Science Fair

We will be holding a science fair focusing on physical science on April 27, 2011. Students will be provided with class time to plan and research their projects. Students will be provided with class time to prepare reports and display boards. The display boards will also be provided to students. Students will need to conduct their investigation and test their hypothesis at home. All investigations must be related to physical or chemical science (matter, energy, chemistry, machines, etc.). Students have until Monday, April 18th, to complete their investigations, so projects must be planned appropriately.

Student steps:

1. **Choose a project idea** – what interests you, in the form of a testable question. The question should not have a yes or no answer and the student should not already know the answer to the question.
2. **Conduct any necessary background research for greater understanding**
3. **Compose a Hypothesis** – A testable statement based on background knowledge, research or scientific reason. A hypothesis states the anticipated cause and effect that may be observed during the investigation.
4. **Design experiment** – procedure to test the hypothesis
    a. What is changed (the variable)?
    b. What stays the same (the constants)?
    c. What is measured?
5. **Validate design** – before getting approval, ask yourself;
    a. Is it safe?
    b. Do I have permission to do it?
    c. What materials do I need and can I get them?
    d. Do I have enough time to build and test my idea and write it up?
6. **Get approval** – do NOT start without approval of your project plan
7. **Collect data** – quantitative and qualitative
8. **Analyze data and draw conclusion** – answer the hypothesis
    a. What was learned?
    b. How does the data relate to the original hypothesis?
    c. Did what you change cause the changes in the results?

Beginning date: March 28, 2011

Project proposal and approval due: April 5, 2011 (proposals may be turned in and approved any time prior to April 5)

Experiments must be completed by April 18, 2011

Project reports and display boards completed by: April 26, 2010

If you have any questions, please contact your teacher.

Science Fair Project ideas - 3rd to 5th grade

- Do cut flowers last longer if you put them in warm water or in cold water? You can test how effectively flowers are drinking water by adding food coloring to it and using white cut flowers, such as carnations. Do flowers drink warm water faster, slower, or at the same rate as cold water?
- Do all students in the class have the same size hands and feet as each other? Trace outlines of hands and feet and compare them. Do taller students have larger hands/feet or does height not seem to matter?
- Are waterproof mascaras really waterproof? Put some mascara on a sheet of paper and rinse it with water. What happens? Do 8-hour lipsticks really keep their color that long?
- Do clothes take the same length of time to dry if you add a dryer sheet or fabric softener to the load?
- Do frozen candles burn at the same rate as candles that were stored at room temperature?
- Do all types of bread grow the same types of mold?
- Do raw eggs and hard-boiled eggs spin the same length of time/number of times?
- What type of liquid will rust a nail the quickest? You could try water, orange juice, milk, vinegar, peroxide, and other common household liquids.
- Does light affect how fast foods spoil?
- Can you tell from today's clouds what tomorrow's weather will be?

- Do cockroaches have a preference for direction? Catch and release cockroaches. Which way do they go? Is there a common trend or not? You can try this project with ants or other crawling insects.
- Does magnetism travel through all materials? Put different materials between a magnet and metal. Do they affect how strongly the magnet is attracted to the metal? If so, do they all affect the magnetic field the same amount?
- Can you taste the difference between foods that contain fat and fat-free versions of the same product?
- Do white candles and colored candles burn at the same rate?

- Do people have the same sensitivity to smell? Place people at one end of a room. Have another person open a scent, such as lemon oil or vinegar. Have your test subjects write down what they smell and what time they smelled it. Is the time the same for different scents? Does it matter whether the test subject was male or female?
- Does storage temperature affect popcorn popping? Store popcorn in the freezer, refrigerator, at room temperature, and in a heated location. Pop the same amount of each 'sample'. Count how many unpopped kernels remain. Can you explain the results?
- Does food cooked in the microwave cool at the same rate as food cooked in the oven or on the stovetop? Heat foods to the same temperature. Use a thermometer to measure the temperature at set times. Explain your results.
- Can you sip the same amount of liquid through two straws at once as one straw? What about 3 straws?
- Does the color of a light affect how bright it appears in fog? in water?
- Where is the best place to store apples? Where is the best place to store bananas? Are they the same?
- Does the temperature of a magnet affect its magnetic field lines? You can trace the magnetic field lines of a magnet by putting iron filings on a sheet of paper over the magnet.
- What brand of battery lasts the longest?
- Make ice cubes starting with different temperatures of water. Does the starting temperature of water affect how long it takes to freeze?

- Can you predict what things will glow under a black light?
- Will chilling an onion before cutting it keep you from crying?
- What ratio of vinegar to baking soda produces the best chemical volcano eruption?
- What type of plastic wrap best prevents evaporation?
- What plastic wrap best prevents oxidation?

