Level Creek Elementary

Science Fair

Planning Guide

Name _____

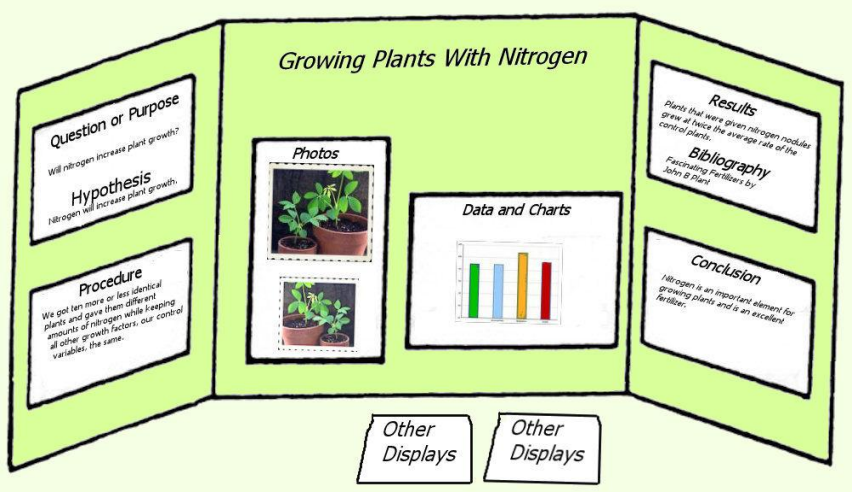
Follow these steps to Science Fair Success

What Kind of Project Should I Do?

There are two types of Projects: Models and Experiments.

Model or Display—Don't do This!

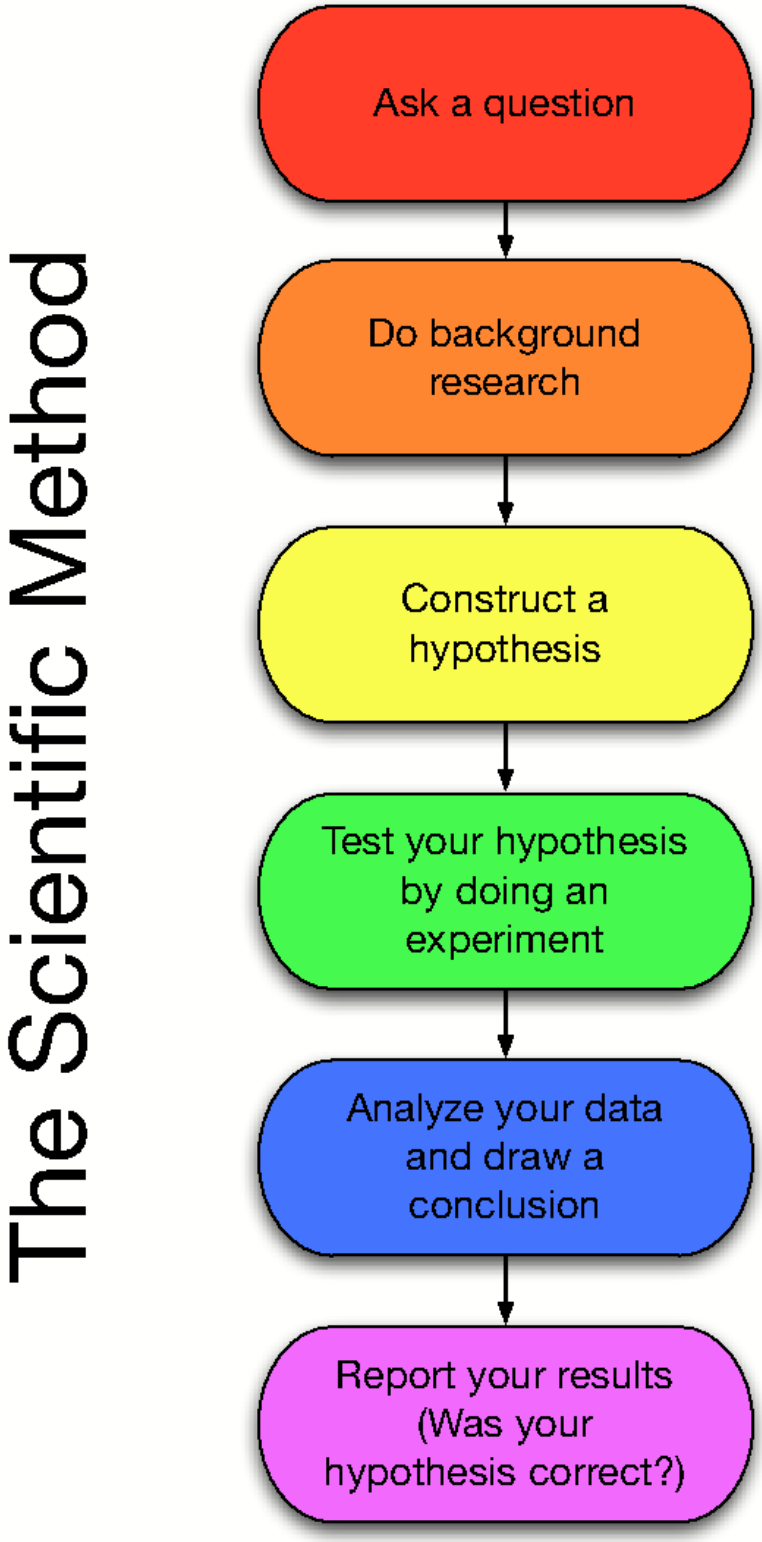
Do an Experiment Like This . . .



