Name _____

Science 10 Design Lab

In any good science lab, the goal is always to change one variable (the independent variable) to see how it affects one other (the dependent variable). Often we are concerned with what the mathematical relationship is between the chosen variables. In other words, does the independent variable affect the dependent variable, and if so, how? Of course, any other variable that could affect the dependent variable must be kept constant.

Prompt: For this experiment you can use the Arduino Science Journal app to measure at least one of your variables. You can use it to measure the independent variable, the dependent variable, or both. If you don't want to use the app to measure any of your variables, that is OK too.

Goal: Design and carry out an experiment that will attempt to determine the relationship between your independent variable and your dependent variable. Try to pick a topic that you are interested in. Make it something that you will have fun doing.

For this design lab you will need to complete the following steps:

1) Brainstorm a list of possible independent/dependent variables. Be sure to list only ones that can actually be measured using equipment you have at school or at home (include units in brackets):

2) Determine if your possible independent variable is adjustable and will give a good range of data. For example, if your independent variable is volume, can you change the volume? If so, what is the smallest and largest volume you'll be able to use? Is there a big enough range between the two values to give reliable data? And be sure to have many different trials within your range, not just two.

What is the smallest and largest value of your independent variable going to be? How many different trials will you have in between these two values?

3) Determine if it is possible to keep all other variables constant. This is extremely important. If you can't keep all of the other variables reasonably constant you'll have to think of another idea as you won't know which variable is responsible for any changes seen.

4) Write a clear, testable question and include a list of the independent variable, dependent variable, and all of the relevant controlled variables:

Question being asked in this experiment:

To determine the relationship between_____

and_____.

Variables:

Independent variable –

_____

Dependent variable –

_____

Controlled variables –

_____

_____

5) Write a procedure, including a materials list, that will allow one to successfully complete your lab. It should be clear how the independent variable is to be changed and measured, how the dependent variable is to be measured and how the controlled variables will be held constant. Diagrams will often be useful. You should be able to hand your lab to a classmate who has no knowledge of your lab, and they should be able to complete it exactly as you would.

Materials:

Procedure:

6) Include a hypothesis that makes an educated guess as to what the relationship between your two variables will be. Will increasing one variable cause the other to increase or decrease? Will it be a linear or a non-linear relationship?

Hypothesis: