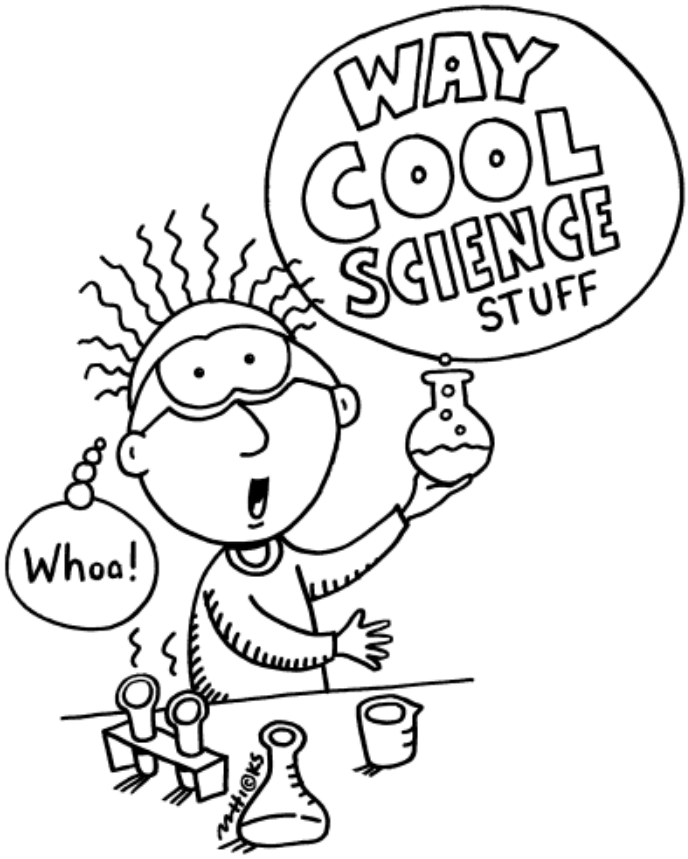
STUDENT HANDBOOK FOR ELEMENTARY SCIENCE FAIRS (Grades K-6)



PLANO ISD
2009-2010

Elementary Science Fair Student Handbook

Participating in a science fair is fun and rewarding. There are many important things to remember when planning and conducting a project. This handbook will assist you with questions you may have and give you the information you need for completing the project correctly. Remember to allow yourself plenty of time to carry out the project and have fun in the process. **Please read the handbook carefully as you decide upon your topic and prepare your science fair project.**

The science fair is conducted for many reasons:

- To focus attention on scientific experiences in school.
- To stimulate interest in scientific investigation beyond routine class work.
- To recognize and commend youthful scientific talent and hobby pursuits.
- To offer an opportunity for display of scientific talent through exhibit and demonstration.
- To stimulate public interest in the scientific abilities of students.

Important Dates

Science Fair Project Open House:
Thursday, December 10, 2009
8:00 a.m. – 1:00 p.m. and 4:00 pm. - 7:00 p.m.
Sockwell Center
6301 Chapel Hill Boulevard
Plano 75093

The Open House is for parents and children new to Science Fairs. No formal meeting or presentation will be offered, however project boards from past science fairs will be displayed. Students and parents may attend any time during the scheduled time and stay as long as needed to gather ideas.

Campus Science Fairs:
All elementary campus fairs must be held during January 18 – January 29, 2010.
Check with your individual school for the date students' Science Fair projects are due for the Campus Science Fair.

Plano District Fair:
Saturday, February 13, 2010
Renner Middle School
5701 W. Parker Road

North Dallas Elementary Regional Science Fair:
Wednesday-Thursday, March 10-11, 2010
Garland ISD Special Events Center
4999 Naaman Forest Blvd
Garland 75040

Who May Enter and Awards Given

Campus Science Fairs:

- All students in grades K through 6 may enter the Campus Science Fair.
- All students will receive an entrant ribbon.
- Each grade level may award ribbons for:
  - Honorable Mention, 3rd place, 2nd place, and 1st place.
- Lower Elementary (made up of all first, second, and third grade projects) will award **One Grand Prize** chosen from the 1st prize winners.
- Upper Elementary (made up of all fourth and fifth grade projects) will award **One Grand Prize** chosen from 1st prize winners.
- **No ties for first place or Grand Prize are allowed.**

