

Somerset Elementary School 2011-2012

Science Fair Guidebook



Feb 13

- Decide on your question and project

Feb 13-24

- Research your project using books and the Internet

Feb 27

- Complete your project proposal and turn into your teacher

Feb 27-29

- Proposals reviewed by teachers

Mar 2

- Proposals reviewed by YSW Committee (5th grade only)

Mar 5

- Proposals returned

Mar 5-13

- Plan and work your project.

Mar 14-20

- Create project board (available at office for \$5).

Mar 22

- Bring completed project to school
- Classes bring projects to cafeteria (scheduled throughout day)

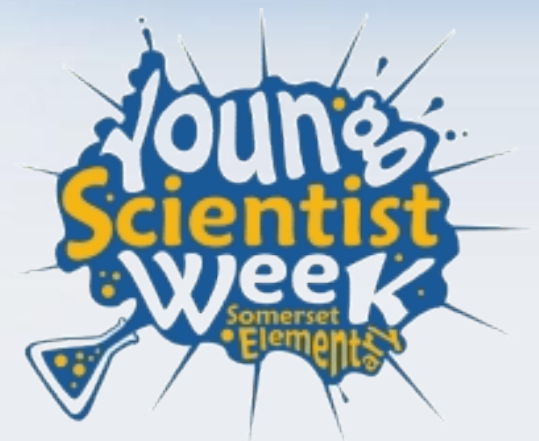
Mar 23

- Class viewing of projects

March 23

- **Science Fair and Carnival, 5:30 – 8 PM**

SCHEDULE

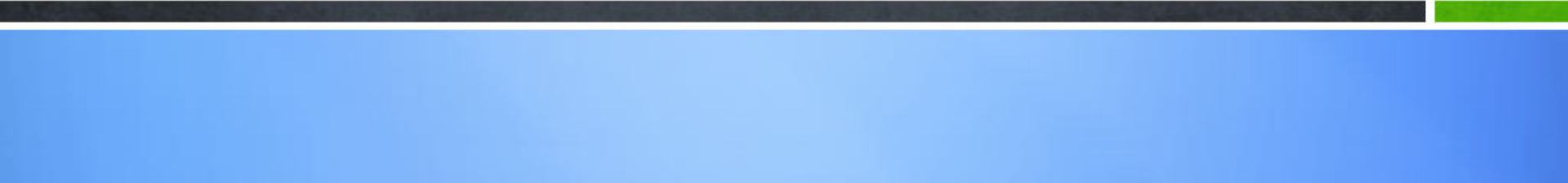




What is the Science Fair?

A **journey** of scientific inquiry.

The Science Fair is an opportunity for Somerset students to study a science-related topic outside of the classroom and document it as an observation (K-3) or perform a science experiment using the Scientific Method (4th & 5th grades). The purpose is to encourage in each Somerset student a sense of wonder and curiosity, and to increase self-direction in the study of the world around them.





K-3rd Grade

OBSERVATIONAL PROJECT

Students in grades K-3 are encouraged, though not required, to create an observational science project. This can be done individually or as a group of 2-3 students. A Project Proposal should be completed and dropped off in the PTSA Box in the front office.

Observational Project

K – 3rd Grade

Observation is the foundation of scientific discovery. Scientists make observations about things and deduce new information based on their observations. They use the information they gather in this way to test hypotheses and theories and form conclusions. Teaching students to be careful observers develops their deductive reasoning skills. This is an integral first step in the teaching of science.

An observational project asks a question, performs an action or actions, and records the results.

Observational Project

K – 3rd Grade: PROJECT IDEAS

How fast does water climb?

Will nails rust in water?

What is the water cycle?

What materials will dissolve in water?

Will jars with different-sized openings affect the rate of evaporation?

What kind of soap or detergent gives the most suds?

What makes the best bubbles?

Under what conditions will seeds start growing?

How fast can different members of the land snail family move?

What are the resulting colors when two or more colors are combined?

How do different spiders spin their webs?

What kinds of insects live in your area?

What is the difference between a butterfly and a moth?

Observational Project

K – 3rd Grade: PROJECT IDEAS

What insects are bugs?

How do scales help fish?

What is the difference between toads and frogs?

What birds do you observe around your locality?

How do nests of various birds compare?

How does a bird take a bath?

How do leaves vary in size, shape and structure?

How does a tree grow?

How can you determine the year in which various trees started to grow?

What use is bark to a tree?

How do twigs of different kinds of trees differ?

What effect does moisture have on seed growth?

What effect does light have on seed germination (growth)?

How do seeds travel?



4-5th Grade

EXPERIMENTAL PROJECT

Students in grades 4-5 are required to create an experimental science project that adheres to the SCIENTIFIC METHOD. A Project Proposal must be completed and given to your teacher for review and comment.

Fifth grade project proposals will then be forwarded to the PTSA Science Committee for review and returned to the student.



Experimental Project

4th – 5th Grade

An experiment is a project that demonstrates testing being done and the gathering and documentation of data following the SCIENTIFIC METHOD.



SCIENTIFIC METHOD

PURPOSE

State the problem.

RESEARCH

Find out about the topic.

HYPOTHESIS

Predict the outcome to the problem.

EXPERIMENT

Develop a procedure to test the hypothesis.

ANALYSIS

Record the results of the experiment.

CONCLUSION

Compare the hypothesis to the experiment's conclusion.

