Science Research
Sophomore Student Summer Assignment

Your first major goal in science research is to identify an area of interest for your research. Once you identify your area of interest you will narrow your topic and develop possible research questions. This assignment is designed to help you do either, or both. We know some of you may have an idea of an area of study while others may have no idea at all. This time and assignment can be used to explore many interests in order to find one that will be the best for you. If you have an area of interest, use the assignment to build your knowledge and to develop a list of resources to utilize to progress in your research.

The Science Research Summer assignment is due on the first day of school-even if there are shortened periods. Your teacher will collect the assignment and check for completeness. You will get the assignment back before it is your turn to present. Once you have a scheduled one to one meeting, you and your teacher will discuss the assignment and set some research goals. Science Research is the place for you to show passion and enthusiasm for your work! We hope that this assignment inspires you as you begin your journey as a science research student at John Jay!

Directions: Complete all work in a bound composition notebook with non-tear out pages-this will be your Science Research Notebook. Directions for setting up our notebook are included below.

1. **Set up your Science Research Notebook:** Directions for setting up your notebook are below. Set up your notebook before beginning the assignments.

Maintaining a Science Research (Laboratory) Notebook

A critical skill that each laboratory scientist must develop is the proper documentation of laboratory work. Biological and chemical laboratory researchers advise that one of the most critical skills for scientists is good record keeping. Research notebooks are legal documents that are used to obtain patents and protect research. A good laboratory notebook is complete enough that you, or someone else, could repeat the work on the basis of the information documented in the notebook.

You will be expected to maintain a Science Research (Lab) Notebook as a chronological log of everything that you do in science research and in the laboratory. Although the type of laboratory notebook and documentation may vary from one research institution to another, there are some basic guidelines that every laboratory worker should follow:

- Use only a bound notebook, with non-tear out pages-traditional composition books are great. Put your name, school address, school email and phone number on the first page of the notebook.
- Set aside the next three or four pages of the notebook to be used for a table of contents.
- Make sure that all of the pages after the table of contents pages are numbered before you use the notebook; enumerate your sections at the beginning of the Table of Contents.
- Set aside the last (from the back of the notebook) 12 pages for keeping a time log of all research related activities.
- Set aside 12 pages, before the time log, for vocabulary words and their definitions.

- Set aside 6 pages before the vocabulary, for research questions.
- Set aside 10 pages from the back, before the research questions, for contact information for scientists with whom you might desire to work.
- Never remove pages from the notebook for any reason.
- Use only black ink to ensure that the entries will show clearly after photocopying.
- Make sure that your handwriting is clear, complete, and legible.
- Make sure you have a complete record of the work that you did each day including, but not limited to: your thinking, observations, and data.
- Record data and observations immediately and directly into the notebook--not on a separate sheet of paper.
- If you have separate pages (such as instrument printouts or graphs) that need to be included in the notebook, you may add them but never cover information up when you do so.
- If you have to affix material into your notebook, tape or paste all sides of it to the notebook page. Indicate the date on which the material was added.
- For corrections, put your initials and a date next to the corrections added.

Adapted with permission from work by Linda Hobart, Finger Lakes Community College, Canandaigua, NY

Note that once you are working with a mentor in a lab, he or she may require that you leave the official lab notebook in the laboratory. Your mentor will give you instruction and direction as to what may be copied and leave the laboratory.

2. **Keep a Time Log**: On the **last page** of your **Science Research Notebook**- Divide the page into three columns—date, activity, duration. Each time you work on your research, record the date, write down what you did, and record how long it took. Use the sample entries below as a model:

Date	Activity	Duration
August 1	Read 2 articles and took notes	1 hour
August 4	Talked with Dr. Watson	35 minutes
August 5	Web searching—3 good sites	1 hour

You should have a minimum of 10 hours of work done and logged over the entire summer.

