

The Scientific Method

The scientific method is an organized way to solve a problem



STEPS OF THE SCIENTIFIC METHOD

B2

- State the **problem**
- Formulate a question that needs to be answered

2. Propose a hypothesis

- A hypothesis is an **educated guess** about what the solution to the problem is.

3. **Test** the hypothesis.

- Testing is done through experimentation. All experiments should contain a **variable** or a condition which can be changed. Experiments also include a **control** in which no change is made. The control serves as the reference.



Steps of the Scientific Method

B3

4. Observations and **data**.

- The results of the experiment are recorded as data. Observations are made with our sense and **instruments**

5. Analysis & Conclusions

- The data from the experiment needs to be looked at and **analyzed**. After this is done, a **conclusion** or answer to the problem

6. **Report & Repeat**

- Conclusions must be **reported** so that other scientists can **repeat** the experiments



Laws & Theories

B4

When a hypothesis has been put through the steps over and over again, it may become **scientific theory (ex. Theory of Evolution, Theory of Relativity)**

A **scientific law** is a theory that has been proved so thoroughly over a long period of time that it is considered a fact or truth (**ex. Law of Gravity**)



Example of the Scientific Method

B5

- **Example of the Scientific Method:**

- *Problem:* Does the green plant need sunlight to survive?
- *Hypothesis:* A green plant will wilt and die if kept in the dark.
- *Test of hypothesis (experiment):* Take two plants of the same type, size and in the same soil.
 - place one in sunlight (the control)
 - place the other in complete darkness (variable)
 - water each plant at the same time every day with the same water
- *Make Observations:* Record in writing the differences you observe between the two plants.
- *Conclusion:* Analyze the observations and draw your conclusions.
- *Repeat the Experiment:* Do another experiment to assure the same results.



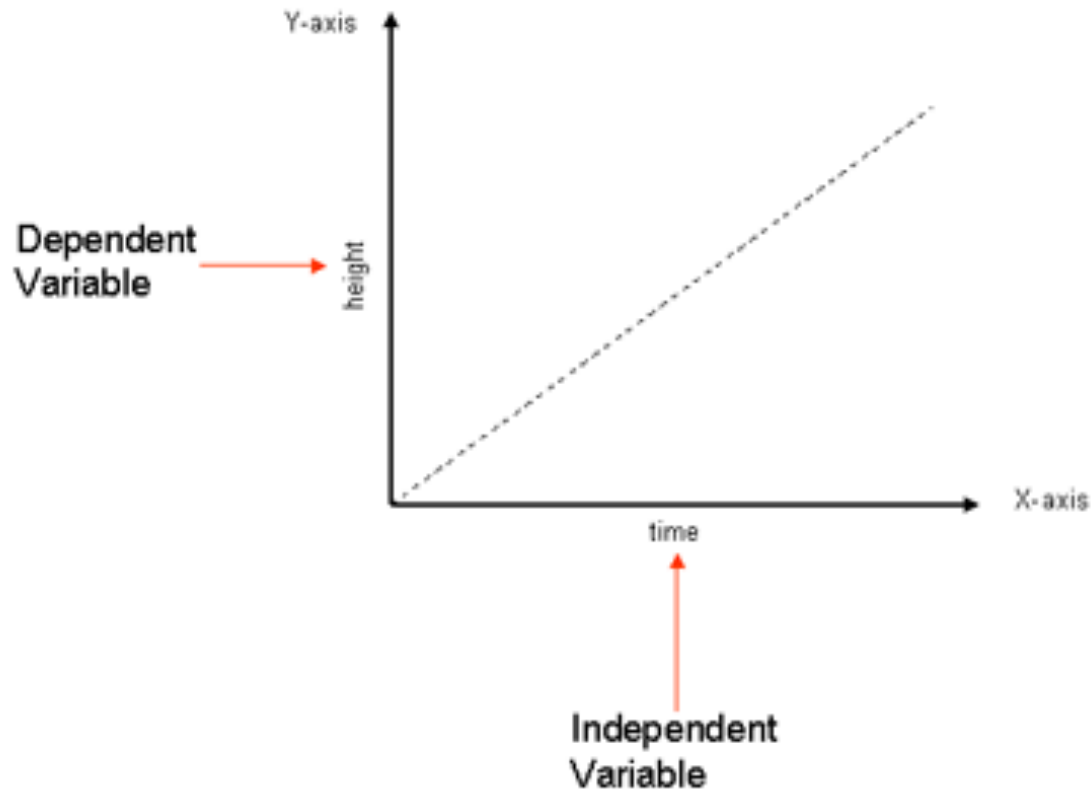
Independent & Dependent Variables

B6

- **Independent Variable:** A variable that is controlled by the experimenter; the ONLY one over which YOU have direct control.
- **Dependent Variable:** The thing that you measure in the experiment (Ex. Height of plant)
- Conventionally the ***independent*** variable is plotted on the horizontal axis (also known as the x-axis) and the ***dependent*** variable on the vertical axis (or the y-axis)



Independent & Dependent Variables



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