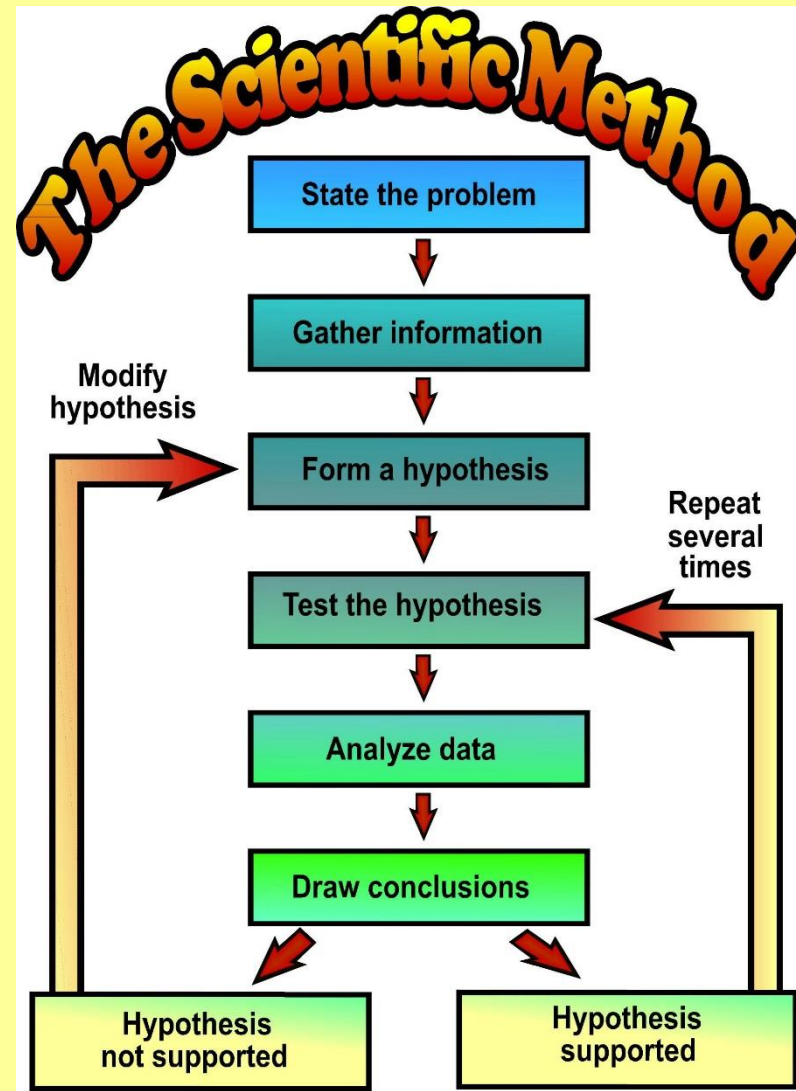


Scientific Method Vocabulary

Scientific Method

Steps scientist follow during experiments that helps with finding answers and solving problems.

- Guides your work
- Keeps you organized and on task.



Testable Question

A problem you are trying to solve and answer with an experiment.

The question must be clear and testable, which means that it must be measurable and controllable.



Does?
Which one?
How much?
How many?

Research

Look into previous information on your topic (books and online)