3. **Organize your Portfolio**: Get a **large** (3 inches or wider) binder and dividers (16 in number) to serve as your **Portfolio**. Label the dividers with the headings listed below:

Portfolio Table of Contents

1. Project Statement
   - Purpose or intended objective of the research project
2. Copy of Laboratory Notebook Pages
   - Photocopy or carbon pages of lab work from lab notebook
3. Time Lines & Hours Worked
   - Ten week timelines for each quarter and summer sessions
   - Record of Time forms for each biweekly cycle
4. Assessment
   - Biweekly assessments completed by teacher and student
   - Ten week evaluations
5. Bibliographic Research

A running, complete bibliography of all reading materials including articles, web pages, books

6. Journals
   Copies of all professional journal articles read and identified as relevant to the research (this will take a large amount of space)
7. Meetings
   A record of all meetings with professional advisor and resources.
   At a minimum, date, time, place, and summary of meeting discussions
8. Phone conversations
   Record of all phone calls related to research topic
9. Written Communications
   Copies of all emails, letters, faxes, etc. sent or received
10. Grants
    Copies of all grant applications
11. Presentations
    Copies of all presentations made by student, including handouts
    Copies of teacher and peer evaluations for each presentation
12. Abstracts
    Copies of all abstracts written by student
    Identify abstract for each quarter, assignment, or competition
13. Drafts of paper
    Includes sophomore midyear paper, junior midyear paper, draft submitted on first day of senior year, and all drafts up to final paper
14. Final Paper
    Copy of the final paper for the research product for Siemens, Regeneron STS, and WR-JSHS
15. Competition Rules
    Rules and regulations for all competitions in which student enters
    Somers Fair for sophomores
    WR-JSHS, WESEF for juniors
    WR-JSHS, WESEF, Regeneron STS, required for seniors
    TriCounty JSHS, NYSSEF, ISEF, ISWEEEP, Accorda, and others for seniors
16. Honors
    Record of all honors, recognitions, awards and news coverage received by student as a result of research completed by the student

4. **Read and take notes:** Begin by flipping through magazines and newspapers and skimming article for interest. When you find an article that attracts you interest, cut it out or photocopy it, read it and take notes. You have to read a **minimum of ten (10)** articles over the summer. Put a print copy of each of your articles into the portfolio. Good sources for articles include print and on-line versions of *The Science Times*, the local newspaper, *Time*, *Newsweek*, as well as other magazines. Using magazines like *Scientific American, Discover, Natural History, Popular Mechanics, Astronomy Today, Psychology Today* and other science periodicals will provide more scientific and technical information that will really help you in be prepared by offering high-quality, current scientific information. Be sure to utilize your local library or the library article database-you will be able to access anything you need.

For each article you choose to read, take notes in your composition book as follows:

- Complete bibliographic information at the top of the first page of your notes
- ½ to 1 ½ pages of notes per article, each article should start on a new page-a brief summary of the article and its importance/significance is all that is needed
- Your notes can be in an outline format
- indicate your level of interest in the article as a potential topic/area on a scale of 1 (not interested) – 10 (highly interested)

5. **Search:** Search the internet for the best web sites related to your area(s) of potential interest. College and university web sites, government web sites, professional society web sites, foundation web sites as well as major business and corporate web sites are good places to begin. You must review a minimum of six (6) web sites. Make a word document, MLA format, for your Portfolio that includes the following information.
    - url, and date accessed
    - a brief, written summary of the kinds of information you can get at the web site
    - a short evaluation of the web site—kind and quality of information, ease of navigation, usefulness
    - Print one page from each web site to attach to the word document
    - Once you have completed the word document with all 6 websites, staple the
    - MLA sample document is available on echalk. You can "save as" and then just type your information onto the template document. (don't forget to remove sample information from the document before printing)
    - You do not need a reference list for this assignment.

6. **Talk to professionals in a science field:** Ask everyone you know if they know someone involved in professional research. These can be family members, friends of your family, a naturalist at a local nature preserve, zoo or science museum. You might speak to a parent of a friend who is a scientist. Arrange to speak with at least three professionals. Some questions you might ask a researcher include: How did you get interested in this particular field? What have been the most significant recent developments in this field? What are the big unanswered questions in this field? What would you suggest I research if I were working in this field? Record a summary of the conversations in your composition Notebook.
    - Include time and date of conversation
    - Indicate location or phone conversation
    - Write a brief summary of the conversation
    - If you contact the professional by e-mail, prior to and/or after the conversation, put a print copy of the email(s) into your Portfolio.

7. **Get Inspired:** Do something fun while noticing the world around you. Choose two from this list-(or more if you like) and complete them in you Science Research Notebook. Log the activities in your time log.

