Lead Mine Elementary

SCIENCE GALLERY INSTRUCTION PACKET*

STUDENT NAME:

_____

Safety Rules

1. SAFETY FIRST!!!
2. Never eat or drink during an experiment, and always keep your work area clean.
3. Wear protective goggles when doing any experiment that could lead to eye injury.
4. Do not touch, taste, or inhale chemicals or chemical solutions.
5. Respect all life forms. Do not perform an experiment that will harm an animal.
6. All experiments should be supervised by an adult.
7. Always wash your hands after doing the experiment.
8. Any project that involves drugs, firearms, or explosives is NOT permitted.
9. Any project that breaks district policy, and/or local, state, or federal laws is NOT permitted.
10. Use safety on the Internet! Never write to anyone without an adult knowing about it. Be sure to let an adult know about what websites you will be visiting or have an adult help you search.
11. If there are dangerous aspects of your experiment, like using sharp tools or experimenting with electricity, have an adult help you, or have the adult do the dangerous parts. That is what adults are for, so use them correctly!

Science Gallery Rules

1. **Projects are required to be based on grade level standards. Thus, students need to choose their project topic from a list of science topics related to their grade level's curriculum. The Grade Level Curriculum Topics Lists are in step 1: "Brainstorm".**
2. The Science Gallery projects are individual projects. Team projects are not permitted.
3. Projects must be completed at home, i.e., NOT during school hours.
4. Adults can help! We want them involved and monitoring. However, we do NOT want them to do the project for you.

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Science Gallery Rules Continued…

5. You will be judged on the use of the Scientific Method. Avoid researching a topic. Experiments that investigate and test a concept are recommended over models, displays, and collections.
6. No demonstrations allowed (no volcanoes erupting, etc.).
7. Your project must include a display. Tri-fold display boards have been used in the past.
8. No recording or transmitting devices are permitted.
9. Respect all adults involved in the Science Gallery... especially the judges!
10. Bring your completed display board to the LME cafeteria between 8:00-8:25 a.m. on Science Gallery Day: April 20, 2023.
11. Each student will be responsible for bringing their project home after the evening Science Gallery on April 20, 2023 from 5:30 p.m. – 8:00 p.m. OR your student can pick up projects in their classroom on the following school day, Monday, April 24, 2023.
12. Winners will receive ribbons on the day of the Science Gallery. Winners will also be announced on the morning announcements within a few days after the Science Gallery.

Types of Science Projects

There are two types of science projects: models/displays/collections and experiments.

Models/Displays/Collections:

A model/display/collection does not really test anything. Rather, it shows how something works. Examples of a model, display, or collection project can include a tornado in a bottle, a solar system display, or a rock collection.

Experiments:

An experiment includes **a project that shows testing being done and the gathering of data**. Examples of experiments can include: “What is the effect of sunlight on the growth of plants?”, “How does the color of light affect the growth of plants?”, or “Which foods do meal worms prefer?” You can tell you have an experiment if you are testing something several times and changing a variable to see what will happen.

Which Should I Choose?

Even though you can learn from a model, display, or collection, the Science Gallery judges are looking for an **experiment**. Why? Experiments are more interesting, more fun, and they take you through the scientific method, which is what real scientists use.

What is the Scientific Method?

The **scientific method** is a way of approaching a problem by drawing a hypothesis based on a series of observations, and then testing the hypothesis by means of experiments designed in a way to support (or not support) the hypothesis. The results lead to more reliable knowledge, not to an absolute truth.

What are Variables?

Variables are any parts of an experiment that can change. When you test your experiment, you should only test one variable at a time in order to get accurate results. For example, if you want to test the affect that water has on plant growth, then all the plants you test should be in the same conditions. These are called controlled variables: same type of dirt, same type of plant, same type of location, same amount of sunlight, etc. The only variable you would change from plant to plant would be the amount of water it received. This is called the independent or manipulated variable. The independent variable is what you are testing. Knowing what your variables are is important because if you do not know them, you will not be able to collect your data or read your results.

How do I start?