Follow the Steps of the Scientific Method that tests something and keeps data, gives information, and makes a conclusion.

Read on to find out how to complete the project step by step.

Here are the Steps for the Scientific Method



Choosing a Topic

Begin by choosing a great question that interests you. Your question will be in one of three major categories. Each category will have a subcategory.

These are the categories:

Life Science

This category deals with plants and the environment. (Remember that you **may not** use humans or animals in your project.) Subcategories include: Consumer Science, Plant Activities, Ecology. Example projects: How Does an Antacid Change the PH level in Juice? Will Dish Detergent Affect Plant Growth? At Which Temperature does Popcorn Pop Best?

Physical Science

If you like trying to figure out how things work, or are interested in the composition of matter this category is for you. Subcategories include: Electricity and Magnetism, Chemistry, Physics, Engineering and Mathematics, Sound and Light, Aerodynamics. Example projects could be: Which Battery Lasts the Longest? How Can You Increase the Strength of an Electromagnet? Which Lasts longer and Incandescent Bulb or a Fluorescent Bulb? Which Airplane Design is Best? What Tower Design is the Strongest? How can I Amplify Sound? How Does the Angle of an Object Change the Reflection?

Earth and Space Science

This category can be tricky. Make sure you are doing an experiment, not making a model. Subcategories include Weather, Geology, and Astronomy. Sample projects could include: How does Weathering affect our Landscape? Does Road Construction Create Problems With the Habitat in an Area? What Effect Has a Period of Drought had on Lake Lanier? How has the Temperature Affected Our Water Supply? What are the Chances that Georgia Will have a Major Earthquake? How does the Weather Impact Travel?

Step One: Come Up with a Good Question

The "Effect" Question: **What is the effect of _____on _____?**

Sunlight	the growth of plants
Types of detergent	grease
Temperature	a balloon's size
Wax	skateboard ramp

The "How Does" Question: **How does the _____affect _____?**

Color of fabric	heat absorption
Humidity	growth of moss
Temperature	dissolving rate of a solute

"Which or What" Questions: **Which/What_____ (verb) _____?**

Paper towel	is	most absorbent
Bubble bath	makes	the most bubbles
Potato chips	has	the least grease
Kind of apple	has	the most seeds

Step Two: Do Research

Read at least three different sources for information. Use the school media center to find encyclopedias, books, or articles about your topic. Identify at least five science vocabulary words, and write the definition of the words to use in your research paper.

The research paper should be at least 2-3 paragraphs about your topic. Do not copy and paste information. You need to write notes in your lab book, and then create your research paper.

Make sure to keep a bibliography, which is a list of your sources of information.

Step Three: Make a Hypothesis

This is a prediction about your experiment. Include your question and research as part of your hypothesis. Make this before you start your experiment.

