Oso Grande Science Fair Helpful Hints & Guidelines 2018

STEP 1: GETTING STARTED - Choosing a Category that interests you…

All great projects start with great questions, but before you get started on a great question, you need to pick a subject or topic that you like. There are three different categories of the Science Fair to choose from. They are:

Life Science: This category deals with all animal, plant and human body questions that you might have and want to do an experiment about. If you are dealing with animals, please let an adult assist you. It is okay to do experiments on plants, as long as they don't belong to someone else. Don't do an experiment on your mom's rose bushes unless you ask her first! Life science also includes studying behaviors, so it's a perfect category to try taste tests, opinion surveys, animal behavior training (or even training behavior in humans…like baby brothers or sisters).

Plants - *(plant growth, development /behavior; factors affecting these, plants used in medicine or industry, forestry, etc.)*

Animals - *(investigations of animal behaviors or interactions, including those of insects, etc.)*

Physical Science: If you like trying to figure out how things work, then this is the category for you! It includes topics about matter and structure, as well as electricity, magnetism, sound, light or anything else that you might question, "How does it work, and what if I do this to it, will it still work?" But remember, you always need to ask an adult first, and always make sure there is an adult with you when you try it. Physical science also includes the composition of matter and how it reacts to each other. These are the science experiments that may have bubbling and oozing going on, like figuring out what is an acid, and what is a base. It is a perfect category to try to mix things together to see what will happen. Again, if you are experimenting with things, you need to recruit an adult to help you out.

Chemistry - *(mixtures, solutions, reactions, chemical changes using only safe liquids & powders at the elementary level).*

Physics - *(laws of physics, heat, electricity, magnets, friction, force & motion, simple machines)*

Properties of Matter – *(solids, liquids, gases, heat & cold)*

Earth and Space Sciences: This category is really awesome because it covers all sort of topics that deal with the Earth or objects in space. This includes studying weather, Geology (which is the study of everything that makes up the Earth, like rocks, fossils, volcanoes, etc.), and the study of all that is in space, including the stars, our sun and our planets.

Geology - *(soil changes, erosion, compositions of soil, rock changes with wind and water)*

Geography – *(formations and changes to landforms, lakes & rivers, mountains)*

Space Science - *(study of planets, sun, moons, constellations, the universe as a whole, astrodynamics, etc.)*

STEP 2: UNDERSTANDING THE RULES

1. Projects **MUST** be the work of the **STUDENT**. Parental help is allowed and encouraged but ultimately the students have to be able to present that they performed the experiment! It must be established that written notes are theirs, research done is their own, and any accompanying reports are written in **"their own words."**

2. Students'/teachers' names should be written on the back of display boards, or at the end of any reports or papers.

3. Use of professional/commercial kits/models is discouraged. We encourage students to make models yourself from household materials such as modeling clay, aluminum foil, cardboard, etc. If electrical, it must be battery run. **A limited amount of electrical outlets are available in the MPR. If your project requires electrical outlet access, please notify the Chairperson of the Science Fair as soon as possible.**

4. Live animals **MAY NOT** be exhibited onsite at the fair. Take photos or draw pictures instead to display on the presentation board. If your project involves any type of liquid on display, a proper container must accompany your display in order to prevent any accidental spills.

5. Projects may show reference lists or bibliographies ON display boards. Valid sources may include: magazines, textbooks, professional journals, library books on topic and electronic journals (found on the Internet, but different than just putting down web sites).

Helpful Websites:

http://www.sciencebuddies.org/
Free Science Fair Project Ideas and Advice

http://school.discoveryeducation.com/sciencefaircentral/
This web site has Janice Van Cleave handbook excerpts and is a very helpful website to walk someone through the process of a Science Fair Project from beginning to end. Links to project ideas are presented.

https://www.youtube.com/user/hooplakidzlab
Videos of fun and simple experiments for people of all ages found at this site. Parental supervision with any YouTube video viewing is encouraged.

http://www.crystal-clear-science-fair-projects.com/index.html
This site offers ideas and help on projects from elementary on up.

www.eskimo.com/~billb/scifair/bio.html#simp
This site offers project ideas of various levels and science topics.

www.theteachersguide.com/QuickScienceActivities.html
A variety of science activities…you might get a good project idea.

https://www.educationalinsights.com/category/our-brands/nancy-b-science-club.do
Nancy B's Science club sites along with her YouTube presentations are a fun resource.