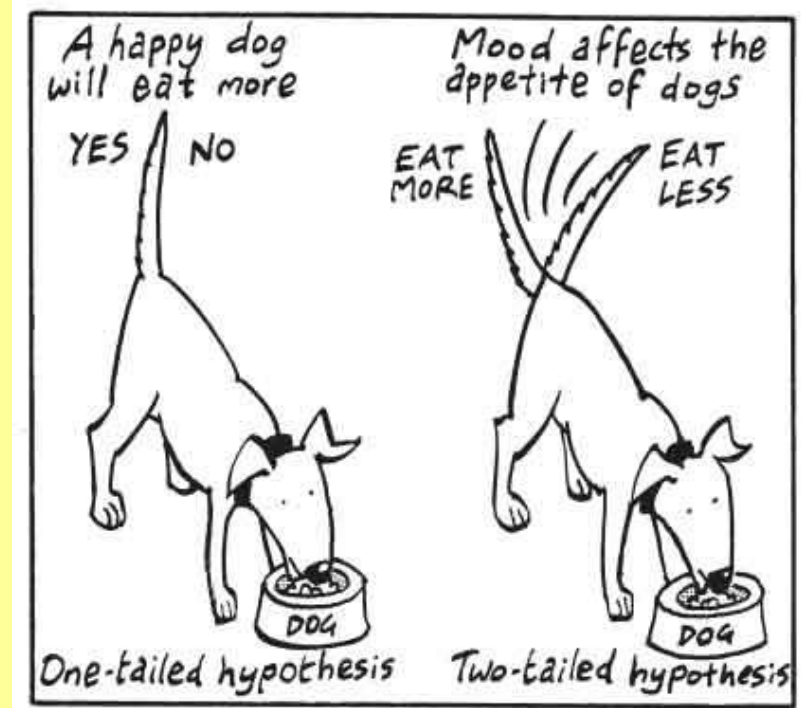
Background information



Hypothesis

An educated guess, opinion, or prediction of to the question/problem of what you think will happen

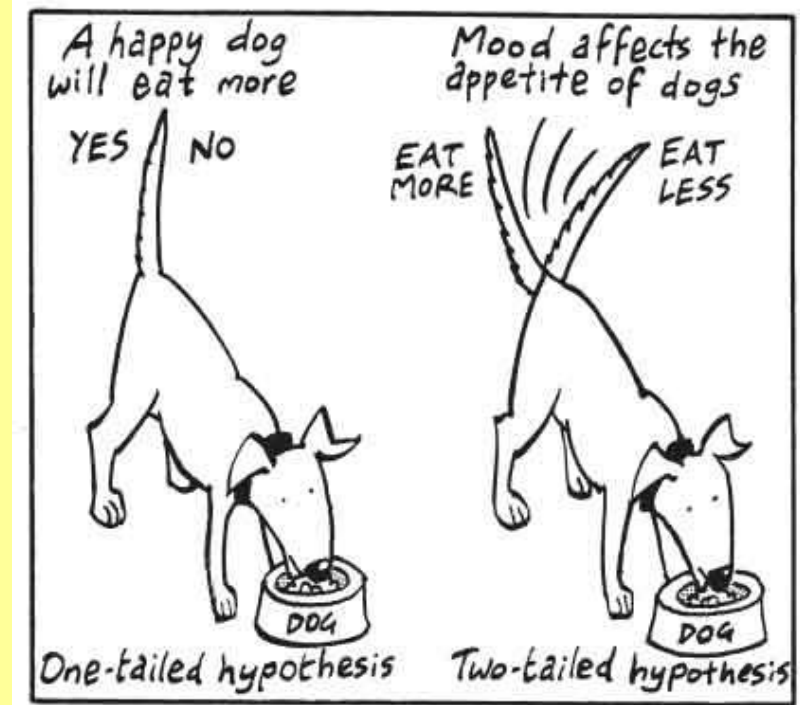
- I hypothesize that...because...
- I predict that...because...