Example Question: Which paper towel is strongest?

Example Hypothesis: The scientist predicts that **Paper Towel A will be the strongest because it is the thickest, and costs more than Towels B and C.**

Do not use Brand Names. Label them with a Letter. In the conclusion you can reveal the Brand.

Step Four: Create Your Experiment

Design an experiment to test your hypothesis. You need to determine your variables, controls, equipment and materials. Remember you need to measure something and use numbers to record data. You will also need to make observations. Keep the directions clear, but simple, and NUMBER YOUR STEPS.

Sample Project: Strength of Paper Towels

First: List your Materials—Three Brands of Towels, Graduated Cylinder, 500 pennies, testing frame, water, masking tape, empty picture frame, blocks of wood or books, stop watch

Second: Write your procedure in numbered steps.

1. Prepare a Data Chart.
2. Cut three pieces of each kind of paper towel.
3. Place one piece of Brand A in a testing frame such as an empty picture frame.
4. Tape the towel securely around all edges with masking tape.
5. Place frame off the table on blocks which are 3 inches thick or use books to get this off the table.
6. Pour 10 mL of water near the center of the towel.
7. Wait one minute until water absorbs.
8. Place pennies one at a time near the middle until a tear occurs or the pennies fall through.
9. Record data and make observations in your log book.
10. Repeat with all of the nine samples.

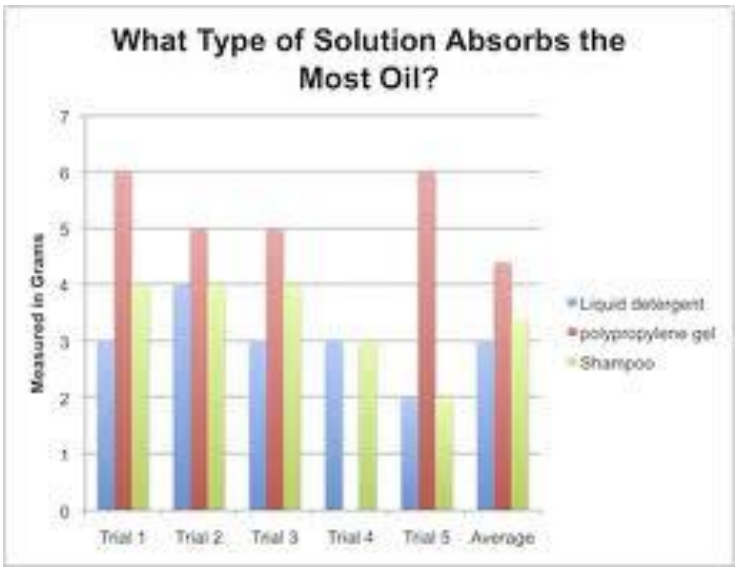
Third: Identify your Variables

Manipulated variable: What you Test—such as kind of paper towel

Dependent variable: What you count – such as number of pennies

Controls: What you keep the same—such as amount of water, and the temperature of the water, size of the towel, distance frame is from table top.

Step Five: Design a Graph from your data.



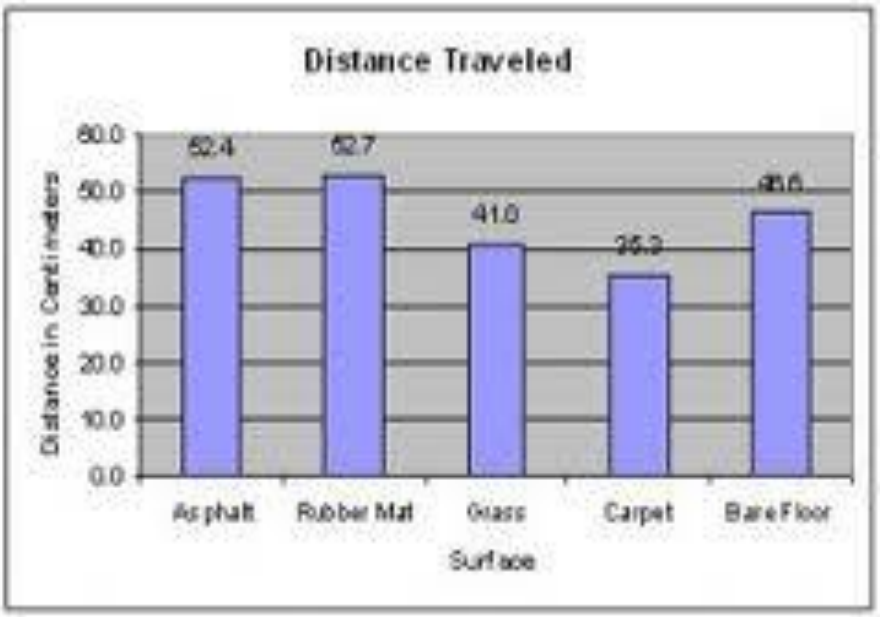
Use your data table and graph the results. Bar Graphs usually work best.

