WashinGTon Elementary School Science Fair

Guide for Developing Models, Displays, and Collections in Science

Guide for Developing Science Experiments

PLEASE READ ALL RULES **CAREFULLY**!

FAILURE TO FOLLOW RULES CAN RESULT IN YOUR PROJECT BEING DISQUALIFIED FROM JUDGING.

Being a part of the WashinGTon Science Exhibition is a fun and challenging way to explore science. You may choose to make a model, build a display or collection, or perform some experiments and exhibit the results. Your project can be related to the Life Sciences (concerning plants or animals), the Physical Sciences (chemistry or physics), or Earth-Space Sciences (meteorology, astronomy, oceanography, or geology) - you choose the topic that interests you!

This booklet is divided into three parts. The first section contains information about developing models, displays or collections. Part two contains guidelines for developing experiments for the Science Exhibition. The final section contains some general information that applies to any category and an entry form.

Talk to your teacher if you have any questions or difficulties along the way. Have fun with your Science Exhibition project, and remember: it's science that gives the WashinGTon Wizard its powers!

Part 1—
Models, Displays and Collections

What is a science model?
A science model is a three-dimensional exhibit of a scientific topic. For example, you might want to build a model of the solar system, or build a clay model representing the shape of the ocean floor. Your models may be made entirely by you or may be made from a kit. These models are not experiments, but they do demonstrate your knowledge and interest in a particular scientific topic. You may work by yourself on the model or you and a friend may work together.

What is a science display or collection?
A science display is a picture of a scientific topic on poster board or some other large, heavy paper. For example, you might want to draw a picture of how the planets travel around the sun, or draw the life cycle of the butterfly.
A science collection is the attractive and organized arrangement of accumulated items that explain or illustrate a scientific concept or principle. An example would be a collection of seashells classed as univalves and bivalves. You may work on your display or collection by yourself or with a friend.

Doing a science project
When beginning a science project, it is always wise to seek advice from teachers, parents, and friends; the more ideas and suggestions you start with, the better your project will be.

What are the model, display, and collection categories?
There are three categories for all Science Exhibition projects:

Life Sciences. Projects in this category would be about plants or animals. Examples include:
Model: a three-dimensional display showing the structure of the human eye
Display: a diagram of the life cycle of the frog
Collection: insects grouped by type

Physical Sciences. This category concerns physics or chemistry. Examples include:
Model: a three-dimensional exhibit showing the structure of the atom
Display: a diagram showing how electricity is generated
Collection: collection of different kinds of prisms

Earth-Space Sciences. Areas in this category include meteorology (weather), astronomy (stars), oceanography (oceans), or geology (earth's formation, rocks, etc.). Examples include:
Model: a three-dimensional display showing how the planets orbit the sun
Display: drawing of the formation of a cold front
Collection: collection of rocks classified by name
Important note: students cannot use microorganisms (e.g., mold, bacteria, fungi) per NC State Fair rules.

Science Exhibition Report:
A short report on your display, collection or model **must be turned in with your project.** This will help you explain your model or display or collection and will help people understand your project. In your report, tell where you got the idea for your project and how you selected the particular way you displayed your project. Provide a bibliography for what sources of information you used. Your report should accompany your project but **must NOT have your name on it**.

Day of the Science Exhibition: Bring your exhibit to school. The exhibits will be set up in the cafeteria. You may want your parents to bring parts of the exhibit to school for you. You should be prepared to explain and answer simple questions about your display.

How will the models, displays and collections be judged?
Your science project will be judged in the following five areas. Students in grades 3-5 may also be interviewed by the judges as part of the evaluation process. You should read about these areas before you even begin your work.

Scientific Thought (25 points)
Does your model, display or collection accurately illustrate a scientific concept or principle?

Creative Ability (25 points)
Does your exhibit show creativity in thought and in the physical display?

Dramatic Value (20 points)
Is your model, display or collection exhibited in an interesting and "eye-catching" manner?
Is the project neat and clearly understood?

Workmanship (20 points)
Does your model, display or collection reflect your own work?

Completeness of Report (10 points)
Does your report completely explain the scientific principle or concept illustrated through your model display or collection? Does your report use correct grammar and spelling?

What are the ribbon designations and other awards?
Medal will be awarded to the three experiments moving onto Regionals; to the best model, display, or collection; and to the best K-2 entry. T-shirts are awarded to the three top-scoring entries in each grade, regardless of type of project (whether experiment, display, etc.). All entries will be awarded a ribbon for their effort, based on the score they achieved:

Outstanding projects will be awarded blue ribbons.
Exceptional projects will be awarded red ribbons.
Good projects will be awarded white ribbons.

Part 2—
Science Experiments

What is a science experiment?
A science experiment is many things...