Variables

- 3 types of variables
 - **Independent (variable):** changed and tested
 - **Dependent:** measured/observed results
 - **Control/Constant:** not changed/same

- If it does not have a variable, it is not an experiment



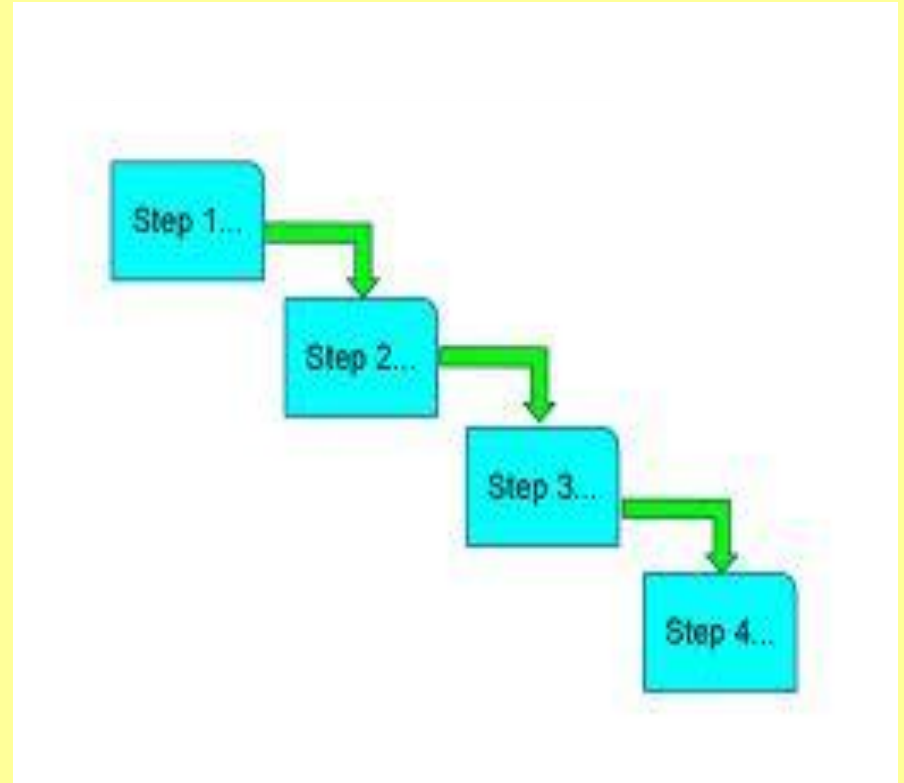
Procedure

The exact and specific steps to follow to **conduct/test** an experiment.

“How to...”

DO NOT say

1. Buy/get materials
2. Open materials



Experiment

The testing of the hypothesis by following the procedures and collecting and recording data (observation and measurement results) as you perform the experiment

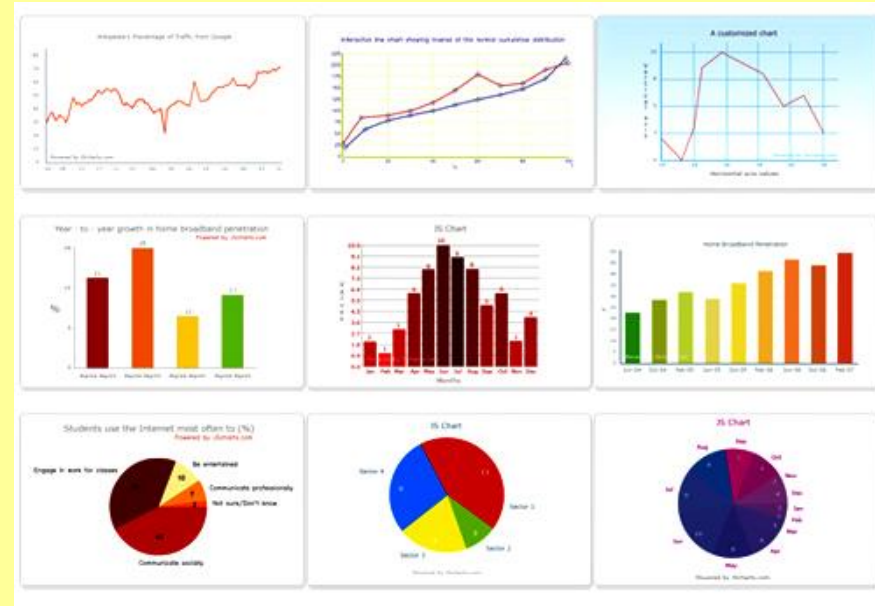


Collect Data

Gather results by:

