Introducing Our Science Fair

Our main objective is to promote enthusiasm and curiosity in children for science and to have them see science as an important part of their world. Doing a science fair project is an exciting opportunity for each student to take on the role of the scientist- to do what a scientist does and to learn something new that the student does not already know. The science fair is voluntary and open to all students in kindergarten through sixth grade.

Although a science project allows the opportunity for the parents and child to work together, the work should be mostly done by the child and be age appropriate. The student must be able to present the theory and results of the project to their homeroom teachers, and to be able to answer questions. Parents can serve as a source of ideas, inspiration, and general information. They may guide the child to find materials, help them interpret the findings and determine the results of the project.

This will be a competitive science fair. An evaluation of each student’s project will be given by the judges.

Science Fair projects may be of three types. The first type is a Demonstration, such as making a collection or a model. The second type is an investigation or Experiment. The third type is a Research Project.

The student may choose any type of project, however, we encourage students to pursue investigative experiments. This type of project teaches the student to use Scientific Method. The scientific method can be used with the simplest projects. Keeping the project simple helps students learn and maintains their interest in science.

Projects can be individual efforts (with family support,) family projects or group projects with teams of no more than four students. Groups can be Kindergarten through 3rd grade or 4th through 6th grade. Materials and costs associated with the project need to be provided by the family.
Science Project Ideas by Grade

6th and 5th Grade

1. What type of line sound wave is best?
2. Which metal conduct heat best?
3. Can the sun’s energy be used to clean water?
4. Do liquids cool as they evaporate?
5. Does a green plant add oxygen to the environment?
6. What percentage of corn seeds in a package will germinate?
7. Does an earthworm to light or darkness?
8. Does the human tongue have definite areas of taste?
9. Can same type balloons withstand the same amount of pressure?
10. Does the viscosity of liquid affect its boiling point?
11. What materials provide the best insulation?
12. What keeps things colder-plastic wrap or aluminum foil?
13. Does heat rate increase with increasing sound volume?
14. Do boys or girls have a higher resting heart rate?
15. Which way does the window blow most frequently?
16. Do taller people run faster than shorter people?
17. Which dish detergent makes the longest lasting suds?
18. Which grows mold faster- moist bread or dry bread?
19. Do sugar crystals grow faster in tap water or distilled water?
20. In which liquids will ice float?
21. Does the color of a material effect it absorption of heat?
22. What affect does size of particles have on the amount of solar energy it absorbs?
23. Is your dog right or left pawed?
24. What metal/materials will rust?
25. What is the freezing points points of different liquids?

4th and 3rd Grade

1. Can you tell what time is is without a clock?
2. How far does a snail travel in one minute?
3. Do plants grow bigger in soil or water?
4. Does smell affect taste?
5. Can you separate salt from water by freezing it?
6. Do different types of soil hold different amounts of water?
7. Which brand of popcorn pops the most kernels?
8. How does omitting an ingredient affect the taste of a cookie?
9. Does an ice cube melt faster in air or water?
10. Does light affect plant growth?
11. How much of an orange is water?
12. Does a plant grow bigger if given milk or water?
13. Does sugar prolong the life of cut flowers?
14. Which brand of popcorn pops the fastest?
15. Which cleaner removes ink stains the best?
16. Which kind of glue hold to boards together best?
17. Does a baseball go further when hit with a wooden or metal bat?
18. How much weight can a plant lift?
19. How do water temperature changes affect fish?
20. How does sunlight affect plants?
21. How do crystals form?
22. What materials are best conductors of electricity
23. Which foods contain starch?
24. Can you replace baking powder for baking soda in a recipe?
25. Will more air inside a basketball make it bounce higher?

2nd, 3rd, and Kindergarten

1. How much salt does it take to float an egg?
2. What kind of juice cleans pennies?
3. What is color blindness?
4. On which surface can a snail move?
5. Start a collection of rocks found in the area.
6. Do ants like cheese or sugar better?
7. Can the design of a paper airplane make it fly better?
8. What foods do mealworms prefer?
9. How long will it take a drop of food color to color a still glass of water?
10. Can plants grow without oil?
11. Does warm water freeze faster than cool water?
12. In my class, which is taller, boys or girls?
13. Do different types of apples have different numbers of seeds?
14. Do bigger seeds produce bigger plants?
15. Which materials absorb the most wast?
16. What is the soil in my backyard made of?
17. Does holding a mirror in front of a fish change its behavior?
18. What color of bird seed do birds prefer?
19. Will bananas brown faster on the counter or in the refrigerator?
20. What holds 2 boards together better, a nail or a screw?
21. Which dish soap makes the most bubbles?
22. What kind of things do magnets attract?
23. Can you tell where sound comes from when blindfolded?
24. Do different types of apples have different sized seeds?
25. On which surface can a snail move?
Websites for Science Project Ideas

