Have a Purpose
Have a Hypothesis

To be a success, a science project must have a definite purpose or goal. What questions are you trying to answer? What experimental data are you seeking? You can only get limited answers in doing one science project. Be sure you have limited your purpose to a goal that you can attain.

A major mistake by students is that of choosing a purpose that involves more information and more work than they understand and complete in the time available. A second common mistake is that of choosing a project that requires skills and materials that are unavailable.

The purpose of an experiment should be stated in one sentence. Difficulty in stating the purpose in one sentence indicates the need for further refinement and narrowing of the planned study. Several basic forms can be used to state the purpose.

1. The purpose of this research is to
    a. investigate _____
    b. compare the effects of _____ on _____.
    c. determine the effects on _____ on _____.
    d. determine the relationship between _____ and _____.
    e. measure the _____.

Example 1:
A scientist was catching turtles in a lake, identifying males and females, and weighing and measuring them. The scientist began to notice that the females seemed to be larger than the males for the most part. These observations lead the scientist to the following research purpose.

The purpose of this research is to catch and measure male and female turtles to determine whether the female turtles tend to be larger than male turtles. The hypothesis to be tested in this research is that on the average female turtles are larger than male turtles. The data collected in the experiment will either support or not support this hypothesis.

Example 2:

The purpose of this research is to determine if bean plants need white light in order to have a green color. The hypothesis states that bean plants need white light to have a green color.

Example 3:

The purpose of this research is to determine if radish seeds need water to sprout and become radish seedlings. The hypothesis states that radish seeds need water to sprout and become seedlings.

Example 4:

The purpose of this research is to compare the effect of dish washing detergents on the health of goldfish and guppies. The hypothesis states that since goldfish are less affected by pollutants, the goldfish health will remain better than the guppies.

Example 5: The purpose of this research is to observe the effects of DDT (a poisonous chemical sprayed on crops) on the egg shell thickness and bone structure of twenty different kinds of wild birds. The hypothesis states that the improper use if too much DDT is responsible for wild birds having eggs with very thin shells and bone abnormalities.

1. Your assignment is to write <u>several</u> purposes and <u>several</u> hypotheses for the experiment you are planning to do.
2. Pick out the <u>best</u> purpose and hypothesis and use them for your project.
3. *Remember, your purpose must be one sentence that states what you want to find out. <u>It must be one clear concise sentence</u>.
4. Your hypothesis is a statement of what you are going to <u>TEST</u>. The data from your experiment *will either support or not support your hypothesis.*

A hypothesis can be defined as:

A proposition or set of propositions set forth as an explanation for the occurrence of some specified group of phenomena, either asserted merely as a provisional conjecture to guide investigation (working hypothesis) or accepted as a highly probable in the light of established facts.

A proposition assumed as a premise in an argument.

A proposition, condition, or principle which is assumed, perhaps without belief, in order to draw out its logical consequences and by this method to test its accord with facts which are known or can be determined.

"We cannot take a single step forward in any inquiry unless we begin with a suggested explanation or solution of the difficulty which originated it. Such tentative explanations are suggested to us by something in the subject matter and by our previous knowledge. When they are formulated as propositions, they are called hypotheses.

The function of a hypothesis is to direct our search for the order among facts. The suggestions formulated in the hypothesis may be solutions to the problem. Whether they are, is the task of the inquiry."

The Independent Variable is a factor which you control and vary during the research. Usually there is only one independent variable in school projects. Two or more are too complicated. In your research you will change something to observe what will happen. The thing you change is the independent variable.

Dependent Variable- you change "something" to observe what will happen. This something may cause something else to happen. This something else is the dependent variable. The result obtained after setting the Independent Variable is the Dependent Variable. (How will you measure your results?)

***A well worded purpose would have the independent and dependent variables in the sentence.