Plano District Science Fair:

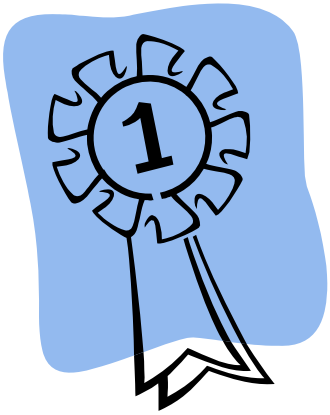
- All **1st place winners** and **Grand Prize winners** from each building may enter.
- Sixth grade may submit 3 to 5 entries from their building.

North Dallas Regional Science Fair:

- Each elementary school may submit:
  - one Grand Prize entry for grades 4 – 5
  - one Grand Prize entry for grades 1 – 3
  - 3 to 5 entries for each grade 6 schools
  - Kindergarten may not compete beyond the Plano District Fair.
  - The individual campus must submit the entry forms for all projects entered in the Regional Science Fair.

Exceptions:

- Any **grand prize** winning project of the **Plano District Science Fair** may be entered in the North Dallas Regional Science Fair, even though it was not a Grand Prize Winner in the Campus Science Fair.
- A **first place** winner at the Plano District Fair may not enter the North Dallas Regional Fair unless he/she is already the campus Grand Prize winner. If you have any questions, please call Mary Swinton at 469-752-8955.



RULES FOR ALL SCIENCE FAIR EXHIBITORS

The following rules apply to student projects.

1. **No experiment dealing with fungus, bacteria, mold (pathogenic substances) may be entered into the Campus, District or North Texas Regional Science Fair.**

2. A student in grades K – 6 may enter only one project, and it must be his or her own work.

3. A student may enter a project as an individual or a group of **no more than three students.**

4. Group projects will compete with individual projects and will not be judged separately.

5. Siblings or friends in the same school or different schools may enter a group project together, but the project must be entered in the grade level of the oldest sibling or friend and in only one school.

6. The identical repetition of a previous year's work is not permitted; however, a student may exhibit previous research on a continuing problem, provided the research shows significant progress when compared with the previous year. A separate research report and notebook showing previous research **must** be part of the new exhibit.

7. Teachers and technically trained professionals may give information and advice to all students entering science fair projects, but may not do the research or work for students.

8. All surveys and research performed with human subjects must be conducted outside of the school day. **School personnel may not assist with the research or survey during the school day.**

9. Two separate folders, composition books, etc are **required** with the project. One contains **a short (age appropriate) report** on research related to the project. **The second is a science project notebook**. Two folders allow judges to quickly find reports and notebooks. Of course, the work will look very different in Kindergarten and in fifth grade.

10. **Metric measurements are required.**

11. The student's face may not appear in pictures on the display board, in the research report or in the notebook. No previous awards of student or school's name may be displayed.

12. **A student's name should not appear on the front of the project.** Student information (name, address, phone number, parent's name, grade, school, and teacher) should be placed in an envelope attached to the back of the display board.

13. Students **may** make improvements on their projects before District and Regional competition.
14. Each student at a campus or district fair should be prepared to explain his or her project to a judge if an interview is requested.
15. Judges **may** choose to interview only the first place contenders in each category at campus fairs. All students will be interviewed at the district science fair. Interviews are not done at the regional fair because judging is done during the school day and students are at their campuses and not available.

The decisions of the science fair judges and officials are final and are not subject to review. Protests will not be accepted.

SAFETY RULES

It is essential for teachers to inform students and parents of these safety rules.

For safety reasons the North Dallas Regional Elementary Science Fair **DOES NOT ALLOW** experimentation using dangerous equipment or substances that may be harmful to students or others.

