Questioning

I would like you to find research questions that require problem-solving or decision-making, questions that allow you to make up your own minds and fashion your own answers.

“How might we restore the salmon harvest?”

“In which Asian city should our family spend a 2 year visit?”

The first step in the Cycle is to clarify and “map out” the dimensions of the essential question being explored. Begin by brainstorming to form a cluster diagram of all related questions. These subsidiary questions will then guide subsequent research efforts.

For instance, my third grader could come up with the following questions on the best fast food restaurant:

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Can I have a birthday party there?
How much does it cost?
What kinds of toys?
Related to recent movies?
Take off shoes?
Electric games?
Parent?

Quantity?
Free refills?
Best Contest?
Best French Fries?

Which is the best fast food restaurant?
Is there a playground?
How high?
Height requirement?
Age?

Inside or out?

Planning

Finding Pertinent and Reliable information

After you have mapped out the research to be conducted, the next step is to think strategically about the best ways to find pertinent and reliable information that will help you to construct answers to these subsidiary questions.
Consider now where the best information might lie?

"Is it readily available in a book?"

"Can I find it on a CD-ROM?"

“If I go to the Internet, where should I start? a search engine like Altavista or Google? a directory like Yahoo? the source site itself like the Census or the Federal Bureau of Justice?"

Which of these sources are most likely to provide reliable information with the most efficiency?

Don’t be afraid to ask for help during this stage.

"Where is the best source for crime statistics?"

"Where can I find weather data?"

**Thinking About Selection, Storage and Retrieval**

In a time of information abundance (some would say "infoglut"), it is folly to jump into gathering without first giving careful thought to strategies for targeting and then storing the most relevant information. This early planning will greatly reduce the need for sorting and sifting later on. It will also contribute to the building of new ideas by emphasizing what information specialists call "signal" (information that illuminates) over "noise" (information that befuddles).

Studying a city like San Francisco in order to compare it with San Diego and LA and make a choice, you might find more than 2 million Web pages ("hits") using a search engine like Altavista or Google.

Your first findings? A Chevy dealer, a hair stylist, a whole bunch of e-mail messages and a bunch of files that might cast little light on your search.

But if you want to know if this city meets your criteria! Is it safe?

![Diagram showing various factors to consider when choosing a city](image-url)
It doesn't help to gather 600 files about crime in San Francisco. What you must do is ask **telling questions** such as "What is the homicide rate per hundred thousand and how has it been changing during the past decade?"

If you are asking telling questions, then you are only keeping the most important findings, and you are storing them where you belong.

If you use your cluster diagram for note-taking, you simply attach your findings as notes to the relevant part of the diagram.

A more challenging way to accomplish the same thing electronically is to set up a database file. Once you have collected several hundred entries, you will find this system very helpful for sorting your findings by key concepts.

The goal of this step of planning for research is to create a storage system that will protect you from accumulating huge mountains of information in hundreds of poorly named files. Retrieval from such a "hodge podge" can be a daunting task.

I also hope to dissuade you from wholesale cutting and pasting. By planning ahead you will have an information storage system that will eventually support concept-based retrieval, synthesis, and analysis.

Organizing gathering around key ideas, categories and questions increases the likelihood that gathering will induce, provoke and inspire thought.
Gathering

If the planning has been thoughtful and productive, you can proceed to satisfying information sites swiftly and efficiently, gathering only that information that is relevant and useful. Otherwise, you can easily wander for many hours, scooping up hundreds of files that will later prove frustrating and valueless.

Sorting and Sifting

The more complex the research question, the more important the sorting and sifting providing the data supporting the next stage - synthesis. Much selecting and sorting should occur place during the previous stage - gathering - but now the you must move toward even more systematic scanning and organizing of data to set aside and organize those nuggets most likely to contribute to insight. You must sort and sift the information much as a fishing boat must cull the harvest brought to the surface in a net.

Synthesizing

In a process akin to jigsaw puzzling, you arrange and rearrange the information fragments until patterns and some kind of picture begin to emerge. Synthesis is fueled by the tension of a powerful research question. This is why you must spend the time necessary to come up with a strong research question as well as good telling questions.

Evaluating

At this point, you must determine if more research is needed before proceeding to the reporting stage. In the case of complex and demanding research questions, you must usually complete several repetitions of the Cycle since you usually do not know what you don't know when you first plan your research. The timing of the reporting and sharing of insights is determined by the quality of the "information harvest" during this evaluation stage.

Reporting

Because multimedia presentation software is now so readily available, you are free to move to persuasive presentation. You have been charged with making a decision or creating a solution, now you may report your findings and recommendations to an audience of decision-makers (your classmates) in a basic speech or with a multi-media presentation.