

The Scientific Method

Problem - Identify a testable question that you would like to answer

Background Information - Find out what is already known about your problem using research & observations



Hypothesis - Predict what may happen in your experiment using an "If... then..." statement

Does the amount of light a plant receives affect it's growth?

If a plant receives 24 hours of light
then the plant will grow taller by 4 inches.

Experiment - Develop and follow a procedure that will test your question; Gather & Record data

a. Experiments have 2 groups

-**Experimental Group**- the group(s) that contains the variable you are changing

- **Control Group**- The group that is kept under "normal" conditions and **used for comparison**

b. Experiments contain **variables** - Any factor that can affect the outcome of an experiment

1. **Independent**- The variable "I" change *(only 1)*
2. **Dependent**- The result that is measured



Identifying Independent & Dependent Variables: Practice

1. Will students do better in school if you "pay for grades"? To test this question, an instructor gives students a math test. Before taking the test, half the students were told that they would receive \$0.25 for every correct answer. The other half was not given a monetary incentive. The number of correct answers was recorded for each student.

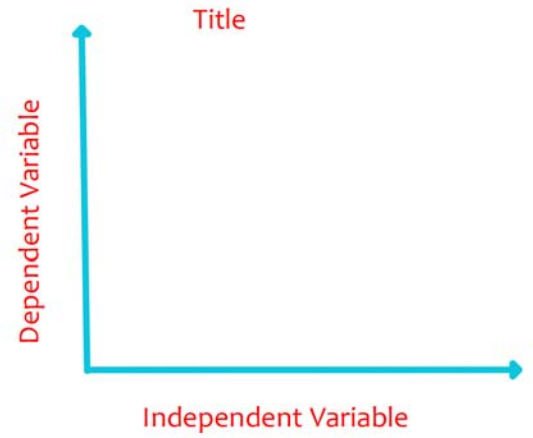
Independent variable: **monetary incentive**

Dependent variable: **# of correct answers (this is the score each person receives)**

7. A researcher suspects that the amount of oxygen in the air affects how quickly yeast will grow. To test this, he varies the amount of oxygen present in 3 closed chambers (low O₂, medium O₂, high O₂) and records the rate of yeast growth (density per square mm) in each chamber.

Independent variable: oxygen levels

Dependent variable: rate of yeast growth (density per square mm)



Analysis - Record the data from the experiment and interpret the results.

Conclusion - Was your hypothesis correct?

Did you make any errors?

How could you improve this experiment?

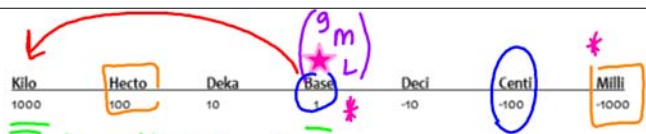


MEASURING

Length: meters (m)^{*}

Mass: grams (g)^{*}

Volume: cm³, liters (L)^{*}



$$1 \text{ km} = \underline{1000} \text{ m}$$

$$100 \text{ hm} = \underline{10000000} \text{ mm}$$

$$9 \text{ g} = \underline{.0009} \text{ kg}$$

$$2 \text{ L} = \underline{2000} \text{ mL}$$

$$105 \text{ cm} = \underline{1.05} \text{ m}$$

→ add zeros

← remove zeros