STUDENT EXPERIMENTATION

Students MUST:

- Obtain approval of the District Science Coordinator **BEFORE** beginning any project involving vertebrate animals, human subjects, or any potentially dangerous substance, material or equipment.
- Have adult supervision when using equipment, sharp objects or chemicals (including household chemicals).
- Observe proper safety protocol at all times.

Students MAY NOT:

- Conduct experiments using poisons, drugs, hazardous substances, controlled substances or devices.
- Conduct experiments on microbial cultures, mold, or fungi (disease or non-disease causing) or any other possibly pathogenic substances.
- Conduct experiments that involve human parts, blood or other body fluids (except teeth or hair).
- Conduct experiments that cause or may cause harm or injury to animals or human subjects.
- Conduct experiments with explosives including guns, ammunition and rocket propellants.
- Conduct experiments with caustic or toxic substances.

DISPLAY RULES

The North Dallas Regional Elementary Science Fair **DOES NOT ALLOW** the display of organic or potentially dangerous materials, and the display of non-essential objects is discouraged. Anything that could be considered hazardous to the public is prohibited. *Determinations of safety are made by the Regional Science Fair Committee and are final.*

Project displays may NOT include the following items:

- Liquids, including water
- Food "stuffs" (candy, gum, popcorn, etc.)
- Living plants or plant materials, which are in their raw, unprocessed, unmanufactured or natural state such as leaves, seeds/nuts, bark, stems, or roots
- Live animals (vertebrate or invertebrate) or animal tissues including eggs or egg shells
- Preserved animals or their parts (except preserved insects or sea shells in tightly sealed containers)
- Human parts, blood or other body fluids (except teeth or hair in tightly sealed containers)
- Microbial cultures, mold, or fungi (disease or non-disease causing)
- Soil (sand, clay, rock, etc.) or waste products
- Laboratory / household chemicals (including detergents)
- Dangerous chemical substances, such as caustics, acids, or highly combustible solids, fluids, or gases in pressurized tanks
- Poisons, drugs, hazardous substances, controlled substances or devices
- Dry ice or other sublimating solids
- Syringes, needles, pipettes or similar devices
- Flames, open or concealed, or highly flammable display materials (including candles)
- Microbial cultures, mold, or fungi (disease or non-disease causing)
- Lasers

RULES AND CERTIFICATIONS FOR

BIOLOGICAL PROJECTS

It is the responsibility of elementary level teachers to approve projects that involve vertebrate animals, human subjects, recombinant DNA, tissues, pathogenic agents and controlled substances **prior** to the research of the student.

All microorganisms collected, isolated, and or cultured from any environment should be considered potentially pathogenic.

ANIMAL SUBJECTS

1. Research must be conducted with a respect for life and an appreciation of humane considerations, which must be afforded all animals.

2. To provide for humane treatment of animals, an animal supervisor, who is knowledgeable in the proper care and handling of laboratory animals, must assume primary responsibility for the condition under which animals are maintained. If the school faculty includes no one who is knowledgeable in the proper care and handling of laboratory animals, the services of such a person, on a consulting basis, must be obtained. The comfort of the animals used in any research will be a prime concern.

3. Experimental procedures that cause pain or discomfort are prohibited. No research using live animals shall be attempted unless the animals have been obtained from a reliable source and the following conditions can be assured: appropriate, comfortable quarters; adequate food and water; humane treatment; and gentle handling.

4. Proper quarters and care must be provided at all times, including weekends and vacation periods. Pet store animals are inappropriate for experimentation. The genetic background, age, and past nutritional status are difficult to determine. Under no circumstances should the students be allowed to perform sacrifice.

5. Exhibitors are reminded that **no vertebrate animals, alive, dead, or preserved**, may be displayed at the campus, district, and regional science fairs.

HUMAN SUBJECTS

The Federal regulations for the protection of human subjects in behavioral and biomedical research are becoming increasingly more rigid. You should discuss proper methodology and humane concerns with your teacher.

Do not start any such research unless adult supervision determines, in advance, that it will be in full compliance with federal guidelines and regulations. This includes research in which you are the subject of your own research.

All projects using human subjects must have signed consent forms from each subject agreeing to their participation in the study and appearance in any photographs, which may be displayed. These are turned in with a project.

