**Designing Your Own Lab Experiment Handout**

***PreLab***

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Class Period:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lab Title: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Note:** Take this seriously. The experiment you choose design can be related to ANY topic you choose. It does not have to be related to a science topic. This is an assessment of your understanding of all of the components of the scientific method and translate that understanding into experimental design.

**TASK:** You have been asked to come up with your own scientific problem, you need to do some thinking/make some observations before starting. A scientific problem is something you don’t understand but you can do an experiment to help you understand. Scientific problems are usually based on observation of scientific phenomena. Here is some advice to help you identify a scientific problem you can address by designing your own experiment.

**1) Find a topic:**

A topic is a relatively specific area of knowledge, or subject, you will be working in, such as smoking and lung cancer, sexual selection in birds, gravity, Newton's Laws of Motion, properties of water, why are the Kardashians so popular, etc... Do some brainstorming about things you’d like to know more about. Write down some possible topics and choose the one that seems most interesting to you.

**2) Identify a problem within the topic:**

The problem is something you’d like to know more about, a question you’d like to answer. Questions can come from many different sources: from lectures or textbooks, from an experiment you have done that raised other questions. To identify a scientific problem, then, you can find sources that relate to your topic and look to see what problems are raised in your search. Write down the problems that you find. Choose one that would be interesting to solve and that is feasible for you to solve.

**3. Questions to answer before doing the lab:**

1. What is the problem? Describe the problem in your own words. Be sure that your description includes known factors (information about the problem given to you in the lab in a problem statement, for example) and unknowns (what you need to find out in order to solve the problem). Then restate the problem in the form of a question or questions that will guide your research
2. What is your hypothesis for the answer to your research question? Using what you know about the problem and the scientific concept of the lab, state a hypothesis, your best estimation of the answer to your research question. Then describe the reasoning that led you to your hypothesis, using what you know about the scientific concept as a basis for your reasoning.
3. What variables can you use to test your hypothesis? A well-designed experiment needs to have variables. Look over your hypothesis, and identify the variables that you will be testing during your experiment: what you can measure or observe (dependent variables) and what you can manipulate in an experiment for the measurements or observations (independent variables). List your variables. Then describe, in words or in a sketch, the relationship among the variables as predicted by the hypothesis.
4. What experiment(s) could you use to test your hypothesis? Referring to the list of variables, brainstorm some experiments you could do that would allow you to manipulate variables so that you can make the measurements or observations necessary for testing the hypothesis. Your experiment may require control and treatment groups. Choose the experiment most likely to yield the results you need to test your hypothesis. List the materials and outline the methods you will use for your experiment.
5. **What you will turn in in:** In your lab book, as Lab #2 (Design Your Own Experiment), you will include anything you have written to this point as the first page of the lab report. On the 2nd page, you will use the lab report format discussed in class to write up your experiment (Title, purpose, hypothesis, procedure, data, analysis, conclusion). You DO NOT HAVE TO ACTUALLY “CARRY OUT” your procedure. If you choose to not perform the experiment, you must still “make up” data that you can analyze and compose a conclusion about.