- Are night insects attracted to lamps because of heat or light?
- Can you make Jell-o using fresh pineapples instead of canned pineapples?
- Do white candles burn at a different rate than colored candles?
- Can a saturated solution of sodium chloride still dissolve Epsom salts?
- Does the shape of an ice cube affect how quickly it melts?
- Do different brands of popcorn leave different amounts of unpopped kernels?
- How accurately do egg producers measure eggs?
- How do differences in surfaces affect the adhesion of tape?
- If you shake up different kinds or brands of soft drinks (e.g., carbonated), will they all spew the same amount?
- Are all potato chips equally greasy (you can crush them to get uniform samples and look at the diameter of a grease spot on brown paper)? Is greasiness different if different oils are used (e.g., peanut versus soybean)?
- Do the same types of mold grow on all types of bread?
- Does light effect the rate at which foods spoil?
- Can you use a household water filter to remove flavor or color from other liquids?
- Does the power of a microwave affect how well it makes popcorn?
- If you use invisible ink, does a message appear equally well on all types of paper? Does it matter what type of invisible ink you use?
- Do all brands of diapers absorb the same amount of liquid? Does it matter what the liquid is (water as opposed to juice or... um.. urine)?
- Do different brands of batteries (same size, new) last equally long? If a brand lasts longer than others, does this change if you change the product (e.g., running a light as opposed to running a digital camera)?
- Do all brands of bubble gum make the same size bubble?
- Do all dishwashing detergents produce the same amount of bubbles? Clean the same number of dishes?
- Is the nutritional content of different brands of a vegetable (e.g., canned peas) the same?
- How permanent are permanent markers? What solvents (e.g., water, alcohol, vinegar, detergent solution) will remove the ink? Do different brands/types of markers produce the same results?
- Do consumers prefer bleached paper products or natural-color paper products? Why?
- Is laundry detergent as effective if you use less than the recommended amount? More?
- Do all hairsprays hold equally well? Equally long? Does type of hair affect the results?
- How does the rate of evaporation of the crystal-growing medium affect the final size of the crystals? You can change the rate of evaporation by sealing the container (no evaporation at all if there is no air space) or by blowing a fan over the liquid or enclosing the jar of medium with a dessicant. Different places and seasons will have different humidities. The crystals grown in a desert may be different from those grown in a rain forest.
- How do crystals grown from uniodized salt compare with those grown from iodized salt?
- What conditions affect the ripening of fruit? Look at ethylene and enclosing a fruit in a sealed bag, temperature, light, or nearness to other pieces or fruit.
- How are different soils affected by erosion? You can make your own wind or water and evaluate the effects on soil. If you have access to a very cold freezer, you can look at the effects of freeze and thaw cycles.
- How does the pH of soil relate to the pH of the water around the soil? You can make your own pH paper, test the pH of the soil, add water, then test the pH of the water. Are the two values the same? If not, is there a relationship between them?

Proposed Science Fair Project

Student name: **Date:**

Proposed project title:

What is the problem? What do you want to find out (your purpose)?

What is your hypothesis? What do you think will happen?

I think that when _____

_____

then _____

_____.

What will you do to find out?

My variable is

My constants are

I will measure

The steps in my procedure are:

What materials will I need?

How will you know if the change you made (the variable) had an effect?

Teacher's notes, suggestions and questions:

Date approved:

What happened (your observations and data)?

What did you learn from your experiment (explain your data)?

What did you learn (your conclusion)?

Was your hypothesis right or wrong?

Can you make a new hypothesis?

From what you learned, would you try anything new (recommendations)?

Science Fair Display Board

PLAN YOUR BOARD:

Make a small sketch of where everything will go. Lay it out before you glue anything down to make sure it looks good.

Design what the "center" of your board will be. This is where everyone will look first. Will it be the title or pictures? Everything else should be place around this.

When you set up your board, put things together in an order that makes sense. Remember, we read from left to right so don't put stuff you did near the end (like the conclusion) on the right side of the board.

COMPONENTS OF YOUR BOARD: .

You should have the following components on your board: (Click on the underlined words below to get an idea of how to word each part of your board. Feel free to use your creativity in expressing yours.)

Figure 7.1 Example of a Good Display

TITLE and QUESTION - The title can be the question in a "catchy" form. If your title is different than your question, then make sure you also include your question.
Ex. Your question might be, "Which bath soap cleans the best?" but your title might be "Splish Splash I Was Taking A Bath."

HYPOTHESIS - This is your educated guess.

EXPERIMENT - This is the procedure you followed to do your experiment. It should follow the scientific method and include:

- Materials
- Procedure
- Constants and variables

DATA - These are your results displayed in a way that your audience can understand. It is usually displayed in a table, graph, or photographs. It is an "analysis" of what you have done.
CONCLUSION - This is a statement of whether your hypothesis was right or not; if it wasn't right, why you think it turned out the way it did, and what you do differently next time.
RECOMMENDATIONS - This is a statement of what you would try new, what you would do differently, or what you will do based on your experiment and the results.

EXTRAS: You should have at least one of the following:
ILLUSTRATIONS - These can be photographs that you took that enhance your project. They can also be containers or labels of products you used in your project.
ACTUAL MODEL OR EXPERIMENT - This is the actual equipment you did at home or a model of your topic.
Ex. If your question was "Does age affect lung capacity?", you might make a model of the human lung or have the actual equipment you used to test this experiment.

COLORS AND TEXT:

1. Labels created on the computer can be very effective. Try using a different font or color for each of the labels.
2. Use colors that are appealing. They should contrast with your board color. If you have a white board, make your text a bright color(s). Try backing your text with colored paper to make your words alive.
3. Type your text. Use stencils or premade letters if you prefer. Make your lettering large enough for everyone to see.

DISPLAY YOUR DATA

ILLUSTRATIONS:

Sometimes your results can be shown by photographs or pictures. Photographs and pictures also enhance a display, especially if you don't have the actual experiment because you used something that can't be

displayed (i.e. pets, family members). You may also use computer generated graphics or photographs off the internet.

FINISHING TOUCHES:

- Make sure you proofread all your written work.
- Use rulers.
- Don't use pencils. It looks unfinished.
- Erase all pencil guidelines.