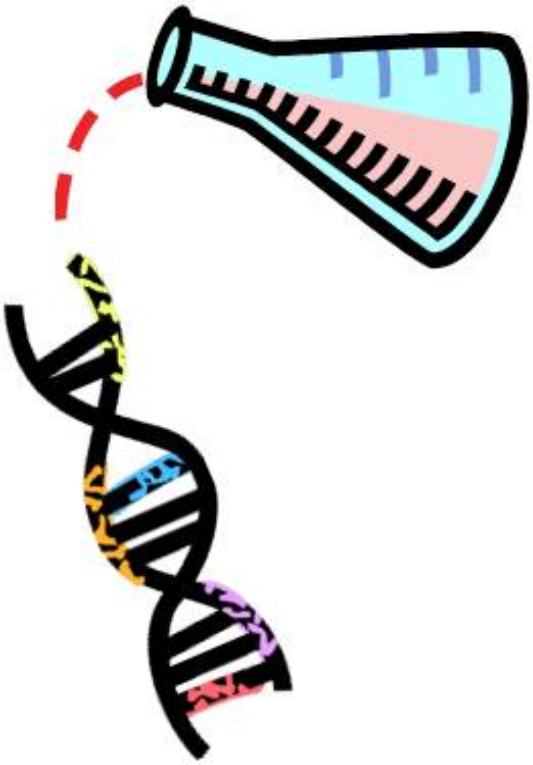
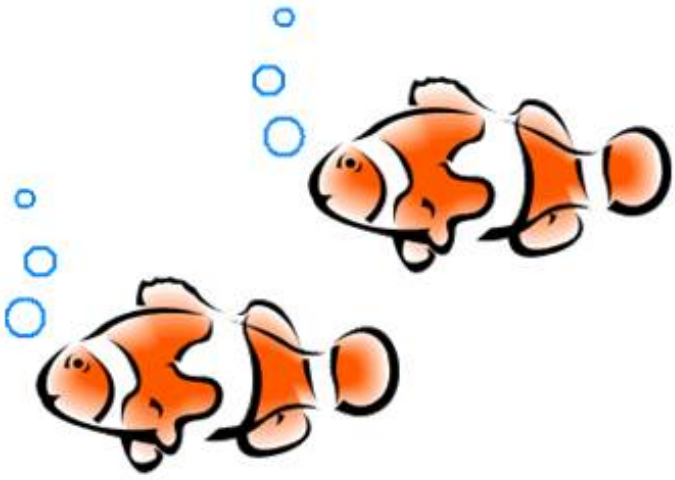
Queens Library

Science Fair Handbook





WHAT IS A SCIENCE FAIR PROJECT?

Adapted from http://www.eduplace.com/science/profdev/science_fair/whatis.html

Science is about asking questions. A science fair project is a unique way to learn the formal process scientists use to pose questions and find out answers to satisfy their own curiosity about the world around them. A science fair project is an experiment, a demonstration, a research effort, a collection of scientific items, or display of scientific tools presented for viewing. It represents the efforts of an investigation into some area of interest and provides a way to share the results with others. Through the development of a science fair project, you gain a first-hand appreciation of the work of scientists and the value of their discoveries. Science fair projects consist of three essential components:

- display unit or backboard
- exhibit materials
- written report.

Together, these elements present your project, the new things you learned, and/or the results of your experiment.

Display Backdrop

The display unit (also known as the backboard) is very important. It is what people see first, it shows the quality of your efforts. As a kind of "advertisement" for the project, it must be neatly put together and designed for best visual presentation. Usually, it stands or rests on a table behind the other exhibit materials.

Exhibit Materials

The materials, items and samples shown in front of the backboard unit can be an exciting part of any science project. These materials should reflect the items used throughout your investigation; they should provide a firsthand look at what your project is about. As a rule of thumb, the display items should tell a story or illustrate a concept sufficiently so others can understand your project even if you are not there to explain it.

Written Report

The written report is a compilation of everything you did to investigate the selected topic. It contains all the information collected or learned during the weeks leading up to the actual science fair. Whether you decide to do an experiment, assemble a collection of objects, demonstrate a scientific principle, conduct some research into a specific area of science, or show a particularly interesting scientific tool, it will be necessary to record observations and information in written form. This written report provides the data or information about your project as well as your understanding of the topic.

