Help Wanted: Scientists

People in ***life sciences*** study living things.

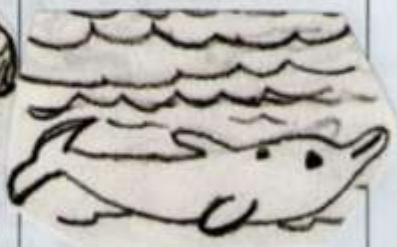
Botanists

study plants and how they grow.

Zoologists

are interested in animals.

Marine Biologists



find out about life in the oceans.

Microbiologists

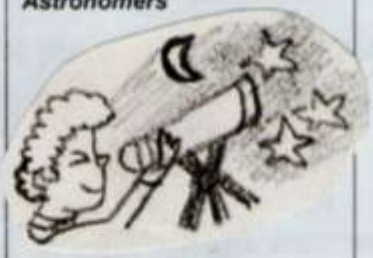
study very small organisms (such as bacteria and viruses).

People in the ***physical sciences*** study the nature of the universe.

Chemists

study the way atoms and molecules interact.

Astronomers



look to the heavens to find out about stars and planets.

Physicists

study such things as electricity, magnetism and gravity.

Geologists

study the earth, including rocks and volcanoes.

Meteorologists

study the weather and the atmosphere.

Oceanographers

find out about the ocean's tides and movements.

People in the ***mathematical sciences*** study numbers and invent formulas. Math is important to scientists.

$E=MC^2$

Mathematicians

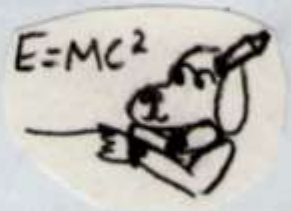


figure out ways to use math to solve scientific problems.

People in the ***social sciences*** study other people and how they live.

Geographers

study the earth how living things adjust to where they live.

INSTRUCTIONS FOR PARTICIPATING IN SCIENCE FAIR

A. GETTING STARTED

The first step on your science fair adventure is choosing the right project. Ask yourself these questions:

- ✓ What kind of science interests me?
- ✓ What would I like to learn about?
- ✓ What special hobbies and talents do I have that I could use to put together my project? (Examples are stargazing, bird-watching, gardening, even cricket!!)

B. DOING THE PROJECT and PERFORMING AN EXPERIMENT

An **experiment** is a test designed to find the answer to a problem. Exploring the Universe through science is exciting but there are rules to follow. To gather and present information in an orderly manner, scientists use a scientific method, a step-by-step approach to discovering answers and solving problems. In general, the steps are:

1. Find a problem. Ask a scientific question that you are able to test. This is the **purpose** of your project. (E.g. will a plastic bat work better or a wooden bat when playing cricket).

2. Give the experiment a **Title.**

3. Gather as much information as possible on your topic from many sources (books, internet, teachers and family). This is your **research**.

4. Make a **hypothesis** – that is, a guess. Predict what the answer to the question will be according to you.

5. Time for the **Experiment!** Use experimental **procedures** (steps in an experiment just like the steps in cooking a recipe) to test your hypothesis. This means that you are trying to see whether what you guessed is right or not. Remember, your experiment is a test of your guess. It may give you the opposite result of what you guessed. It is absolutely alright. You still learned something. The important thing over here is your experiment and what you learn from it. Write the result honestly. If scientists already knew what the result of their experiment is going to be, then we would not have had so many discoveries!! **So be honest and be ready to learn and discover!**

6. Collect **data** from the experiment. Record the result. E.g: If you want to know what happens when an apple slice is coated with different things:

Time	Plain apple slice	Apple slice Coated with lemon juice	Apple slice coated with salt.
After 30 min.	Turned slight brown	No colour change	Turned slight brown.
After 2 hrs.	Turned more brown	No colour change	Turned slight brown.

…….. and so on.