STEP 3: UNDERSTANDING - What is a Science Project?

1. Choose a **PROBLEM** to solve.
2. State your problem as a **SPECIFIC QUESTION**.
3. **RESEARCH** your problem.
4. Form a **HYPOTHESIS**.
5. **PLAN** your project.
6. Set up a **TIME SCHEDULE**.
7. Make a list of all the **MATERIALS** you will need.
8. **COLLECT** all your materials.
9. **CONDUCT** your experiments, several times.
10. **RECORD** the data.
11. **ORGANIZE** the data in a more orderly form.
12. **DRAW CONCLUSIONS** from the data.
13. Prepare your **REPORT**, graphs, drawings, and diagrams (reports are not mandatory)
14. Construct your **SCIENCE FAIR DISPLAY**.

What is not a Science Project?

1. A collection of related or unrelated objects.
2. A list of things.
3. A report not supported by data or an experiment.
4. A model, illustration, or piece of equipment unrelated to an experiment.

Step 4: CHOOSING A SCIENCE PROLEM & CREATING A SELF CHECK LIST

There are many categories from which to choose a problem on which to base your science project. You should be able to answer "yes" to every question below for the problem you have chosen. If any answer is "NO," you may wish to reconsider your choice; it may be a good idea to choose a different problem or to alter the focus of your project.

Y / N 1. Is this a problem I am interest in?

Y / N 2. Will I have enough time to complete the project for the Science Fair?

Y / N 3. Will I learn something new about this subject through my observations and experiements?

Y / N 4. Is this problem specific enough so that I will be able to define exactly what I need to do?

Y / N 5. Do I have sufficient knowledge & experience to conduct the experiments necessary for the project?

Y / N 6. Will I be able to obtain all of the equipment necessary to do the project?

Y / N 7. Is this a project that I will be able to accomplish with very little or no outside help?

After Choosing Your Problem…State your problem in the form of a **QUESTION** which gives you a clear and simple idea of what your project needs to be.

STEP 5: RESEARCHING YOUR TOPIC & LISTING RESOURCES

Once you have chosen your science problem, it is time to research your problem as much as possible. Becoming an expert on your topic is what real scientists do in real labs. **So, how do you become an expert?**

1. **YOU READ!!!! YOU READ!!!! YOU READ!!!! YOU READ!!!!** READ about your topic. READ encyclopedias. READ magazine articles and books from the library. READ articles from the Internet. Review and READ online presentations on YouTube with parental guidance. Take notes of any new science words you learn and use them. Keep track of all the books and articles you read. You'll need to make a list of every book, article and website that was used for research. If you have used the IIM method before, for researching and citing sources, use it again now. It will help you put things in your own words.

2. **YOU DISCUSS!! YOU DISCUSS!! YOU DISCUSS!! YOU DISCUSS!!** Talk about it with your parents. Talk about it with your teachers. Talk about it with experts like veterinarians, doctors, weathermen or others who work with the things you are studying.

3. **KEEP A RECORD** of your information in a notebook or on index cards.

4. **LIST** all of the reference and resources you use. These will be included in your final report. Documenting your references in a list is called a bibliography. References are usually placed in alphabetical order. Examples of how to list your references are as follows…

   Example of a BOOK in Bibliography Format:
   Black, Susan. The Life of George Gaylord Simpson, New York: Broadway Press, 1999.
   Books I used to research my topic are:
   _____
   _____
   _____

   Example of a WEBSITE in Bibliography Format:
   Andrew, Jim. Paleontologist. (Online) Available http://www.altavista.com , September 30, 2012.
   Internet sites that I used to research on my topic are:
   _____
   _____
   _____

   Example of a PERSONAL INTERVIEW in Bibliography Format:
   Thomas, Lewis. Personal interview. October 10, 2012.
   People I talked to about my topic are:
   _____
   _____
   _____

5. When you have completed your research, **FORM A HYPOTHESIS**. A hypothesis is an educated guess in which you propose solution to your problem based upon your research. Having a hypothesis helps you to focus your project. Your experiments will either prove your hypothesis to be correct, or they will disprove it.

