Science Projects

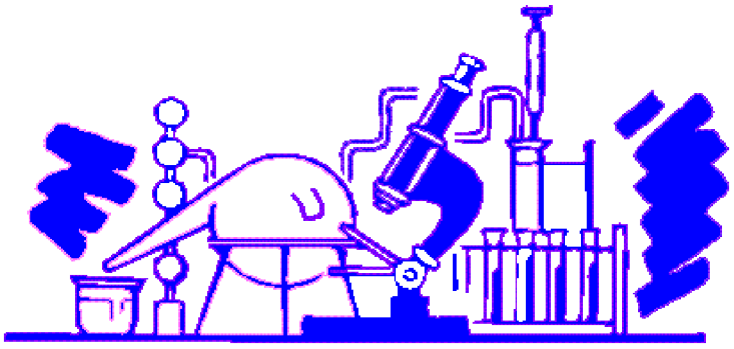
A Parent Handbook

Dear Parents:

The school is planning a science fair. Science projects will involve research and experimentation on a topic of individual interest. The educational benefits to the student who completes a project are numerous and include developing skills in writing, oral presentation, creative thinking , problem solving and time management.

Each student will be given instructions and handouts during class for the various steps of his/her project.
Your support is key to a successful project. Your child may need you to monitor his/her progress and most importantly provide encouragement. Please do not allow your involvement to extend any further in order to assure equity and promote student learning. Also, be aware that a prize winning project can be completed for under $10.00.

This pamphlet highlights reasons for doing a science project, student expectations and some helpful hints for providing encouragement. Please take time to read this information carefully. We hope that the science fair is a wonderful learning experience for your child and will promote a love of learning and science.



Why A Science Project?

- **Students get to live real science by being a scientist.**
- **Students get to develop and demonstrate a wide range of skills (Reading, Writing, Math, Social Studies, etc.)**
- **Students get to improve life-long skills of problem solving, organization, and critical thinking.**
- **Students get to practice using tools of science and METRIC measurement.**
- **Students become more proficient at Scientific Thinking!!!**
- **Students will get invaluable experience for developing poise and quick-answer thinking through the judging process.**

Get in step with Science Fair!!

Listed below are the standard expectations for the science project.

1. Researching a selected topic
2. Designing an experiment to answer a scientific problem
3. Determining a hypothesis for the problem
4. Maintaining a scientist's data notebook
5. Completing a formal written report that includes the problem, purpose, background research, hypothesis, procedure, materials, results, variables, conclusions and bibliography
6. Making a display of required information

How Can Parents Help with Science Projects?

- **SUPERVISE and use resources to ensure SAFETY for both your child and tested organisms (if any).**

- **Ask questions instead of giving answers.**
  - **Questions place the responsibility on your child.**
  - **Questions help your child explore dimensions of the problem.**
  - **Questions draw solutions from your child.**
  - **Questions communicate trust and confidence.**
  - **Questions help anticipate probable outcomes of different choices.**

- **Use these questions to guide self-evaluation in your child:**
  - **"What do you want to happen?"**
  - **"Do you think doing this will get you what you want?"**
  - **"What other ways might you try?"**

- **Be interested, encouraging, and positive.**

- **Explain concepts that are difficult to understand.**

- **Structure work time.**

- **Provide technical help.**

- **Purchase materials.**

- **Provide transportation.**

- **Help your child understand Science Projects are about learning, not winning!**

Glossary

Topic:

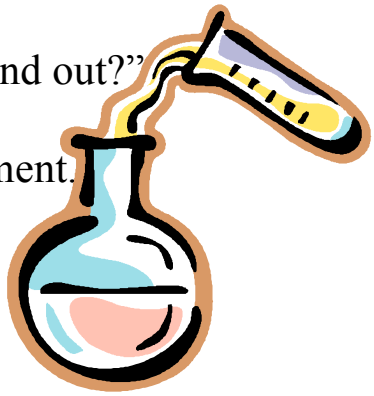
The subject of interest that will be explored. This should be something of student interest and to which he/she can relate.

Background Research:

Learning about the topic by reading books, newspapers and magazines/journals OR by watching TV, videos OR by interviewing knowledgeable people.

