

AMES

Grade 7 and 8

Science Fair

Project



Why Do a Science Fair Project?

Teacher's perspective

- ▶ Need to remember the *intent* of the Science curriculum
- ▶ “The child is curious. He [she] wants to make sense out of things, find out how things work, gain competence and control over himself and his [her] environment, and do what she [he] can see other people doing. She [He] is open, perceptive, and experimental...” – *John Holt*

Why Do a Science Fair Project?

Student's perspective

- ▶ To learn to think scientifically and see what it is like to be a scientist.
- ▶ To make your own observations about the world.
- ▶ Provide an opportunity to take the initiative in my learning.
- ▶ To improve my use of science processes to solve problems.
- ▶ To become actively involved in learning and participating in science.
- ▶ To learn how to organize and finish a long-term project.

The Scientific Method

A Science Fair project is an opportunity to investigate some event or phenomena in the same way a scientist would investigate it.

Scientific Method Steps

- ▶ Research
- ▶ Hypothesis
- ▶ Experimenting
- ▶ Data Collection
- ▶ Conclusion
- ▶ Write-up
- ▶ Presentation



Safety (Part 1)

- ▶ 1. Exhibit is no more than 0.8 m deep, 1.2 m wide and 2.4 m high.
- ▶ 2. No chemicals are on display.
- ▶ 3. No open flames are on display.
- ▶ 4. No live animals are on display.
- ▶ 5. Experiments using vertebrates must be supervised by a vet or performed in a qualified lab. An Ethics form must be filled out prior to starting ANY animal research

Safety (Part 2)

- ▶ 6. Electrical power cords have 3-wire grounded connections.
- ▶ 7. Electrical connections are insulated.
- ▶ 8. Non-current carrying metal parts are connected to the ground lead.
- ▶ 9. Lasers will not be operated during public display.

Safety (Part 3)

- ▶ 10. No biological toxins are on display.
- ▶ 11. All microbial cultures are sealed.
- ▶ 12. No organisms pathogenic are on display.
- ▶ 13. Maximum of two students may work on the project.
- ▶ 14. For projects involving humans, check the website: www.wbrsf.ca/forms.html

Types of Science Fair Projects

EXPERIMENT
INNOVATION
STUDY

There are 3 types of project you might choose. The process of completing each is similar, but there are some differences you will need to understand. On the next page the three types are outlined, and examples of each are given.

Levels of Science Fair Projects

– The Experiment

- 1) An **experiment** is a science project that uses a process of scientific inquiry to investigate the question. You would think of a question about a topic, make a hypothesis (educated guess based on your existing knowledge or by reading) regarding the answer, and then design and conduct an experiment to test that hypothesis. You will make, record, and analyze observations to accept or reject your hypothesis. The key to a good experiment is identification and control of the variables.

Example: You might be interested in plants and have a question about what would happen if you tried different conditions for plant growth, or you might want to know whether using certain study strategies could improve test scores.

Levels of Science Fair Projects

- An INNOVATION

- 2) An **innovation** is a project in which you design a product that solves a particular problem. You would identify a problem, and experiment with materials to design a solution. You would conduct trials to test the product, and improvements in design are made to better meet the needs of the original problem.

Example: You might like building models, and might want to choose to design something that solves a particular problem, such as how to lift a heavy fridge up into a tree fort, or a device that transfers heat energy to turn on a light bulb.

Levels of Science Fair Projects

- A STUDY

- 3) A **study** is a project in which observations are made about an existing phenomenon and results are recorded. Instead of controlling and changing the variables, you would choose existing or naturally occurring variables for observation. Your focus is on finding a (new) explanation for the recorded observations. This type of project can also be a purely literature-researched based project in which you compare work of several others in a field and look for relationships that they may have missed. This is a less common type of project, but if done well, is certainly as strong as the experiment or innovation.

Example: You might be interested in how animals behave in certain circumstances, and may want to observe some aspect of their behaviour, such as their attentiveness to their young. You might want to do a library search to see if there are geographical patterns of disease that correspond to pesticide use.

Ladder of Success

Date: _____
Present Your Project

Date: _____
Develop Your Presentation

Date: _____
Construct Your Exhibit

Date: _____
Write Your Research Paper

Date: _____
Draw Your Conclusions

Date: _____
Organize Your Results

Date: _____
Experimenting

Date: _____
Gather Your Materials

Date: _____
Begin Your Research

Date: _____
Develop Your Purpose

Date: _____
Choose Your Topic

Student Workbook



All students need to keep a student workbook to record all of their Science Fair project work.

This will be provided to you.

Choosing a Topic

A good topic will:

- ▶ Be specific
- ▶ Be of interest to you
- ▶ Be stated as a question
- ▶ Involve experimentation. Innovation or study
- ▶ Be something you can successfully complete.
- ▶ Use the internet and basef.ca

Good Topic

► For example:

“What are the effects of fertilizers on bean plants?”

Develop Your Purpose

- ▶ Try to explain the purpose of the project in two or three sentences. A possible way of starting is: “The purpose of the project is to . . .” The purpose may include the hypothesis
- ▶ For example:

The purpose of the project is to determine if Brand A fertilizer is better than Brand B in causing bean plants to grow quickly.

