reviewed by experts in the same field. This type of writing will be heavier in STEM-specific vocabulary than other resources you read on your topic, particularly nonscholarly writings on the web. Most of the scholarly research articles are protected behind firewalls and require a connection via a library. The library connection gives you access to high-quality, full-text scholarly articles, which you can e-mail to yourself. You'll also find citations for journal articles that the library may have in paper formats.

To gain access to library databases, you must either be on campus or have login permission. Your high school library and local public library may subscribe to certain databases that will give you access to some scholarly writings, so ask your librarian for help. University and college libraries may grant visitors occasional login privileges, even if you are not a current student. If going alone to a university library, call the library ahead of time to ask about its policies. Most university libraries do welcome visits from high school classes doing serious research through field trip arrangements made by teachers, school librarians, and/or school administrators. These visits benefit both you and the university library. You get to do college-level research early and to experience a nearby university's research services. The university gets to host you as a potential future customer and show you a little of what college life is like. Although as a guest at a university you may not be able to check out paper resources, you will be allowed to make photocopies and e-mail full-text articles to yourself.

There are also current and reliable materials that are available online that are not stored behind firewalls, but you will not necessarily be able to identify which ones are reliable if you use a basic search engine like Google or Yahoo. With a growing movement toward Open Access (OA), research institutions are increasingly making scholarly writing available for free. The sidebar provides an introductory list to databases that will help you identify free scholarly research.

Free, Open-Access Resources

- Directory of Open Access Journals *www.doaj.org/doaj?func=searchArticles*
- Google Scholar *http://scholar.google.com*
- InfoMine *http://infomine.ucr.edu*
- Infotopia *www.infotopia.info*
- Medscape Reference *http://emedicine.medscape.com*
- National Science Digital Library *http://nsdl.org/search*
- Public Library of Science *www.plos.org/journals/index.php*
- Scirus *www.scirus.com/srsapp/advanced/index.jsp*
- Open J-Gate *http://openjgate.org/Search/QuickSearch.aspx*
- Wiley Online Library *http://onlinelibrary.wiley.com*
- OAIster *http://oaister.worldcat.org*
- WorldCat *http://worldcat.org*

Methods of Note Taking

At this point, let's take a step back in the process. Even before you begin searching for resources to answer your research questions, you should plan how to organize your note taking. Do not just start reading and jot down sentences or phrases. After you finish your experiment, you will be writing a scientific paper or preparing a poster, and therefore, you must share with the reader where the information came from. For everything you read, record not only the name of the resource your information came from but also the page numbers on which it appeared. To save you time and focus your research energy, you should also organize your notes within the categories of your research questions.

Brief Introduction to Documentation

The word *documentation* refers to the practice of referencing or citing previous works within a piece of writing in accordance with an "official" documentation style guide, such as that of the Modern Language Association (MLA) or American Psychological Association (APA). There are many documentation styles used by researchers; however, in this handbook we will only learn MLA. I'll go into the details of how to document a paper using MLA style in Chapter 10. Right now, you need to understand the basics of documentation so that you collect the appropriate information as you take notes from your resources.*

The most important principle of documentation is that you give credit to the ideas, information, or expressions of others in two places within your writing: in parentheses within the narrative of your text and in a reference section at the end. Perhaps up until now, you have been allowed to write a paper and simply list the resources at the end. This method is not sufficient for the level of writing research you are doing now. It is *imperative* that as you take notes you keep track of where the information came from and what pages the information appeared on. Consequently, you must remain organized while taking notes. To prevent yourself from inadvertently plagiarizing, you should get into the practice of writing your notes in short phrases, not in complete sentences.

* I chose to use MLA as the documentation style for this handbook because it is what most high school English teachers use. Also, MLA style is the one you will most likely encounter your freshman year in college. Note, however, that professional STEM scientific papers are never written in MLA style. What is important is that you learn the principles behind documentation. In college, if you decide to enter a STEM field, it will not be difficult for you to transfer what you have learned from MLA to another style of documentation. If you plan to enter your research at a national symposium or fair contest while you are still in high school, be sure to refer to their guidelines regarding documentation style. Most competitions do not require a specific style—only that it is applied consistently and correctly.