    - Take a hike locally-Lewisboro has lots of trails that can be found here: https://www.lewisborogov.com/parksrec/page/walking-wild Take photos (3 min.) and tape into your notebook, record three observations or pose two questions.

    - Go to a movie-in a theater or drive-in. Tape the ticket stubs and write 3 sentences connecting the movie to research and/or your area of interest for research.

    - Go to a local nature center for a program or presentation: Ward Pound Ridge, Mianus River Gorge, Teatown, Marshland Sanctuary, Muscoot farm or any count or state park-check websites and the local newspapers for programs and times. Take photos to tape into your notebook and write a three to five sentence summary.

- Watch a sunset or a sunrise from your favorite place. Take photos or a video. Even more fun at the beach! Record your observations (3 sentences/observations) in your notebook.

- Go out for meteor showers: https://stardate.org/nightsky/meteors Take a photo – count the meteors. Record your observations in your notebook.

- Go to the beach. Count the number of waves that crash in one minute, take photos or a video. Record 3 observations or pose two questions about what you see there.

- Go to a local lake. How many kinds of organisms can you observe? Take photos and tape them into your notebook.

- Go the American Museum of Natural History. Photograph your top 3 artifact/exhibits, tape ticket stub into your notebook.

- Go to the Norwalk Aquarium. Photograph your top 3 organisms/artifact/exhibits, tape ticket stub into your notebook.

- Spend the evening stargazing. Use Nightsky app or borrow a book to identify what is visible. This website is helpful https://www.timeanddate.com/astronomy/night/@5114184 as is http://earthsky.org/tonight/moon-saturn-mars-light-up-predawn-sky

- Go out and spot the International Space Station. How fast dose it move across the sky? Record your observations and time in your notebook. https://spotthestation.nasa.gov/sightings/index.cfm

- Take a walk along the Hudson. Photograph 3 views and record what is most interesting in each of the views-in your notebook, of course. Tape the photos into your notebook. http://walkway.org/, https://www.scenichudson.org/parks/riverwalkparktarrytown or https://hudsonriverpark.org/events/hudson-river-nature-walk

- Spend an hour in your backyard. Count the number of trees, birds, animals that you see and hear. Take photos or make a sketch-tape into your notebook, and record your observations there too.

8. Research Questions and Reflection: answer these in your notebook

A. Questions
   i. Questions: Based on your readings, web searches, conversations, and inspirations write out some possible **research questions**. Create a list with a minimum of five possible research questions. Record this list in your composition Notebook, in a separate section before the vocabulary.

B. Reflection
   i. Address through specific and concrete examples what characteristics you have that best demonstrate your affinity and aptitude for being a good scientist. What have you done that illustrates scientific attitude, curiosity, inventiveness, initiative? How does your experience suggest future success as a scientist, mathematician or engineer?

ii. What is a major scientific question in your field whose answer you believe will have a significant impact on the world in the next 20 years, and why? Using examples from your own experience or research, explain how you might envision addressing the question over the next 20 years.

9. When school opens, every student in the program will give a brief and informal presentation. Seniors and juniors will go first, then sophomores. You should be prepared to introduce yourself (state your full name), state/describe your area of interest and discuss what you did and learned over the summer. This presentation should last three to five minutes and is very casual and conversational.

Use the summer assignment completion checklist on the next page to help you complete your work.

Summer Assignment Completion Checklist

Use this checklist to help you organize and keep track of work completed. Complete all summer assignment work in the science research notebook.

Assignment Component	Date completed	Evaluation
Research Notebook set up o Name o Table of contents o Time Log		
Portfolio set up o 5 inch ideal, 3 inch ok o 16 dividers, labeled appropriately		
Reading articles o 10 minimum o Complete bibliographic info o Notes with details o Rating of interest o Time in time log		
6 websites o printed page with url/screen shot with url for each-fold in half and tape/staple into notebook		
Talked with 3 professionals o Date and time logged in your notes and in time log o Summary of conversation in notes of research lab notebook		
Get inspired o Chose at least 2 activities o Logged and completed in research notebook		
5 Research questions in research notebook		
Reflection completed in lab notebook		
Spend 15 minutes thinking about what to say when you introduce yourself to the class. Remember, seniors and juniors will model this and go first. It is informal, but important to state your name and what interests you.		