Project Framework

Getting Started

Have you ever watched a crime scene detective show on TV, baked a loaf of bread, or put fertilizer on house plants? If so, then you are experiencing the results of scientific research. Scientists sometimes solve mysteries or problems, experiment to determine cause and effect, or conduct research to create new products or make the products that we use every day better.

When you do a science fair project, you become the scientist searching for answers! The tool that you will use is the scientific method.

The scientific method involves the following steps:

►Identifying a problem or question

►Stating a hypothesis
►Experimenting
►Reaching a conclusion

Keep a Journal

A journal is a bound notebook that provides a complete and accurate record of all your research and work.

It should contain the following information:

►Topic and project research
►Descriptions of experiments
►Your observations
►Diagrams, graphs

Each entry should be as neat as possible and dated. The journal will be displayed with your completed project at the science fair.

Select a Topic

What will your project be about?

►What topic interests you?

►What do you already know about the topic?

►What else would you like to know about your topic?

Learn more about your topic by reading about it, talking to others who are interested or knowledgeable about the topic, or visiting places where you can learn more about it.

NOTE!

Projects are prohibited from using vertebrate animals in experiments that would result injury, discomfort or death of the organism.

Doing a Project

Identifying a Problem or Question

What do you want to find out?

The problem is the scientific question to be solved or answered. It is stated as a question that can only be answered by experimentation. Not just a yes or no answer.

Collections, models, inventions, demonstrations, and product comparisons **do not** use experimentation to answer or solve a **scientific** question.

Stating a Hypothesis

What should happen?

A hypothesis states what you think is going to happen when you conduct the experiment.

Don't change your hypothesis even if the results of your experiment are different than what you predicted.

Experimenting

Testing your hypothesis.

Design your experiment to solve the problem or answer the question by changing the conditions that will help you test your hypothesis.

Variables are experimental conditions that can change - amount of light, water, sample size, etc.

►Select only one variable to change - this is the **Independent variable**

►Keep the rest of the variables the same - these are the **Controlled variables** or constants.

►The **Dependent variable** is the results that occur during the experiment as the independent variable changes.

You will also need a control group for comparison - where the independent variable does not change.

For best results repeat the experiment several times.

List all **materials** used in your investigation. Include what, how much, and what kinds of materials you used.

►*Good listing*

6 Big Boy tomato plants

6 - 12 x 18 x 11 ½ inch cardboard boxes

1 - clear plastic sheet marked with a half inch grid

►Poor Listing

Plants
Boxes
Grid

Procedure

How you did the experiment.

It is a list of step-by-step directions - much like a recipe in a cookbook. Anyone who reads it should be able to duplicate your investigation and get the same results.

Results

What happened?

Results can be observable or measurable amounts and can be presented in graphs or tables.

Reaching a Conclusion

Did you find out what you wanted to know? Can you explain what you observed?

Form your conclusion by summarizing the results of the experiment.

►What was discovered by doing the experiment? Include results that do not support your hypothesis.

►Was your original hypothesis correct? Give possible reasons for the difference between your hypothesis and the results.

Project Report

Your report is the written record of your entire project from start to finish.

The report should be clear and detailed enough for the reader to know:

►what you did
►why you did it
►what the results were
►whether or not the experiment supported your hypothesis
►where you got your research information

By recording everything in your journal as the project progresses, all you need to do in preparing the report is to organize and neatly copy the journal's contents.

The report can be hand– or typewritten, double-spaced, and bound in a folder or notebook.

It should contain:

►a title page

- a table of contents
- an introduction
- one or more experiments and data
- a list of sources
- acknowledgements

Project Display

The display tells the story of the project in such a way that it attracts and holds the interest of the viewer.

Be thorough, but keep it simple.

The display must fit within a space of 48 inches wide, 30 inches deep, and 108 inches high.

Posted on the display board should be the:

- Project title
- Problem
- Hypothesis
- Experiment - variables, materials & procedure
- Data
- Results
- Conclusion
- Pictures, graphs, charts

Please include your journal and report in your display.

You may also include any items that illustrate the experiment as space allows.

The following items **may not** be included in the project display under any circumstances (use drawings or photographs instead):

- live animals
- open flames
- dangerous chemicals
- microbial cultures
- preserved vertebrate or parts
- **fungi**
  - live pathogens
  - any other material hazardous to public display

Oral Presentation

You will be required to explain your project in an interview with the judges. Make it short but complete.

The judges give points for how clearly you are able to discuss the project and explain its purpose, procedure, results, and conclusion.

Your ability to discuss your project and answer the judges' questions convinces them that you did the work and understand what you have done.

Judging Criteria

Students receive points for accomplishing the following:

Project Objectives:

►Presenting original ideas.
►Stating the problem clearly.
►Defining variables and using controls.
►Relating background reading to the problem.

Project Skills:

►Being knowledgeable about equipment use.

►Performing the experiments with little or no assistance except as required for safety.

►Demonstrating the skill required to do all the work necessary to obtain the data reported.

Data Collection:

►Using a journal to collect data and research.

►Repeating the experiment to verify the results.

►Spending an appropriate amount of time to complete the project.

►Having measurable results.

Data Interpretation:

►Using tables, graphs, and illustrations in interpreting the data.

►Using research to interpret data collected.

►Using only data collected to make a conclusion.

Project Presentation - written materials, interviews, display:

►Having a complete and comprehensive report.

►Answering questions accurately

►Using the display during the oral presentation.

►Summarizing what was learned.

►Presenting a display that show creative ability and originality.

►Presenting an attractive and interesting display.

Resources

Websites

►Discovery School – Science Fair Central
http://school.discovery.com/sciencefaircentral/

►Cyber Fair - A Resource For and By Elementary Students

http://www.isd77.k12.mn.us/resources/cf/welcome.html

►Science Fair project ideas
http://othello.mech.nwu.edu/~peshkin/scifair/chias_ideas.html

►**The Ultimate Science Fair Resource**
http://www.scifair.org/

►**Agricultural Ideas for Science Fairs**
http://www.ars.usda.gov/is/kids/fair/ideasframe.htm

►**Biodiversity Science Projects**
http://investigate.conservation.org/sciencefairprojects/default.htm

►**Science Fair Project Ideas**
http://othello.mech.nwu.edu/~peshkin/scifair/chias_ideas.html

►**LSU Libraries - Chemistry Library - Science Fair Internet Resources**
http://www/lib/lsu/edu/sci/chem/internet/science_fairs.htm

Books

►More Prize-Winning Science Fair Projects by Penny R. Durant

►Environmental Science - High School Science Fair Experiments by H. Steven Dashefsky

►Science Fair - Guide for Teachers by Addison-Wesley

Info obtained from: http://www.wedoscience.org/pages/Science_Fair_Guidelines.htm