Follow the below procedures to complete your Science Gallery project. Do not forget to ***HAVE FUN*!!!**

1. BRAINSTORM:

Choose a project topic based upon your grade level, using the **Grade Level Curriculum Topics Lists below**. As you think of possible science gallery project ideas that are grade level curriculum based, write them down.

Grade Level Curriculum Topics Lists

Kindergarten

Investigating Properties	Objects have observable properties such as color, size, shape, and texture, which can be used for describing and sorting.
Weather	Weather changes each day and influences our daily lives. There are four seasons each year.
Animals	Animals have similarities and differences. They also have basic needs such as food, water, and shelter.
Forces and Motion	Understand the positions and motions of objects and organisms observed in the environment.

First Grade

Earth in the Universe	Recognize the features and patterns of the earth/moon/sun system as observed from earth.
Balance and Motion	Understand how forces (pushes or pulls) affect the motion of an object.
Earth Materials	Earth materials (including rocks, minerals, soil, and water) can be described and sorted based on their observable properties. Objects can be compared based on their properties.
Organisms	Plants and animals are living things or organisms. Organisms have needs that must be met for survival.

Second Grade

Solids and Liquids	Solids and liquids have properties that can be observed. Some properties require a test, such as sinking or floating.
Sound	Sound is caused by vibrations. Pitch, volume, and quality (timbre) are characteristics of sounds.
Air and Weather	Air (a mixture of gases) has properties that make it different than solids and liquids. Weather instruments such as wind vanes, rain gauges, and anemometers can be used to collect weather data.
Life Cycles	Animals have a life cycle that includes birth, development into an adult, reproduction, aging, and death.

Third Grade

Human Body	The skeletal and muscular systems work together to provide the body structure, protection, and a wide range of movements. Skin is the largest organ of the human body.
Objects in the Sky	The Earth is part of the solar system. An object's changing shadow indicates apparent movement of the sun across the sky. There are patterns of stars in the sky called constellations. Moon phases follow a predictable pattern.
Changes	Materials can undergo various changes such as freezing or melting. The production of gas indicates a chemical change has occurred.
Plants	Plants have a life cycle. Plant parts have specific functions. Soil has properties such as color, texture, and capacity to hold water, which may promote the growth of some plants and hinder the growth of others.

Fourth Grade

Magnetism and Electricity	Magnets interact with all things made of iron and with other magnets to produce motion without touching (e.g., like poles repel, while opposites attract). Electrically charged objects push and pull on other electrically charged objects to produce motion.
Earth Materials	Minerals can be identified using tests for physical properties of hardness, color, luster, and streak. Rocks are classified as metamorphic, sedimentary, or igneous. Fossils provide evidence of Earth's early environments and the organisms that lived long ago.
Landforms	The surface of the Earth is constantly changing. Some changes are slow such as erosion and weathering. Other changes are rapid such a flooding, landslides, earthquakes, and volcanic eruptions.
Animal Studies	Animals meet their needs by using behaviors in response to information received from the environment.

Fifth Grade

Motion and Design	Factors such as gravity, friction, or a change in mass affect the motion of objects.
Human Body Systems	Some traits are learned while others are inherited. Inherited traits are passed from one generation to the next. The body is comprised of many systems which perform specific functions necessary for life. These systems include the respiratory, digestive, circulatory, skeletal, and muscular systems.
Investigating Weather Systems	Weather data can be collected and used to compare weather patterns and to predict upcoming weather events. Local (NC) weather is influenced by the Jet Stream, global wind patterns, and the Gulf Stream. This unit also includes the water cycle and a study of heat transfer.
Ecosystems	Common ecosystems, including estuaries, oceans, lakes and ponds, forests, and grasslands, have distinct characteristics. Organisms in an ecosystem can be classified as producers, consumers, or decomposers. Humans can adapt their behavior in order to conserve natural resources (e.g., recycling).

2. QUESTION/TITLE/PROBLEM:

What is the experiment about? What problem are you trying to solve? This is the focus of your project and the title that will be displayed on your board. A scientific question is a type of question concerning something that is answerable with a scientific method, explanation, or scientific experiment. (Helpful hint: Any question that can have a “yes” or “no” answer is **not** a scientific question.) To help you decide on a question, you can use either the Effect question, the How Does/Affect question, or the Which/What and Verb question:

- “What is the effect of _____ on _____?” (Example: What is the effect of sunlight on the growth of plants?”) or
- “How does the _____ affect _____?” (Example: How does the color of light affect the growth of plants?” or
- “Which/What _____ (verb) _____? Example: “Which foods do meal worms prefer?”)