RECOMBINANT DNA
Non-exempt recombinant DNA studies must be conducted in a federally registered research institution under the direct supervision of a Qualified Scientist. Exempt DNA studies may be conducted in a non-federally registered laboratory under direct supervision of a Qualified Scientist.

TISSUES
When tissues samples (including blood, blood products, hair, teeth, saliva, urine, etc.) of human or vertebrate animals are obtained by the student from an institution or biomedical scientist, a statement signed by the adult providing the tissue is required.

Note: Human blood and blood products must be documented as free of AIDS and Hepatitis prior to the student receiving the tissue.

CONTROLLED SUBSTANCES
Students must adhere to all federal regulations governing controlled substances. Controlled substances include DEA classed substances, prescription drugs and alcohol and tobacco. Substances must be acquired and used according to local, state and federal laws. Students under 21 may not purchase and/or handle smokeless powder or black powder for science projects.

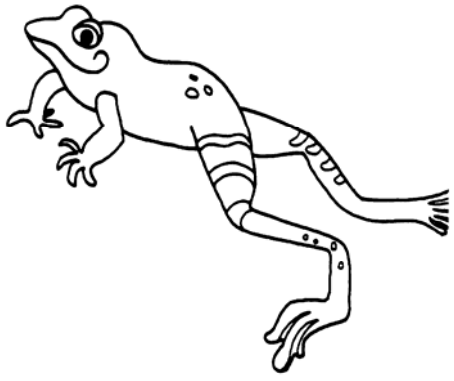
Health Rules

1. The practice of medicine by students is illegal and will not be permitted without documentation of direct, complete and involved supervision of a licensed professional.

2. All research involving animals must be conducted with a respect for life and an appreciation of humane considerations that must be afforded all animals.

3. Teachers and students must indicate a familiarity with and understanding of all rules involving vertebrate animals, human subjects, recombinant DNA, tissues, pathogenic agents, and controlled substances PRIOR to starting their research.

4. Teachers should review all research involving human subjects prior to the investigation to determine that there is no risk or harm to the subjects, either physically or psychologically, and that privacy is insured.



REQUIRED FORM FOR BIOLOGICAL PROJECTS

This form must be completed for all research involving **vertebrate animals, human subjects,** (including **surveys of human subjects**), **recombinant DNA, tissues, controlled substances,** and/or **microorganisms** prior to the research.

THIS FORM MUST BE COMPLETELY FILLED OUT AND PLACED IN THE ENVELOPE ON THE BACK OF THE PROJECT PRIOR TO JUDGING.

Type or print

Student's name_____

School_____ Grade_____

I agree to sponsor the student named above and assume responsibility for compliance with existing Science Fair rules.

Date_____

Teacher's signature_____

Teacher's name_____

Teacher's position_____

Teacher's address_____

City/State/Zip_____

Teacher's office phone_____
(area code)

Teacher's conference hour_____

HELPING YOUR CHILDREN WITH THEIR SCIENCE FAIR PROJECTS

Things a parent may do:

1. Give encouragement, support, and guidance. (Be positive!)

2. Make sure your child feels it is his or her project. Make sure the project is primarily the work of the child.

3. Realize that the main purpose of a science fair project is to help your child use and strengthen the basic skills he or she has learned and to develop higher-level skills.

4. Realize your child will need help in understanding, acquiring, and using the major science process skills (researching, organizing, measuring, calculating, reporting, demonstrating, experimenting, collecting, constructing, presenting).

5. Realize that your child may be using reading, writing, arithmetic, and social skills in a creative way to solve a problem.

6. Help your child design a safe project that is not hazardous in any way.

7. Provide transportation to places such as libraries, nature centers, universities, etc. that can help find project information. Several sources will take time to help your child find ideas and give suggestions for successful project.

8. Help your child write letters to people who can help on the science project and be sure the letters are mailed.

9. Help your child develop the necessary technical skills and/or help the child do the technical work such as building the exhibit and doing the photography.

