

The following activity will help you better understand the elements of sound scientific experimental design.

- 1) Write a valid scientific hypothesis for your project topic.

- 2) Write the null hypothesis: the negative corollary of your hypothesis, or what you would expect to see if your hypothesis is wrong.

- 3) Devise an experiment to test your hypothesis – be as specific as possible about any and all relevant conditions. (How many experimental groups do you need? How exactly will you measure your dependent variable? What condition(s) will you use for your independent variable (how much, how often)? How many individuals will you ask to participate?)

- 4) Identify the independent and dependent variables in your experimental design.

- 5) List at least three constants or “controlled variables” that will need to be considered in your experimental design.

- 6) What is an appropriate negative control for your experiment?

- 7) The ideal positive control for experiments involving human subjects is not always possible due to ethical, moral, financial, or other considerations. Put these issues aside for a moment, and propose the ideal positive control for your experiment. Then, explain why this positive control may or may not be possible to include in your study design.

- 7) Now assume you find results that support your original hypothesis. Draw out those hypothetical results below, in graphical form. Your graph may be in any form, though a line or bar chart will probably work best. Make sure your X and Y axes are correctly labeled!

- 8) Confounding variables must always be considered when designing and executing experiments with human subjects. List at least three confounding variables that could affect the interpretation of your results.

- 9) The placebo effect is estimated to effect anywhere from 30-90% of individuals in a research study (depending on the topic, study design, and other features of the research). How might the placebo effect influence the results of your proposed experiment?

- 10) Explain how double-blind study design could be used to control for the placebo effect in your study.