- observing (5 senses)
- taking measurements

Data is organized in a
Table/Chart



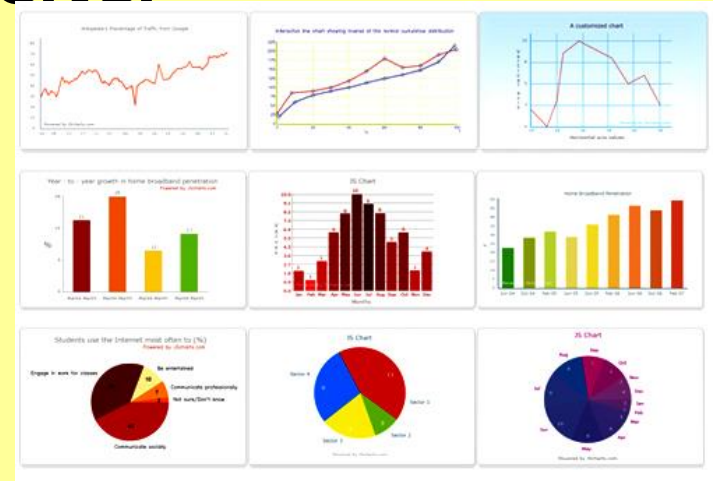
Analyze Data

Ask: “What does this mean?”

Your results of your observations and/or measurements are turned into graphs.

- Bar graphs
- Pie graphs
- Line graphs

Graphs help us to better understand and read results



Conclusion

Summary of results/data and what you learned from the experiment.

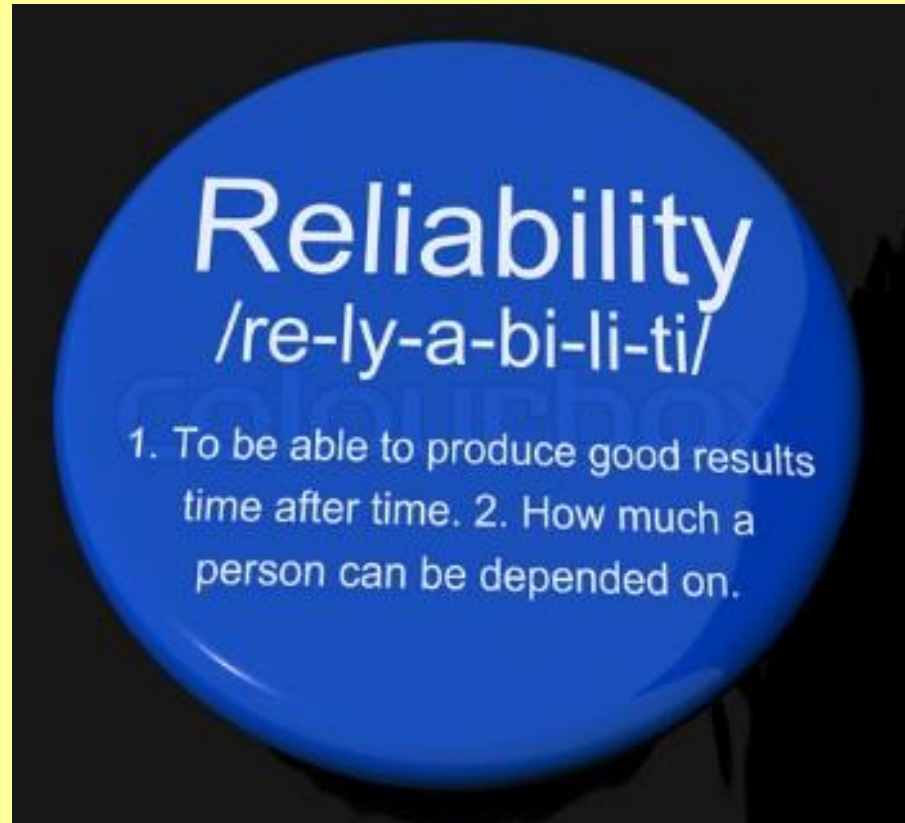
Results of experiment explained

Explains how the experiment supports or disproves your hypothesis.