Problem:

The specific problem that is going to be investigated.
State this in the form of a question. "What do I want to find out?"



Hypothesis:

An educated guess presuming the outcome of the experiment.
What do I think will happen?

Experiment:

A test designed to check your hypothesis.

Control:

The control group has no changes added. The data collected from the control group is used to compare with the experimental group.

Variables:

Anything in your experiment that is changed in order to solve your problem statement is a variable.

Independent- one thing that you change ex. type of soil
Dependent- the effects of the experiment ex. height of plant

Constants:

Everything that is kept the same in the experiment.
ex. amount of water, type of container, placement of plants

Conclusion:

A statement about the results of the experiment and how the results compared with what you thought would happen (your hypothesis).
Identifies problems with the experiment, what could be further tested, how this could be applicable to real life.

Abstract:

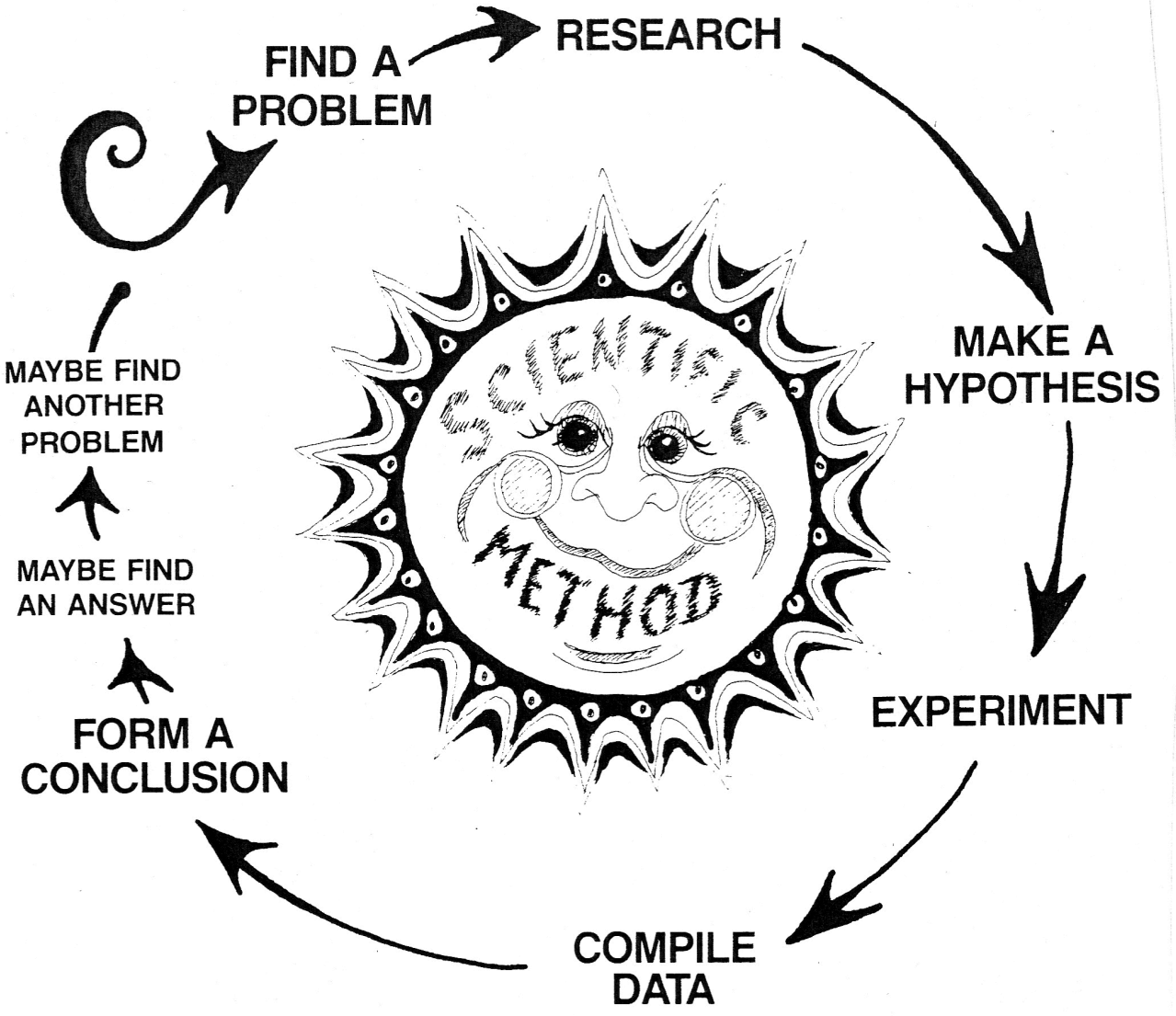
A very brief condensation of the project. This should summarize the problem, what you did and the results.

