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Understanding and  loving  the scientific method:

Why is the scientific method so very important? It provides an objective, standardized approach to conducting experiments. It teaches the brain to logically examine & process all information received when asking & answering Q's  
The steps of the scientific method are generally followed in a certain way, but it can vary according to scientist, topic, and many other variables!


1. What is step 1 of the scientific method? make an observation that leads to a measurable & testable question
2. What is step 2 of the scientific method? Do background research
3. What is step 3 of the scientific method? Construct a hypothesis
  - measurable
  - logical
  - testable
  - observable
4. What is step 4 of the scientific method? Create a controlled experiment to test the hypothesis
5. What is step 5 of the scientific method? Conduct the experiment
6. What is step 6 of the scientific method? Review results of the experiment
7. What is step 7 of the scientific method? Hypothesis supported? (go to step 8)  
reflected? (go to step 3)
8. What is step 8 of the scientific method? REPEAT!

What is the difference between a **theory**, **law** and a **hypothesis**? A theory is a general principle that explains a wide variety of observations. It is consistent w/ known experimental results & is predictive.

- a. Give an example of a theory EVOLUTION, CLIMATE CHANGE
- b. Give an example of a law  $E=MC^2$  or Gravity
- c. Give an example of a hypothesis Why do hummingbirds prefer red flowers?

→ as new knowledge is gained, it can be refined. A hypothesis is a statement/question that can be tested (hummingbirds...)  
While a law is a mathematical relationship that is consistently found to be true

What is the difference between a **theory**, **law** and a **hypothesis**? \_\_\_\_\_

See other paper! 

- a. Give an example of a theory \_\_\_\_\_
- b. Give an example of a law \_\_\_\_\_
- c. Give an example of a hypothesis \_\_\_\_\_

When conducting an experiment, it needs to be **controlled** in order for the results to be considered scientifically valid.

Independent variable: A changeable factor; changed by the experimenter (Manipulated)

Dependent variable: A factor that is effected by changes in the independent variable (observed for changes)

Control: Constants are not changed during an experiment.

Used to show the results of an experiment are due to the condition being tested

Variable: A changeable factor

### **Data:**

Qualitative: Observations such as color, smell, & other senses

Quantative: recorded measurements in the form of numbers

Anecdotal: discriptive, "story"-like data

Direct: An observation of something as it occurs (watching it rain)

Indirect: Requires an inference be made (coming out of a movie theater & the ground is wet)

\* it must have rained.