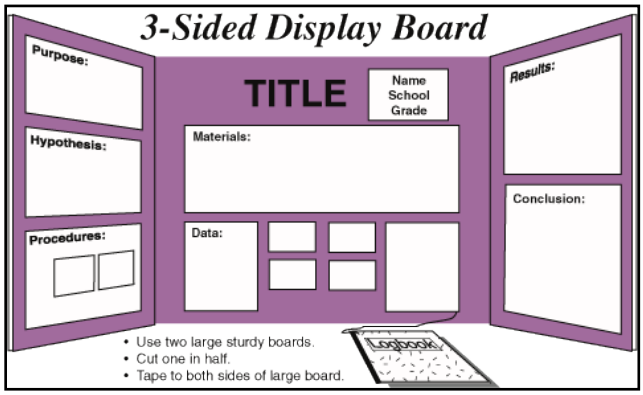
7. **Analyze** your results. Figure out what the experiment results tell you:
   a. Do the results of your experiment tell you your hypothesis is on the right track or not? How?
   b. Did your experiment make you think of new questions that need answers?
   c. How can the information you found be useful? How does it relate to the world in which you live?

8. Make a **conclusion** and decide whether it proves or disproves your hypothesis.

C. THE DISPLAY: HOW TO SHOW YOUR EXPERIMENT AT THE FAIR:

- The purpose of the display is to give a "project summary" at a glance. This display is basically a written **BRIEF** description of what your **topic question** is and all you did in finding answers to your question.

- Use **tall cardboard that is able to stand on its own**. Your project description should be written on sheets of paper that are then stuck on this self-supporting cardboard. Your board must be no larger than 4 feet wide by 3 feet high. If you can make a three sided cardboard display, it is best. Otherwise, you can make your cardboard display stand on its own like a photo frame with a support at the back.



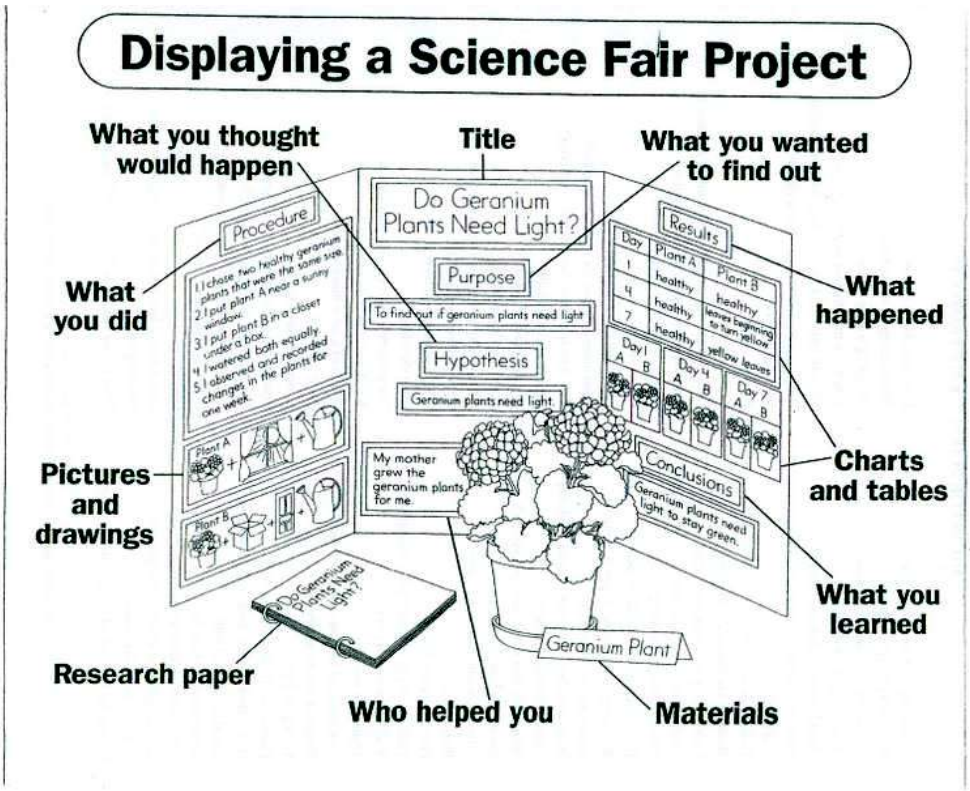
- You may display your experiment, if possible, or your model (if any) in front of your display board.

- The following is what your display must contain: **Typed neatly** or **written neatly** on **separate sheets of paper and stuck on the display board**. (PLEASE DO NOT WRITE DIRECTLY ON THE BOARD AS THE PROJECT WILL NOT BE ALLOWED IN).
  1. A descriptive **title** of ten words or less.
  2. Your **name** and **class.**
  3. The **purpose** of your project. It should be in a question form.
  4. Your **hypothesis**.
  5. A short summary of your **procedures**. This is a step-by-step account of what you did. It should include the **materials** and **methods** used to reach your conclusion.
  6. A short summary of your **data.** This is all of your results in the form of tables, charts, etc.
  7. A short summary of your **analysis**. How your data supports or does not support, your hypothesis.
  8. A short summary of your **conclusions**.
  9. A list of your **resources** (where you collected your information from).