Step 6: WRITING YOUR HYPOTHESIS

Now it's time to PREDICT what you think will happen if you **TEST** your problem. This type of "SMART GUESS" or PREDICTION is what real scientists call **a HYPOTHESIS.** The hypothesis is based upon your research. To give you an idea of what we mean, we have provided some examples for you to consider below…

The "Effect" Question & Examples:

What is the effect of _____ on _____?

sunlight / decomposing rates
eye color pupil / dilation
tenderizing methods / a piece of meat
temperature / the size of a balloon
oil / the surface of a ramp
size of wire / an electromagnet

The "How Does It Affect" Question & Examples:

How does the _____ affect _____?

color of light / the growth of plants
humidity / the growth of fungi
color of a material / its absorption of heat
different light / fading of construction paper
seed planting position / the sprouting of bean seeds

The "Which/What and Verb" Question and Examples:

Which/What _____ (verb) _____?

Lego robot is the strongest lever
shape of ice melts slowest
glass block is most energy efficient
oil spill cleanup is fastest
folding design flies paper airplanes farthest
black marker contains the most ink dyes
which surface causes less friction

This is how you write the formalized hypothesis:

The hypothesis not only predicts what will happen in the experiment, but also tells why the scientist thinks it will occur, showing that the scientist used research to back up the prediction.

How does the color of crayons affect the how fast they melt in the sun?
***IF** black and white crayons are placed in the sun, **THEN** the black crayons will melt faster than the white ones **BECAUSE** dark colors absorb more heat than light colors do.*

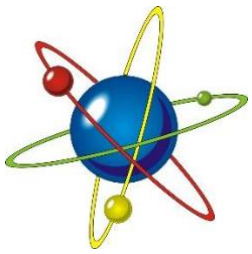
Step 7: PLANNING YOUR SCIENCE PROJECT

When you have completed your research, you may want to create a work schedule for the project itself. Your work schedule will include gathering the materials and equipment you'll need to conduct your experiments, doing the experiments and recording the data, writing your report, and designing and building your science fair display. Always give yourself more time than you think you will need for each step, so unexpected problems don't cause you to become anxious or to rush through the steps.

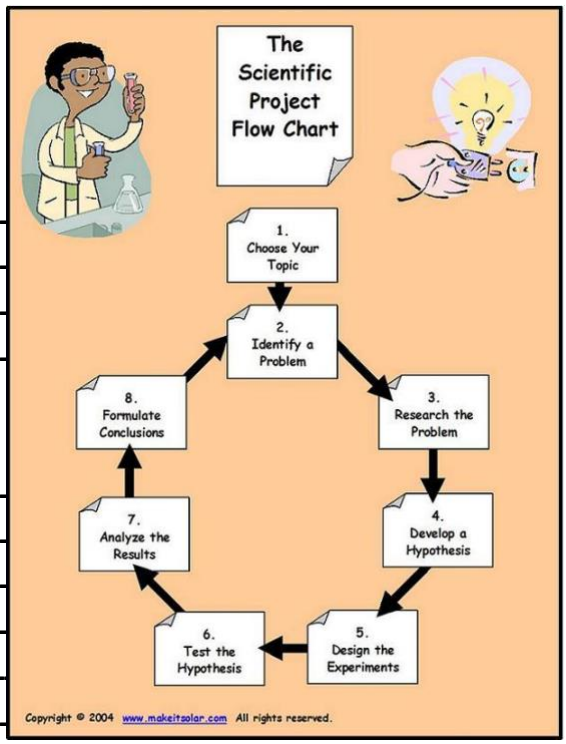
When working out your schedule, think about the following:

1. How will I go about solving my problem? What is my goal? What do I want to show, prove or disprove?
2. What materials & equipment will I need? Make a detailed list of everything you will need for the project, including the experiments and the science fair display.
3. What experiments will I need to conduct? Remember that you will need to run your experiments several times to get truly accurate and valid data.
4. How will I go about collecting and recording my observations, data and conclusions?
5. How much information will I want to include in my final report?
6. How will I want my science fair display to look? What kind of background would look best? Who will it be built?
7. What should I include in my display? Consider including samples, models, illustrations, graphs, charts, tables, photographs, diagrams, written reports, and equipment from your experiments.

It is important that you do not become discouraged if your experiments or projects do not work out exactly as planned. Scientists learn as much from their many "failed" experiments as from the few which prove successful. Often, with a little thought, you can develop a new way to state your conclusions that will be more satisfying than reporting a negative result. Remember: no project is a failure; you learn from it no matter what its results are. Don't give up too soon!



