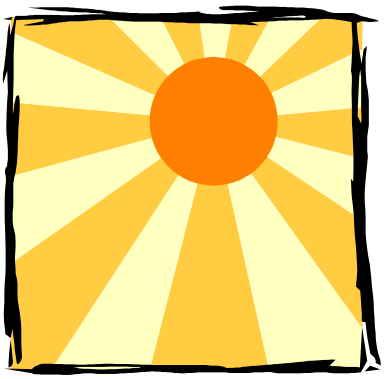
Pinchbeck PTA

Science Fair Information Packet



April 15, 2010

Exhibit Information

- All entries must be taken to the gymnasium on Thursday, April 15 by 8:15 a.m.
- Classes will have the opportunity to view the displays, and your child will share his/her project with classmates throughout the day.
- That afternoon from 2:00-3:00pm and from 5:00-7:00pm the PTA will host a **Science Fair Open House** for parents, family members & friends.
- All entries must be taken home by the end of the PTA meeting that evening.
- Exhibits are not judged. All participants will be recognized by the PTA.

Science Fair Rules

1. A student may only enter one individual project. A student may also enter as part of a classroom or small group project.

2. Teachers or parents may advise or act as consultants. They must not conduct any part of the experiment or write the report. Students in grade K and 1 may dictate the report to an adult. The report must be the student's own words and work.

3. Reports may be hand written or typed and may include graphs, photographs, and drawings.

4. Projects must be free-standing and not more than 38 inches deep, 48 inches wide and 36 inches high (from the table top). The equipment that was used in the experiment may be part of the display.

5. The following are all PROHIBITED: dangerous chemicals, open flames, explosives, or animal experiments.

6. The school, faculty and PTA assume no responsibility for loss or damage to any exhibit.

The Scientific Method for Experiments

You will use the scientific method for your science experiments. Just follow the steps below and you won't have any problems.

1. CHOOSE A TOPIC (INITIAL OBSERVATION)

You notice something, and wonder why it happens. You see something and wonder what causes it. You want to know how or why something works. You ask questions about what you have observed. The first step is to write down what you have noticed. A good topic has a problem that can be answered only by experimenting.

2. COLLECT INFORMATION

Find out about what you want to investigate. Read books, magazines or ask professionals who might know in order to learn about the effect or area of study. Keep track of where you got your information.

3. TITLE YOUR PROJECT

Choose a title that describes the effect or thing you are investigating. The title should summarize what the investigation will deal with.

4. STATE THE PURPOSE OF YOUR PROJECT

What do you want to find out? Write a statement that describes what you want to do. Use your observations and questions to write the statement.

5. MAKE A HYPOTHESIS

A hypothesis is a prediction of what you think the answer to your question or the solution to your problem might be. Make a list of answers to the questions you have. This can be a list of statements describing how or why you think the observed things work. *Hypothesis must be stated in a way that can be tested by an experiment*.

6. DESIGN AN EXPERIMENTAL PROCEDURE TO TEST YOUR HYPOTHESIS

Design an experiment to test your hypothesis. Make a step-by-step list of what you will do to answer your question. This list is called an experimental procedure.

Guidelines for Experimental Procedures

- Select only one thing to change in each experiment. Things that can be changed are called variables.
- Change something that will help you test your hypothesis.
- The procedure must tell how you will change this one thing.
- The procedure must explain how you will measure the amount of change.
- Each type of experiment needs a "control" for comparison so that you can see what the change actually did.

7. GATHER MATERIALS AND EQUIPMENT

Make a list of the things you need to do the experiments, and prepare them.

8. DO THE EXPERIMENT AND RECORD DATA

Do the experiment and record all numerical measurements made. Data can be amounts of chemicals used, how long something is, the time something took, etc. If you are not making any measurements, you probably are not doing an experimental science project.

9. RECORD YOUR OBSERVATIONS

Observations can be written descriptions of what you noticed during an experiment, or problems encountered. Keep careful notes of everything you do, and everything that happens. Observations are valuable when drawing conclusions, and useful for locating experimental errors.

10. CALCULATIONS

Perform any math needed to turn raw data recorded during experiments into numbers you will need to make tables, graphs or draw conclusions.

11. SUMMARIZE RESULTS

Summarize what happened. This could be in the form of a table of numerical data or graphs. It could also be a written statement of what occurred during the experiments.

