

SCIENTIFIC METHOD

1. PROBLEM/QUESTION

- ✓ This testable question is the purpose for the investigation
- ✓ The scientist can answer by performing an experiment
- ✓ The variable to be tested should be stated in the question

2. RESEARCH

- ✓ Topics that deal with the scientific problem
- ✓ Background information is useful when making a hypothesis
- ✓ Use several resources: encyclopedia, computer, books, magazines,
- ✓ Be sure to write bibliography for each resource when doing a project

3. HYPOTHESIS

- ✓ An explanation that answers the scientific problem
- ✓ An assumption to be tested
- ✓ Shows cause and effect (use if, then statement)

4. EXPERIMENT

- ✓ Performed to test your hypothesis
- ✓ Make a materials list (review safety rules)
- ✓ Consider all variables that can affect your experiment and control all variables except the ONE in the scientific question
- ✓ Test only ONE VARIABLE at a time (called experimental variable)
- ✓ Measuring variables:
 - Independent Variable-scientist selects before experiment begins (measured in equal increments)
 - Dependent Variable-measured during experiment & is dependent on the independent variable
- ✓ Write the procedures using short, concise, numbered steps that are easy to follow.
- ✓ Include safety rules and use metric units.
- ✓ Use large test groups or repeated trials to produce valid data.

5. RESULTS

- ✓ Make careful & accurate observations of what happened
 - QUALITATIVE: use appropriate senses and be descriptive
 - QUANTITATIVE: collect numerical data (use metric system)
- ✓ Record data on a data table to keep organized
- ✓ Analyze and summarize data in paragraph format (similarities & discrepancies)
- ✓ Use neat drawings, clear photographs, and graphs to visually present data

6. CONCLUSION- the ending of the experiment

- ✓ Answer the scientific question using observations and results
- ✓ Discuss your hypothesis and compare to the results
- ✓ Write an inference about one observation
- ✓ Discuss possible errors that may have happened
- ✓ Discuss what you would do differently if you repeated the experiment

7. APPLICATION

- ✓ Relate the knowledge you learned (the conclusion) to a real life situation
- ✓ Explain how the scientific knowledge you gained could be used by ordinary people