10. Help your child understand that science is not just a subject, but a “way of looking at the world around us”.

11. Be sure that your child states in the paper and/or exhibit the help he or she has received from you or others. This will help judges to make a fair evaluation of the project.

12. Look over the project to check for grammar, neatness, spelling and accuracy. Make suggestions on how it can be corrected.

13. Buy or help find the necessary materials to complete the project.

14. Realize that a good project doesn't have to cost a lot of money. Many times a simple project that is well displayed and explained is the best.

15. Help your child understand that a weekend chore, or one or two posters, is not a project.

16. Help your child keep a record (science project notebook) of all he or she does and a list of references used.

17. Find an area in the house where your child can work on the project and not have to worry about pets or brothers and sisters.

18. Explain to your child that he or she should consult with you or the teacher when problems arise. Set aside time for help sessions. Make them short and constructive. Be an interested and enthusiastic listener.

19. Have your child present his or her science project to you before he or she takes it to school.

20. Help transport your child and the science fair project to and from the school/district/ regional science fairs.

21. Be positive and supportive if your child doesn't win a prize at the science fair. The skills the child has gained are worth all the effort. Help your child to begin a plan for next year.

22. Feel a sense of pride and satisfaction when the project and the science fair are finished. Share this with your child, you have both earned it!

TIPS FOR KINDERGARTEN PROJECTS

1. Help your child choose a topic, which is interesting and age-appropriate for him or her.
2. Encourage your child to draw pictures or write as much as possible on the backboard. Inventive spelling is acceptable. You as the parent can write for him or her, but let the child tell you what to write and record his or her words faithfully.
3. Have your child tell another adult about the project. This will help prepare for the judge's possible interview.
4. Start the project early so you both have time to work a <u>little</u> each day. Trying to complete the project during long sessions will cause much distress for you both.
5. More important than the project is your child's attitude toward science investigations. Help make the project fun and motivating.
6. A simple log book with words or drawings is appropriate for Kindergarten projects.
7. Model for your child your interest in science and science capabilities. Don't let your lack of comfort or interest in science stand in the way of your child's natural curiosity and eagerness to explore and discover something new.

Your Project… Step by Step

Remember to make notes in your Science Project Notebook (see page 13) each time you work on the project.

1. Start as soon as possible to prevent a last minute project and give yourself plenty of time to investigate your question. A 4 to 8 week plan is best.

2. Check websites about science fair projects.

   http://www.all-science-fair-projects.com/
   http://www.sciencebuddies.com/
   http://www.sciencefair-projects.org/
   http://www.terimore.com/

3. Decide on a topic. Narrow down interest to a certain field of study.

4. Decide on a question to investigate. Be sure the question is appropriate to the child's ability level.

5. Research information about what is already known about the topic and question. Remember to keep notes on resources used.

6. Develop a hypothesis. (What outcome do you expect?)

7. Identify the variables (see page 15 for information and examples of variable)

8. List the materials needed.

9. Gather the project materials and display supplies.

10. Develop a procedure/investigation.

11. Conduct the experiment. Remember to use metric measurements. Make notes about observations, problems that arise, changes needed if repeated, and additional information discovered.

