ST. ALPHONSUS SCIENCE FAIR MANUAL

A STEP-BY-STEP APPROACH GRADES 5-6

No one has ever won a Nobel Prize for a science fair project. Keep it simple ... don't bite off more than you can chew. Keep age, grade and EXPERIENCE in mind; this should be a learning experience.

SCIENTIFIC METHOD

1. ***PURPOSE*** *- State the problem*
2. ***FORM A HYPOTHESIS*** *- "If …. Then…" Statement*
3. ***EXPERIMENT*** *→ Test the hypothesis*

   Materials & Procedure
4. ***DATA/RESULTS*** *- RECORD YOUR OBSERVATIONS*
5. ***DRAW A CONCLUSION***
6. ***COMMUNICATE RESULTS –*** *Write a Report*

How to decide if your topic is an appropriate one to investigate (**Do an experiment)**:
Ask these six questions of it. If the answer to each question is "yes", then your question is an appropriate one to try to answer.

1. Is it a topic that interests me?
2. Is it a topic that I know little or nothing about?
3. Is it a topic that involves MEASURING?
4. Is there a **testable** hypothesis?
5. Is it a topic that involves available supplies and equipment?
6. Is it a topic that is related to everyday living?

A scientific study may also be entered in the science fair.

1. Follow the same procedure for an experiment, excluding the log book/journal.

2. Present research on display board in the manner described in the manual: Follow the Scientific Method.

3. Display report in a display folder of your choosing. This report is to be typed in MLA format with a separate works consulted/cited page.

SCIENCE FAIR INFORMATION

This Science Fair Information Packet is meant to be a tool to help in your completion of a project for the science fair. This information packet is intended to help guide you and to inform you about some things. All points below may be discussed with the science fair coordinator with the understanding that the coordinator has final say.

1. There is limited electricity accessibility. These outlets are reserved for 7th/8th grade entries and MUST be approved by science coordinator. Battery operation is permissible if it falls under the size requirements.

2. No live animals are permitted without specific written consent from the science fair coordinator.

3. You are limited in space to what can be placed in front of your standard size science board. Pictures of larger size projects are encouraged. This can be discussed with the science fair coordinator and taken under consideration.

4. All display boards are due in school the morning of the science fair, as the committee has set up the tables to accommodate the entrants. **Please be on time.** Materials will be returned to entrants on the last day of the science fair (usually before dismissal).

5. All 7th and 8th grade students are required to follow the instructions in the booklet they received. The web page instructions are meant as guidelines for students in 5th and 6th grade, and do not contain all requirements for 7th/8th grade.

35 SCIENCE FAIR IDEAS

1. Do metals rust at different rates?
2. Does the temperature of the air affect the *air* pressure?
3. Which type of water evaporates the quickest: salt, tap, or fresh?
4. Do different colors of the same object have different temperature?
5. Do crystals grow at the' same rate?
6. Does the time of day affect your body's temperature?
7. How much salt will. a plant be able to tolerate and still grow?
8. Which fruits contain a large quantity of acid?
9. Does color have an affect on a person's food choice? How?
10. What effect does loud noise have on growing plants?
11. Does magnetism affect plant growth? How?
12. Does magnetism affect an animal’s behavior? How?
13. Which packaging method best reduces the growth of mold or fungus?
14. What effect does the amount of sunlight have on the color of a leaf?
15. What kind (shape) of sail will make a boat go fastest?
16. Does gravity affect the direction that a seed grows?
17. Does caffeine affect plant growth? How?
18. Which paper towel absorbs the most water?
19. Which battery lasts the longest?
20. Which popcorn pops the best?
21. Does the type of material affect how a parachute works?
22. Which paper airplane design flies the furthest?
23. Does the size of a nail affect the strength of an electromagnet?
24. Which bandage sticks the best?
25. Does temperature affect the height 'that a ball will bounce?
26. How much water do different types of wood absorb?
27. Which orange juice has the most vitamin C?
28. Does planting depth affect the growth of a seed?
29. Does color affect the growth of a plant?
30. Does the type of water (rain, spring, tap) affect plant growth?
31. How acidic is our water?
32. Which fruit contains the highest percentage of water?
33. Does the number of coils of an electromagnet affect how many paper clips it can pick up?
34. What is the best soap solution for creating long lasting bubbles?
35. Do right handed students kick with their right foot?
36. Which kind of soil absorbs the most heat?

This is only a sample list of ideas that your children can choose to investigate. The children can be creative in deciding what topic they would like to investigate.