Reliability

Retesting an experiment to make sure the results are correct and can be trusted.



REMEMBER

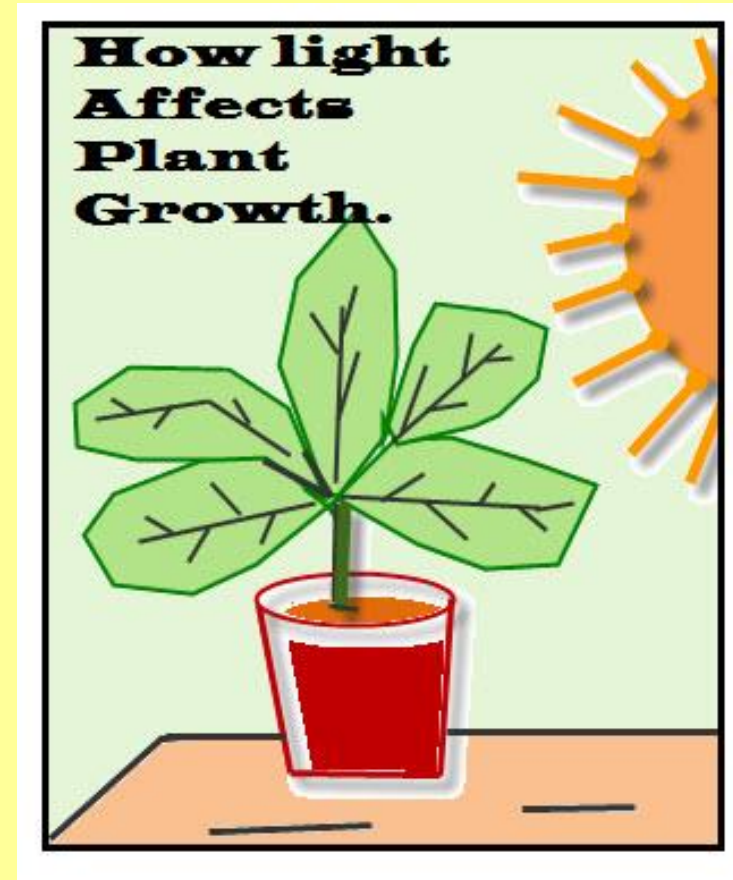
- Under NO circumstances are you allowed to change your hypothesis AFTER you complete the experiment
 - It is okay to be wrong
- Science is about being wrong and finding the correct answer

Independent Variable

What you are testing and/or comparing because it is different

The part of the experiment that is different because you changed or manipulated it.

The variable is NOT a step in the scientific method; it is embedded within the experiment