Organizing the Note-Taking Process

There are many note-taking methods. I'll discuss two: using note cards and using a notebook.

There are also free online note-organizing tools that allow you to create accounts, format citations, take notes, and share the citations and notes with other individuals. These sites include but are not limited to the following:

- EasyBib (*www.easybib.com*) allows you to create virtual note cards, associate them with specific sources, and add page numbers and tags so you can easily find information you have recorded.
- NoteStar (*notestar.4teachers.org*) allows you to create subtopics to match your background questions, take notes, and organize notes and sources. It can be used in conjunction with (*thinktank.4teachers.org*).
- SpringNote (*www.springnote.com*) is a specialized wiki that helps you organize your notes online by setting up either a personal notebook or a group notebook.
- Noodletools (*www.noodletools.com*) includes links to online databases to help you find reliable resources. It also functions as a place to record information and organize online note cards. In addition, it will support you in formatting your resources into MLA style.

Even if you plan on using an online note-taking website to organize your research, you should still read the remainder of this chapter so that you understand how your notes should be organized to make the scientific paper or poster easier to write.

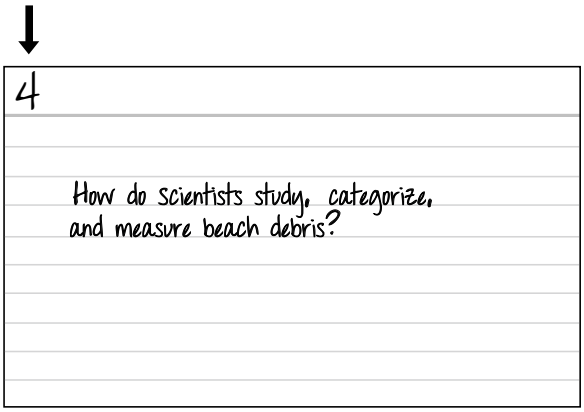
Note-Card Method of Organizing Background Research

1. *Research Question Cards:* Assign each background research question a number and write this number and question on a single note card (see Figure 3.1, p. 42). Consider using different-color cards for each question.

Figure 3.1

Sample Research Question Card

Place the assigned library research question number in the upper left corner.

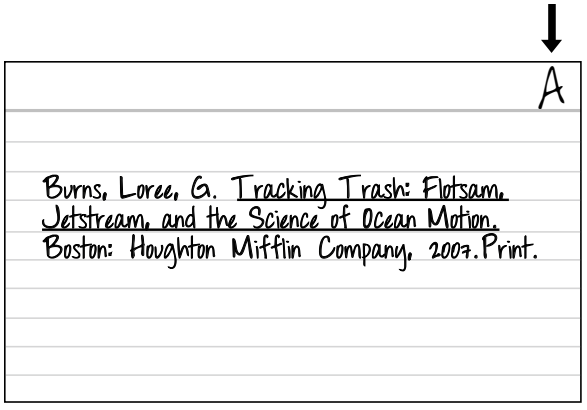


2. *Bibliography Cards:* For each resource you use (book, journal, or website), you will write the bibliography information (using MLA style—see Chapter 10) on a single card, assigning a letter to these resources as you go (see Figure 3.2).

Figure 3.2

Sample Bibliography Card

Place the assigned letter for this resource in the upper right-hand corner.



If handwriting, underline the book title. If typing, italicize it.

3. *Note Cards:* Begin taking notes on the note cards (see Figure 3.3).