The Scientific Method

State the purpose / question /problem: One sentence in the form of a question. The scientific method starts when you ask a question about something that you observe: How, What, When, Who, Which, Why, or Where? And, in order for the scientific method to answer the question it must be about something that you can measure, preferably with a number.



The Scientific Method

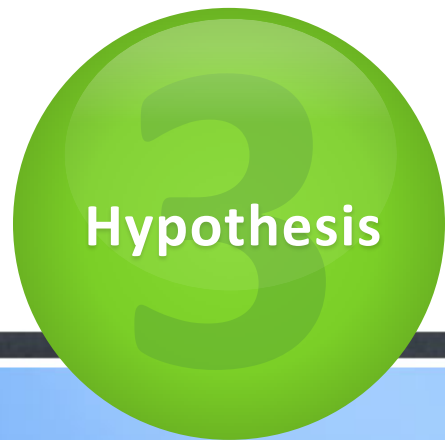
Research, read, watch science videos, contact resource people who may help. Incorporate prior knowledge. Rather than starting from scratch in putting together a plan for answering your question, you want to be a savvy scientist using library and Internet research to help you find the best way to do things and insure that you don't repeat mistakes from the past.



The Scientific Method

Hypothesis: A hypothesis is an educated guess about how things work or more simply stated, predict what will happen based on what you know, communicated in a single sentence.

You must state your hypothesis in a way that you can easily measure, and of course, your hypothesis should be constructed in a way to help you answer your original question.



The Scientific Method

Experiment: Your experiment tests whether your hypothesis is true or false. It is important for your experiment to be a fair test. You conduct a fair test by making sure that you change only one variable at a time while keeping all other conditions the same. You should also repeat your experiments several times to make sure that the first results weren't just an accident.



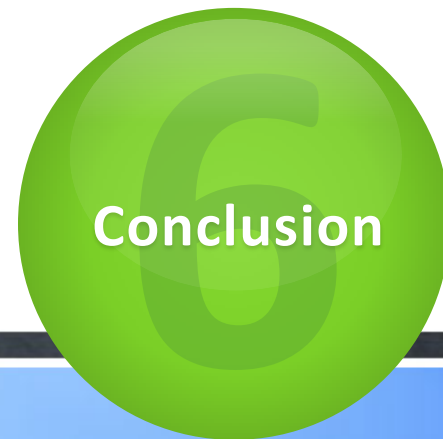
The Scientific Method

Analysis: Once your experiment is complete, you collect and record your data and analyze it to see if your hypothesis is true or false. Scientists often find that their hypothesis was false, and in such cases they will construct a new hypothesis starting the entire process of the scientific method over again. Even if they find that their hypothesis was true, they may want to test it again in a new way.



The Scientific Method

Conclusion: What did you learn from your experiment? Was your hypothesis proven? Why or why not? To complete your science fair project you will communicate your results to others in a final report and a display board. Professional scientists do almost exactly the same thing by publishing their final report in a scientific journal or by presenting their results on a poster at a scientific meeting.



Project Display



Experimental Project

4th-5th Grade: PROJECT IDEAS

http://www.sciencebuddies.org/science-fair-projects/project_ideas.shtml

<http://www.education.com/science-fair/>

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

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



5th Grade

INVENTION PROJECT

Students in grade 5 have the option to create an invention science project. Inventions can be almost anything created to solve a problem or meet a need. A Project Proposal must be completed and given to your teacher for review and comment.

Fifth grade project proposals will then be forwarded to the PTSA Science Committee for review and returned to the student.

Invention Project

5th Grade

Creating a Science Fair Invention Project using the Engineering Design Process.

Nearly everything we use, work with, or wear is engineered. Someone had to think of how to design that object to solve a particular problem. Anyone can be an engineer! An engineer is someone who uses knowledge of science and math, and their own creativity to design objects or processes (inventions) to solve problems.

Invention Project

5th Grade

I. PROBLEM

Ask a question about an everyday problem you would like to solve. Inventions can be almost anything created to solve a problem or meet a need. Examples include pencils, cups, cell phones, processes to clean water or move heavy objects, etc.

II. RESEARCH

Research products/processes already available to meet a need or serve a similar function. To do your research, look online, visit stores, and interview experts as well as potential invention users.

Invention Project

5th Grade

III. POSSIBLE SOLUTIONS

Brainstorm possible solutions. Imagine a few different set-ups or designs. Compare and talk about the positive and negative points of each idea. Do not just try your first idea, but choose the *best one*. *Reach consensus on which idea is the best possible solution.*

IV. PLAN

Make a plan. Draw a diagram and label the parts of your diagram. Use symbols to label the parts. Make a list of the materials you would like to use for your invention and the amounts you will need.

Invention Project

5th Grade

V. CREATE

A. Materials: Collect the materials you will need for your invention. It is best to borrow, make, or use inexpensive materials.

B. Build: Build your invention according to your “plan.”

C. Test: See if it works! Keep a data log of when and how you tested. Evaluate the results.

VI. IMPROVE

Gather information from the “test” of your first design to help find problems that need improvement. Improve your first design and test again. Make it better!

Unacceptable for Display

Live animals

Microbial cultures or fungi, living or dead (e.g., mold, bacteria)

Animal or human parts

Liquids, including water

Chemicals and/or their empty containers (including caustics, acids and household cleaners)

Open or concealed flames

Batteries with open-top cells

Combustible materials

Aerosol cans of household solvents

Controlled substances, poisons or drugs

Sharp items such as syringes, knives and needles

Gases