

What is a Science Fair Project?

A science fair project should be selected from one of the following types of projects:

- **Experiment**

In this type of project, a hypothesis (an educated guess) is made to answer a question. Then, experiments are carried out to test this hypothesis.

Example: you might be interested in the question, "What design of paper airplane will fly the farthest?" You would research different designs of paper airplanes by going to the library and looking at books on paper airplanes, or by having a parent help you do an Internet search under "paper airplane design." You might then develop the following hypothesis for this question: "Paper airplane design #1 will fly farther than design #2 or design #3." You would then make the paper airplanes, fly them and take notes on which design flew the farthest.

- **Collection**

A collection is a group of objects. This group of objects must be scientifically oriented and show that you have learned something through the process of collecting and categorizing. The items should be categorized and labeled correctly. **Example:** you might have a collection of leaves separated into categories based on the type of tree on which they grew.

- **Model**

A model is a small object usually built to scale that represents some already existing object. **Example:** you might decide to construct a model of the planet Saturn from Styrofoam and cardboard. Your posted should include facts about Saturn, a description of how you constructed the model and a discussion about the features of your model and how these features represent the actual planet.

- **Demonstration**

A demonstration is an illustration of a scientific principle. This type of experiment shows how and why something works. **Example:** you might demonstrate a principle of sound using a rubber band stretched around a box. You could show that the more tightly stretched the rubber band, the more rapidly the rubber band vibrates, and the higher the sound that is produced.

All projects will include a three-sided display board that gives an overview of the science project.

How to Start your Science Fair Project

Choose an Area of Science

Choose an area of life, earth or physical science that interests you. Do a little research to be sure that this topic really interests you. Then, from that area of science, such as life science, select a general topic such as "plants." Finally, narrow your general topic to a specific subtopic such as "plant growth." Below is a list of general topics you can consider for your science project:

acids and bases	airplanes	amphibians	anatomy	animal behavior	astronomy
atoms	birds	bones	cells	circulatory systems	colors
computers	crystals	digestion	dinosaurs	diseases	electricity
energy	engines	flowers	food chains	fossils	geology
gravity	heart	heat	insects	invertebrates	jet propulsion
learning	light	liquids	machines	magnetism	mammals
muscles	medicines	migration	molds	nutrition	ocean life
parasites	planets	plants	pollution	reptiles	robots
rockets	rocks	seeds	senses	shells	sound
tides	trees	vertebrates	water	weather	yeast

Help choosing a topic:

Here are some websites that may be helpful. Please consult a parent while searching for and before choosing a science fair project. (Suggestion of the following websites DOES NOT constitute approval or endorsement of every project or idea on these sites! Approval must still be obtained from a parent and your classroom teacher!)

<http://www.lasciencefair.org/ideas.htm>

<http://www.energyquest.ca.gov/projects/>

<http://www.ipl.org/div/kidspace/projectguide/topic.html>

<http://www.juliantrubin.com/fairprojects.html>

<http://www.scifair.org/>

<http://www.billnye.com>

<http://pbskids.org/zoom/activities/sci/>

<http://www.sciencebuddies.com/>

<http://www.cdli.ca/sciencefairs>

Choosing a Question

Choose one question that will narrow the focus of your investigation. For example, using the subtopic "plant growth," one question could be, "How does sunlight affect plant growth?" Another question could be "Which plant food works the best?" Below is a small sample of science questions to be investigated:

Astronomy

Why does the earth have seasons?

How are tides created?

Consumer Science

Which laundry detergent is best?

How does a radio work?

Electricity

What is the best conductor?

How does a switch operate?

Botany

Do large seeds grow large plants?

Can plants grow in water alone?

Chemistry

How can you tell if a substance is an acid or a base?

What is a chemical reaction?

Earth Science

How do crystals grow?

What is the water cycle?

Physical Science

How does an airplane fly?

How does an electromagnet work?

Anatomy

How does blood get from the heart to the toes?

How do muscles and bones work together in movement?

Choose the Project Form

Decide which type of project would best show your audience the answer to your question. You can do an **experiment**, show a **collection**, do a **model** or a **demonstration**.

Research

You are now ready to begin planning your project by researching your question. You can get information from books, encyclopedias, the Internet, pamphlets, interviews, field trips or television. Look for information from several different sources. Become an expert on your topic!

Plan Ahead

Sometimes, science experiments don't work. If you plan and conduct your experiment well in advance of the science fair and your experiment does not work, you will have the opportunity to retry or change your experiment.

What if my experiment fails?