12. DRAW CONCLUSIONS

Using the trends in your experimental data and your experimental observations, try to answer your original questions. Is your hypothesis correct? Now is the time to pull together what happened, and assess the experiments you did.

Other Things You Can Mention in the Conclusion

- If your hypothesis is not correct, what could be the answer to your question?
- Summarize any difficulties or problems you had doing the experiment.
- Do you need to change the procedure and repeat your experiment?
- What would you do different next time?
- List other things you learned.

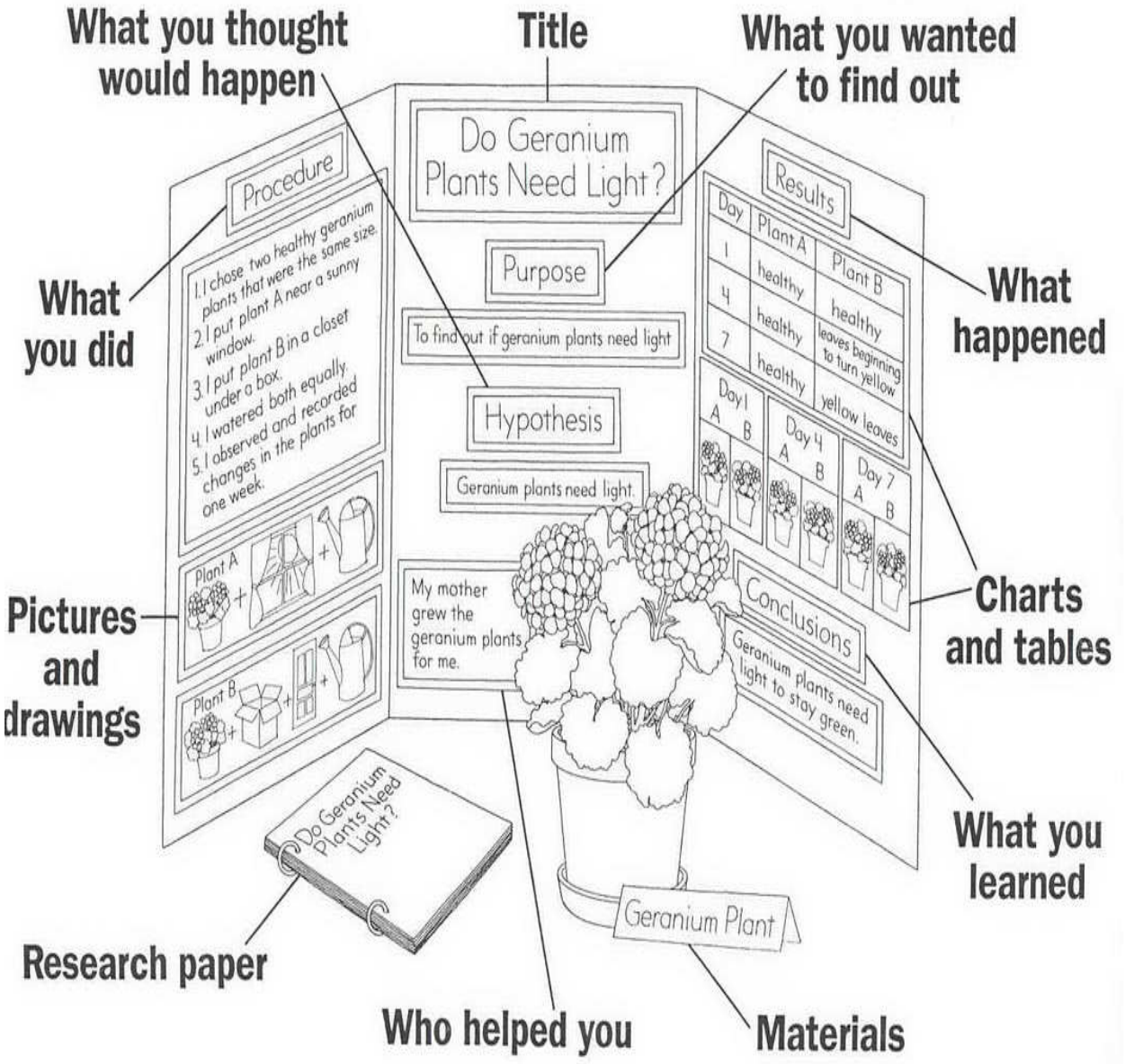
13. TRY TO ANSWER RELATED QUESTIONS

What you have learned may allow you to answer other questions. Many questions are related. Several new questions may have occurred to you while doing experiments. You may now be able to understand or verify things that you discovered when gathering information for the project. Questions lead to more questions, which lead to additional hypothesis that can be tested.