Place your Manipulated Variable on the Horizontal axis (X axis).

Place your Dependent Variable on the Vertical Axis (Y axis).

Be sure to title your graph, and use a key if there is more than one color.

You may make your graph by hand with graph paper, or use the computer to make your graph.



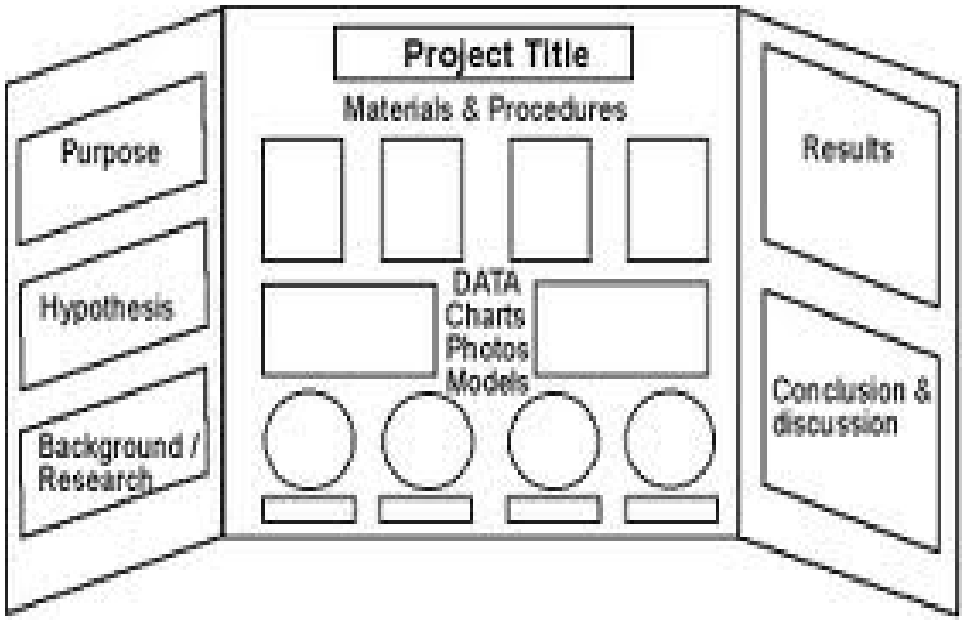
Step Six: Write a Conclusion

This is a summary of what you have learned. It needs to be written in paragraph form.

Include answers to the following:

1. Was the hypothesis correct, incorrect, or partially correct?
2. How does your data prove or disprove your hypothesis? Remember scientists are wrong more than they are right.
3. What did the data say? What were the average and the range?
4. What observations did you make during the experiment?
5. What did you learn from this?
6. How would you change this if you did this again?
7. Who might use the information that you have found?
8. Why is this an important experiment?

Step Seven: Prepare Your Display



1. Title of Project
2. Materials, Procedure, Variables
3. Data Charts and Graphs
4. Photos with Captions (but no faces shown)
5. Purpose- why you did the project
6. Hypothesis
7. Research Paper
8. Results summary
9. Conclusion
10. No liquids or breakable materials.
11. Use photos with no faces visible.