Any written report for a science fair project should include the following:

- Title Page
- Table of Contents
- Statement of Purpose
- Hypothesis (for a scientific investigation)
- Research
- Materials
- Procedure
- Observations and Results
- Conclusion
- Bibliography
- Acknowledgements

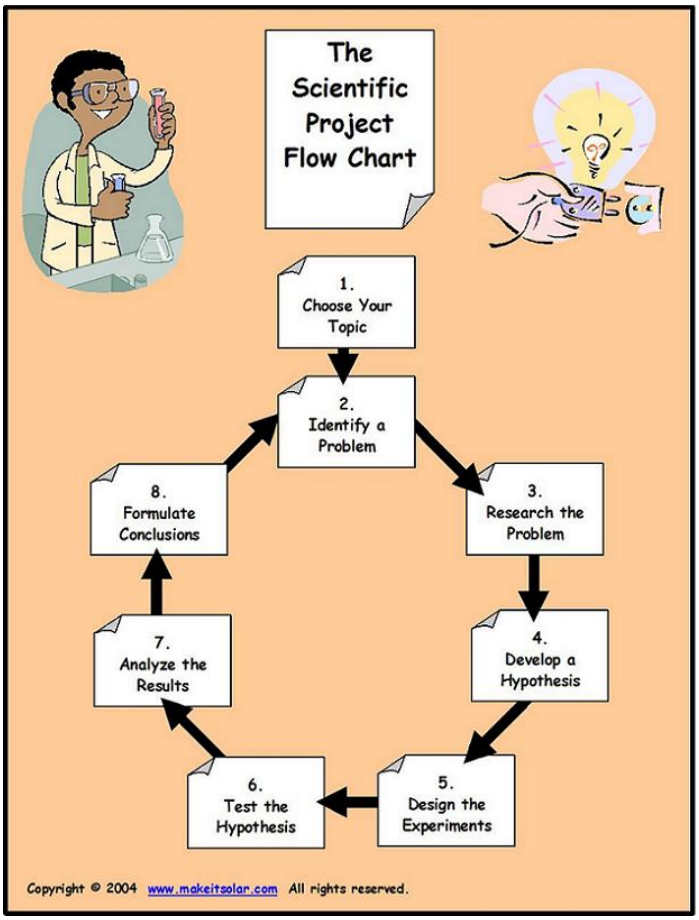
THE SCIENTIFIC METHOD

Source: www.makeitsolar.com/index.htm

In its most basic form, the thought process in the scientific method consists of the following tasks:

- Identifying a Problem
- Forming a hypothesis
- Designing and Performing Experiments
- Collecting and Analyzing Data
- Formulating Conclusions (based on your experiment and data) about whether your Hypothesis is correct or not.

You can find many different opinions on exactly what the scientific method is. Ask your teacher for the guidelines you should follow for your science fair project.



SAMPLE SCIENCE FAIR POSTER BOARD LAYOUT

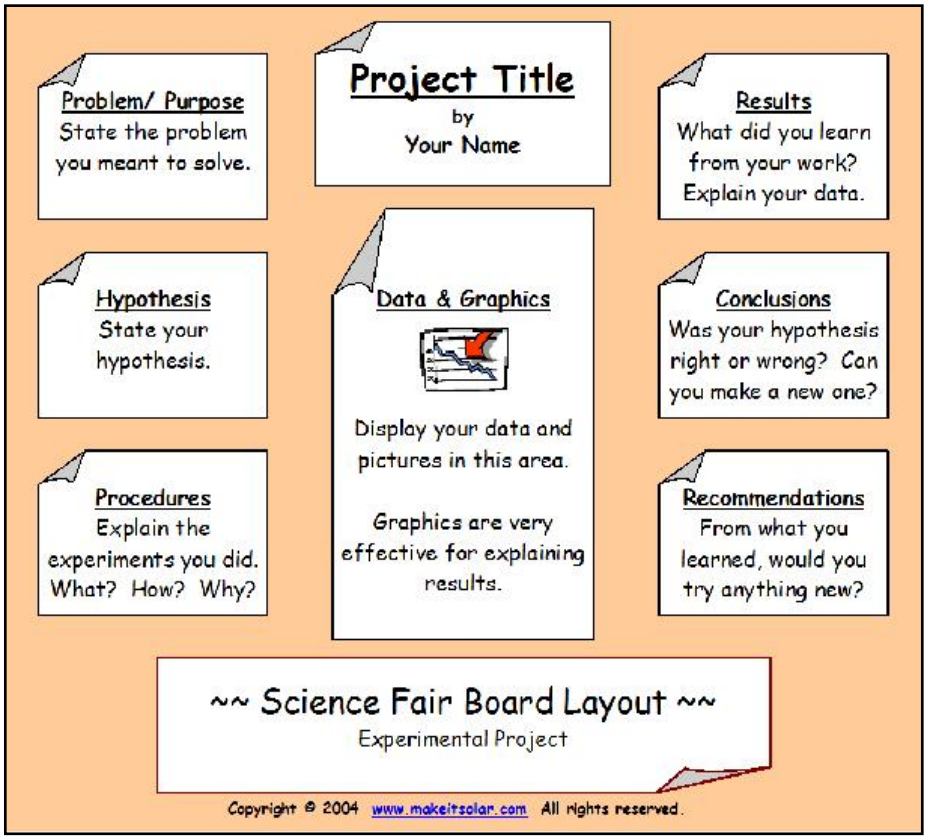
¡Check with your teacher or Science Fair coordinator before using this format!