WHAT IF MY SCIENCE PROJECT DOESN'T WORK?

No matter what happens, you will learn something. Science is not only about getting "the answer". Knowing that something didn't work, is actually knowing quite a lot. **Experiments that don't turn out as planned are an important step in finding an answer.**

Displaying a Science Fair Project



The Scientific Method for Experiments Worksheet

1. CHOOSE A TOPIC (INITIAL OBSERVATION)

2. COLLECT INFORMATION

3. TITLE YOUR PROJECT

4. STATE THE PURPOSE OF YOUR PROJECT

5. MAKE A HYPOTHESIS

6. DESIGN AN EXPERIMENTAL PROCEDURE TO TEST YOUR HYPOTHESIS

7. GATHER MATERIALS AND EQUIPMENT

8. DO THE EXPERIMENT AND RECORD DATA

9. RECORD YOUR OBSERVATIONS

10. CALCULATIONS

11. SUMMARIZE YOUR RESULTS

12. DRAW CONCLUSIONS

13. TRY TO ANSWER RELATED QUESTIONS

The Scientific Method for Experiments Worksheet - *EXAMPLE*

1. **CHOOSE A TOPIC (INITIAL OBSERVATION):** *Cooking instructions tell you to add salt to water before boiling it*.

2. **COLLECT INFORMATION**

3. **TITLE YOUR PROJECT:** *The Effect of Salt on the Boiling Temperature of Water*

4. **STATE THE PURPOSE OF YOUR PROJECT:** *To find out how table salt affects the boiling temperature of water.*

5. **MAKE A HYPOTHESIS:** *Adding table salt to boiling water will cause the water to boil at a higher temp.*

6. **DESIGN AN EXPERIMENTAL PROCEDURE TO TEST YOUR HYPOTHESIS**

    1. *Boil one quart of distilled water on a stove.*

    2. *Measure the temperature of the boiling water. Record the highest temperature reading. This is the **CONTROL** to compare with.*

    3. *Measure out table salt using a kitchen measuring spoon. Level the spoonful.*

    4. *Add the measured salt to the boiling water and stir.*

    5. *Measure the temperature of the boiling water with the salt in it. Record the highest temperature reading.*

    6. *Repeat for other amounts of salt.*

7. **GATHER MATERIALS AND EQUIPMENT:** *Table salt, distilled water, 2 quart cooking pot, pint measuring cup, teaspoon and tablespoon measuring spoons, thermometer, stirring spoon*

8. **DO THE EXPERIMENT AND RECORD DATA**

Amount of boiling water	*2 cups*
*Temperature of boiling water **(CONTROL)***	*212.9 degrees F*
Amount of table salt added to boiling water: Run #1	*1 Tablespoon*
Temperature of boiling water after adding salt: Run #1	*215.6 degrees F*
Additional amount of table salt added to boiling water: Run #2	*1 Tablespoon*
Temperature of boiling water after adding salt: Run #2	*218.3 degrees f*

9. RECORD YOUR OBSERVATIONS: *When the salt was added to boiling water it bubbled up more, and then stopped boiling. Shortly afterwards, it boiled again.*

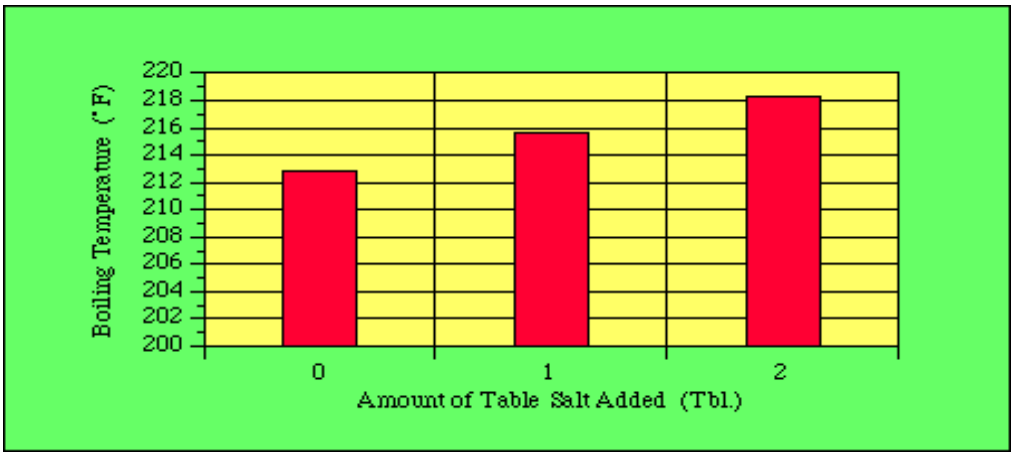
If the thermometer extends beyond the outside of the pot it reads a higher temperature. Heat from the stove burner makes the thermometer read higher. Keep the thermometer over the pot when making temperature measurements.