SCIENCE PROJECT PLANNING SHEET



Name:_____

Problem (in form of a question):

_____
_____
_____
_____

Hypothesis: "I think that if

_____
_____
_____
_____

then _____
_____
_____
_____
_____

Materials & equipment to be used:

_____
_____
_____
_____
_____

Experiments(s):

_____
_____
_____
_____
_____

Data collection method:

_____
_____
_____
_____
_____

SCIENCE PROJECT PLANNING SHEET (2)

Information to include in final report (if you are including a report):

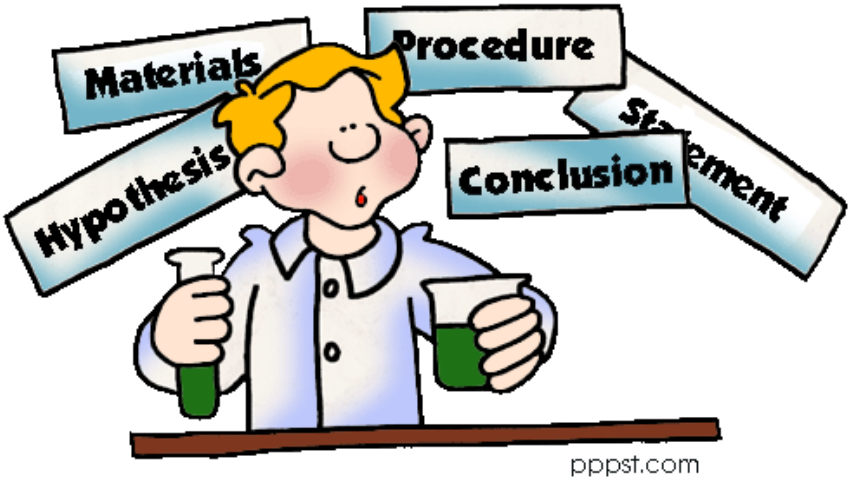
_____
_____
_____
_____
_____

Final display plans:

_____
_____
_____
_____
_____
_____

Other:

_____
_____
_____
_____
_____



SCIENCE PROJECT WEEKLY JOURNAL

Name: _____

Project: _____

Problem:

_____
_____
_____
_____

Hypothesis:

_____
_____
_____
_____

Materials gathered:

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

Experiments conducted:

_____
_____
_____

Observations and data gathered:

_____
_____
_____
_____
_____

SCIENCE PROJECT WEEKLY JOURNAL (2)

Illustrations, graphs, charts, and tables completed:

_____
_____
_____
_____
_____

Final report work: (Finish report by…)

_____
_____
_____
_____
_____
_____

Fair display work: (Finish fair display by)

_____
_____
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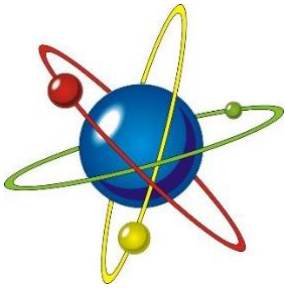
_____

General notes:

_____
_____
_____
_____
_____



PROJECT REPORT AND DISPLAY

Project Report:

A report is not mandatory. Should you choose to include one with your display, it should be clear and concise, and it should tell exactly what your project accomplished. Your report should include:

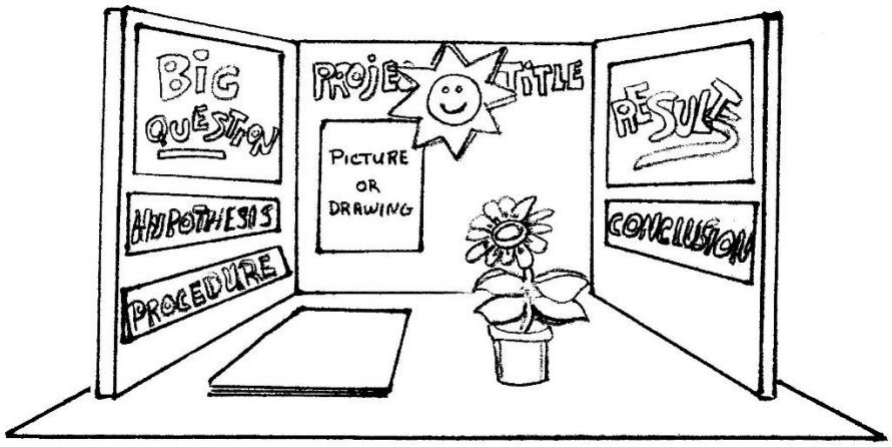
- A **COVER PAGE** with the project's title and your name, your teacher's name, the date, your school name, or your room number.
- A statement of the **PURPOSE** of your project.
- What **PROCEDURE** you used to solve the problem.
- A summary of the **EXPERIMENTS AND TESTS** you conducted.
- A **SUMMARY** of your data and findings.
- Your **CONCLUSIONS** based on the data and findings.
- A **BIBLIOGRAPHY** and list of all your resources.

