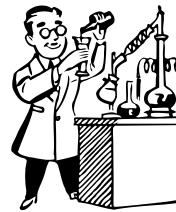
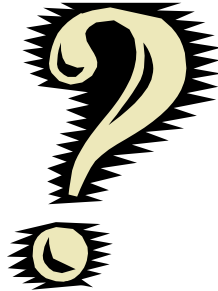


# Riverside's "Giants in Science" Science Fair



## Participant's Project Guide

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## Welcome and Overview

If you're reading this, you have decided to do a project and enter Riverside's science fair. Either that, or you are considering the possibility. Good for you! With preplanning and some hard work on your part, the days ahead will be very fun and rewarding. Your teachers and parents will probably be of help and support to you, but most of the responsibility for the project rests on your shoulders. Realizing this, you need to carefully organize and use your time and resources wisely. This project guide was designed to help you do just that. Hopefully, by the time you get done looking through this guide, you will feel more comfortable and confident about your project.

### Objectives

Riverside's science fair will emphasize fun through learning by:

- Stimulating imagination and independent thinking
- Increasing knowledge in many scientific areas
- Teaching the use of the processes of science
- Training in the organization and completion of major tasks
- Providing the opportunity to enjoy science
- Learning the process of effective problem solving
- Providing the students with the opportunity to share what they have learned with other students and community members.

### Project Options (choose one)

You will be choosing one of the following three areas to complete your project in. Make sure you choose a topic that you are interested in and excited to learn more about.

1. Scientific Inquiry- Focusing on a question about science and then using the scientific method to help answer the question.
2. Original Invention- Create an invention that will solve a special problem or need that we have.
3. Research a Scientist- Choose a scientist that has changed the way we live. Students will learn about a scientist's life and what they contributed to science.

## Presentation Displays

Students have the option of buying a tri-fold display board from school or getting one on their own. They are available in our office for the low price of \$4.00. The price includes a 36" X 48" board (color of your choice) and a 10" X 36" title board. Stop by the office and pick one up anytime before the science fair.

Here are some things to consider when planning your presentation display:

- Displays should be neat and informative. Most information given on your display should be word processed and easy to read, even at a distance. Information should also be shared through your own words and thoughts.
- Displays should be attractive and eye-catching. Bold words and color make a display interesting to a curious passer-by.
- Displays should be original, standing out from the rest. Observation tables, graphs, and photos help to give a clear understanding.

\*There are more suggestions in each section of this guide to help you with your display board depending on the type of project you are working on.

The rest of this project guide will help you in selecting a topic and creating a visually appealing display board. Good luck and have fun!

## **SCIENTIFIC INQUIRY PROJECT:**

Are you a curious person? Maybe you are always asking questions about why things happen. Or maybe you ask questions about what would happen if... If you find yourself curious or interested in the world around you, maybe this is the type of project you should select for the science fair. This type of project would also be appropriate if you want to learn about a scientific law or natural phenomenon. Just remember, this type of project always starts out with a purpose in the form of a question.

For example, if you want to enter a rock collection, you might ask questions such as these: Are all rocks equally hard? Is the hardness of a rock correlated to the density of a rock? Then you can pose a hypothesis and test it, as well as display an interesting collection of rocks.

As another example, you might already know what causes a rainbow. But can you pose some questions and think of some ways that you could demonstrate to the visitors at the science fair how one is formed? But, if you simply bring in a collection of seeds, rocks, plants, etc., you really do not have a science fair project. You only have a collection. Going a few extra steps will help you include your collection as part of a science project. It is essential for a science fair project that you formulate a question and hypothesis and try to prove or illustrate it using the scientific method which is explained below.

The steps you will follow are used by scientists to explain problems and their solutions. This process is the scientific method. The scientific method consists of five steps:

1. Stating the research question to be solved (Purpose)
2. Forming the hypothesis
3. Experimenting and observing
4. Explaining the results
5. Drawing conclusions

Before you get started, you must first select a topic. Your project will center around the research question you want to solve. Science covers many general areas from which you can choose a research question. The scientific areas to consider for your project are:

1. Behavioral Science- the study of people's behavior in society
2. Life Science- the study of living things; humans, plants, and animals
3. Physical Science- the study of physical principles, machines, and technology
4. Earth Science- the study of things on Earth and in the universe

\*Since your project will require time and effort, it is important to select a topic you will enjoy. Scientists are not skilled in all areas of science. They specialize in one specific field. Which area of science interests you the most? Why?

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\*Deciding the topic of your science project can be hard to do, but do it the easy way. Everyone has asked these questions: "How does this work?" or "Why?" or "Is it possible to do this?" Think about the four areas of science. What are some questions you would like to solve?

