

## **ENGINEERING PROJECT RESEARCH PLANS**

*Engineering projects are different than controlled experiments and should include the following sections:*

- A. **Defined Need** (instead of problem): What problem are you trying to solve with your design or invention? Define your target user or customer.
- B. **Hypothesis/Engineering Goals:** What is/are the primary goal(s) you are trying to achieve? What will you use as the benchmark for success? What exact task or function will you use to “test” the functioning of your design?
- C. **Methods and Experimental Procedures**
  - **Design Criteria** (instead of Variables): Design criteria are additional requirements that you, the engineer, must consider when making decisions about how to build the resulting product. They are the real-world factors that limit your design.
    - **Sample list of design criteria:** cost of certain materials, availability of certain supplies, available power source, power output, weight, storage/construction space, timeframe/time available for design and testing, performance goals (what tasks it needs to be able to complete), durability, style/appearance factors, etc.
    - You may use a **bulleted list** to identify your design criteria, but you ***MUST include a brief statement or even a few sentences to describe how each design criterion will influence your design.***
    - For example, you might set out to design a baseball bat that will be easier to swing and reduce arm fatigue. Your engineering goals might call for the design to have the same strength and size as an aluminum bat, but half the weight. These criteria would rule out making the bat from balsa wood (not strong enough) or steel (too heavy). They would lead you to look at materials like carbon fiber composites (very cool stuff, but very expensive). Depending on your budget, some materials that might meet your engineering goals may simply not be practical for you to incorporate into your design due to cost.
  - **Materials List:** See earlier description (same as for other projects)!
  - **Preliminary Designs** (instead of “Procedures” section): sketches and descriptions of preliminary design ideas, plus step-by-step procedures for any parts of your design that have been borrowed from other sources (cite the sources where you learned to build or construct certain parts of your design).

If you are doing an engineering project and need help, please see:

[http://www.sciencebuddies.org/mentoring/project\\_engineering.shtml](http://www.sciencebuddies.org/mentoring/project_engineering.shtml)