- REMEMBER THE FOLLOWING FOR YOUR DISPLAY:
  a. **Use your display wisely**. Fill the display board but do not crowd. Your presentation will be more attractive and interesting if you use graphs, photographs, charts, drawings, or samples.
  b. **Remember to be neat!**
  c. Make your display **interesting and attractive**. You can use snappy visual effects and colours.
  d. **Be ready to discuss** your project with others.
  e. **Photos and drawings are encouraged on the display board.** Your project will be on display for one complete day. Please be aware that other students may handle your exhibits. If you are worried that something may be broken, do not use it in your exhibit but display photos or drawings of it instead.

The following site is one of many web-sites that give you examples of how to make and organize your display boards: **http://school.discoveryeducation.com/sciencefaircentral/Science-Fair-Presentations/How-to-Create-a-Winning-Science-Fair-Display-Board.html**

AN EXAMPLE OF THE WAY YOUR PROJECT SHOULD BE DISPLAYED IS SHOWN BELOW. YOUR EXHIBITS / MODELS, IF ANY, MAY BE PLACED IN FRONT OF YOUR PROJECT DISPLAY.



HANDS OFF!!

The following items are **not** allowed in the Science Fair:

- × Any body parts (except for teeth, hair or nails).
- × Hypodermic needles
- × Drugs
- × Dangerous chemicals
- × Materials that explode or catch on fire
- × Live animals including fish
- × Sharp objects

TIPS FOR SUCCESS:

- Perform your test more than once to be sure your results are accurate. Repeat the first test exactly. Each repeat is called a **trial.** Record the results of each trial separately.
- Keep a logbook. For each trial, record the date and time, any measurements, observations or results, as well as any comments you have.
- If possible take photographs of noticeable things that take place during the experiment.
- **Be sure that you don't gather only those results that say your hypothesis is correct. Finding the real answer is more important than proving your hypothesis!**
- ABOVE ALL MAKE YOUR EXPERIMENT SAFE!

All the best!!

SOME SCIENCE PROJECT IDEAS

Plants:

1. Does the amount of light on plants affect their growth?
2. Does the amount of water given to plants affect their growth?
3. What is the effect of detergents on a bean seed?
4. In what kind of material (sand, clay, etc) do seeds grow best?
5. What is the effect of chlorinated water on plant growth?

Animals:

IMPORTANT: Treat all animals with respect. Do not mistreat animals in your experiments.

1. What kind of life can be found in square meter of my garden soil?
2. How does a bird embryo grow in an egg.
3. How does an earthworm react to light and darkness?
4. Do different kinds of caterpillars eat different kinds of food?
5. Do mint plants repel insects?
6. What is the effect of temperature on the activity of different insects / worms?

Earth And Space

1. Does the moon rise every night at the same time and in the same location in the sky?
2. Is rainwater absorbed at the same rate in different kinds of soil?
3. From which direction does the wind blow most frequently?

Human Body

1. How do fingerprints differ?
2. Are certain dominant traits exhibited in the same family?
3. Who has bigger hands, boys or girls?
4. How accurately can you tell the temperature of an object by touch?

Physical Science

1. What is the effect of heat when dissolving sugar? Salt?
2. Can salt melt ice faster?
3. How much of the air is oxygen?
4. Can salt water be desalted by freezing?
5. How is the strength of a magnet affected by glass, cardboard and plastic?
6. What is the best shape for a kite?
7. Does painting prevent the formation of rust?
8. Do all objects fall at the same speed?
9. Which kind of metal conducts heat best?
10. On what kind of surface does a ball roll fastest?
11. Sound travels best through, solid, liquid or gas?
12. How does the design of a paper airplane affect its flight?

Consumer Science

1. Which chewing gum holds its flavor the longest?
2. Which detergent breaks up oil the best?
3. Which detergent makes the most bubbles?
4. Which brand of diaper holds most water?
5. Which type of battery makes toys run longest?

YOU MAY GET MORE IDEAS ON THE INTERNET. CHOOSE WHAT YOU LIKE AND UNDERSTAND BEST.