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## SELECTING A SCIENTIFIC INQUIRY TOPIC

After you have selected an area of science that interests you, think about questions that you are curious about and would like to solve. The question you try to solve will be the topic of your science fair project. You need to choose a question that can be answered by an experiment that you can do or a model you can make. Do not choose a question that does not interest you, or one that is too hard to solve.

The following are sample research questions that may help you think of your own research question.

- |   |  |
|---|--|
| How does electricity travel through wire?         | How do batteries work?                                       |
| What objects are attracted by magnets?            | How is electricity generated from solar energy?              |
| How can rusting be prevented?                     | How do integrated circuits work?                             |
| What is the shape of the magnetic field?          | How does a robot work?                                       |
| How can gasoline make a car move?                 | How can a tomato plant be grafted to a potato plant?         |
| How does overcrowding affect life in a terrarium? | Do plants grow better in sunlight or artificial light?       |
| How does gravity affect the growth of a plant?    | How does mold grow?  |
| How is a bridge built so it does not collapse?    | How fast do different fibers burn?                           |
| How is sound obtained from a phonograph record?   | What does a dam do?  |
| How do soft drinks affect teeth?                  | How does a canal lock work?                                  |
| How does exercise affect the heart?               | Does the moon rise at the same time every night?             |
| How do spiders spin webs?                         | How accurately are weather and natural disasters forecasted? |

\*Put a star beside the research question that most interests you, or write a question of your own on the lines below. Think of an experiment that you could do to solve the question or a model you could build to explain a situation.

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## WRITING THE HYPOTHESIS

After you have selected a research question, you have performed the first step of the scientific method. The second step is forming the **hypothesis**. The hypothesis (hi-poth-i-sis) is an educated guess or a possible explanation of the research question.

Kim and Carlo wanted to solve the question,  
"Do plants grow taller in sunlight or in artificial light?"  
They each wrote a possible explanation of the question,  
And these are the hypotheses they came up with:

**Kim's hypothesis:** Plants will grow the same,  
whether in the sun or under artificial light.

**Carlo's hypothesis:** Plants will grow taller in artificial light,  
because they will get light for a longer period of time.

\*There are several other possible hypotheses. Write another possible hypothesis for Kim's and Carlo's research question.

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\*Write your research question and two (2) possible hypotheses below. Circle the hypothesis you feel is best. Why do you think this is the best hypothesis?

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## **SCIENTIFIC EXPERIMENTING AND RESEARCH**

The key to a successful science fair project is planning. Now you are ready to begin researching your topic and planning for the experiment you wish to perform. Safety comes first. Remember to have adult guidance when experimenting with electricity, batteries, harmful chemicals, or fire. Always have the necessary emergency supplies ready should an accident occur.

### **YOUR RESEARCH:**

Take careful notes as you research your topic and always give credit where credit is due! Below, take the time to write the bibliography of the resource you are using. You may need to use more than one resource. You need to provide this information on your display, as well as acknowledge the people who have helped you with this project.

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### **PLANNING:**

Plan carefully before you start experimenting or making your model.  
Make a list of the materials you need here:

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Make a list of the steps you need to perform below:

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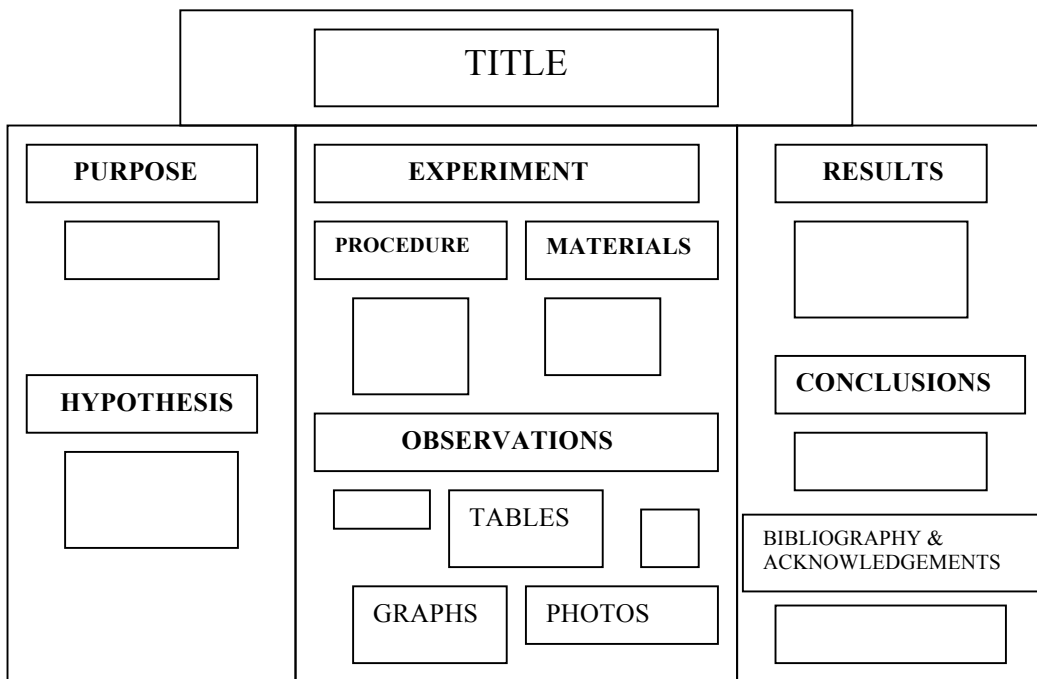
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### **YOUR SCIENTIFIC INQUIRY DISPLAY**