Science Fair Display:

Some of the possible items to include in your final science fair display are listed below. Of course, not all of these will apply to your project.

- Charts, graphs, and tables showing the data you collected.
- The samples, materials, and equipment that you used in your experiments.
- Models, photographs, and illustrations.
- A demonstration of your experiment, if it can be reproduced at the fair (and still abide by the rules and regulations guidelines mentioned).

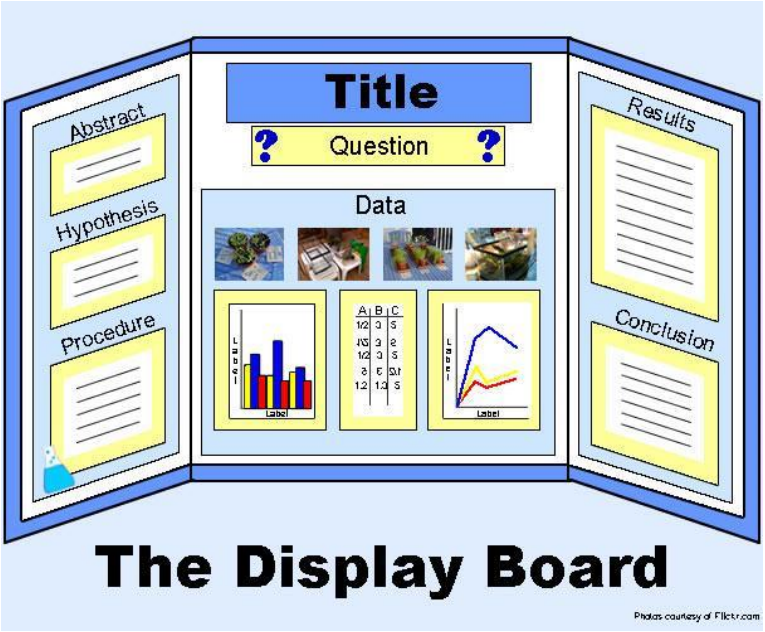
You should choose carefully what to include in your display. Use only those items which will clarity and enhance your display. Avoid needless clutter; a simple display with a few key items is often most effective.



(Any Models, Journals and Research Reports go in front of the board)

BUILDING YOUR 3-SIDED DISPLAY BOARD

EXAMPLES:



MATERIAL:

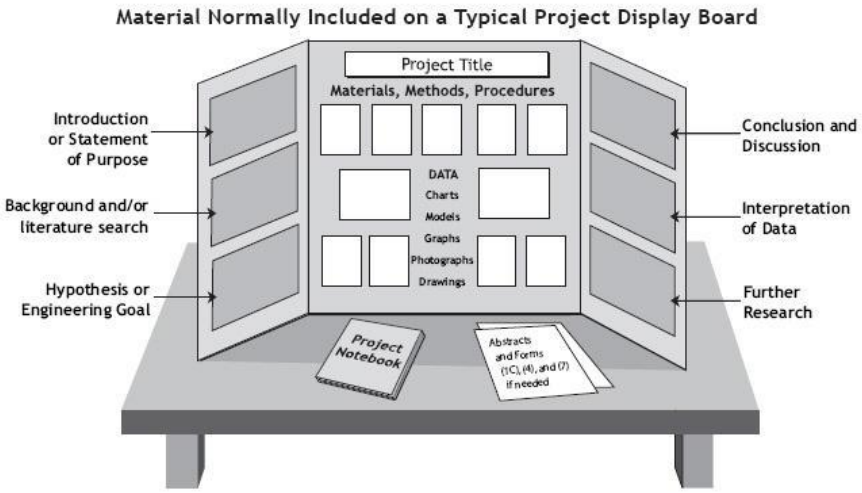
Make the backboard from any sturdy material. Remember that it should stand by itself on a table. 3-sided display boards can be purchased at Michael's or other stores that carry art supplies. If you wish to make one yourself, you could use plywood, pressed board or heavyweight cardboard assembled into three sections. Your display board should not be larger than 4 feet in length. Any materials, reports or models may be displayed and should not be larger than the space in front of the project board. Materials should not protrude further than the front of your 3-sided display board. Please note that there are a limited amount of electrical outlets available.

