

Student Research General Guidelines and Time Requirements

1. Create a reasonable timeline with specific goals and due dates. All projects will have to be 100% complete by the deadline in January.
2. Student Research at middle and high school level is a very involved process requiring a lot of preparation before students are even allowed to start experimenting.
 - a. 1 Week
 - i. Choosing a Topic: This is often the most difficult process. Students will need guidance. Students should be given assignments to be discussed in class (see **“Topics for Discussion”** attachment). The trick is to forget about science for a moment, try to discover each student’s passion and interests. A student doing research on a topic they enjoy will make them more dedicated and make the process more rewarding. Once they have a hobby or an interest, it is easy to find the science involved (science is in everything).
 - b. 2-3 Weeks
 - i. Start obtaining parental permission for each student to conduct research. This can take time so it should be an on-going activity during this phase. Parental permission must be obtained before the student starts experimentation.
 - ii. Do background research on selected topics. This is important! Students should learn as much as they can about their topic and all science related to it. That way they don’t repeat someone else’s experiment or mistakes. They should become experts in their topic before they start experimenting.
 - iii. Formulate a specific question, hypothesis or engineering goal. It should be very narrow, testable and focused. Start thinking about a procedure and how you will test.
 - iv. Think of a good scientific title for the project that is descriptive. A judge should be able to tell what a project is about, just by reading the title. Titles should NOT be creative, they should be DESCRIPTIVE:
 1. Bad Example (1): “Magnetism vs Plants”
 2. Bad Example (2): “Got Magnets?”
 3. Good Example : “The effect of 100 gauss magnetic field on the growth rate of Phaseolus vulgaris over the period of 10 days”

In the above “good” example, notice how the title is very specific to what exactly the student is testing:

- 100 gauss magnet: (typical refrigerator magnet with a specific strength of 100 gauss).
- Phaseolus vulgaris: Scientific name of the particular plant the student tested
- 10 days: The specific time scope of the experiment

- c. 2 or more weeks
 - i. Write up a research proposal, what you intend to do, what materials you will use and step by step instructions you will use. Include at least 5 legitimate references (bibliography) from where you retrieved your background research. References should be in APA format. "Google" or "Wikipedia" are not valid references. They can be web based but should be real peer reviewed publications.

- d. 1 or 2 weeks

Teacher will review all proposals before students begin their research. Some research will require prior review by special committee (in addition to the teacher).

 - i. Vertebrate Animal Studies
 - ii. Studies involving Human Participants as test subjects (including opinion surveys, etc.)
 - iii. Studies involving microorganisms (bacteria mold, etc.) (MUST BE DONE IN A LAB, CAN'T BE DONE AT HOME!!)

The online system will guide the student and teacher through this process step by step.

- e. Once the project has been approved, the student may begin the actual experimentation. The amount of time a student needs will depend upon the study.

- f. 1 week:
 - i. When the study is complete, the student will analyze and summarize their data and write an Abstract (brief summary of project including their question, hypothesis or engineering goal, general procedure and conclusions). The Abstract will be 250 words or less.

- g. 1 -2 Weeks
 - i. Students will create their Display boards to help them present their information to the judges. Students should practice their presentations. A good presentation will NOT be a memorized speech. Students should present as if they are teaching the subject to others. Judges will interact, ask questions etc. A student will have about 10 minutes to present and answer questions from each judge.

Topics for Discussion

1. List three of your favorite hobbies or things you enjoy doing.
2. If you had magic powers, list three things you would do to change the world.
3. If you were a great inventor, list three things you might create or make better.
4. What is the most fun thing you have ever done?