10. CALCULATIONS

- *Total amount of table salt added for Run #1: 0 + 1 = 1 Tablespoon*
- *Total amount of table salt added for Run #2: 1 + 1 = 2 Tablespoons*

11. SUMMARIZE YOUR RESULTS

*Temperature of boiling water **(CONTROL)***	*212.9 degrees F*
Amount of table salt added to boiling water: Run #1	*1 Tablespoon*
Temperature of boiling water after adding salt: Run #1	*215.6 degrees F*
Total amount of table salt added to boiling water: Run #2	*2 Tablespoons*
Temperature of boiling water after adding salt: Run #2	*218.3 degrees f*



12. DRAW CONCLUSIONS

- *Is the hypothesis correct? Yes. Adding table salt to water causes the water to boil at a higher temperature.*
- *Problems with doing the experiment: The temperature readings were hard to make. Gloves had to be worn to keep my hands from getting too hot. Had to be careful that the stove heat was not hitting the thermometer.*
- *Other things learned: Be careful when adding salt to boiling water. It makes the water boil vigorously for a second or two.*

13. TRY TO ANSWER RELATED QUESTIONS

- *Why do you think cooking instructions tell you to add salt when boiling water? When the water is hotter, you can cook food faster.*

Displaying Your Science Fair Project

You will need a large poster board that will be folded so that it can stand on its own on the display table. (Fold it into 3 sections.)

The following components should be labeled and described in detail (complete sentences):

- **Title**
- **Purpose:** what you wanted to find out
- **Hypothesis:** what you thought would happen
- **Who helped you**
- **Materials**
- **Procedure:** the steps you went through in your project
  This section will include the steps of your process (in order) and any pictures & drawings of your process.
- **Results:** what happened
  This section will include charts & tables.
- **Conclusion:** a statement explaining the result of your research
  This should answer the question or be the solution to your problem

When the display board is set up, materials that were used, "before and after" observations or data, and your research paper can be placed on the table in front of the board.

Science Fair Resources

BOOKS: These books are available in the Pinchbeck Library for students and parents to use in planning a project for the Science Fair. The books are on Reserve in order for everyone to have equal access. The Library hours are 7:30am-4:00pm daily. Please come in!

- 101 Great Science Experiments: A Step-By-Step Guide
- How Science Works: 100 Ways Parents and Kids Can Share the Secrets of Science
- How the Weather Works: 100 Ways parents and Kids can Share the Secrets of the Atmosphere
- Encyclopedia of Science Projects
- So you Have to Do A Science Fair Project
- 101 Science Experiments
- Bill Nye The Science Guy Considers the Following: A Way Cool Set of Science Questions, Answers and Ideas to Ponder
- Experiments with Water
- Experiments with Electricity
- Experiments with Chemistry

WEB SITES FOR SCIENCE FAIR PROJECTS

- www.ipl.org/div/kidspace/projectguide/
- www.sciencebob.com
- www.nyelabs.com
- www.,halcyon.com/sciclub/kidproj1.html
- http://www.isd77.k112.mn.us/resources/cf/SciProjIntro.html

