

Name _____ Date Due _____

Class _____

Library Guides: Frontiers in Biology

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 [Printer-friendly version](#) [The Research Process](#) (.PDF version)

Frontiers in Biology: Biology 20 - Research Project -Part 1

How to begin researching is often the most difficult part of the investigative process. The steps below will explain the best process for preparing yourself to research your topic. A sample topic and reference books were chosen only as an example to help clarify the research process.

Steps to Take to Complete Assignment 1:

1. Read "The Research Process" - Part 1 below This is an example of how you are to complete your homework assignment.
2. Complete COS Library Planner Worksheet by:
 - A. Defining Your Topic
 - B. Developing a "Glossary of Terms" of unfamiliar words
 - C. Researching the history of your subject. Write a descriptive paragraph on the history including how scientific discovery on the subject has evolved over time. A timeline is a good way to illustrate this.
 - D. Writing at least one question concerning statistics and/or demographics on your topic and attempt to locate the answer(s) using reference and non-fiction book sources.
 - E. Listing all books used to locate your information in MLA Format.

THE RESEARCH PROCESS - PART IA

Writing Questions

Why write questions? First of all questions require an answer, something that you as the writer have to answer to your own satisfaction but more importantly to the reader's satisfaction. Consider what your research project is supposed to cover such as statistics, biological concepts, etc. Ask questions that will force you to find answers that cover these areas. Also consider who your audience is and what types of questions they would be likely to ask you about your topic. Questions and answers also help keep you focused so that you don't go wandering off into subject areas that are not appropriate.

Definition

Defining your topic requires you to think critically about your topic and ask questions you will need to answer. To define your topic refer to your textbook and or Reference Books such as subject dictionaries and encyclopedias located in the Reference Section on the First Floor of the COS Library. (Some good examples of books to use are listed on the library planner worksheet you will be filling out next.) A definition should be two sentences to a paragraph long. In addition you should make sure you understand any words in the definition you do not understand.

EXAMPLE: **Topic - Sickle Cell Anemia**

Question 1: What is the definition of sickle cell anemia?

Sickle-cell **anemia** is an inherited disease characterized by sickle (crescent) shaped red blood cells that contain an abnormal **hemoglobin** molecule, called hemoglobin S, and chronic anemia caused by excessive destruction of red blood cells. These cells impair circulation, resulting in chronic ill health (fatigue, mild jaundice, **dyspnea** on exertion, swollen joints, and infections due to an enlarged spleen), periodic sickle cell crisis, long-term complications and sometimes premature death.

At this point if the definition contains words you are not familiar with **highlight or circle those words** and look their definitions up as well and write them down.

Anemia - The condition characterized by inadequate red blood cells and or hemoglobin in the blood.

Hemoglobin - A protein found in red blood cells, which protect the body from infection.

Dyspnea - Breathlessness or shortness of breath; difficult or labored breathing.

Non-fiction books used to develop this definition are:

- Dorland's Illustrated Medical Dictionary. Philadelphia: W.B. Saunders Co., 29th ed., 2000.
- The Merck Manual of Medical Information. Mark H. Beers, editor-in-chief, Whitehouse Stations, NJ.: Merck Research Laboratories, 2nd Home ed., 2003. Call # R 616 M555
- Professional Guide to Diseases. Springhouse, Pennsylvania: Lippincott Williams & Wilkins, 7th ed., 2001. Call # R 616 P964

HISTORY

Most of the time questions that cover the history of a subject can be answered in subject encyclopedias, other specialized books located in the Library Reference Section, or the non-fiction book collection. Understanding the history of a subject gives you a fuller understanding of your topic to include how science has advanced solving problems surrounding your topic. The books below helped develop the questions and answers you see.

Question 3: What is the history of sickle cell anemia and is there a timeline?

Looking in the COS Book Catalog under the subject heading *sickle cell anemia* the two books listed below were located and used to develop the following history.

Non-Fiction Books (Can be checked out)

- Keith, Wailoo. Dying in the city of the blues: sickle cell anemia and the politics of race and health. Cambridge, Mass.: Harvard University Press, 1986. Call # 362.196 W139
- Edelstein, Stuart J. The sickled cell : from myths to molecules. Cambridge, Mass.: Harvard University Press, 1986. Call # 614.5 Ed21

Answer 3: According to Edelstein the word sickle was introduced in 1910 by a Chicago physician named James B. Herrick after examining the blood of an anemic black patient from the West Indies. Microscopic examination showed that the blood cells that are usually supposed to be round were "peculiar elongated and sickle-shaped." It was later discovered that low oxygen was related to sickling of red blood cells by altering the structure of the hemoglobin in the molecule. (note to myself- keep looking for a history timeline)

Demographics and Statistics

Now that you have defined your topic, and are still focused on using reference sources look for statistics that tell demographic information about your topic. Write a few questions that you will have to locate answers to about statistics such as age, culture, and incidence of the problem. Referring to statistical sources and specialized reference books is once again the best place to look first.

Question 1: What is the statistical incidence of this disease?

Answer 1: Sickle Cell Anemia is most common in tropical Africans and in persons of African descent; about 1 in 10 American blacks carries one copy of the gene for sickle cell disease. This causes *sickle cell trait* (carriers) that results in 20% to 40% of their total hemoglobin becoming hemoglobin S; the rest are normal. People with Sickle Cell Trait do not develop *sickle cell anemia* and usually have no symptoms and can expect a normal life span. Genetic screening and counseling is required for sickle cell carriers. If two sickle cell carriers marry, each of their children has a 25% chance of inheriting sickle cell anemia. About .03% of blacks have two copies of the sickle cell gene and will develop the disease.

Question: Besides people of African descent what other ethnic populations can have sickle cell anemia?

Answer: Sickle cell anemia also appears in other ethnic populations, including people of Mediterranean or East Indian ancestry.

Reference Book Used: (cannot be checked out)

- Professional Guide to Diseases. Springhouse, Pennsylvania: Lippincott Williams & Wilkins, 7th ed., 2001.
Call # R 616 P964

RESEARCH PROCESS Part 1b - WORKSHEET

Now you are ready to begin research on your own topic using the important steps we have just discussed by completing the Research Process Part 1b Worksheet. Use this handout as an example. Your grade will be based on going through each step and completing each part of the form.