- It is deciding you are willing to make the commitment to see your project through to completion.
- It is choosing a topic that interests you and is something that you would like to know more about.
- It is formulating a purpose for your project and making guesses, or hypotheses, about the outcome of the experiment.
- It is experimenting to test your hypothesis or guesses, making observations, recording your data, and then repeating your experiment to verify your results.
- It is recording your work in your science experiment journal.
- It is analyzing your findings and drawing conclusions.
- It is preparing your science experiment report and your display.
- Finally, it is knowing that you have accomplished something worthwhile.

What are the categories for Science Exhibition experiments?
All of the experiments must be placed in one of the following categories:

Life Sciences. Projects in this category would be about plants or animals. Examples include:
Which plants grow bigger: those grown under sunlight or those grown under light bulbs?
Which hamster will learn to run a maze faster: one that is rewarded with food or one that is not?

Physical Sciences. This category concerns physics or chemistry. Examples include:
Which object hits the ground faster: a heavy object or a light object?
Which airplane wing design lifts an airplane higher or faster?

Earth-Space Sciences. Areas in this category include meteorology (weather), astronomy (stars), oceanography (oceans), or geology (earth's formation, rocks, etc.). Examples include:
What effect does a heavy rainfall have on water quality?
What type of ground cover (grass, rock, or bare dirt) will best prevent soil from washing down a hillside during a rainstorm?

Choosing your topic
When deciding on a topic to investigate, ask these questions:

- What topic interests me?
- Is this a question that can be answered by experimenting?
- Is this question too difficult for me to solve by myself?
- What materials will be needed? (Equipment and materials should be reasonable in cost.)
- Is the problem a safe one?
- Is it of significance to today's society?

An additional note of choosing a topic: students cannot use microorganisms (e.g., mold, bacteria, fungi) per NC State Fair rules. If your experiment uses animals, recombinant DNA, tissue samples, or relies on observing or testing other humans and you're in Grades 3-5, you will need to complete and sign an extra form before you submit your project. Use the form wizard at the following URL and submit with your entry form only the “special form” it recommends (i.e., ignore the ones it requires for everyone for this school level of competition).
https://student.societyforscience.org/forms

A word about computers
You may use a computer to help you conduct the experiment or investigation. You **may NOT** develop a computer program or focus primarily on the computer as an experiment in itself.

Every project must have a purpose
After you have chosen a topic, you must explain the purpose of the experiment in just a couple of sentences in your report and journal. Here is an example of a science experiment purpose:

The purpose of this project is to determine which light is best for growing geraniums.

The project title for this experiment could either be "The Effect of Light on Geranium Growth," or "What Effects do Lights Have on the Growth of Geraniums?"

Research
No matter what the topic or purpose of your experiment, the next step is research. Find books, Internet websites encyclopedias, magazines, and any other information about your topic (Grades 3-5 are encouraged to document their sources; see Tips for Grades 3-5 on the last page of this document).

Taking notes
You may be eager to start experimenting, but often the results of an experiment are not accurate because accurate notes were not kept. Therefore, **both a report and a journal are required along with your exhibit**. Keep notes in a journal about everything about your experiment: a list of your materials, the quantities of materials you use, and your daily observations.

Experimenting
Every experiment should include a hypothesis (your guess on what will happen) along with some sort of comparison and control. In other words you, as the scientist, will change certain conditions and observe what happens following those changes. It would be wise to get some advice from your teacher, parent, or someone who has experience with scientific experimentation.

Conclusions
After you complete your experimentation and your record keeping, you must draw some conclusions. For example, if the geraniums that are placed in direct sunlight grow the tallest, you might conclude that direct sunlight is best for growing geraniums. If the geraniums that received no light at all died, you might conclude that some light is necessary for geranium growth.

Experiment journal
The journal is a record of everything you do as you conduct your experiment. Buy a small notebook before you start experimenting. Keep notes about everything. You never know what information will be important until the experiment is completed; then it is too late to recall what steps you followed. List your materials and how much you use. Record your observations and then the time that you made them. Discuss problems as they occur. **This notebook should be displayed with your exhibit, so keep your notes neat. Also, these notes should be kept in your own handwriting. However, your name should not be on your journal or any part of your project.**

Experiment report
The purpose of your experiment report is to describe your experiment for the judges. Your report will need to contain each of the following parts:

Title: **Without putting your name on the paper**, write the title of the experiment at the top of the page.
Purpose: Explain the purpose of your experiment. Why did you conduct this experiment? What were you trying to prove?
Hypothesis: This is a description of what you think your results are going to be before you conduct any experiments.
Procedures: What materials did you use? What did you do, step-by-step, in your experiment?
Results: What were the results of your experiment? This could be organized into graphs, charts, tables, or essay form.
Conclusions: What did you think the results seem to indicate? That is, which group in the experiment is the better group?
Bibliography: If you relied on outside information, provide these sources.