3. RESEARCH:

Learn as much as you can about your project and the materials you will be using. Use reliable Internet sources, library books, magazine articles, science books, conduct expert interviews, etc.

4. HYPOTHESIS:

Now it is time to make a smart guess about what you think will happen if you test your problem and why. Use your research results when deciding upon your smart, or educated, guess. This educated guess is called a hypothesis. There is no right or wrong hypothesis, so it is okay if your hypothesis does not prove to be correct.

5. GATHER MATERIALS:

List all the materials you will need for your experiment. Do not forget to take pictures or draw pictures of your materials. (Pictures should not include faces of students.) The pictures will be useful when you are making your display boards.

6. DESIGN YOUR EXPERIMENT PROCEDURE:

What are you doing in the experiment? Write the steps. Be as specific and clear as possible so that others could duplicate the experiment exactly as you performed it. Remember to identify your variables and follow the scientific method. Take or draw pictures of your procedure for your display board. (Pictures should not include faces of students.)

7. CONDUCT YOUR EXPERIMENT and RECORD RESULTS:

Follow your experiment procedure. What happens during the experiment? Record all observations and write down any interesting notes. Take or draw pictures of the science project being done and the results. (Pictures should not include faces of students.) Use a science journal, tables, graphs, or charts to record results. However, only make a graph, table, or chart if you can use it to benefit your project and to help you make sense of the results. *Record your data as soon as you collect it so that you do not forget what happened!* **Have fun!**

8. CONCLUSION:

Tell what you learned from the experiment. What is the answer to the question you asked? What did the results tell you? Was your hypothesis right, wrong, or neither? Why?

9. REFLECTION:

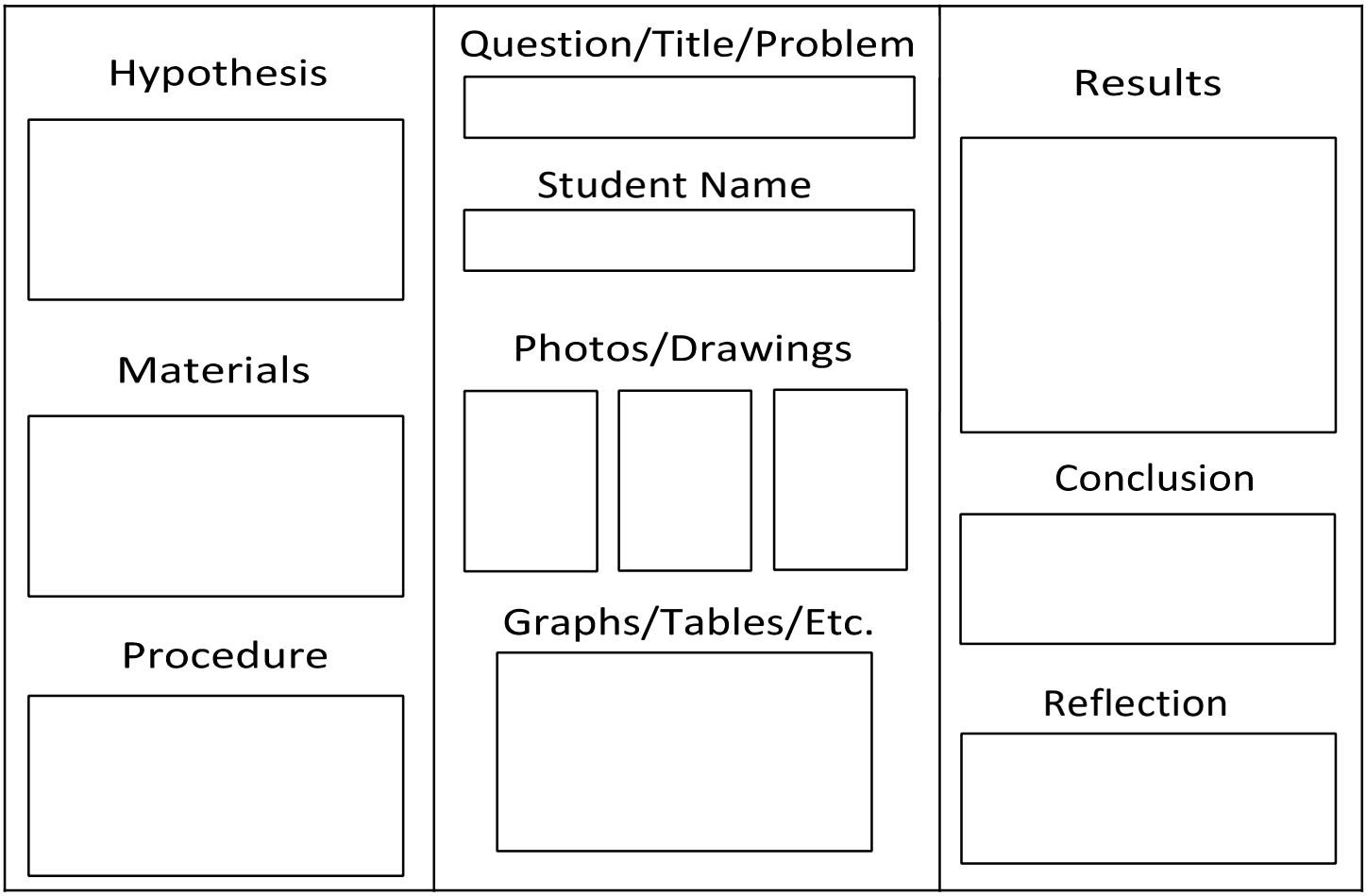
What, if anything, would you change if you conducted this experiment again? Are you curious about something else now that you have completed your experiment? How would you improve this experiment? What is something you really enjoyed about the experiment?

