

**2016 – 2017**

# **Science Fair**



**Evergreen**  
School District

**Student Handbook**

Dear Parents,

Today marks the beginning of our formal preparation for this year's Science Fair. The District Science Fair is scheduled for Thursday, March 16, 2017 from 6:30-7:30 p.m., at Quimby Oak Middle School. Each school will hold its own Science Fair and select students to participate in the District Science Fair.

We encourage each student who enters the Science Fair to receive support at home in completing a high-quality project. Please feel free to help and support your child's best efforts in putting together a first-rate project. However, please be careful to let your child complete the project independently. Your child will learn more if you limit your involvement to encouraging and guiding.

The Student Handbook is on the District website and includes a list of ideas for possible projects, as well as guidelines for completing a project. Please go through this information and help your child select a project that will be of interest and will be appropriate in terms of level of difficulty and resources (materials, information, and space) available. If you have any questions, please contact your child's teacher.

Since one of most difficult parts of preparing for a Science Project is selecting a topic, your child may need some assistance from you in this area.

Thank you for your help and cooperation.

Sincerely,

Science Fair Coordinator

# MODEL SCIENCE FAIR JUDGING CRITERIA

## 1. SKILLS AND PROCEDURES

Does the project answer a specific question?

Has the appropriate project form (experiment, demonstration, model, collection, or invention) been used to answer the specific question?

For Experiments:

Has a hypothesis been formulated? (answer the question)

Was the scientific method followed to test the hypothesis?

Were the observations and measurements recorded?

Was data analyzed accurately?

Was an accurate conclusion drawn based on observation and data?

For Demonstrations, Models, Collections, or Inventions:

Did the model or demonstration work?

Were models or inventions constructed accurately?

Was the invention realistic, creative, and useful?

Did the collection have a suitable number of items?

Was the collection organized and labeled appropriately?

Did the model, collection, or demonstration teach the desired topic?

## 2. UNDERSTANDING

Were project and procedures clearly explained?

Was the scientific principle explained and understood?

Was the research and how it related to the project presented accurately?

Was the importance of this information clearly explained?

## 3. CLARITY

Did the observer easily understand what was done?

## 4. DISPLAY

Was the display neat, attractive, colorful, and appropriate for the project?

Was the display well constructed and sturdy?

Did the display meet Science Fair size requirements?

Were effective graphics used to display data?

Were graphics clearly labeled?

Does the display contain accurate research information?

Was the display student-generated?

# WHAT IS A SCIENCE FAIR PROJECT?

A science project will give you an opportunity to extend your knowledge of a particular scientific topic or idea that you find interesting. It will allow you to share the results of your investigation with others. This scientific investigation can be developed in one of five ways.

- **EXPERIMENT**  
An experiment can be a test made to demonstrate a known scientific fact or it can also be a test to determine if a hypothesis (your educated guess of what will happen) is accurate. An example would be to determine if plant food A out performs other brands.
- **MODEL**  
A model is a small object usually built to scale that represents some already existing object. An example would be a model of plate tectonics and explanation of the theory.
- **DEMONSTRATION**  
A demonstration is an illustration or explanation of a scientific principal that shows how and why something works. An example would be to use a switch to demonstrate and explain how an electrical switch operates.
- **COLLECTION**  
A collection is a grouping or gathering of various objects which must be scientifically oriented and show that you have learned something through the process of collecting and categorizing. Items should be categorized and labeled correctly. For example, a rock collection defined by the three types of rocks with explanations about their differences and similarities.
- **INVENTION**  
An invention is a new device or process used to improve conditions, solve problems, or to fill needs. Inventions can be completely new ideas or improvements on something that already exists today. An example would be to invent fertilizing golf tees which would fertilize the grass after being left in the ground when broken.

Your project must include a three-sided display that gives viewers an overview of the science topic under investigation. This display will be an overview of what you found out as a result of your investigation. It will have a title, a summary of your most important information, and pictures, graphs, charts, and/or drawings to show what you did and what you learned. Your project must also include an experiment, model, demonstration, collection, or invention, which is exhibited on the table in front of your display.

You will be required to give a short oral presentation about your project. You will need to explain what you have done and what you have learned as a result of your investigation.