Here is a sample of the correct layout of information on your display for a SCIENTIFIC INQUIRY. This way, the observer reads through your project from left panel to right panel according to the scientific method.



### **\*\*\*WINNING STRATEGIES**

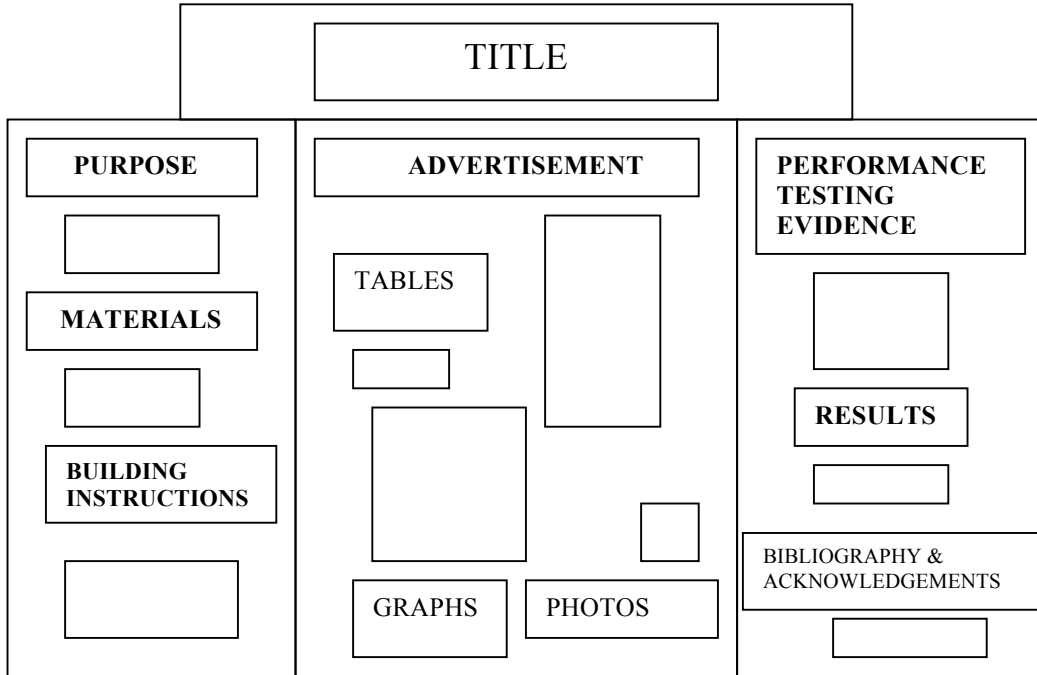
1. Think of your display as the billboard advertising your project.
2. Plan the colors of your display to enhance the overall presentation. While neon and astro-glo colors attract attention, they are hard on the eyes when there is much to read. Caution: stripes and checkerboard designs on your display can be timely and too active to look at for an extended period of time.
3. Be sure your title board and subtitles on your display are large enough to be read at a distance or in poor lighting.
4. Be sure all graphs, illustrations, photographs, and drawings are labeled, titled, or self-explanatory.
5. The display should tell the story of your project whether you are standing there or not.

## ORIGINAL INVENTION PROJECT

If you are creative and full of ideas, then this topic may be perfect for you. Think about it, you get to invent something that you think may benefit others. You will create an invention, test it, and market it. That's right, you even get to create an advertisement for it to persuade others why they should use your invention. Most importantly, don't forget that you must have a working model of your invention on display for everybody to be "Wowed" by.

### YOUR ORIGINAL INVENTION DISPLAY

Here is a sample of the correct layout of information on your display for an ORIGINAL INVENTION.



