

Getting Started on Your Science Fair Project

The Scientific Method

A science project uses experimentation and the scientific method to determine the answer or best solution to a scientific problem. It is important to understand the scientific method, before starting a project. The scientific method is the standard tool that scientists use to find the answers to questions.



The scientific method involves the following steps:

Define the question

Gather information and resources

Form a hypothesis

Perform experiment and collect data

Analyze data

Interpret data and draw conclusions that serve as a starting point for new hypothesis

Publish results



Define the Question: The very first thing to do in a science project is define the question.

What is it that you want to answer?

Example: Does Soaking Chile Pepper Seeds in Water Help then Germinate Faster?

With this one idea you can actually turn it into several different ideas.

Does Soaking Chile Pepper Seeds in Salt Water Help then Germinate Faster?

Does Soaking Chile Pepper Seeds in Vinegar Help then Germinate Faster?

Gather Information and Resources:

Project research is the process of collecting information from knowledgeable sources, such as books, magazines, software, librarians, teachers, parents, scientists, or other professionals. Your first research is used to select a project topic. The information you gather is to help you understand the topic, express a problem, propose a hypothesis, and design an experiment. It is also data collected from exploratory experimentation.



Form a Hypothesis:

A hypothesis is an idea about the solution to a problem, based on knowledge and research from previous experiments or problems. While the hypothesis is a single statement, it is the key to a successful project. All of your project research is done with the goal of expressing a problem, proposing an answer to it (the hypothesis), and designing project experimentation. Then all of your project experimenting will be performed to test the hypothesis. The hypothesis should make a claim about how two factors relate. For

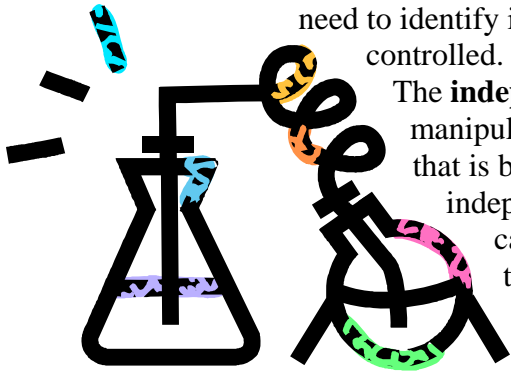
example, in the following sample hypothesis, the two relating factors are soaking solution and germination rates.

Here is one example of a hypothesis:

“By using a soaking solution, we will be able to determine how quickly a chile pepper seed will germinate.”

Perform Experiment

Project experimentation is the process of testing a hypothesis. The things that have an effect on the experiment are called variables. There are three kinds of variables that you need to identify in your experiments: independent, dependent, and controlled.

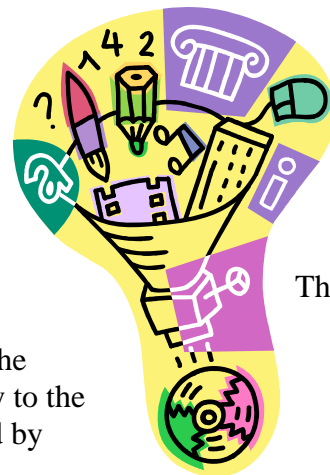


The **independent variable** is the variable you purposely manipulate (change). The **dependent variable** is the variable that is being observed, which changes in response to the independent variable. The variables that are not changed are called **controlled variables**. A control is a test in which the independent variable is kept constant in order to measure changes in the dependent variable. In a control, all variables are identical to the experimental setup—your original setup—except for the independent

variable. Factors that are identical in both the experimental setup and the control setup are the controlled variables. Here is where you will start by asking a question, gathering materials that will help you answer the question and coming up with a procedure for your experiment.

Analyze Data:

Before you can state the results of an experiment, you must first organize all the data collected during experimentation. Numbers, called "raw data," have little meaning unless you organize and label them. Data from each experiment needs to be written down in an orderly way.



The

Project Conclusion

project conclusion is a summary of the results of the project experimentation and a statement of how the results relate to the hypothesis. Reasons for experimental results that are contrary to the hypothesis are included. If applicable, the conclusion can end by giving ideas for further testing.