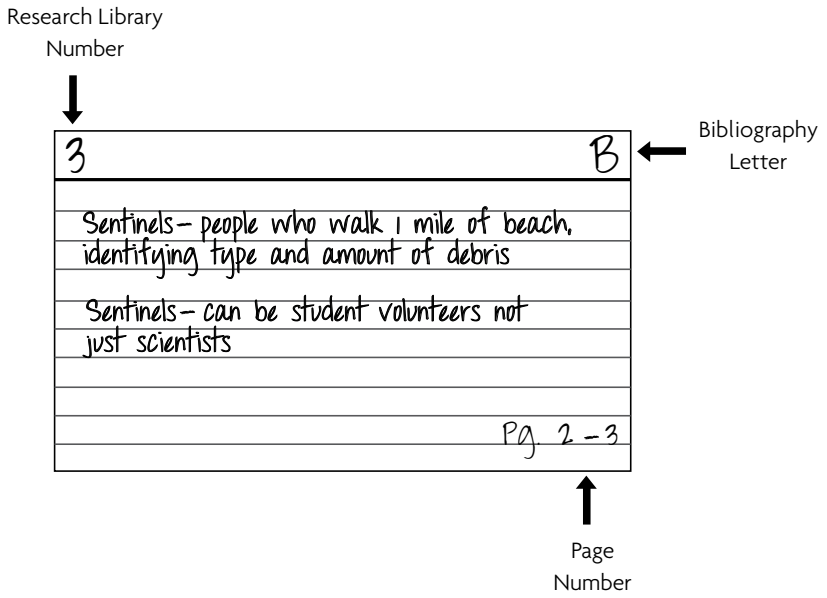
   a. In the upper right-hand corner, put the letter of the resource from which the information is coming.

   b. In the upper left-hand corner, put the number of the background research question the notes are addressing. If you want to color code your note cards, coordinate the color with the research question card—not the bibliography cards!

   c. In the lower right-hand corner, put the page numbers where you found the information. When recording notes from pages of actual books, journals, and PDF files, use the abbreviation "pg." When recording notes from a web page, do not use page numbers; instead include paragraph numbers and use the abbreviation "para."

Figure 3.3

Sample Note Card



As you take notes, it is quite possible that one resource will help you answer more than one research question. Be sure to start a new note card when the question you're addressing changes. Each note card does not need to be full.

In favor of the note-card system: *Once the note taking is complete, the cards can be shuffled and reorganized in a way that makes writing the paper easier. (The keys to making this system work are to keep the cards organized and to carry them around without misplacing them.)*

Against the note-card system: *Loose note cards are easily misplaced or lost. Consider hole punching the cards and using metal rings to keep them together. Recipe boxes with tabs to separate the research questions also work well.*

Notebook Method of Organizing Background Research

This method uses the Notebook Organizer provided at the end of this chapter (pp. 55–56). This system also works well if you prefer to take notes electronically or in a spiral-bound notebook or composition notebook (where pages won't fall out).

1. *Bibliography Information Page:* Make the front pages of your notebook the place to list your resources (books, journals, or websites). You list these resources (using MLA style; see Chapter 10), assigning letters to them as you go (see Figure 3.4).

Figure 3.4

Sample Bibliography Information Page

	Bibliography Information
A	Sheavly, Seba B. *National Marine Debris Monitoring Program: Lessons Learned.* Virginia Beach: U.S. Environmental Protection Agency, 2010. Web. 4 Nov. 2010
B	Fradin, Judy B., and Dennis B. Fradin. *Hurricanes: Witness to Disaster.* Washington D.C.: National Geographic, 2007.
C	Burns, Loree, G. *Tracking Trash: Flotsam, Jetstream, and the Science of Ocean Motion.* Boston: Houghton Mifflin Company, 2007.
D	

Notice that the entries are NOT in alphabetical order. That is because you will write the resources in the order that you find them. Later when you type the resources into your Works Cited, an alphabetical listing is necessary.

2. *Research Question Pages:* Write the number you assigned to each background research question on top of its own page in your notebook (see Figure 3.5).