Science Fair Project Ideas for Grades K-1

- How much salt does it take to float an egg?
- What kind of juice cleans pennies best?
- Which dish soap makes the most bubbles?
- Do watches keep time the same?
- On which surface can a snail move faster – dirt or cement?
- What brand of raisin cereal has the most raisins?
- How can you measure the strength of a magnet?
- Can the design of a paper airplane make it fly farther?
- Do roots of a plant always grow downward?
- Can you tell what something is just by touching it?
- What kind of things do magnets attract?
- How long will it take a drop of food dye to color a glass of still water?
- Does a bath take less water than a shower?
- Can you tell where sound comes from when you are blindfolded?
- Can plants grow without soil?
- Does warm water freeze faster than cool water?
- In my class who is taller – boys or girls?
- Do different types of apples have the same number of seeds?
- Which materials absorb the most water?
- What materials dissolve in water?
- What is the soil in my schoolyard made of?
- Does holding a mirror in front of a fish change what a fish does?
- What color of birdseed do birds like best?
- What holds two boards together better – a nail or a screw?
- Will bananas brown faster on the counter or in the refrigerator?
- Does temperature affect the growth of plants?
- Does a ball roll farther on grass or dirt:
- Do all objects fall to the ground at the same speed?
- Does anyone in my class have the same fingerprints?
- Which paper towel is the strongest?
- Can plants grow from leaves?
- Which dissolves better in water –salt or baking soda?
- Can things be identified by just their smell?
- With which type of battery do toys run longest?

Science Fair Project Ideas for Grade 2

- How far does a snail travel in one minute?
- Do different types of soil hold different amounts of water?
- Will adding bleach to the water of a plant reduce fungus growth?
- Does water with salt boil faster than plain water?
- How far can a person lean without falling?
- Can you tell time without a watch or clock?
- How far can a water balloon be tossed to someone before it breaks?
- Does the shape of a kite affect its flight?
- Does an ice cube melt faster in air or water?
- Does sugar prolong the life of cut flowers?
- Will more air inside a basketball make it bounce higher?
- Does the color of light affect plant growth?
- Does baking soda lower the temperature of water?
- Which brand of popcorn pops the most kernels?
- How much can a caterpillar eat in one day?
- In my class, who has the biggest feet – boys or girls?
- Do plants grow bigger in soil or water?
- Does the color of water affect evaporation?
- Can you separate salt from water by freezing?
- How does omitting an ingredient affect the taste of a cookie?
- Do suction cups stick equally well to different surfaces?
- How much weight can a growing plant lift?
- Will water with salt evaporate faster than water without salt?
- Does it matter in which direction seeds are planted?
- Which cheese grows mold the faster?
- Do all colors fade at the same rate?
- Which brand of diaper holds the most water?
- In my class, who has the smallest hands – boys or girls?
- Which kind of cleaner removes ink stains best?
- Does a plant grow bigger if watered by milk or water?
- Which brand of soap makes the most suds?
- Does a baseball go farther when hit by a wood or metal bat?
- Do living plants give off moisture?
- Using a lever, can one student lift another student who is bigger?
- What gets warmer – sand or dirt?
- Which kind of glue holds two boards together better?

Science Fair Project Ideas for Grade 3

- What type of line carries sound waves best?
- Can the sun's energy be used to clean water?
- Does a green plant add oxygen to its environment?
- Which metal conducts heat best?
- What percentage of corn seeds in a package will germinate?
- Does an earthworm react to light and darkness?
- Does the human tongue have definite areas for certain tastes?
- Can the same-type balloons withstand the same amount of pressure?
- Does the viscosity of a liquid affect its boiling point?
- Does surrounding color affect an insect's eating habits?
- Do children's heart rates increase as they get older?
- Can you use a strand of human hair to measure air moisture?
- What materials provide the best insulation?
- Is using two eyes to judge distance more accurate than using one eye?
- Do different kinds of caterpillars eat different amounts of food?
- What plant foods contain starch?
- What keeps things colder – plastic wrap or aluminum foil?
- Does heart rate increase with increasing sound volume?
- Do boys or girls have a higher resting heart rate?
- Do liquids cool as they evaporate?
- Which way does the wind blow most frequently?
- Does the size of a light bulb affect its energy use?
- For how long a distance can speech be transmitted through a tube?
- Which grows mold faster – moist bread or dry bread?
- What type of soil filters water best?
- Does the color of a material affect its absorption of heat?
- Does sound travel best through solids, liquids, or gases?
- Do sugar crystals grow faster in tap water or distilled water?
- Can you see better if you limit the light that gets to your eye?
- How much of an apple is water?
- What common liquids are acid, base, or neutral?
- Do taller people run faster than shorter people?
- Does the length of a vibrating object affect sound?
- Does a plant need some darkness to grow?
- Who can balance better on the balls of their feet – boys or girls?
- Does exercise affect heart rate?
- Which dish soap makes the longest lasting suds?
- What are the effects of chlorine on plant growth?
- Which type of oil has the greatest density?
- How accurately do people judge temperatures?