Research



- ▶ Begin your research by using the library, internet or professionals.
- ▶ Make sure you keep your notes in your logbook.
- ▶ Use proper bibliographic style.

Gather Your Materials

- ▶ Make a list of specific materials.
- ▶ If you need seeds, they could be difficult to find in January or February.

Experimenting

Experiments need to include controls:

- ▶ Independent variable—the experimenter changes something to observe what will happen
- ▶ Dependent variable—the experimenter changes something to observe what will happen. These changes produce a response that can be measured in some way (i.e. your experimental plants grow higher). This response is the dependant variable.

Experimenting

- ▶ Control the variables - in a fertilizer experiment, the experimenter would ensure that the plants grow in the same size container, receive the same amount of light and water, and the same amounts of and type of soil
- ▶ (Negative) Control group - in a fertilizer experiment, these are seeds that do not receive any fertilizer

Organize Your Results

- ▶ Observations of your experiment need to be organized.
- ▶ A table and graph is the best way to do this.

Draw Your Conclusions

- ▶ You have done the experiment, and have collected data. Now you must interpret that data.
- ▶ The data will either support or disprove your original hypothesis.

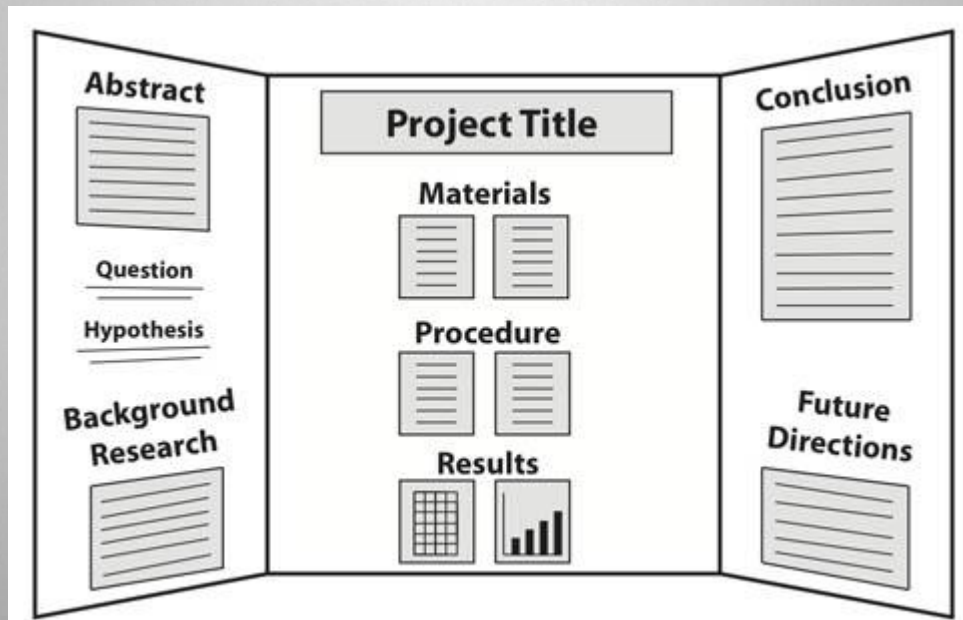
Write Your Research Paper

The parts of the research paper

- ▶ Title page
- ▶ Purpose
- ▶ Acknowledgments
- ▶ Material and methods
- ▶ Conclusion
- ▶ Further study and application
- ▶ Bibliography

Construct Your Backboard

Your backboard is like an advertisement for your project! It shows your teacher, classmates, and fair judges the hard work you put into your project. You want your backboard to be neat, professional, and interesting.



Parts of a Backboard

Be sure to include all of the following items on your science fair display board:

- ▶ the title
- ▶ a purpose statement
- ▶ your hypothesis
- ▶ the procedure
- ▶ data and results - charts, graphs, analysis
- ▶ your conclusions
- ▶ Watch videos on Youtube on successful display boards

Present Your Project



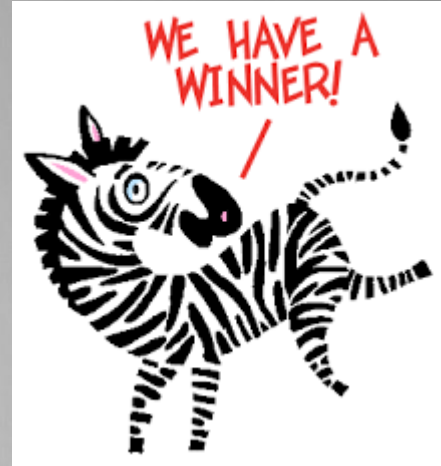
Practice your presentation before presenting to your class or judges.

School Science Fair will be on January 31, 2024

Bay Area Science and Engineering Fair **registration** opens February 1st and closes March 10th ish.

BASEF is usually the last week of March and will be at Mohawk College. Winners chosen from the School Science Fair will be invited to register for BASEF.

Everybody who
completes a project is a
winner!



Step by Step help and lots
of resources to support.



You can do this!!