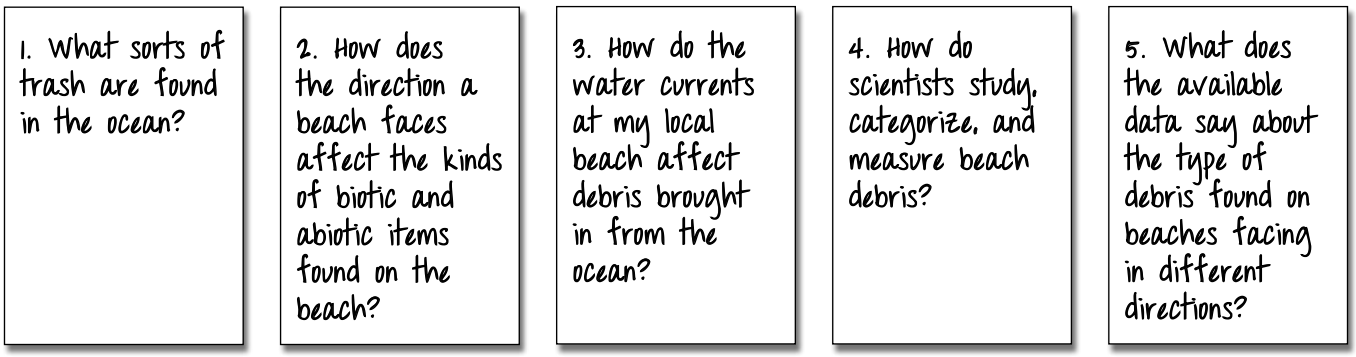
a. If you are using the provided Notebook Organizer (pp. 55–56 have at least two to three pages for each research question.

b. If you are organizing this in a notebook, evenly divide the notebook pages between your research questions, so that there are plenty of pages to take notes for each research question.

c. If you are organizing notes electronically, insert page breaks between each research question, and consider using tables to organize the note-taking described in step 3, below.

Figure 3.5

Sample Research Question Pages



3. *Taking Notes:* Begin taking notes in your notebook (see Figure 3.6, p. 46).

   a. Place the bibliography letter in the first column of the table

   b. Place the page numbers in the second column.

   - When recording notes from pages of actual books, journals, and PDF files, use the abbreviation "pg."
   - When recording notes from a web page, do not use page numbers; instead include paragraph numbers and use the abbreviation "para."

Figure 3.6

Sample Note-Taking Entries

Research Question (and Number):

4. How and why do scientists study, categorize, and measure beach debris?

Bib Letter	Page #	Notes: In Your Own Words!
C	4	-study debris: if large amounts of one item (toys, sneakers) are found...scientists try to find the source
C	5	Large spills: sometimes containers that fell off cargo ships
C	4	"Tracking toys and sneakers gives us a chance to see what the ocean does with our trash...and we can learn from it"
C	5	Beachcombers: people who collect things they pick up at the beach...scientists communicate with them to get data
C	40	Sentinels—people who walk 1 mile of beach, identifying type and amount of debris (on paperwork provided)—can be
		student volunteers not just scientists
A	4	Monitoring beach debris can show the condition of the water
A	4	National Marine Debris Monitoring
		Program (NMDMP): developed a standard way to record beach debris
A	5	Goal of NMDMP: determine 1) is the amount of debris changing? 2) what are the major sources of debris?

Notice: Notes are in short phrases, not in full sentences.

If you are handwriting your notes, feel free to use more than one line for the notes. This makes finding the information much easier.

In favor of the notebook system: *Taking notes on notebook paper is what most students are used to doing, and notebook paper is less likely to be lost than note cards. This method organizes all the notes by research question, so that they can be further organized into paragraphs.*

Against the notebook system: *Once the notes are written in the notebook, you cannot change the order in which they were taken (unless you choose to enter your notes electronically).*

While reading through your resources and taking notes, do not become focused on answering only one research question. A single source may help you answer several background research questions. Therefore, while you read from one resource, you may take notes on three different pages (or several note cards) because there is information that answers different background research questions.

Avoiding Plagiarism

Plagiarism is "using another person's ideas, information, or expressions without acknowledging that person's work" (MLA 2009, p. 52). Although you probably understand that copying word-for-word from a resource and not giving credit to the author is plagiarism, what you may not realize is that *just using someone's ideas without giving credit to them in parentheses within the paper is also plagiarism.* Whether plagiarism is intentional or not, it is a serious offense.

There are two ways you can prevent yourself from unintentionally plagiarizing.

Avoiding Plagiarism When Taking Notes

The best way to avoid plagiarism while taking notes is to take notes in your own words. One way to do this is, first, read a paragraph; second, close the resource (or minimize the program on your computer); and third, from your memory, write your notes. Write short phrases that summarize rather than complete sentences. The idea is to give an accurate presentation of the author's ideas. Then recheck your notes to be sure that you have correctly interpreted the content as well as the author's intent. Be careful not to change the meaning of what the author intended to say. *An important reminder:* Keep careful track of where information comes from and its page number; this will save you a lot of time in the long run.

When taking notes, don't say to yourself, *I'll just copy this into my notebook now but I'll rewrite it in my own words later.* You run the risk of forgetting to rephrase the direct quotes and then you may be accused of plagiarizing. In the end, it is much better to have a paper that—though perhaps not very eloquently written—is your own than it is to have a paper with parts that have been plagiarized. If you do come across a set of words that you cannot rephrase without losing the meaning or tone, be sure to put quotation marks around the words in your notes, so that you can properly credit the author when using those words in your paper.

Avoiding Plagiarism When Writing the Paper

If you took your notes in your own words, avoiding plagiarism while you write the paper is much easier then if you copied from your resources—or even worse, if you skipped the note-taking process altogether. When you are ready to write the paper, understand that even if you changed an author's wording into your own, you still must document *within your paper* where the idea came from; it is not enough to just add the resource to the reference list at the end of your paper. Changing the author's words into your own *is not* enough to keep you out of plagiarism trouble. And, again, if you use an author's wording exactly, you must use quotation marks.

Another way to be sure that you do not plagiarize while writing the paper is to use a minimum of two different sources to back up each new idea in a paragraph. Use the facts you have in your notes to write, in your own words, about the topic at hand, and compare your research to earlier research (which you cite in your paper). It is your job to collect what the experts say about various topics and then organize this information to introduce or explain your research study. In your paper, you will put together many facts from different sources in a way that has not been done before.

It should be mentioned here that electronically copying-and-pasting any author's work, including text, photos, images, or graphs, is plagiarism, unless that work is given proper documentation. *Anything* you put in your paper must be documented at the place in the text where you use it, in addition to being added to the reference list.

Using Quotations Within the Paper

Although you may view quoting an author's words exactly as the quickest way to get information into your paper, use this method sparingly. Save quotes for well-worded phrases that lose meaning when reworded.

The example below shows how a direct quote should be documented. Notice how the writer begins the sentence and allows the quote to finish it. Whenever you quote from a source, be sure to discuss the quote in your paper—do not assume it will speak for itself. Integrate the quote into the idea of your writing. Here is an example from a student research paper:

> *Preston describes the amplification of the Ebola virus as the "virus convert[ing] the host into itself" (18) causing the person to become depersonalized. Essentially, "the who" of the host "has already died, while the "what" of the host continues to live (19).*

Notice that the author's name is integrated into the text before the quote and that the page number is given in parentheses after the quote. If you do not include the name of the author as part of the text, put it inside the parenthesis in front of the page number. (See Chapter 10 for more detailed information about MLA style.) If the person who is reading your paper wants to learn more from this resource, the in-text citation gives enough information to identify it in the reference list, or what is called Works Cited in the MLA style of documentation. The author cited—Preston—can be found by looking at the Works Cited alphabetical listing under P. Therefore, the following entry would be found on the Works Cited page:

> Preston, Richard. The Hot Zone: A Terrifying True Story. New York: Anchor Books, 1994.

