The Scientific Method

The Steps

- Problem
- Research
- Hypothesis
- Experimental Design
- Collect Data
- Analysis (Analyze Data)
- Conclusions & Future Research

Problem

- Asks a testable question
- “What is the effect of _____ on _____?”
- “How does _____ affect _____?”

Research

- Gathers information about the variables
  - Control: the variables that must remain the same (this helps decide if the independent variable actually affects the dependent)
  - Independent: the variable that is maniuplated (changed)
  - Dependent: the variable that is measured (the outcome)

Hypothesis

- Testable solution to the problem statement
- Written as "If….then…. because…."
- Includes IV & DV
- Prediction of the results
- Based on research
- Ok if it is wrong!
- Example: If parents go to bed before teenagers, then strange things will happen, because there is no adult supervision.

Experimental Design

- Step by step instructions, detailed so that anyone can recreate
- Complete List of Materials

Collecting Data

- Chart your results in a data table that includes the independent and dependent variables
  - Include all observations

Table 1: The Effect of Additives on the Temperature of Water

Substance Added	Water Temperature (˚C)			
	Trial 1	Trial 2	Trial 3	Average
Nothing (tap water)				
Ice				
Ice & Salt				

Analyzing Data (Analysis)

- Graph results (line, bar, pie, etc)
  - Title – includes the IV and DV
  - Axis labels including units
  - Legend of the data
  - Appropriate grid sizing
- Summarize graph in paragraph form
- State major finding (trends, patterns)
  - Best fit lines
  - Outliers

Conclusion & Future Research

- Restate the hypothesis
- Tell whether hypothesis was supported or not and WHY
- What problems could have impacted data?
- Is the data reliable? (refer back to research)
- Future experiments
- This is where you state your opinion