Designing Your Experiment

Step 1: What are you testing?

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Step 2: How are you going to test it?

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(Now talk this out with your group. Are you only testing one thing in this experiment? Does the experiment test what you want it to test?)

You need a group in your experiment where everything is under normal conditions. This is called a **control group**, and it will show you what would have happened had you not done your experiment and changed something.

What is your control?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

You need a group (or groups) where you are changing something to see what will happen. This is called an **experimental group**.

What is your experimental group(s)?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If you’re going to compare these two groups, you need everything to be the same between the groups except the ONE thing you are testing. The things which are the same are called **constants**. These can include things like temperature, amount of food source, or anything that you do to both groups and any conditions that stay the same.

What are your constants?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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In all good experiments you are changing one thing in your experimental group. This is called the **independent** **variable (manipulated)**. A **variable** is just any condition in an experiment.

What are you changing (independent variable)?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When you change something (like temperature of a growing plant), that will affect something else (like ability to grow). You will take data from this outcome. It is called the **dependent variable (responding)** (because it is dependent on the variable you changed to begin with).

What condition will you take measurements from (dependent variable)?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Step 3: Predictions

What do you think will happen in this experiment?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Now let’s take this and turn it into a hypothesis. A **hypothesis** is a prediction you make about your experiment. Fill in the following sentence to create your hypothesis:

“If \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ then

*(Insert above your independent variable. What are you changing and to what?)*

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*(Insert above your dependent variable. What should happen as a result of your change?)*

Ex. If a plant is placed close to a light source then it will grow faster.

* Congratulations! You’ve planned your experiment! ☺ Show this to Ms. Wallace to get her approval. She must initial before your group can get started on their experiment. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Step 4: Experiment and Data

Set up your experiment. Create a data table to record your results. Use a ruler and don’t forget to include what you are using to get measurements from (number of drops, centimeters, seconds etc.).

Do this on a separate sheet of paper, and staple it to this paper. ☺

Step 5: Data Analysis

Create a graph on the notebook paper you will staple to this sheet.

Things to include in a graph:

* + Use a ruler! Create an x and y axis.
  + Information from the independent variable goes on the x-axis
  + Information from the dependent variable goes on the y-axis
  + Write the name of your variables on your graph [ex. Temperature (oC), Distance (cm)]
  + Give your graph a title (ex. The effects of temperature on plant growth)
  + Plot your data on the graph

Look at your graph. What does it tell you? Is there a trend (pattern) that you notice?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Step 6: Conclusion

Write two paragraphs and staple it to this sheet. In the first paragraph, explain your results. Did they agree or disagree with your hypothesis? Why do you think this is? What was happening to create your data?

In the second paragraph explain what you could do to make the lab better if you were to do it again. If the data you took seemed weird, why do you think that was? Did something happen that made your data not correct? Finally, talk about what other experiments you think you could do to continue studying this topic.