No matter what method you use to organize your notes, be sure to pattern your organization on the Notebook Organizer on pages 55–56. You need to keep track of both bibliography information and page numbers.

Technology Research Tools

Conducting Searches Within Databases

It is important that you learn how to perform effective Boolean searches (for a discussion of the meaning of *Boolean*, see *www.internettutorials.net/boolean.asp*) within the databases you are searching. Using the operators *and*, *or*, and *not* will help weed out search results that are not relevant to your topic. As you search within online databases, don't always limit your searches to "full text." Since you are working on a long-term project, if the library has neither an electronic (PDF), nor a paper version of the article, you can request it through an interlibrary loan (ILL) program. In a matter of days, the article may be in your hands.

RSS Feeds and Readers

Ask your teacher what sorts of online resources will be accepted as credible for your STEM research paper. If you use the open-access databases listed earlier in the chapter, your resources are more likely to be credible. While scholarly journal articles are important sources of information, do not overlook a blog posting from a world-renowned scientist from Yale or a podcast of a mathematician presenting at an international conference. Digital media allows us to get information as it happens. Having said this, the amount of information available on the internet can be overwhelming. However, there is help.

The answer is using RSS feeds and readers. RSS feeds, which stand for Real Simple Syndication, allow you to subscribe to relevant websites and specific engine searches to have the information sent to you—all in one place. These news feeds, or aggregators, allow you to have news and pertinent topical readings come to you via your RSS reader to collect websites publications on topics that interest you. The first step is to set up a mailbox, or an RSS aggregator, known as an RSS reader. There are many to choose from—Google Reader, FeedBurner, and NewsGator, to name a few. Once you create an account, you scour the internet for places that have, or might in the future have, relevant articles, interviews, or scientific studies. While searching on the web, look for the RSS logo or a link that invites you to subscribe to a feed. Many sites allow you to have only certain topics forwarded to your RSS reader, not every post from the website. For example, the RSS feed at the *Scientific American* website allows you to request feeds on only specific topics or narrowed areas of science.

In addition to subscribing to specific news websites, you can also have the powerful search engines behind Google News (*http://news.google.com*) or Yahoo News (*http://news.yahoo.com*) update you when new web pages on your topic are published. When you go to either of these sites, use the advanced search, and work at narrowing and perfecting a search on your topic. Once you have a search result where most of the topics look pertinent, right-click on the "RSS" link or icon, and select the phrase "Copy Shortcut" (or "Copy Link Location" or "Copy Link Address") and paste the address into your Add Subscription form in your RSS reader. Now any new news will be delivered to you! If after a week you find you're receiving too many results, delete the feed, and go back and narrow your advanced search to come from specific sources. Although media news resources are *not* considered reliable for scientific writing, they will help you get ideas, and their references can lead you to more reliable resources. You can find more details of how to fully use RSS feeds in Will Richardson's book, *Blogs, Wikis, Podcasts, and Other Powerful Web Tools for Classrooms*.

Social Bookmarking Tools

For a long time, what was missing from reading information on a computer screen was the ability to highlight text, handwrite notes in the margins, and "dog ear" the page (I don't condone that practice, by the way). Well, social bookmarking sites now allow you to do all of these things AND share your notes and markings with others. Social bookmarking sites such as Delicious (*www.delicious.com*) and Diigo (*www.diigo.com*) allow you to highlight text with any color highlighter you want, add a virtual sticky note to a web page,

and determine textual tags that will help you find the site later. Of course by doing all of this you have bookmarked the page. Think about the time you have wasted looking for a specific idea you know you had bookmarked on an extremely long web page. Imagine now that your highlighted text draws your eye to the correct place on the page and that your virtual sticky note reminds you how you thought that text might help you on your project.