Look up these websites for additional science project ideas:

<table>
<thead>
<tr>
<th>Website</th>
<th>URL</th>
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<tbody>
<tr>
<td>CU Physics Education Technology</td>
<td>phet.colorado.edu/new.simulations/index.php</td>
</tr>
<tr>
<td>Steve Spangler Science</td>
<td>stevespanglerscience.com</td>
</tr>
<tr>
<td>National Geographic for Kids</td>
<td>nationgeographic.com/kids</td>
</tr>
<tr>
<td>How Stuff Works</td>
<td>howstuffworks.com</td>
</tr>
<tr>
<td>Cool Science for Curious Kids</td>
<td>hhmi.org.coolscience/</td>
</tr>
<tr>
<td>Educational Web Adventures</td>
<td>eduweb.com</td>
</tr>
<tr>
<td>Discovery for Kids</td>
<td>yucky.discovery.com</td>
</tr>
<tr>
<td>Explore Learning</td>
<td>explorelearning.com</td>
</tr>
<tr>
<td>Fun Science Gallery</td>
<td>funsci.com</td>
</tr>
<tr>
<td>EPA Explorer's Club</td>
<td>epa.gov/kids</td>
</tr>
<tr>
<td>Bill Nye Online</td>
<td>billnye.com</td>
</tr>
<tr>
<td>Jefferson County Public library</td>
<td>jefferson.lib.co.us/kids/kids_fair.html</td>
</tr>
</tbody>
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Organizing Your Project

Once the student (or group of students) chooses a question or topic to investigate for the science fair, he or she must decide which type of project to work on. Listed below are the basic types of projects.

1. The **Demonstration** type project usually reflects the reading approach to learning science, as the student primarily imitates that which he or she has read or heard. Very few of the doing skills of science are learned or expressed using demonstration type, but this may be appropriate for some students. There are two demonstration type projects.
   a. One type of demonstration project is the presentation of a **collection** by a student. Students may present a collection for a science project after considering the following:
      i. The objectives of the science project
      ii. A science project/investigation
      iii. What is a collection?
      iv. Examples of collections that you friends or family have
      v. Maybe you have already started a collection without knowing
      vi. Books that tell about a certain collection
vii. A collection of objects of something you like
viii. Make up a question that can be answered by your collection
ix. Examples of things found in your natural environment

This type of project certainly may provide a positive and successful experience in science for a student’s first time science fair entry.

b. The second kind of demonstration project is a **model** or **scientific** device. Students may develop a model after considering the following:
   i. The objective of the science project
   ii. What is a model
   iii. What are gadgets that you, your friends, or family have made?
   iv. Do you like to build things with wood, wires, wheels, or motors?
   v. The model must be made by you, using homemade materials
   vi. You will need to explain the parts of the model and show ways that it can be useful

These types of projects are challenging for some students, but here is little room for demonstration of the skills of science. Nevertheless, the student might compensate with the demonstration of other important skills by developing an extensive write up or an elaborate display with this approach. Does the student ask a question that can be answered by using a model or is the answer to the question easily found by looking in a book.

2. The **Investigation** Type is another which uses the scientific method. This method allows students to do what a scientist does. It gives students a more balanced approach to learning science. The procedure for the Scientific Method is as follows:
   a. Find a problem or develop a question
      i. What do you want to find out? What is your topic and question?
      ii. Think of several ways you might answer your question
   b. Gather information about the topic
      i. What do you already know?
      ii. Find more information about your topic.
      iii. Record what you find out and list your sources of information.
   c. Make a hypothesis
      i. A hypothesis is guessing how you think your experiment will turn out
   d. Develop a method or procedure to test your hypothesis
      i. Develop an experiment: a test to see if the answer you picked could be right or wrong
      ii. Write out each step of your experiment. List the materials you’ll need and the measurements you’ll make.
      iii. Repeat exper several times to allow for variations in results.
      iv. Record your results and measurements. Have you answered your original question? Was your hypothesis correct? If not, can you explain what happened?
      v. Make a report of your work and prepare a simple display showing your project.
   e. Tell others what you found out
What new questions do you now have about this topic? What other experiments or observations might add to your knowledge? Make a display, following the accompanying suggestions and rules.

