

Scientific Method – NOTES KEY

Question -- sometimes called the purpose -- ask a question based on observation

- always in the form of a question
- what is the effect of ___ on ___?
- Should be specific
- Should be original and interesting

Research - Gather information about the problem and for the experiment

- Keep a log book of all research
- Research the dependent and independent variables

DEPENDENT VARIABLES - The response that is observed and measured in the experiment.

INDEPENDENT VARIABLES - What is manipulated, or changed in the experiment

CONTROLLED VARIABLES - factors that are kept the same

- Use a variety of sources
- Information should be current

Hypothesis - Form a statement that proposes an answer to the problem or the question asked

- Predicts the results of the experiment
- Based on research
- In the form of an if-then statement
- Includes independent and dependent variables
- must be testable

Experiment/Procedure - Design and plan an experiment to test the hypothesis

- List all materials
- Provide step by step directions to conduct the experiment
- Should be specific so anyone can duplicate the experiment
- Include safety procedures
- Experiment must have three trials
- Gather materials and conduct the experiment

Collect data - Record all observations, measurements and results of the experiment

- Keep a log book, and make daily entries
- create data tables to record information
- collect qualitative and quantitative data

QUALITATIVE DATA - Observed with your senses

QUANTITATIVE DATA - Measured, counted or calculated

Analyze Data - Organize the data, and look for trends that support or reject the hypothesis

- Create a chart or graph
- **Bar graph** compares different groups of data
- **Pie chart** shows percentages of a whole
- **Line graph** Shows change in data over time

Summarize the chart/graph in paragraph form determine any trends

Conclusion - Summarize the results of the experiment

- restate the problem/question and hypothesis
- state whether the data supports or rejects the hypothesis and why
- data which variables, if any, could have affected the results of the experiment
- explain any differences between the results and the initial research
- List any Problems encountered and how they could be corrected next time
- make recommendations for improvement and/or further study