### **\*\*\*WINNING STRATEGIES**

1. Think of your display as the billboard advertising your project.
2. Plan the colors of your display to enhance the overall presentation. While neon and astro-glo colors attract attention, they are hard on the eyes when there is much to read. Caution: stripes and checkerboard designs on your display can be timely and too active to look at for an extended period of time.
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## RESEARCH A SCIENTIST PROJECT

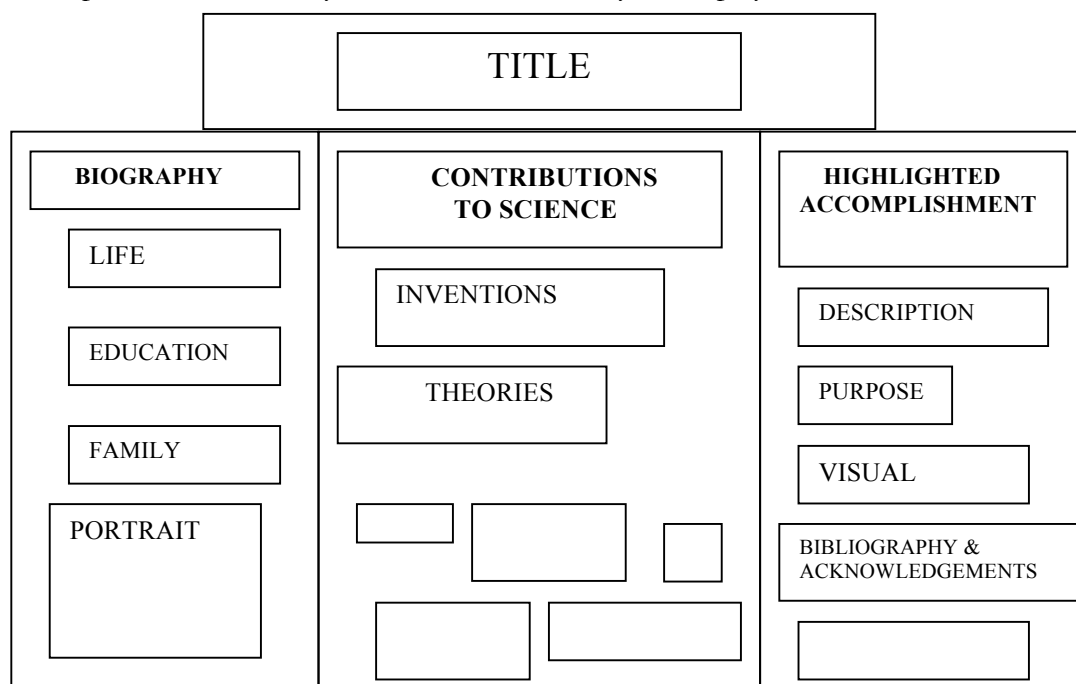
If you love researching and learning about people that have made a real impact in science, maybe this will be the topic you should choose. Here is a list of just a few of the famous scientists that have overcome obstacles and have shown courage in their time to change the way we think about our world:

Archimedes	Isaac Newton	Nicholas Copernicus	Marie Curie
Aristotle	Galilei Galileo	Thomas Edison	Benjamin Franklin
Niels Bohr	Albert Einstein	Nikola Tesla	Leonardo Da Vinci

After you choose a scientist, you will research their life. You will learn about their childhood, schooling, and hobbies. You will also discover how he or she contributed to science. After you have explored the life of your scientist, you will highlight one of their most important accomplishments. Make sure you back this up with evidence of why you feel it was so important. Lastly, you will create a hands-on project to accompany your display board. This project should tie into a contribution or theory that your scientist was instrumental in discovering.

### YOUR GIANT SCIENTIST DISPLAY

Here is a sample of the correct layout of information on your display for a GIANT SCIENTIST.



#### \*\*\*WINNING STRATEGIES

1. Think of your display as the billboard advertising your project.
2. Plan the colors of your display to enhance the overall presentation. While neon and astro-glo colors attract attention, they are hard on the eyes when there is much to read. Caution: stripes and checkerboard designs on your display can be timely and too active to look at for an extended period of time.
3. Be sure your title board and subtitles on your display are large enough to be read at a distance or in poor lighting.
4. Be sure all graphs, illustrations, photographs, and drawings are labeled, titled, or self-explanatory.
5. The display should tell the story of your project whether you are standing there or not.

**SCIENCE FAIR WORKSHEET (for your use only- not to be turned in)**

**Topic:**

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**Title:**

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**Please check one:**

Scientific Inquiry

Research a Scientist

Original Invention

**Purpose:**

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**Equipment, Materials:**

**(Resources)**

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**Procedure:**

**(Findings and Highlighted Accomplishment)**

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**Results:**

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**Conclusion:**

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