The display poster board is an important tool for the presentation of your project.

The objective of a display board is to present the main areas and conclusions of your project so that others can easily understand what you accomplished. This is not the same as your written report. The actual project will have a lot more detail that will be shown in your written report. Think of the display board as a commercial for your project. The commercial will state the main points and key features of your research so that others will understand what you did and how you did it.

Like books, people will read your board from left to right and top to bottom. It is a good idea to arrange your project information so that observers can read your display in logical order. Part of your challenge is to make it easy for others to understand your work. The only section not following this convention is the title which should be located at the top center of the display.

The main areas of a poster board could be the ones shown in the chart on the right. The areas are explained below. Each section presented on the display board should be only one paragraph if possible. The actual areas you use will depend on the rules of your fair and the choice of exact information you want to present.



Title: The title of your project and your name

Data and Graphics: Present any significant data, graphs, and pictures in this section. Visual representations of your results, if done effectively, are worth a thousand words.

Problem/ Purpose: State the problem that you are interested in, or the question you are trying to answer. Explain why you selected the topic you did.

Hypothesis: State your hypothesis, or what you think will be the answer to your problem, purpose, or question. In other words, what you think will happen.

Procedure: State the procedures you followed in carrying out your experiment or project. What experiments did you perform and why?

Results: What did you find out from your data? Explain the results. Note, you cannot do this until you have carried out the **Procedure**.

Conclusions: Was your hypothesis right or wrong? Can you make a new statement that you know to be true based on your research?

Recommendations: From everything you learned, would you make any recommendations for further research? Do you have new questions about the topic? Write your ideas for further research in this section.

Other Display Materials

Abstract: An abstract is a brief overview of what your project is about. It should include the title, your name, and brief summaries of the problem, hypothesis, procedures, data and conclusions. It should be no more than one typed page with 1 or 2 paragraphs.

Models or Research Tools: Did you create any models or experimental setups that are important in explaining your work? Three dimensional objects and pictures are often more effective than words at communicating complex ideas. Find out from your teacher if it is appropriate for you to display models to illustrate your ideas and concepts.

A FEW IDEAS FOR SCIENCE FAIR PROJECTS

Grades 2 to 3

- How animals grow
- Animals and their young
- Animals in our lives
- Endangered animals
- What do roots, stems, and leaves do?
- Growing and caring for flowers
- The food we get from plants
- How are some plants dangerous?
- Properties of matter
- How does matter change?
- Work, force, and energy
- Pushing and pulling
- How is energy used?
- Simple machines and their uses
- Compound machines and their uses
- How does sound move through matter?
- The earth's crust and how it changes
- Rocks and minerals
- Important natural resources
- Water and the water cycle
- Weather and weather predicting
- Clouds and storms
- The moon and sun
- Planets in the solar system
- Taking care of your body
- Healthy habits

Grades 4 to 5

- How do temperature changes affect a fish?
- Do preservatives stop bread mold from growing?
- How leaves lose water
- The effect of sunlight on plants
- What fabrics make good insulators?
- Materials that are the best conductors of electricity
- How are crystals formed?
- Removing salt from water
- The three layers of the earth
- Create your own fossils
- The ocean floor
- Taste buds on the tongue
- What does a magnetic field look like?
- Properties of minerals
- Food chains and food webs
- How animals live underground
- The life cycle of non-seed plants
- How plants make food
- How animals and plants adapt in order to survive
- How rocks are formed
- How air temperature changes
- Similarities and differences between the planets
- Compare predicted weather with actual weather
- Bird's nest
- Series and parallel circuits
- What are the proper foods to eat?