10. DISPLAY BOARD

Using the information collected, put together a display board.

- Information on the board can by typed or hand-written neatly.
- Use a tri-fold board.
- If used, photos should NOT include faces of students.

Example Display Board Format:



Student Name: _____

Student Grade Level: _____ **Judge Initials:** _____

JUDGE GRADING RUBRIC		1 Good	2 Super	3 Outstanding
1.	**Grade Level Curriculum Topic**			
2.	**Presentation**: *Visually appealing, neat, and attractive? Makes you want to learn more?*			
3.	**Components**: *Are the below present and complete?*			
a.	**Question/Title/Problem**: *Clearly stated, relevant, and testable?*			
b.	**Hypothesis**: *Educated estimate/ reasonable?*			
c.	**Materials Used:** *Stated and clear?*			
d.	**Experiment Procedure**: *Specific and clear?*			
e.	**Experiment Results**: *Written clearly with supporting graphs, tables, charts, pictures, and/or drawings?*			
f.	**Conclusion**: *Reasonable based on results and proves or disproves the hypothesis?*			
g.	**Reflection**: *Relevant?*			
4.	**Child Oriented:** *Does the project show evidence that it was completed by the child (i.e., NOT an adult)?*			
	Total Points			

Additional Resources

Need more help? Below is a list of a few websites about Science Gallery projects.

- Internet Public Library Science Fair: https://www.ipl.org/div/projectguide/
- Discovery.com - Science Fair Central: https://www.sciencefaircentral.com/
- Science Fair Idea Exchange: http://amasci.com/sc/scifair.html
- All Science Fair Projects: http://www.all-science-fair-projects.com/
- Experimental Science Projects - An Introductory Level Guide: http://www.scienceproject.com/projects/guide/SciProjIntro.html
- Science Fair Primer: http://users.rcn.com/tedrowan/primer.html
- Neuroscience for Kids - Successful Science Fair Projects: http://faculty.washington.edu/chudler/fair.html

Other Questions/Needs

Need help with supplies? The PTA will provide qualifying students in need with Science Gallery materials and/or trifold boards.

Please contact Amy Horst, the PTA volunteer Science Gallery coordinator, at: Amy.Horst@hotmail.com with any additional questions or needs.