# HOW TO START YOUR SCIENCE FAIR PROJECT

## CHOOSE AN AREA OF SCIENCE

Choose an area of science (physical, life, or earth) in which you are interested. Do a little research to be sure that this topic really interests you. Then, from that area of science, like “life science”, select a general topic like “plants”. Finally, narrow your general topic to a specific subtopic about plants, like “plant growth”. Below is a list of general topics you may consider for your science project.

acids and bases	aerodynamics	airplanes	amphibians	anatomy
animal behavior	astronomy	atoms	automation	birds
bones	brain	chemistry	color	computers
conservation	cells	crystals	digestion	dinosaurs
diseases	constellations	environment	ecology	electricity
energy	engines	first aid	fish	flowers
food chains	fossils	geology	gravity	heart
heat	horses	insects	invertebrates	jet propulsion
kelp	learning	lights	liquids	machines
magnetism	mammals	matter	migration	muscular system
nervous system	nutrition	oceanography	parasites	photosynthesis
planets	plants	pollution	prehistoric life	reptiles
respiration	robots	rockets	solar energy	senses
shells	solar system	sounds	tides	trees
vertebrates	vocal cords	water	weather	yeast

## CHOOSE A QUESTION

From your subtopic, choose one question that will narrow the focus of your investigation. For example, using the subtopic of “plant growth”, one question could be “How does sunlight affect plant growth?” Another question could be “Which plant food works the best?” You can choose from many questions for each subtopic. This will be the question you will be trying to answer with your project. Below is a small sample of science questions to be investigated.

### Astronomy

Why does the earth have seasons?  
How are tides created?

### Consumer Science

Which laundry detergent is best?  
How does a radio work?

### Electricity

What is the best conductor?  
How does a switch operate?

### Chemistry

How can you tell if something is an acid or base?  
What is a chemical reaction?

### Earth Science

How do crystals grow?  
What is the hydrologic (water) cycle?

### Physical Science

How does an airplane fly?  
How does an electromagnet work?

## CHOOSE THE PROJECT FORM

Decide what type of project (experiment, model, demonstration, collection, or invention) would best show your audience the answer to your question.

## RESEARCH

You are now ready to begin planning your project by researching your question. You can get information from encyclopedias, books, pamphlets, field trips, the internet and interviews. Look for information from several different sources.

## SCIENCE FAIR RULES

1. All projects must be approved by the teacher before beginning.
2. Each project will be classified by grade level and then into one of the following categories: experiment, model, demonstration, collection, and invention.
3. A contestant may only enter one project.
4. More than one student may participate on a project, if allowed by the school or teacher.
5. Teachers or parents may advise. Parents should have students do the actual work.
6. The three-sided display board should be free-standing and not more than 19 inches tall and 36 inches wide when fully extended.
7. When displayed, the backboard and project should not occupy more than 48 inches of length and 16 inches of table depth.
8. The following are prohibited: dangerous chemicals, open flames, explosives, illegal drugs, or animal experiments that involve starvation or any other form of cruelty.
9. Electrical switches and cords needed for exhibits must be approved by the teacher. There will be no electrical outlets available, however, at the District Science Fair.
10. Expensive or irreplaceable fragile items should not be displayed. Valuable items essential to the project should be simulated or photographed.
11. School and teachers assume no responsibility for loss or damage to any exhibit.

# THE SCIENTIFIC METHOD

Below are the five steps used in the scientific method when conducting an experiment.

1. Identify the Problem

Think about what area of science interests you. Narrow it down to a specific question.

Example: In the area of life science, a topic could be “plants.” A specific question could be, “What plant food causes the fastest lawn growth?”

2. Collect Information

Research your topic. Take notes on information you feel will be important.

3. Develop a Hypothesis

A hypothesis is an educated guess. It takes into account the research you have done and also your opinion of what will happen. What do you think will happen when you perform your experiment? The hypothesis answers your question.

Example: Plant food “B” will cause lawns to grow faster.

4. Conduct the Experiment

First, make a list of needed materials and collect them. Conduct your experiment and observe what happens. Make sure that you are only changing one variable while all other conditions remain constant. In other words, everything should be the same among the tested items (conditions remain constant). The only difference (variable) would be the procedure or item being tested in the experiment. Keep a journal recording changes, growth, or other results in your experiment. Photos and/or illustrations of your progress during the experiment are helpful additions to your display.

Example: All lawns being tested should be treated the same (conditions remain constant): same type of grass, soil, temperature, sunlight, water, feeding times, etc. The only difference (variable) would be the different plant foods fed to the lawns. Make a chart recording lawn growth.

5. Draw a Conclusion

Analyze the results of your experiment. Draw a conclusion based on your results. Was your hypothesis correct? Why or why not? Your conclusion should tell what you learned by conducting the experiment and why the experiment was important. Remember, an experiment is not a failure if the hypothesis is proven wrong.

