Research Guide

This document provides general guidelines for doing successful, scientific research.

Step 1: Frame Your Research Question

The first step is to identify your research question. See if you can frame your research with a single sentence. You want to capture your overall goal with this exercise, so it needs to be a big question, but you also want to be as specific as you can.

For example, if you are working on a project looking at the effects of climate change on coral reefs, think about how you can narrow your focus. Think about questions like “where?”, “which?”, “how?”, and, most importantly, “why?”

- Is there a particular region that you are most interested in?
- Are you focused on a particular species, or is this more of an overview discussion that relates to many species?
- Are you looking at a particular threat from climate change, or are you researching all threats?
- Are you interested in the mechanisms of degradation, or are you more interested in the effects and potential mitigating strategies?

Step 2: Inventory

The next step is to really think through your research question. Take stock of your current resources and think through what you hope to accomplish. Ask yourselves the following questions:

What do you know already?

Think in general terms here. Start with basic, fundamental concepts, so that you’re familiar with the common concepts that you may find when you start really digging into your research. It wouldn’t hurt to do a quick web search and find some fact sheets from reliable sources.

What do you need more information about?

In your preliminary fact sheet-based research, you may come across some terms that you are unfamiliar with or would like more clarification on. Make sure you familiarize yourself with the technical jargon, or you may miss some really important facts simply because you didn’t understand what the article was saying.

What would you like to find?

Based on your research question, think about what you hope to find to help guide your research. For each question you come up with, try to also have a Plan B. This type of critical thinking will help you find possible surrogates for the data you’re looking for.

Step 3: Search, Find, and Take Notes

Focused Search

Depending on your research, you may want to focus only on journal articles and books, but often the first place you’ll go is Google. Coming up with a focused search on Google is an art and it takes practice. There are tons of articles on the web with tips about keywords, using quotes, wildcards, and using

question words to get really focused answers. I tend to start really focused, i.e. using 5 to 6 words in a meaningful phrase and see where that leads. You can often tell right away if you need to adjust.

For example, if I search: us average emergency room visits per year, the top result from the CDC provides some really promising data in a table. The tabular data is great and may be exactly what I need, but I definitely want to check out the PDF that the data came from. That provides the necessary context for me to decide whether it's useful or not.

Skim First

You have some specific questions that you're looking for. Try to skim the text for keywords related to your search. If you're looking at an article, read the abstract. If you don't see anything that looks promising, move on. Also, science changes at the speed of light. If some of your results are before the late 1990's, you can probably skip them. Start with the most recent articles and work your way back.

Dig Deeper

If you find what seems like a good source, but your source didn't cover what you were looking for exactly, take a moment to look at the References or Works Cited, especially if the citation appears near a part of the text that is close to what you were looking for. It could be the author of the paper you are looking at now wasn't interested in what you're looking for, but that the cited author was. For every article you read, the author already read dozens of articles about their subject matter.

Check out this article:

How to Read a Coronavirus Study, or Any Science Paper
https://nyti.ms/3doJ9S3

Take Notes

For each source, take some notes about anything interesting that you find. Note the author, URL, page number(s). Make it easy on yourself to be able to find this information again.

Step 4: Synthesize Your Findings

You've found some promising leads, and you've also found some important dead ends. Organize these findings into a table: something that you can use directly for the next phase of your work. Highlight important findings that you're confident you can use, and cross out things that you're confident won't work.

Step 5: Ask Questions

Put together a list of questions you aren't clear on and then find someone who might be able to provide more guidance. This could be a faculty member, graduate student, expert in a governmental organization, or it could even be on a web forum. Good research is not conducted in a vacuum. The best research involves collaboration.