1. COLLECT THE INFORMATION ON YOUR TOPIC

BACKGROUND INFORMATION AND RESEARCH

Expect to make at least one trip to the library. All material should come from a variety of sources, not just the internet!

1. Gather general information about your topic.

2. Read the material and photocopy the parts that relate to your topic. Staple the copies into the log book or keep a folder for this information.

3. Go to the library and look up the answers to any questions you have after reading the general information. Don't be afraid to use materials that are above and below your grade level.

4. As you research, discuss what you are learning with other people.

5. Useful information may be found outside the library; nature centers, garden centers, extension services, the government printing office, etc.

6. Record the name, date and information that comes from consultation with people you know (interviews).

7. You need a minimum of <u>two</u> non-internet sources (7^{th}/8^{th} grade).

<u>TIP:</u>
Make a photocopy of the front page(s) of the books, magazines or pamphlets you use as you go along. When it is time to write your report, you can alphabetize the copies and you will have your works consulted/cited page.

2. FORM A HYPOTHESIS

Now that you have collected and read information about your topic, make a prediction as to what the answer to your question will be. This is always an If . . .then statement.

Once you have formed your hypothesis (made your prediction), you are ready to test it to see if it is correct or incorrect.

You do that by doing an experiment.

IF YOU ARE DOING AN EXPERIMENT:

3. ORGANIZE A LOG BOOK

IMPORTANCE OF AND PREPARATION OF THE LOG BOOK

1. Set it up correctly.

2. Use it. It doesn't have to be pretty, <u>just complete</u>.

Record everything! Include as many details as possible and note any problems you encounter. Constantly update your logbook.

4. DESIGN YOUR EXPERIMENT

This involves two things:

1. List all the materials that you will need.

2. Develop a set of step-by-step directions (procedure) that you will follow to test your hypothesis.

Things to keep in mind:

1. *DESIGN* your experiment so that it *measures* something!!
   The best results are those that have numbers attached to them.

2. *VARIABLES:* Think about the things that could affect the outcome of the experiment.

3. *CONTROL:* A standard to compare changes that happen during the experiment.

4. *IDENTIFY* your manipulated and responding variables.

5. *MULTIPLES:* Is your sample size adequate to verify your results?

6. *METRIC* measurements should be used.

7. *DATA COLLECTION AND RECORDING:* Make a chart or table to record your results and then make a graph of your chart.

8. *DETAILS, DETAILS, DETAILS:* Write everything down when you do it and as it happens.

5. RECORD YOUR OBSERVATIONS

RECORD everything you do in the Log Book

a. Make notes on the deviations from the original design
b. Record variables that may have influenced the outcome of the experiment
c. If necessary, or if helpful, do the experiment again

REVISE: Keep making notes on the materials and procedure followed until you have captured enough information for someone to duplicate the experiment exactly as you have performed it. Make note of where you obtained the materials.

TIP: Ask someone who has had nothing to do with the project to look over your experiment and log book and make a list of questions or tell you what part of your project they don't understand. In other words, find someone who will play "Devil's Advocate."

6. DRAW CONCLUSIONS.

1. Results should be represented in chart and graph form.

2. The conclusion should relate directly to the question and the hypothesis.

3. **All hypotheses will not be proven**! If the results do not support your hypothesis, explain why they don't. You should indicate what went wrong and what you would change in a future experiment to make the experiment better.

7. COMMUNICATE RESULTS

Use the Log Book. If you prepared the log book correctly and recorded all aspects of the project so far, then everything you need to write your report is already there. Take a highlighter, go through the log book and highlight the information that you want to include in the final report

YOUR DISPLAY

1. The backboard should be a three-sided shape within the size limitations stated below.

2. When displayed, the project should not occupy more than 99.4 cm. of length, 77 cm. of depth and 122 cm. of height.

3. Backboards may be made of any suitable material that allows them to be self-supporting.

4. The center panel should contain the project title. The lettering should be clear and large enough for someone to read from a distance. This panel could also contain any visual materials such as photos, drawings, etc.

5. A suggested layout of your display:
   Center (front) panel - Project Title and state the problem
   Left panel - state the hypothesis (include materials list) and procedure
   Right panel - state your Data (results) and conclusion

6. Side panels can also hold supporting material such as more photos, graphs, charts, etc.

7. Things that will enhance your project:

   BOLD HEADINGS
   COLOR
   PHOTOGRAPHS
   COMPUTER GRAPHICS
   LINE, BAR or PIE GRAPHS
   NEATNESS
   CLARITY
   GOOD ORGANIZATION
   CORRECT SPELLING

8. Your name(s) should appear on back of board only!