The social aspect of these bookmarking sites is what makes them so powerful. The ability to share with others your bookmarks and the marks you made on the page is extremely beneficial. If you are working in a group of students on the same topic, you can create a group within the social bookmarking site and share the bookmarks that pertain to the topic with them. The members of your group can in turn make comments on the page. Now you have true collaboration—not to mention increased efficiency.

Electronic Mail

If you find an article by a specific individual, go look up him or her online. Maybe you'll find the author is an active blogger, or maybe you'll find more recent, or yet-to-be-published, articles. Most important, look for online contact information. If you have questions or would like suggestions from an expert, consider contacting him or her directly. The first level of contact should be an

E-Mailing a STEM Professional

What to Include in Your E-Mail

- Formal opening that would be used in a business letter: "Dear Dr. Smith,"
- How you found that person (what article or website of his or hers you read).
- Who you are, and where you are from (a student working on a research project from ABC High School).
- If your teacher has given you permission, mention his or her name and maybe your teacher's e-mail address so that the scientist can verify what you say.
- A clearly stated request.

  Examples of Requests:

  - Could you answer three questions for me?
  - Could I interview you in a Skype (a "Voice Over Internet Protocol") conference call?
  - I'm having a problem with my research design [explanation here]. How do you suggest I address this?
  - Would you be willing to be my mentor throughout my project?

(continued)

E-Mailing a Science Professional *(continued)*

- Your contact information.
- Sincere thanks, acknowledging the person's expertise and making sure the person knows you value his or her time.
- Sign off, as you would in a formal business letter: "Sincerely" and your full name.

What Not to Include in Your E-Mail

- Questions about the individual that you can find the answers to online.
- Casual language like, "Hey! I found you on the internet."
- IM/text-messaging abbreviations. (If you cannot find the time to type out full words, why should this expert spend any of his or her valuable time answering your questions?)
- General questions such as "How do you design an experiment on this topic?" The more specific your question, the more likely you are to get an answer.
- An attachment of your entire paper, asking for any suggestions.

e-mail. However, remember, you are speaking to an authority figure on your topic. You should spend a lot of time constructing the e-mail, use respectful language, and clearly state what you are asking of the individual.

Chapter Questions

1. How are background research questions used to organize note taking?
2. How can you be sure that your research methods will provide you with reliable resources?
3. When taking notes, what are the key parts that need to be organized?
4. What can you do to avoid plagiarism?
5. Chose one technology tool that you may consider using. How might it help increase your efficiency?

Chapter Applications

I trust that this chapter helped you determine which background research questions you will use to focus your library and online searching. Complete Student Handout #3, Background Research Questions, and have it approved by your teacher. If at any point during the research process you determine that

you need to modify your research questions, do so only with the permission of your teacher. Determine which libraries to visit to gain access to databases. Also consider bookmarking the Open-Access websites provided in this chapter (p. 39) to have them available when you begin researching. Decide (or ask your teacher) which note-taking method (note cards or notebook) you will use. Familiarize yourself with this method, and purchase anything you need (note cards or notebook and anything else mentioned earlier in the Organizing the Note-Taking Process section, pp. 41–46) to get started.

If working with others on your STEM research project, have a meeting and determine the tasks that need to be accomplished during the background research stage. As a group you may decide to divide the research questions among the group members with the intent to have each member answer only the assigned question. However, if you organize your notes in Google Docs, you could assign group member resources, allowing each to answer any research question as it applies. Assign tasks, write them down, and have each group member sign the contract before turning it in to your teacher.

In Chapter 4, you will learn how to rewrite your hypothesis. The background research you are completing now will help you to develop a hypothesis that is testable and will move you forward to developing a more detailed research design.

References

MLA handbook for writers of research papers. 7th ed. 2009. New York: Modern Language Association of America.

Richardson, W. 2009. *Blogs, wikis, podcasts, and other powerful web tools for classrooms*. Thousand Oaks, CA: Corwin Press.