3. A **Research** Project is the last type of project. The purpose of this type of project is for the student to gain, through research, knowledge about the scientist, invention, or theory. The project will be judged on content, method of presentation (creativity, imagination and originality are all important.)

The project should address the following aspects:

1. Describe in detail the person, theory or invention.
2. Describe the impact or contributions this person, invention, or theory have made on our lives.
3. If the project is an invention or theory, describe how it was discovered. What other discoveries led up to its discovery?
4. Describe any important national and international impacts this person, invention or theory have had.
5. If the project is about a person, include birth and death dates, as well as how and where he/she died.
6. What did you learn researching this topic? Was anything surprising?
7. Include a bibliography.

The format of the research project will be a 8-½” X 11” report. Where applicable, try to include pictures of the subject of your report.

**Checklist of things to do**

- Select a Topic/Form a question
- Hypothesis/Prediction of what the results will be
- Title of Project
- Plan of Procedures
- List of materials needed for project
- Results: graphs, tables, pictures
- Conclusions
- Research/Bibliography
- Backboard/Display
Presentation of the Project
Setting Up the Display

The science project is expected to be primarily the work of the student (especially grades 3-6). Some parental help is acceptable and should be proportional to the student’s age. Younger children (K-2) will need lots of help reading and letting the display, etc. Help may include library/research work, proofreading, observing/supervising the experiment and limited assistance with display construction. Remember, it’s the students project!

The presentation of the project must be a visual account of the student’s work. The format should be modeled for the students before they try to do their own displays. Use some of your student’s ideas and work as you go. The following checklist can be used by participants to ensure their displays are appropriate:

- First, I made a sketch of my display
- I made lettering easy to read and spelled correctly
- The project title, my name, grade, teacher’s name, hypothesis, procedure, results, conclusion and records of my experiment are clearly displayed
- Other parts of my display have been included, such as:

<table>
<thead>
<tr>
<th>Graphs</th>
<th>Pictures</th>
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</thead>
<tbody>
<tr>
<td>Models</td>
<td>Samples</td>
</tr>
<tr>
<td>Things I measured with</td>
<td>Research Paper</td>
</tr>
<tr>
<td>Drawings/diagrams</td>
<td>Equipment used</td>
</tr>
</tbody>
</table>

- My display is not too big and I can stand it up by myself.
- I invited my parents the Science Fair Viewing/Award Ceremony
Safety Rules

Proper attention to safety is expected of all science fair participants, including compliance with the following requirements for all operating exhibits:

- Batteries with open top cells are not permitted. Other types of batteries may be used for electrical power. High voltage equipment must be shielded with a grounded metal box or cage to prevent accidental contact.
- Large vacuum tubes or dangerous ray-generating devices must be properly shielded.
- High voltage wiring, switches and metal parts must have an UL rating. Any extension cords used must be properly rated for the capacity, and must be equipped with a standard grounded plug.
- All wiring must be properly insulated. Nails, tacks or uninsulated staples must not be used to fasten wiring.
- Bare wire and exposed knife switches may be used only on circuits of 12 volts or less; otherwise, standard enclosed switches are required.
- Electrical connections in 110-volt circuits must be soldered or fixed under approved connectors and connecting wires must be properly insulated.
- Only one 110 volt, AC connection will be provided per exhibit, if requested.
- Exhibitors must furnish a 20 ft extension cord.
- Maximum amperage=5 amps; maximum wattage=500 watts.
- Anything which could be hazardous to public safety is PROHIBITED.
- This includes, but is not limited to:
  - Live disease causing organisms which are pathogenic to man or other live vertebrates
  - Microbial cultures and fungi, live or dead, including unknown specimens.
  - Any flames open or concealed
  - Highly flammable display materials
  - Dangerous chemicals including caustics and acids
  - Highly combustible solids, fluids, or gases.
  - No inappropriate use of animals in any way.
Display

If you don’t want others touching your display, please let others know by placing a “DO NOT TOUCH” or equivalent sign near your display.

It is a good idea to use a pre-assembled science fair backboard, they may be purchased at local craft and office supply stores.

Below is an example of how your display might look.