Example: The lawn fed with plant food “A” grew faster than any of the other plant foods tested. My hypothesis was not correct, even though plant food “B” cost more and promised better results. I learned that not all plant foods are the same and that advertising is not always true.

Name: \_\_\_\_\_ Room: \_\_\_\_\_ Grade: \_\_\_\_\_

## SCIENCE FAIR PROJECT PROPOSAL EXPERIMENT

An experiment can be a test made to demonstrate a known scientific fact. It can also be a test to determine if a hypothesis (your educated guess of what will happen) is accurate.

Area of Science     Physical                       Life                       Earth

Project/Problem: What science question will you be attempting to answer?

Hypothesis: What do you think will happen (answers the above question)?

Procedure: How will you find out what will happen? Write a brief description of how you plan to test your hypothesis. How will you record and display your experiment and data?

Materials: What materials will you need?

## SCIENCE FAIR PROJECT PROPOSAL MODEL or DEMONSTRATION

A model is a small object usually built to scale that represents some already existing object. A demonstration is an illustration or explanation of a scientific principle that shows how and why something works.

Area of Science     Physical                       Life                       Earth

Project/Problem: What science question are you trying to demonstrate or model?

Materials: What materials will you need?

Procedure: Write a description of what you plan to do. How will it be displayed?

Results: What do you hope to teach others with your demonstration or model?

Due Dates: _____	Signatures: _____
Proposal: _____	Parent Approval: _____
Final Project: _____	Teacher Approval: _____

Name: \_\_\_\_\_ Room: \_\_\_\_\_ Grade: \_\_\_\_\_

## SCIENCE FAIR PROJECT PROPOSAL COLLECTION

A collection is a grouping or gathering of various objects that must be scientifically oriented and show that you have learned something through the process of collecting and categorizing. Items should be categorized and labeled correctly.

Area of Science     Physical                       Life                       Earth

Project/Problem: What will you collect? What science question will your collection illustrate?

Hypothesis: How will you obtain the items for your collection?

Procedure: How will you organize and label your collected items? How will your display illustrate your research and collection?

Results: What do you hope to learn and teach others with your collection?

## SCIENCE FAIR PROJECT PROPOSAL INVENTION

A collection is a grouping or gathering of various objects that must be scientifically oriented and show that you have learned something through the process of collecting and categorizing. Items should be categorized and labeled correctly.

Area of Science     Physical                       Life                       Earth

Project/Problem: What will you invent? What science question will your invention answer?

Materials: What will you need to construct your invention?

Procedure: How will you construct your invention? How will your display illustrate the operation of your invention?

Results: What is the benefit of this idea?

Due Dates:

Signatures:

Proposal: \_\_\_\_\_

Parent Approval: \_\_\_\_\_

Final Project: \_\_\_\_\_

Teacher Approval: \_\_\_\_\_

## SCIENCE FAIR GUIDE EXPERIMENT

PROJECT TITLE

Problem:

Hypothesis:

Materials:

Procedure (Experiment):

Data: What kind of data did you collect? Record your data in a separate journal.

Graphics: Which of the following can you use to display your data?

Charts     Graphs     Photos     Illustrations     Other

Conclusion:

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## SCIENCE FAIR GUIDE MODEL or DEMONSTRATION

PROJECT TITLE

Project (Scientific Question):

Materials:

Procedure: List the steps you will be demonstrating or the procedures you followed to make the model.

Graphics: Which of the following can you use to display your data?

Charts     Graphs     Photos     Illustrations     Other

Conclusion: What did you teach others with your demonstration or model?

## SCIENCE FAIR GUIDE COLLECTION

PROJECT TITLE

Project (Scientific Question):

Materials: How and where did you get the items for your collection?

Procedure: How did you organize your collected items?

Graphics: Which of the following can you use to display your data?

Charts    Graphs    Photos    Illustrations    Other

Conclusion: What did you learn and teach others with your collection?

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## SCIENCE FAIR GUIDE INVENTION

PROJECT TITLE

Project (Scientific Question):

Materials: What did you use to build your invention?

Procedure: How did you build your invention?

Graphics: Which of the following can you use to display your data?

Charts    Graphs    Photos    Illustrations    Other

Conclusion: What is the benefit of this idea?