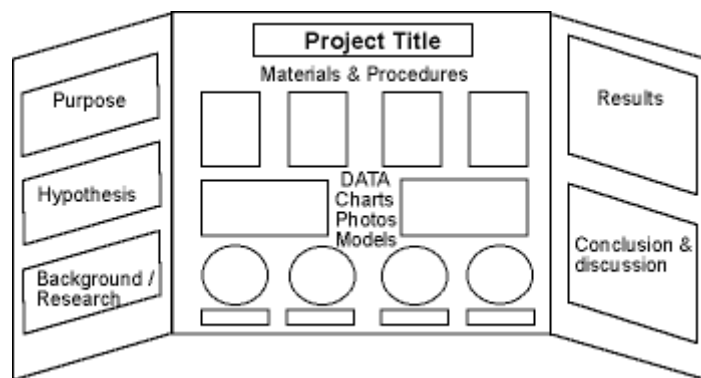
This happens sometimes but **don't worry**, you should still present your work. Present what you did in your poster. In the conclusion section of your presentation, suggest ways to investigate *why* your experiment did not work. Experimental failure is common for scientists, who usually repeat the experiment, and if it still does not work, they ask their question a different way or redesign the way experiment was conducted.

Displaying Your Project

A very important part of your Science Fair project is your display, since it is a way of teaching others what your project is about and what you have learned.

Your display, **which must be displayed on a three-sided display board**, should include the following sections:

1. **Project Title:** Your title should include the word that describes your project's category: experiment, collection, model or demonstration. Also, include your name, grade and teacher's name below the title. This information should be at the top and center of the center panel.
2. **Scientific Questions or Hypothesis:** if your project is an experiment
3. **Procedure and Materials:** text and photos, if needed
4. **Results/Data:** text, graphs, tables, photos, drawings
5. **Conclusion:** for experiments
6. ******* Your approved proposal form, taped to the back of the poster board *******
7. **Acknowledgement:** please thank the people who helped you
8. **Collection, Model or Demonstration or Materials Used in Experiment** should be displayed in front of your display board. If it will not fit in front of your display board, please let your teacher know in advance that you will be bringing an oversized project and we will arrange for an area in which those projects can be displayed.



The Scientific Method
For Projects which Involve Experiments

Use the following five steps of the Scientific Method when conducting an experiment.

1. Identify the problem

Think about what area of science interests you. Narrow your focus down to a specific question.

2. Collect information

Research your topic. Take notes on information that you think will be important for your experiment.

3. Develop a hypothesis

A hypothesis is an *educated guess*. It takes into account the research you have done and also your opinion of what you think will happen. What do you think will happen when you perform your experiment? The hypothesis answers your question.

Example: Plant food 'B' will cause the lawn to grow faster.

4. Plan and Conduct An Experiment

First, make a plan for how you will do your experiment and a list of all the materials you will need. Conduct your experiment and observe what happens. In your experiment, make sure that you are only changing one variable at a time. This means that everything should be the same among the tested items (conditions remain constant). The only difference (variable) would be the procedure or item being tested in that part of the experiment. Keep a journal to record what you did and your observations - changes, growth or other results of your experiment. Photos or illustrations of the progress of your experiment are good ways to display what you did and what your results were.

Example: All lawns being tested should be treated the same (conditions remain constant): same type of grass soil, temperature, sunlight, water, feeding times, etc. The only difference (variable) would be the plant food fed to the lawns. Make a chart of the weekly lawn growth.

5. Draw a Conclusion

Analyze the results of your experiment. Draw a conclusion based on your results. Was your hypothesis correct? Why or why not? Your conclusion

should tell what you learned by conducting an experiment. Remember, an experiment is *not* a failure if the hypothesis is proven wrong!!

Example: The lawn fed with plant food 'A' grew faster than those fed with any of the other plant foods tested. My hypothesis was not correct, even though plant food 'B' cost more and promised better growth. I learned that not all plant foods are the same and that advertising is not always true.

Science Fair Project Proposal Experiment

Name: _____

Grade: _____

Teacher: _____

An experiment can be a test made to demonstrate a known scientific fact. It can also be a test to determine if a hypothesis (your educated guess of what will happen) is accurate.

Project/Problem: What scientific question will you be attempting to answer?

Hypothesis: What do you think will happen (answers the above question)?

Procedure: How will you find out what will happen? Write a brief description of how you plan to test your hypothesis. How will you record and display your experiment and data?

Materials: What materials will you need?

Parent Approval: _____

Teacher Approval: _____

Science Fair Project Proposal Collection

Name: _____

Grade: _____

Teacher: _____

A collection is a grouping or gathering of various objects which must be scientifically related and demonstrate that you have learned something through the process of collecting and categorizing. Items should be categorized and labeled correctly, using scientific names when possible.

Project: What will you collect? What scientific question will your collection illustrate?

Materials:

Procedure: How will you organize and label your collection? How will your display illustrate your research and collection?

Results:

Parent Approval: _____

Teacher Approval: _____

Science Fair Project Proposal

Model or Demonstration

Name: _____

Grade: _____

Teacher: _____

A model is a small object usually built to scale that represents some already existing object. A demonstration is an illustration or explanation of a scientific principle that shows how and why something works.

Project: What scientific question are you trying to demonstrate or model?

Materials: What materials will you need?

Procedure: Write a description of what you plan to do. How will it be displayed?

Results: What do you hope to teach others with your demonstration or model?

Parent Approval: _____

Teacher Approval: _____