

10 Steps to a Successful Science Fair Project

A science project is like a mystery in which you are the detective searching for answers. Science projects let you practice and exhibit your “detective” skills. You not only get to select which mystery to solve, but you design the methods for uncovering “clues” that will lead to the final revelation of who, what, when, where, how, and why. This help sheet will give you guidance and ideas. It’s your job to discover the answers!

STEP 1: THE “BIG QUESTION”

A good science investigation usually involves a question that can be answered by selecting one answer from a few possible answers. Another characteristic of a good science investigation is that it involves a topic about which you can find a lot of background information in books, magazines, encyclopedias, on the internet, etc. It should also be about something that is easily observed and measurable. Finally, your question should lead to an experiment that you can do with available equipment and materials.

STEP 2: PROJECT FEASIBILITY

Once you have decided on your “big question”, you need to determine if it is feasible for you to do this project. Things to consider are 1) Is there enough time? 2) Are the supplies and/or equipment needed to do the project available? 3) Is there enough information available to do the project? The lack of information, supplies, equipment, or time could turn out to be a major obstacle in the completion of your project.

STEP 3: RESEARCH

Go to the library, internet, etc. to find out all you can about your topic. Be sure to write down all of the sources you use for information. These will become part of your bibliography.

STEP 4: MAKING A HYPOTHESIS

All science investigations are based on a hypothesis that can be tested. A hypothesis is a topic question that has been reworded into a form that can be tested. For example:

Big Question = “What effect does water temperature have on the size of soap bubbles?”

Hypothesis = “Warmer water will produce larger bubbles than cooler water.”

STEP 5: EXPERIMENT DESIGN & TESTING YOUR HYPOTHESIS

This step should be a description of exactly what needs to be done to complete the investigation. This is a difficult part of the investigation because close attention must be paid to every detail in writing up the exact procedures.

Example:

Step 1: Place 10 test tubes in a

Step 2: Fill each test tube to the top with

Step 3: Working under water in a large bowl

In order to design a successful experiment, you need to identify all of the important variables in the experiment and control them.

variable - factors that change during an experiment

dependent variable - a factor that changes because of the independent variable

independent variable - a factor that the experimenter causes to change

STEP 6: STUDENT PROJECT JOURNAL

It is very important as you carry out the steps in your science investigation, that you keep careful notes and records of your observations, data, results and any related ideas that come to mind in a journal. Your journal should be a permanently bound notebook that is reserved for notes and data from the science investigation project. It is always wise to put the date of each entry at the top of each page. This will help you to organize your results when it is time to write the final paper.

STEP 7: MAKING SENSE OUT OF YOUR PROJECT RESULTS

The most important information in your Project Journal is the data that you obtain from the observations and measurements made during the investigation. Some good ways to organize, analyze and compare results are tables, bar graphs, averaging, line graphs, and pie charts. It is also important when making your observations to expect the unexpected. Even observations that seem unrelated to your topic question may have very important consequences.

STEP 8: CONCLUSIONS

The main conclusion for any science investigation is a statement that either supports or rejects the hypothesis of the project. When making conclusions, you must be very careful not to over-conclude. A successful science investigation project will usually suggest further experiments. Remember that no investigation is perfect. In an experiment, there are always some problems with control, gathering data and other aspects of the scientific method.

STEP 9: SHARING YOUR RESULTS -- THE FINAL WRITTEN PAPER

One of the last steps for any science investigation project is sharing results with others. In writing your final paper, you should use the same general format that a scientist would use reporting his or her results in a scientific journal. This paper should include a title and the following sections: introduction, methods & materials, results, conclusions & discussion and references (bibliography).

Introduction - This includes the topic question to be explored and the hypothesis.

Methods & Materials - This describes the essential steps or procedures that were completed during the project. The equipment and other supplies used are also described in this section.

Results - This includes the data from the investigation (charts, graphs, etc.).

Conclusions & Discussion - This is an explanation of why you accept or reject your hypothesis. You should also discuss possible sources of error in your investigation and any ideas that could improve or expand your science project.

References - This is a list of all of the books, magazines, web sites, people, etc. used in your science investigation.

STEP 10: THE FINAL DISPLAY

Dr. Wingert has standard display boards which you may borrow for your project. The display should contain neat, clear headings and titles with your information. Your display should include your Project Journal and your final written paper. On the day of the fair (in January) you will be asked questions about your project by the judges. You should be able to answer any questions they may have.