Project Log:

This is a record of the experiment and should include details of what happened during the experiment. Required for all projects!

The Scientific Method

MOST SCIENCE CURRICULUM IS BASED ON THE RESEARCH OR SCIENTIFIC METHOD. THIS METHOD IS USED IN EXPERIMENTS AS WELL AS SOLVING MOST EVERYDAY PROBLEMS.



Display and Safety:

In general, most displays will not have any problem satisfying the items on the safety checklist.
However, anything made of glass and containers holding liquids could cause problems.

Backboard:

The backboard is a display of the project and should address the following items:

- Project Title
- Purpose
- Problem
- Hypothesis
- Materials
- Procedures
- Data
- Variables:
  Independent, Dependent, Constants
- Conclusion

The following is a suggested layout for the backboard.

Purpose:	**Project Title**	**Variables:**
Problem:	**Procedure:**	**Independent** **Dependent**
Hypothesis:		**Constants:**
	Data:	
Materials:	**Charts and graphs**	**Conclusion:**
Abstract:		

What is a Conclusion?

The conclusion is your final step in the scientific method. It addresses the answer to your problem. Your hypothesis is restated with an explanation as to whether or not you proved it. In the conclusion you interpret the data that you collected when you tested your problem. You can not arrive at a conclusion until you have completed the experiment.
Make sure you address the following:

- •Restate the problem
- •Restate your hypothesis
- •Use data to support or disprove your hypothesis
- •Discuss problems you had with your experiment and how they might have affected the results.
- •Write how you might test your experiment differently next time.
- •Tell how your project relates to real life situations.

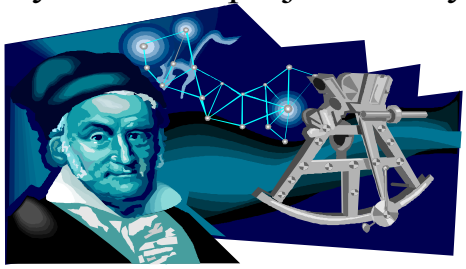
What is an Abstract?

An abstract is a short summary (approximately 200 words) of your entire project.

The abstract should include:

- •The purpose of your research (why are you doing this project)
- •A statement of the hypothesis
- •Methods and Procedures (what you did)
- •Observations (what you saw)
- •Results, conclusions, and other important information
- •A partial bibliography of the resources

The abstract is a condensed version of your entire project. Many times it is what judges and others view first.



What is a Science Project Log?

The logbook or log is a notebook or folder in which you record all of the steps and activities that took place during your project. It is the place where you will record **everything** that you do and read. You will record field measurements there, and you should present this as evidence of your work. Keep it as neat as possible. The things you write in there should all be dated, so that the record is completely clear, and neatness is not so important as clarity. You will use the information in your logbook to complete your report/forms. It needs to be on display with your project during the science fair.

Your log is written as you go. There is no need to make rough notes on bits of paper, so you can copy them into the log when you get home. Real logbooks show where they have been written in during rain storms, they have mud stains, and that is OK. Look after your log, but do not stress out if it suffers some indignity. And if, for some reason, you have to use loose paper, date it, and paste it into the book.

You should keep notes of any interviews or phone calls you make, phone numbers and e-mail addresses, because you never know when you will need to e-mail a contact again - and computer systems can always turn nasty on you.

So get your book, label it, and start with a list of possible topics, and then move on to a timetable. Have a great time and remember that real science involves researching to find out what is already known, finding out what techniques to go and where to look, getting the equipment that is needed, and so on. You will need to do the same, ***because every science project is real science.***

Project logs are required for all projects!