12. Record the results. Consider using a table, graph, pictures or chart to display the results.

13. Interpret the data and other observations.

14. Draw appropriate conclusions.

15. Write the report. (see page 14)

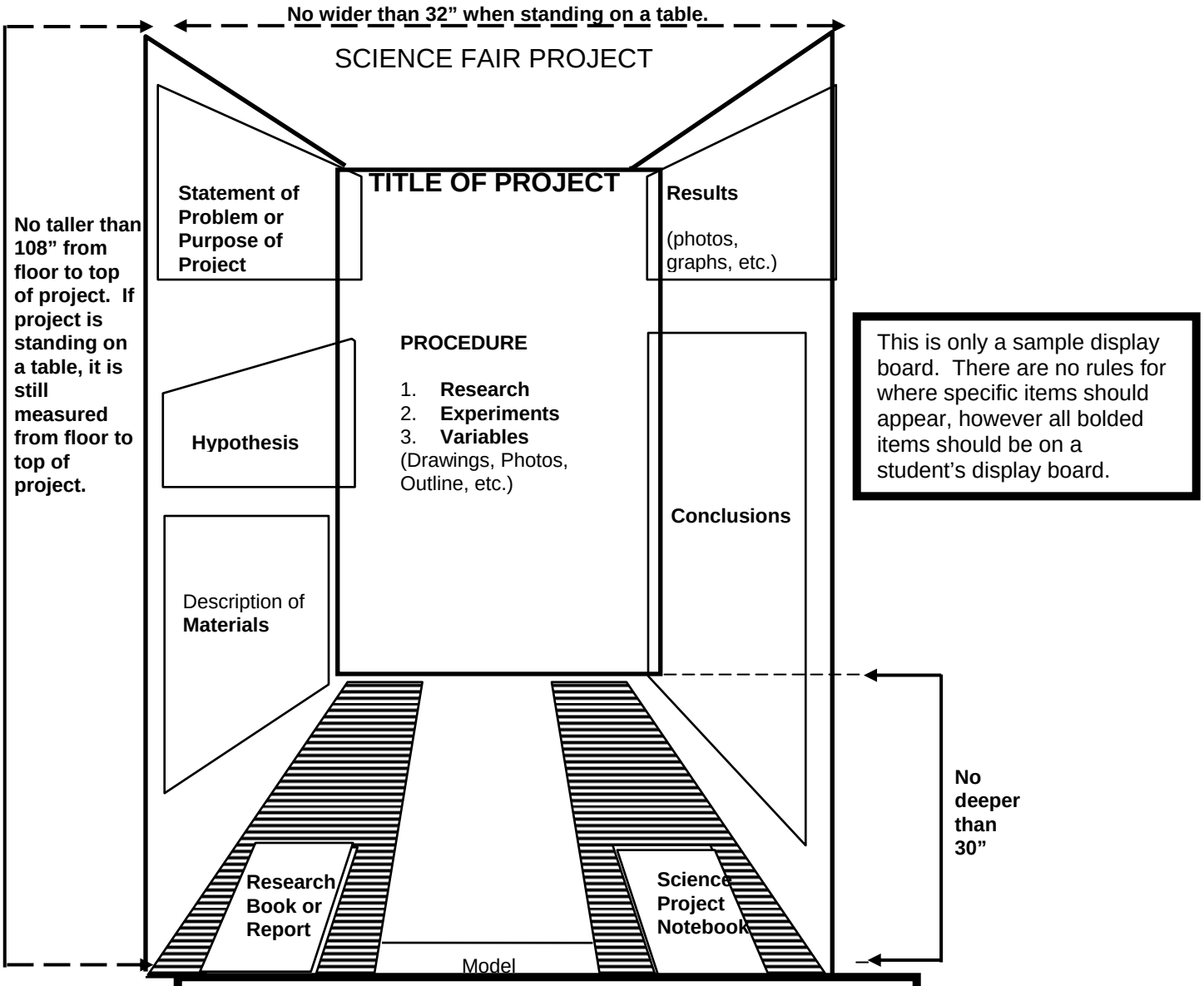
16. Create a display board/exhibit. (see page 12)

SAMPLE SCIENCE PROJECT DISPLAY BOARD

All exhibits must be self-supporting and may be placed on a table or the floor. Please measure your project carefully before entering it in a science fair. It must not exceed size requirements. (30 inches deep, 32 inches wide, 108 inches high from floor to top of exhibit)

The student must furnish all equipment and other necessary material when setting up an exhibit. The Science Fair will provide exhibit tables only. Please bring your own extension cords and duct tape to the fair.

The Campus, District, and Regional Science Fair officials are not responsible for items lost or damaged at the fairs. Please make copies of all research done and your notebook. Since the exhibit areas cannot be completely secured, please copy anything that could not be replaced. Students could display photographs in place of actual objects.



This is only a sample display board. There are no rules for where specific items should appear, however all bolded items should be on a student's display board.

Photographs used on the display board may **not** show the student's face or any other faces.
Photographs used on the display should **not** show dissections, animal parts, trauma or injury.
The student's name may **not** appear on the front of the display board or in the research book, or notebook.