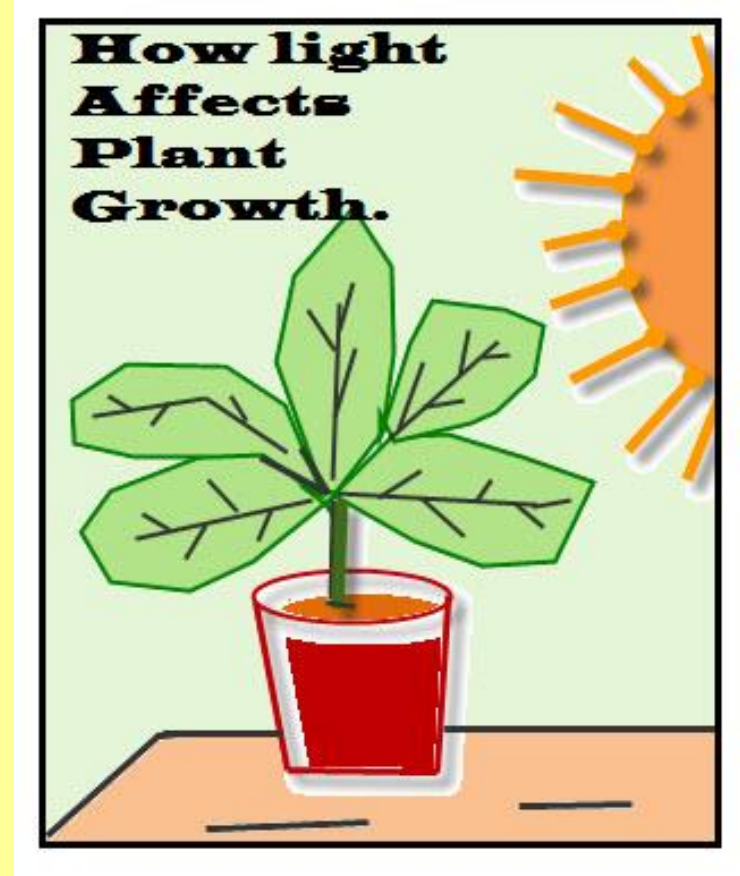
Light is the variable because it is different.

Dependent Variable

You can always measure and/or observe the dependent variable (results)

What happens during the experiment. **YOUR RESULTS!!!**

The dependent variable is also embedded within the experiment

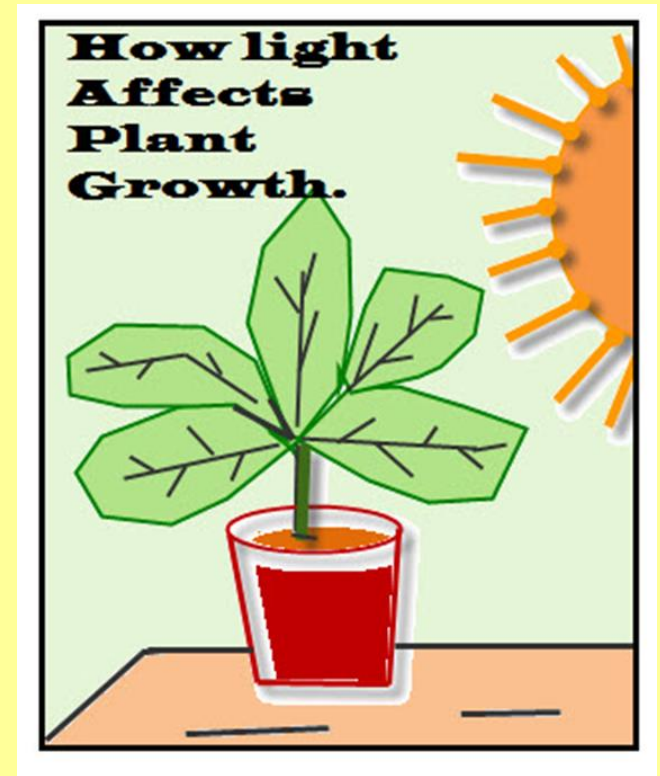


How much the plant grew is the dependent variable because I can measure it

Control Variable/Constant

All other factors that are kept constant (the same) during an experiment.

