EXPERIMENTAL SCIENCE PROJECTS:
An Introductory Level Guide

INITIAL OBSERVATION

You notice something, and wonder why it happens. You see something and wonder what causes it. You want to know how or why something works. You ask questions about what you have observed. The first step is to write down what you have noticed.

INFORMATION GATHERING

Find out about what you want to investigate. Read books, magazines or ask professionals who might know in order to learn about the effect or area of study. Keep track of where you got your information.

TITLE THE PROJECT

Choose a title that describes the effect or thing you are investigating. The title should summarize what the investigation will deal with.

STATE THE PURPOSE OF THE PROJECT

What do you want to find out? Write a statement that describes what you want to do. Use your observations and questions to write the statement.

MAKE HYPOTHESIS

Make a list of answers to the questions you have. This can be a list of statements describing how or why you think the observed things work. Hypothesis must be stated in a way that can be tested by an experiment.

DESIGN AN EXPERIMENTAL PROCEDURE TO TEST YOUR HYPOTHESIS

Design an experiment to test each hypothesis. Make a step-by-step list of what you will do to answer your questions. This list is called an experimental procedure.

Guidelines for Experimental Procedures

Select only one thing to change in each experiment. Things that can be changed are called variables.
Change something that will help you test your hypothesis.
The procedure must tell how you will change this one thing.
The procedure must explain how you will measure the amount of change.
Each type of experiment needs a "control" for comparison so that you can see what the change actually did.

OBTAIN MATERIALS AND EQUIPMENT

Make a list of the things you need to do the experiments, and prepare them. If you need special equipment, ask your teacher about borrowing or purchasing what you need.

DO THE EXPERIMENT AND RECORD DATA

Do the experiment and record all numerical measurements made. Data can be amounts of chemicals used, how long something is, the time something took, etc. If you are not making any measurements, you probably are not doing an experimental science project.

RECORD YOUR OBSERVATIONS

Observations can be written descriptions of what you noticed during an experiment, or problems encountered. Keep careful notes of everything you do, and everything that happens. Observations are valuable when drawing conclusions, and useful for locating experimental errors .

CALCULATIONS

Perform any math needed to turn raw data recorded during experiments into numbers you will need to make tables, graphs or draw conclusions.

SUMMARIZE RESULTS

Summarize what happened. This could be in the form of a table of numerical data or graphs. It could also be a written statement of what occurred during the experiments.

DRAW CONCLUSIONS

Using the trends in your experimental data and your experimental observations, try to answer your original questions. Is your hypothesis correct? Now is the time to pull together what happened, and assess the experiments you did.

Other Things You Can Mention in the Conclusion

If your hypothesis is not correct, what could be the answer to your question?
Summarize any difficulties or problems you had doing the experiment.
Do you need to change the procedure and repeat your experiment?
What would you do different next time?
List other things you learned.

TRY TO ANSWER RELATED QUESTIONS

What you have learned may allow you to answer other questions. Many questions are related. Several new questions may have occurred to you while doing experiments. You may now be able to understand or verify things that you discovered when gathering information for the project. Questions lead to more questions, which lead to additional hypotheses that can be tested.

WHAT IF MY SCIENCE PROJECT DOESN'T WORK?

No matter what happens, you will learn something. Science is not only about getting "the answer." Knowing that something didn't work is actually knowing quite a lot. Experiments that don't turn out as planned are an important step in finding an answer.