Science Fair Project Ideas for Grades 4 & 5

- Which liquid cleans a penny best?
- Which liquid dissolves aspirin the fastest?
- Do liquids weigh the same?
- Which type of cup keeps water coldest longest?
- Which shoes attract the most dirt?
- Which material will store the heat longest?
- Do all pencil leads erase the same?
- Does the type of liquid affect whether cotton balls sink or float?
- Is the strength of a paper towel related to its cost?
- In which liquid will ice melt the fastest?
- Do girls see an optical illusion differently than boys?
- Are your dishes really clean?
- Does mold appear first on moist or dry bread?
- Which types of music affect plant growth the most?
- Do garden beans grow best in lime, peat, or common soil?
- Do different kinds of water affect plant growth?
- Does playing video games increase the heart rate?
- Do all people have the same taste?
- Does a saline solution affect the time it takes for water to boil?
- What do acids do to calcium – the outside surface of your teeth?
- Which water evaporates the fastest?
- Do different liquids weigh the same?
- Does the color of a paper towel affect the way it absorbs water?
- Will the size of the battery affect the power of an electromagnet?
- Does the color of a birthday candle affect how fast it burns?
- Which color roof top will help your air conditioner work more efficiently?
- Trash bags – do you get what you pay for?
- Does fat content affect melting time of dairy products?
- How does heating water affect the rate at which materials dissolve?
- Does the amount of salt in water affect the flotation of an object?
- Do salt crystals grow better in light or dark?
- Does the weight of a pendulum affect the number of swings a pendulum makes before it comes to rest?

Additional Project Categories

EXPERIMENTS

-Use the Scientific Method to answer a question
-follow the experiments guidelines outlined separately

COLLECTIONS (K-3 Grade levels only)

-of scientific specimens (shells, leaves, rocks etc)
-try to ask a question that can be answered by describing properties, comparing, contrasting, or grouping your specimens (example: How do you label and organize a rock collection?)
-displays should be well organized by classifying and ordering specimens
-describe and compare where your objects were found, characteristics of objects, etc. This information will be important to collect and display with your specimens.

INVENTIONS

-develop something new!
-could be a creative way to solve a common PROBLEM
--state the problem or question that the invention is designed to solve or answer
-if possible, make a model for demonstration
-if not, provide a detailed drawing (a “blueprint”) or photograph with your display

MODELS

-a replica of a scientific theory, process or feature
-can be operational (example: volcano that uses baking soda and vinegar to erupt)
-your display might include:

- materials used
- drawings, photos, and explanations of the parts of the model
- historical perspective (example: what, when, where were the most famous volcano eruptions?)

OBSERVATIONS

-you may answer a question by using your senses and powers of observation to study a particular object or subject (example: what are winter constellations? What are the adaptations of earthworms?)
-a diary or daily log may factor into your plan
-research may be necessary to support your observations or provide backgrounds

DEMONSTRATIONS OF A SCIENTIFIC PRICIPLE

-an explanation of how something works (like an electric motor) or why something happens the way it does (what causes rainbows).
-be sure you understand it thoroughly and can explain it to others
-if possible, put together a working model (ex; a telegraph, a bell, or an electric motor)
Suggestions to include in your display:

- Detail in simple terms the scientific principle being demonstrated
- A clear explanation so that those who read your poster can learn
- Key scientists who might have been involved in exploring this principle
- Bibliography of references used

Countdown to the Science Fair

Use this form to keep your Science Fair project on schedule

Check off when completed

__Choose a topic that you are interested in doing

__Fill out the Participation Form and return to your teacher

__Research your topic. Record your references

__Write out your procedure

__Gather your materials

__Work on your project

__Carefully collect and record your data and observations as you progress

__Take photographs if needed as you work

__Begin work on your display board

__Deliver your project on Thursday, April 15

__Attend PTA Science Fair and proudly discuss your project with other students throughout the day. That afternoon from 2:00-3:00pm and from 5:00-7:00pm PTA will host a Science Fair Open House for parents, family and friends

__**Pick up project by the end of PTA meeting on April 15**