Also embedded within the experiment

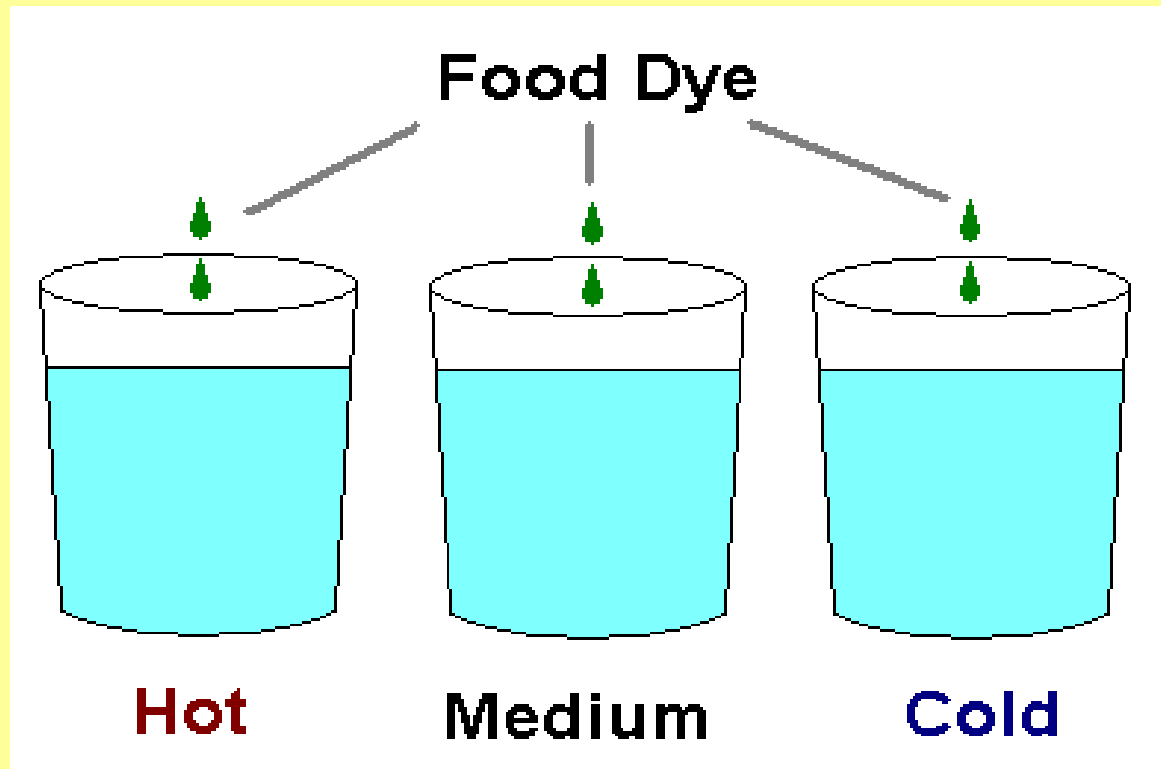


The type plant, the type of soil used, and the amount of water given are the controlled variables because they are the same for all plants used

Turn the project into an experiment

1. Color changing milk
2. How to make an egg float
3. How to inflate a balloon with baking soda and vinegar

Your Turn!!



What question could we answer with this experiment?

What is the independent variable?

What is the dependent variable?

What is the control variable?

Identifying Variables

Journal pages 10-12

Example 1:

Does changing the size of a paper airplane affect how far it flies?

- **Independent Variable:** (pg. 10)
 - Size of the airplane (small vs. medium vs. large)
- **Dependent Variable:** (pg. 11)
 - Distance (how far it flies)
- **Control Variable:** (pg. 12)
 - Same type of paper
 - Same force
 - Airplane design

Example 2:

What material best conducts heat?

- **Independent Variable:** (pg. 10)
 - Different materials (plastic, paper, aluminum foil, Styrofoam)
- **Dependent Variable:** (pg. 11)
 - Ending Temperature
- **Control Variable:** (pg. 12)
 - Starting temperate
 - Same size/amount of materials
 - Amount of time

Example 3:

Does the length of a wire affect the strength of an electromagnet?

- **Independent Variable:** (pg. 10)
 - Different lengths of wire (short vs. medium vs. long)
- **Dependent Variable:** (pg. 11)
 - Strength of electromagnet (amount of paperclips picked up)
- **Control Variable:** (pg. 12)
 - Type of wire (copper)
 - Battery size
 - Number of coils
 - Size and type of nail