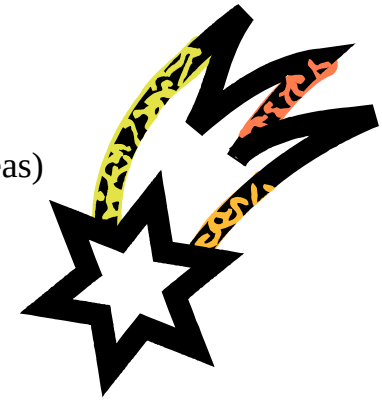
Grades 6 to 8

- How water rises in different kinds of plant stems
- Forming compounds
- How heating water affects the rate at which materials dissolve
- Factors affecting how fast liquids will mix
- Freezing points of different liquid substances
- What metals and/or materials will rust?
- Good and poor conductors
- Are there particulates in the air we breathe?
- What materials are biodegradable?
- The effect of different kinds of physical activity on pulse rates
- Sprout seeds without using soil
- Atoms
- How glaciers change the land
- Constellations
- The circulatory system
- Eclipses of the sun and moon
- Tides
- What is photosynthesis?
- What is respiration?
- Invertebrates
- Reptiles and amphibians
- Gestation periods of different mammals
- Endangered and threatened species of animals and/or plants
- Environmental effects on the size of animal populations
- Succession in an ecosystem
- Electricity
- Laser beam technology
- Major sources of energy
- The "Greenhouse Effect"
- Nuclear energy
- Ways to conserve energy
- Physical and chemical weathering
- Weather records and extremes
- The life cycle of a star
- Fossil fuels
- Solar heaters or cookers
- Can nonliving things grow?
- Factors affecting germination
- The effect of salt water and other liquids on plant growth
- Cell reproduction
- How our eyes distinguish color
- Different types of satellites
- Major nerve pathways in the body
- The parts of a cell
- Tissues, organs, and systems in the body
- The migration patterns of selected birds
- How the human body reacts to exercise and inactivity
- The development of the atomic theory
- Benefits of recycling
- Earthquakes
- What causes volcanoes?
- The phases of the moon
- Phototropism
- Ways to slow down plant growth
- Effects of smoking
- Drinking and driving
- Robots
- Rockets into space
- Space probes

GREAT PLACES TO BEGIN YOUR RESEARCH

The **public library** has a wealth of books on science and math projects, many of them specifically about creating a science fair project. Ask a librarian at your local library for recommendations of books about topics that interest you.

For on line resources, explore these web sites.



Science Fair Resources and Experiment Ideas

www.all-science-fair-projects.com/ (including Nano technology ideas)

www.kids-science-experiments.com/

www.education.com/science-fair/

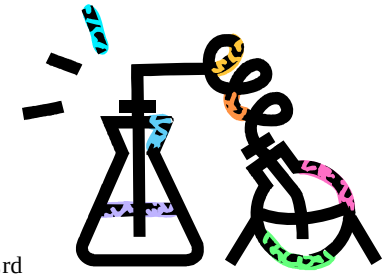
www.cool-science-projects.com/Science-Fair-Experiment.html

www.sciencebob.com/sciencefair/ideas.php

www.sciencebuddies.org

learning-center.homesciencetools.com/article/science-fair-projects-for-elementary/

www.icanteachmychild.com/science-fair-projects/



More great science Resources on the web

www.kidsciencechallenge.com/
The Kids' Science Challenge is a nationwide annual competition for 3rd – 6th graders to submit experiments and problems for REAL scientists and engineers to solve.

www.jpl.nasa.gov/edu/learn/activities/science-fair-project/
Guides about how to do each stage of a science fair project from NASA scientists

www.exploratorium.edu/explore
The Exploratorium is a leader in interactive science learning and one of our partners in planning the Children's Library Discovery Center.

www.loc.gov/rr/scitech/mysteries/
Answers to lots of science questions from the Library of Congress