Hints for Your Board

- Keep lettering neat and a dark color like black or blue.
- Frame your work with a complimentary color. See your teacher for some paper if needed.
- Lay out your papers before you glue.
- Use a ruler to keep it straight.
- Type or print very neatly.
- No Cross Outs. Erase Neatly.
- No tape should be showing!
- Space your items.
- Fill empty space with drawings or clip art, but do not clutter.
- Use a larger font for titles.
- Each section should be titled.
- Follow the sample display format as closely as possible. It makes it easier to read for the judges.
- Yellow is a hard color to read for lettering. Only use to frame a picture.
- Do not use too much color.
- Keep simple and attractive.
- Be creative with your title to invite the judge to read it.
- Place your log book in front of your board.
- Use photos (with no faces visible) to document your experiment. Ask your parent to be your photographer.

Science Fair Rules

1. **You may have up to one student per project.**
2. **Adults can help gather materials, supervise the experiment, and help to build the display.**
3. **This must be an experiment, not a model.**
4. **You cannot perform the experiment during judging.**
5. **<u>No food of any kind or plants (alive, dead, or fake)</u> can be displayed.**
6. **No electrical devices may be used because plugs will not be available.**
7. **No glass or animals are permitted.**
8. **All Science Fair projects are due on Wednesday, December 3, 2014.**
9. **Projects will be on display Wednesday, December 10, 2014 during Science Fair night.**
10. **Judges will judge your project by the information that is shown on your project board. Remember this is your project, not your parents. You may ask for help in getting materials and in taking photos.**
11. **The decision of the judges is final.**

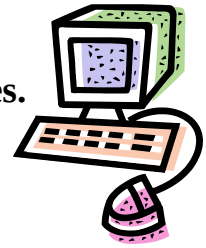
Safety Rules

1. **Do not eat or drink during the experiment.** 

2. **Wear safety goggles when the activity could lead to eye injury. You may ask the science teacher to check out a pair of goggles to you if you need them. Please remember to return them when you are finished.** 

3. **Do not use humans or animals**  **or bacteria or mold.** 

4. **Any project involving drugs, firearms, or explosives is <u>not permitted</u>.** 

5. **Use the internet safely with parent permission and approved sites.** 

6. **Sharp tools like knives and electric tools, or chemicals must be supervised and used with adult help.**  

Helpful Websites*

*Please be aware that some of these sites may suggest projects involving humans, animals, bacteria or mold. <u>These are not permitted</u>.

Science Fair Central at **Discovery.com**
http://school.discoveryeducation.com/sciencefaircentral

"Creative investigations into the real world." This site provides a complete guide to science fair projects. Check out the 'Handbook' which features information from Janice VanCleave, a popular author who provides everything you need to know for success. You can even send her a question about your project.

Internet Public Library
http://www.ipl.org/div/projectguide/

Are you looking for some help with a science fair project? If so, then you have come to the right place. The IPL will guide you to a variety of web site resources, leading you through the necessary steps to successfully complete a science experiment.

Science Fair Idea Exchange
http://scienceclub.org/scifair.html

This site has lists of science fair project ideas and a chance to share your ideas with others on the web.

Try Science
http://tryscience.com

Science resource for home that gives you labs to try and 400 helpful links all related to science.

The Yuckiest Site in the Internet
http://yucky.kids.discovery.com/

Brought to you by Discovery Kids, this site gives you lots of ideas on how to do the messiest yuckiest experiments.

Gateway to Educational Materials: Science Fair Projects
http://members.ozemail.com.au/~macinnis/scifun/projects.htm

The Gateway to Educational Materials extensive and detailed step-by-step guide to doing a science fair project.

Science Fair Primer
http://users.rcn.com/tedrowan/primer.html

A site to help students get started and run a science fair project.

What Makes A Good Science Fair Project
http://www.usc.edu/CSSF/Resources/Good_Project.html

A website from USC that gives a lot of good tips and ideas to think about regarding what makes a good science fair project. Advice for students as well as teachers and parents is included.

Neuroscience for Kids: Successful Science Fair Projects
http://faculty.washington.edu/chudler/fair.html

Site made by Lynne Bleeker a former science teacher, science fair organizer, and judge. Gives a thorough and detailed description of the steps to a successful science fair project.

Please note: This list is just a sample of currently active websites. There are hundreds of websites that you and your parents can preview.