

Scientific Method

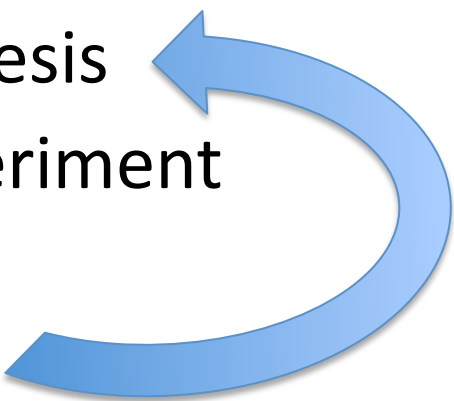
Vocab

- Experiment
- Variable
- Hypothesis
- Constant

Scientific Method

- What is the scientific method?
 - Process of creating new knowledge
 - Systematic
 - Objective
 - Logical
 - Leads to conclusion
- Why use scientific method?
 - Maintains order
 - Reproducibility
 - Validity of results

6 Steps of Scientific Method

1. Identify the purpose
 2. Gather background information
 1. How?
 3. Form Hypothesis
 4. Conduct experiment
 1. Data
 5. Analyze data
 6. Form conclusions
- P - B - H - E - A - C
- 

Purpose

- Usually stated as a question
- Poor example
 - Is fertilizer good for plants?
- Good example
 - Do plants grow taller when treated with fertilizer?

Gather Background Information

- Why do we need to do this?
 - Don't want to reinvent the wheel
 - “Fortune favors the prepared mind”
 - Louis Pasteur
- How do we do this?
 - Internet
 - Library
 - Experts



Form Hypothesis

- Hypothesis defines the scientific question
- Can be written in an IF THEN format
- If we wanted to study the effects of a new drug on cancerous tumors we could write the following hypothesis
- **IF** patients are given drug X, **THEN** their tumor size will decrease.

Hypothesis

- IF is the independent variable
 - It is what you vary
- THEN is the dependent variable
 - It is what you measure

Hypothesis Practice

- Form a hypothesis for the following scenario
 - A researcher would like to determine the effects of ground water pollution on size of corn plants. They notice plants that are not exposed to water pollution tend to grow taller.
 - What is the IF part
 - What is the THEN part

Experiment

- When the hypothesis is tested
 - Control Group
 - Experimental Group
 - Independent Variable
 - Dependent Variable
- First determine proper protocol
 - What are you testing?
 - How will you measure?
 - Time, distance, mass
- Only change one variable at a time

Analyze Data

- Data typically put into easy to understand format
 - Graph
 - Table
- Graphs require
 - X axis label (Independent Variable)
 - Y axis label (Dependent Variable)
 - Units on both X and Y axis
 - Title
 - Key

Conclusion

- Conclusion either supports or rejects the hypothesis
- Answers the question posed in hypothesis
- Plants treated with fertilizer grow taller than those not treated with fertilizer.

Scientific Method Review

- Purpose
- Background
- Hypothesis
- Experiment
- Analyze Data
- Conclusions

Develop Controlled Experiment

- IF I use Gold Medal Flour THEN the cake will bake faster.
- Independent: Type of flour
 - Dependent : Bake time