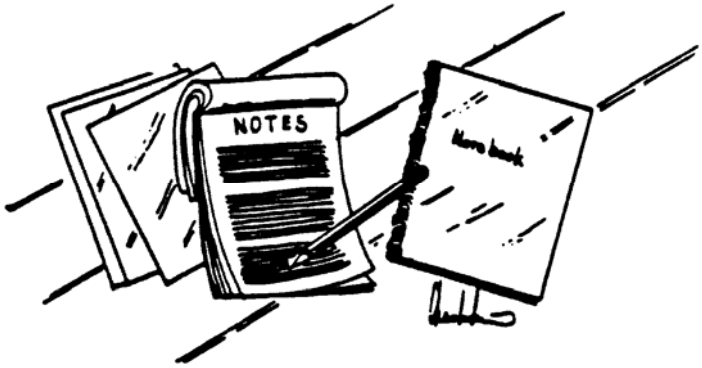
SCIENCE PROJECT NOTEBOOK

All the data gathered during your experiment should be carefully recorded in a science project notebook. Certainly this includes the data gathered as a result of the experiment itself, but it also includes much more.

Your Notebook should include:

- project title
- a list of all the materials used
- notes on all the preparations you made prior to starting your experiment, including brainstorming sessions.
- Information about the resources you use (books, people, libraries, museums, etc.).
- detailed day-by-day notes on the progress of the project from your first brainstorming session through to your last work session.
    - What you are actually doing
    - Problems you encounter with the experiment
    - Things you would change if you were doing this investigation again
- any drawings that might help explain your work.
- data that was gathered during the course of the experiment (notes, charts, tables, graphs).
- any required forms.

BE SURE TO DATE EACH ENTRY IN YOUR NOTEBOOK



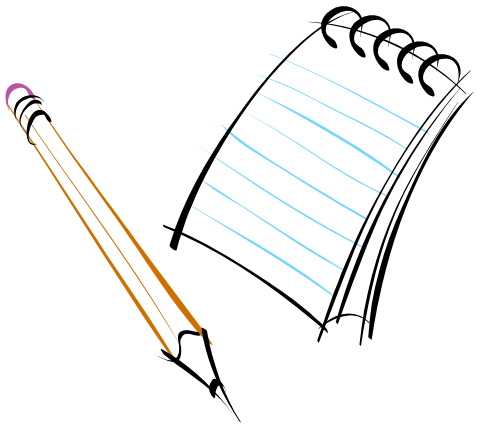
SCIENCE PROJECT REPORT

Possibly the most important and, at the same time, the most neglected phase of the scientific method is the compilation of a complete report. If scientists as a group fail to report their results, then each of us might wake up in a whole new world every day, doomed to repeat the failures of the past or else to waste time and effort in the rediscovery of old knowledge.

Your report should include:

- project title
- your question.
- your hypothesis, along with your reasoning for why you arrived at that hypothesis.
- your research.
- list of variables.
- materials
- procedure
- a summary of your observations and results from the experiment.
- statement of support or non-support of the original hypothesis based on the data gathered in your experiment.
- description of any problems or unusual events that occurred during the investigation that might have affected your results.
- changes you would recommend for next time, and what further experiments might need to be done to fully answer the question.
- anything you learned in addition to what you expected to discover.
- acknowledgments. You should always credit those who assisted you including individuals, businesses, and institutions.
- references.

If this information looks familiar to you, it should. The report is simply a summary of all your work. That's why people tend to neglect it. They are eager to move on to the next problem. Remember, however, it's the most important part of real-world science!



ALL ABOUT VARIABLES

SOME DEFINITIONS of Variables and Control(s)

Manipulated Variable - What you change **on purpose** in the course of your procedure.

Responding Variable - What you do not change directly, but rather changes by itself in **response to** changes in the manipulated variable during the course of your procedure.

Controls: - The factors you keep constant or hold fixed. A control is held fixed so that it doesn't affect the outcome of the experiment.

Students must only change one variable at a time, conduct repeated trials, and note their results. If they change more than one variable at a time, they will not know what affects their results.

