

Science & The Scientific Method

Science is:

Wondering

Asking Questions

Performing Investigations

Reporting

Creating Models or Theories

Science is gaining knowledge and understanding of our natural world.

Technology is using scientific knowledge to to make products.

The Scientific Method

Using a scientific approach to solve problems involves a pattern:

Asking a question:

This should be expressed as a question and you must be able to define the aim of the experiment or to identify a focused research question.

State which variables are independent, (manipulated) and which are dependent, (responding).

Manipulated, (independent), variable: is the factor that you, the experimenter, investigate or change in a systematic manner during the experiment.

Responding, (dependent), variable: is the result or change that occurs because of the manipulated variable.

Controlled variable: those other factors which must be held constant so that they do not affect the responding variables.

Making a Hypothesis: The hypothesis is your prediction and should be formulated to be an answer to the research question.

A hypothesis proposes a possible explanation along with reasons for this explanation. It also suggests a method of obtaining evidence that will support or reject the proposed explanation.

This should express a possible relationship between two or more variables, e.g. "If (manipulated variable)..... is done, then (responding variable) will occur because (reasoning)".

Experimental Design:

Making up an investigation, i.e. an experiment, to test the hypothesis.

This describes the procedure which allows for the collection of sufficient relevant data.

Performing and Recording: After planning an investigation, it is important to follow the procedure and record qualitative and quantitative observations. Qualitative observations refer to non-numerical observations that describes the qualities of the objects and events. A numerical observation based on measurements refer to the quantitative observations.

Data processing and presentation: Data processing includes calculations and interpretations based on the observations. Analyzing or carefully studying the data observations to show patterns, trends and thus to answer the question posed at the beginning.

Conclusion and evaluation: This section should answer the question in the problem by summarizing the observations and / or inferences and indicating whether or not the original prediction was correct. Your observations must be analyzed and evaluated to determine an answer to the beginning question. You must also determine whether the evidence gathered supports or does not support your hypothesis

In addition the conclusion should state whether the results of the experiment support or refute the reasoning in the hypothesis.

Communication: communicating ideas, plans, procedures, results and conclusions orally, in writing, and / or in electronic presentations. Using the new information to ask a new question.

Assignment: Complete the worksheet:
“Introduction to Science and The Scientific Method”