Allow plenty of time for completing your science experiment
Now that you have decided to do a science project, you will need to be very careful about the time spent on the project. Don't let your time go by and then decide to do all of your work the weekend before the Science Exhibition. You will have too much work to do, and you will not learn as much from your project.

Day of the Science Exhibition :
Bring your exhibit to school. The exhibits will be set up in the cafeteria. You may want your parents to bring parts of the exhibit to school for you. You should be prepared to explain and answer simple questions about your display.

How will the science experiments be judged?
Your science project will be judged in the following five areas. You should read about these areas before you even begin your experiment. **Students in grades 3-5 may also be interviewed by the judges as part of the evaluation process.** Note that only projects from grades 3 through 5 are eligible for state and regional science fairs.

Scientific Process (30 points)
1. Did you identify a problem and have a purpose and hypothesis?
2. Did you identify the appropriate groups to be compared?
3. Did you use appropriate equipment or materials to solve the problem?
4. Did you show accurately recorded data?
5. Did you repeat the experiment to verify your results?
6. Did you clearly state the results?
7. Did you clearly and logically state the conclusions?

Creative Ability (25 points)
1. Does your experiment show creative thinking?
2. Does your exhibit show a creative display of work?

Completeness of Report and Journal— note that you must have both (20 points)
1. Does your report and journal explain the purpose of the experiment and the procedures that you used?
2. Does your report and journal explain the results of the experiment?
3. Does your report and journal explain the conclusions?
4. Is your report and journal written neatly and correctly with good grammar and spelling?

Workmanship (15 points)
1. Did your exhibit represent your own work?
2. Did your report and journal represent your own work?
3. Did your exhibit include materials of your own making?
4. Is your exhibit and report/journal neatly done?
5. Does your exhibit explain your experiment clearly?

Dramatic Value (10 points)
1. Did you display your exhibit in an interesting and "eye-catching" way?
2. How does the overall appeal of the exhibit compare with others?

What are the ribbon designations?
Medal will be awarded to the three experiments moving onto Regionals; to the best model, display, or collection; and to the best K-2 entry. T-shirts are awarded to the three top-scoring entries in each grade, regardless of type of project (whether experiment, display, etc.). All entries will be awarded a ribbon for their effort, based on the score they achieved:

Outstanding projects will be awarded blue ribbons.
Exceptional projects will be awarded red ribbons.
Good projects will be awarded white or yellow ribbons.

Now see the next part of this booklet, which will list some basic rules for your project.

Part 3—
General Guidelines for all Science Exhibition Categories

Displaying your project
The exhibit featuring your model, display or collection, or your experiment, is a way of showing other people your project. Remember, the exhibit alone is not your science project, but it is important. The following are guidelines for developing your exhibit:

- Your exhibit should include a **title.**
- Your **report** must accompany your exhibit for both experiments and models, displays, and collections.
- If you are displaying a science experiment, your exhibit should also contain the **purpose of your experiment, a hypothesis, the procedure followed in the experiment, your results, your conclusions, any special equipment used, and your experiment journal in addition to your report.**
- Your **name must not appear** on the exhibit, in your report or your journal (don't worry, we provide you a numbered label that allows us to identify you).
- Exhibits are limited to table tops, and should be no more than **48" wide and 30" deep**.
- Provide a **table covering** if your science project is messy.
- Bring your own **extension cord** if electricity is required for your project. Experiments involving electricity must be safely wired.
- **No live animals (including fish, worms, and insects)** may be displayed. Experiments with animals that involve deficient diets, discomfort, pain, or death will be disqualified.
- **Dangerous chemicals, open flames, or explosives will not be accepted** in the exhibits.
- Exhibits **must be taken home** following the PTA Science Exhibition Open House.
- Your exhibit **should be self-supporting**, and if free-standing, should be constructed from stiff poster board or science fair display board. However, you are not required to use the "traditional"size of tri-fold board or in the case of models and collections, to even have a poster. Instead, choose the size and manner of display that best suits your project.
- If photos or videos are included as part of the display, they may only be of the student(s) who are submitting the project, or must include a statement of written permission and release from the person being photographed.

Tips for K-2
While an experiment notebook should be handwritten, there is no other rule regarding typed vs. handwritten materials for these younger grades. In other words, use your judgment as a parent as to what will let your child best present a legible project while maintaining its integrity as their own thought and work.

Tips for 3-5
At this grade level judges expect to see a bibliography (that is, a list of sources used to obtain information) and may even be surprised if it's missing. Students conducting experiments are encouraged to provide a written abstract (a 3-5 sentence summary) at the beginning of their report. Both the bibliography and abstract are requirements for being able to apply to Regionals, and having them will make the application process smoother.