EXAMPLES OF VARIABLES

Let's say that the following hypothesis had been selected:

The cheaper the paper towel, the less water it will absorb.

Manipulated Variable: price (brand) of paper towel

Responding Variable: amount of water that is absorbed

Control(s):
size of paper towel
amount of water poured on each towel
temperature of the water used
container in which towels are placed
method of pouring

HELPFUL HINTS

A GOOD TITLE
Your title is an extremely important attention-grabber. A good title should simply present your research and should make the casual observer want to know more.

TAKE PHOTOGRAPHS
Many projects involve elements that may not be safely or practically exhibited at the fair but are an important part of the project. Photographs of these phases of experimentation can be used in the display. You may NOT use photographs depicting animal dissections or other surgical techniques. You must receive permission to photograph or videotape human test subjects.

BE ORGANIZED
Make sure your display is logically presented and easy to read.

EYE-CATCHING
Make your display stand out. Use neat, colorful headings, charts and graphs.

CORRECTLY PRESENTED AND WELL-CONSTRUCTED
Be sure to adhere to the size limitations and safety rules when constructing your display. Display all required forms in your lab notebook.

ADVICE FOR A WINNING PROJECT

CAREFULLY PREPARE YOUR SCIENCE PROJECT NOTEBOOK AND REPORT

A science project notebook is your most valuable piece of work. It is a day-to-day record of the experiment. Accurate and detailed notes make for a logical and winning project. Good notes show consistency and thoroughness to the judges, and help when writing a paper.

A well written report that includes all needed information is essential to a good project. Check your sentence structure, flow of ideas, and spelling and make certain the report is a summary of all of your work.

VISUAL DISPLAY
You want to attract and inform. Construct a clear and concise display. Make headings stand out and label everything clearly and correctly.

RULES FOR JUDGING

Judges look for well thought-out research. They look at how significant your project is in its field as well as how thorough you were. Judges are not interested in memorized speeches. They simply want to talk to you about your project and see if you understand it from start to finish.

Before starting your project, read the Science Fair Project Judging Form carefully. Make sure you understand each of the categories because your project will be judged on these categories. If you have questions, please discuss them with your teacher or Science Fair coordinator.

Science Fair Project
Judging Form

Project Title:_____ Project #:_____

Important Elements of a Project	Range of Points			Points Earned
	Poor	Average	Excellent	
Question/Problem (original - not copied from a book or the Internet)	0-4	5	6-8	
Investigation/Experiment (active investigation/experiment – not a model, kit, demonstration, or collection	0-4	5-8	9-11	
Purpose (understands and explains problem)	0-4	5-7	8-9	
Problem (posed as a testable question - not Yes or No)	0-2	3	4	
Hypothesis (posed scientifically – If …… then statement)	0-2	3	4	
Experimental Plan (develops a fair test using adequate number of trials and/or uses a large enough sample)	0-2	3	4	
Variables (defined & documented)	0-1	2-3	4	
Procedure (step-by-step procedure carefully followed)	0-1	2-3	4	
Results/Conclusion (conclusion supported by results, accurate data presented in graphs, tables, pictures, etc.)	0-1	2-3	4	
Research (student's explanation in their own words of current research & a plan for further study)	0	1	2	
Practicality (real world application – valid generalizations, notes limitations)	0-2	3	4	
Difficulty Level (appropriate – not too easy or too difficult for age)	0-4	5-6	7-8	
Appearance (logical flow and neatly executed)	0-3	4-5	6	
Thoroughness (adequate number of repeated trials; testing and data; evidence of student work)	0-1	2	3	
Solved Problem Stated (clearly stated as valid or invalid)	0-1	2	3	
Lab Notebook (notebook/journal: a daily written record of project)	0-1	2	3	
Reports (well organized, summarizes work done)	0-1	2	3	
Conclusion (supported by data and connected to hypothesis)	0-2	3-4	5-6	
Display (descriptions & labels guide you through the project)	0-2	3	4	
Written Responses (clear & well organized)	0-3	4-5	6	
		TOTAL POINTS		