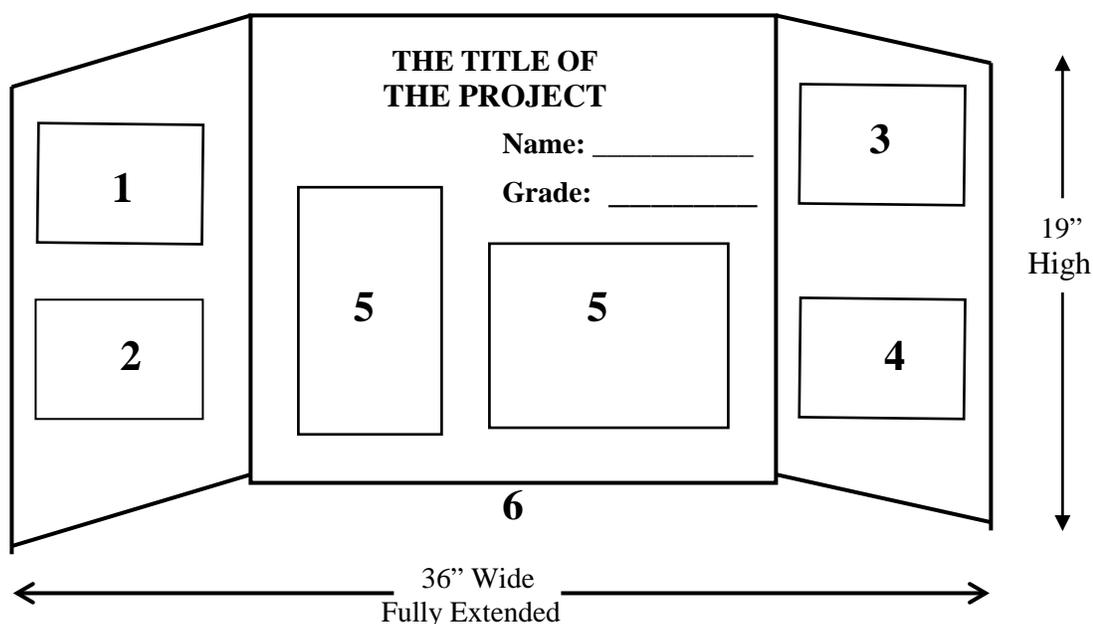
# DISPLAYING YOUR PROJECT

A very important part of your Science Fair project is your display, since it is another way of showing others what your project is about. Most people will judge your project based upon the quality and thoroughness of this display.

The three-sided display board should be free-standing and not more than 19 inches tall and 36 inches wide when fully extended. When displayed, the backboard and project should not occupy more than 48 inches of length and 16 inches of table depth.

The center part of the display is reserved for the title of the project and diagrams, photos, or drawings of your work. The left side wing of the display should contain the scientific question and procedures. The right side wing of the display should contain your results and conclusions. On the table in front of the display you should place your experiment, model, demonstration, collection, or invention.

## 3-SIDED DISPLAY



1. Project/Scientific Question  
Hypothesis Required for Experiments
2. Procedure
3. Results/Data
4. Conclusion
5. Title of Project, Diagrams, Photos, Drawings
6. Experiment, Model, Demonstration, Collection, Invention

The diagram above is a sample display. Your own creativity will determine how you make your own display.

# HELPFUL CONSTRUCTION TIPS

## MATERIAL

Make the display from any sturdy material. Remember that it should stand by itself on the table. Use mat board, poster board, or illustration board. Do not use tag board or railroad board (such as that sold at Long's Drugstore) for the display. It is not sturdy enough to stand without support.

## LETTERING

Your title should be cut out of construction or poster paper and glued to the display. The use of large stencils will make the letters more attractive. Posters could be lettered by hand, first in pencil and then retraced in marker. Stick-on letters could also be purchased at office supply stores. Computer-generated lettering could be used if trimmed and attached neatly. Whichever lettering style is used, make sure that all letters and labels are mounted horizontally on the display. Select a lettering style that is easy to read and understood from a distance. Neatness is the key!

## COLOR

Before you go any further, decide what colors you will use. Choose contrasting colors for lettering. Mount diagrams, information, and photographs with complementing background colors. Sometimes a colored border focuses attention to the middle of the display. If you are in doubt about color combination, get another opinion.

## DRAWINGS

Drawings and sketches should always be drawn in pencil first and then retraced. Use another sheet of paper to complete the drawing rather than drawing directly on to the display. You can fix your mistakes more easily and then mount it on the display. Be sure to color and label every drawing, illustration, or diagram.

## PHOTOS

Good photography can be enlarged at a photo dealer to 5"x7" or 8"x10" so that you can show your picture clearly. Every project does not need photos, but if you have a camera, you might consider recording your progress. Photos on your display should also be labeled.