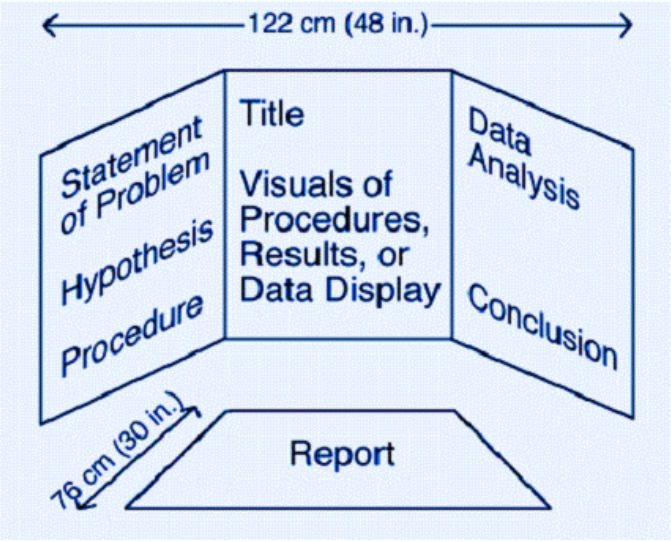
LETTERING:

Your title should be made using a computer, stick on letters, or cut from construction paper. All lettering on your board should be LARGE, clear and legible. USE CORRECT SPELLING!

COLOR:

Be creative. Use attractive colors, large print and high contrast on your display board. This is the big pictorial advertisement of your project. People should look at your board & want to see more!





PHOTOS:

Good photography can be enlarged to a 5x7 or 8x10 so that you can show how you set up your experimentation. Every project does not need photos, but if you have a camera, consider recording your progress. If the photos are included in your research paper, they should be placed at the end. Photos on your backboard should be labeled.

You need to S-P-A-C-E out your typed information and decide which layout is best for your project BEFORE you glue anything down.

PROGRESS SELF-CHECK LIST

The questions below will help you to evaluate your own progress as you work on your science fair project. If your answer is "no" to any of the questions, you will want to make the necessary changes or additions. You may want to complete this checklist more than once during your project.

YES / NO

1. I have acquired **background knowledge** by researching books, magazines and other written materials which deal with my chosen problem.

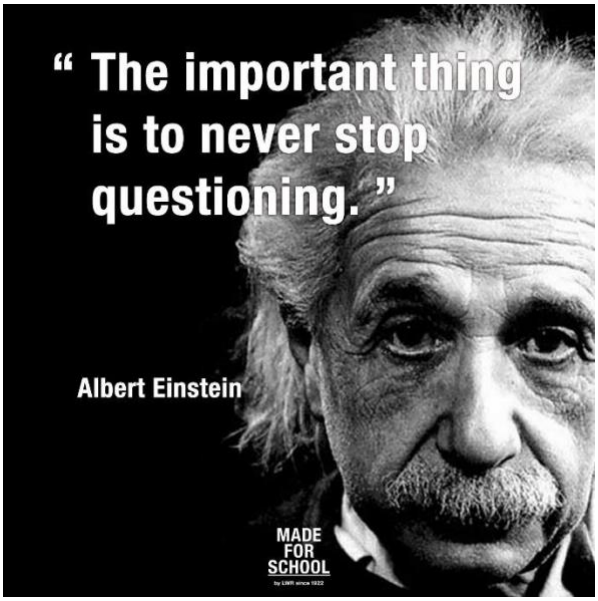
2. For **reliable results**, I am doing my experiment several times, or using several specimens.

3. I am keeping careful and accurate **records** of my progress and the results of my experiments, noting my successes and failures. I am making notes of all pertinent facts and observations.

4. I am aware that the following factors may affect the progress and results of my project, and I have taken them into account:

   - **Previous assumptions** I had about this subject may affect my objectivity.
   - My **equipment** may not be as accurate as I would like it to be.
   - **Safety precautions** may limit what I can do in my experiments.

5. I have collected and recorded specific and accurate **data and evidence** to support my conclusions.



- *Acknowledgements: Some information taken from "Harvard Elementary School Science Fair Handbook 2013-2014" and Milliken Publishing Company Science Fair 2011*