

## Planning a Science Fair Project:

1. **Form a Hypothesis (Scientific Method) or Define a Need (Engineering Design)**
  - a. Be sure to include a clear (but brief) statement of what you intend to do and what you plan to measure.
  - b. Be specific about what you believe will be the outcome of your experiment (Scientific Method) or what you hope to build (Engineering Design)
  - c. Make sure your question is testable and can be done in the available amount of time.
  - d. Your hypothesis should include **what is being tested** and **what result** you expect.  
Note: Since one experiment cannot of itself prove a hypothesis, it is sometimes better to write your hypothesis to **disprove a negative idea**. (e.g. "Plants will grow without light")
  
2. **Design your Experiment (Scientific Method) or Describe your Design Criteria (Engineering Design)**
  - a. Write up your *Experimental Design Diagram* (Scientific Method / Engineering Design) - to make sure you have identified all parts of a good experiment.
  - b. For Scientific Method Projects: State Hypothesis. Identify the Independent Variable, levels of Independent Variable, constants, Control, and Dependent Variable (with units). Make sure to plan enough trials (participants, etc) in each group to allow your results to be statistically significant.
  - c. For Engineering Design Projects: Define a Need, Outline Design Criteria, Identify form of prototype testing to be conducted: goals for prototype (productivity, action, etc) , standard design to which the prototype is to be compared, outcome to be measured (units), adequate number of trials, criteria for modifications after testing, safety precautions
  - d. **NOTE: Engineering Design Projects will still need to use the Scientific Method when testing the success of the prototype.**
  - e. Use this as a guide to prepare a Research Plan for your project.
  
3. **Prepare a Research Plan** (Follow the guidelines for the *Research Plan*) List all materials, and make sure all details of your procedure are explained clearly. Discuss your research Plan with your adult supervisor before submitting it to science teacher for approval.
  
4. **Complete the necessary Forms:**
  - a. *Seton Science Fair Entry Form*
  - b. *Checklist for the Adult Sponsor (Form 1)*
  - c. *Student Checklist (Form 1A)*.
  - d. Prepare the *Approval Form (Form 1B)* for Seton's Science Department to complete after review of your Research Plan and other Forms.
  
5. **If your project needs special permission** (involves Human Participants, Vertebrate Animals, Hazardous Chemicals, Activities, Devices, or Microorganisms), be sure to fill out the appropriate Forms
  - *Form 2 – Qualified Scientist*
  - *Form 3 – Risk Assessment*
  - *Form 4 and Sample Informed Consent – Human Participants*

- *Form 5A – Vertebrate Animals*
  - *Form 6A – Potentially Hazardous Biologic Agents (Microorganisms)*
6. **Turn in all these papers to your science teacher. They will be reviewed and** you will be notified of either project approval or the need to do further preparation before your project can be approved. **NOTE: you can only begin formal experimentation after project is approved.** You are encouraged to informally test steps of your procedure to make sure it is the best method even before writing up your research plan\*. No results from this informal experimentation can be used in your project.

\* Any informal testing of procedure before Seton School's review must be done under the guidance and supervision of your adult supervisor and with permission of your parents. Follow all safety precautions as directed by your adult supervisor/parents.