

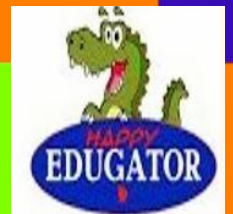
**Includes 100
Project Ideas!**

Science Fair Projects

Student Guide

With

Ideas, Directions, and Checklist



100 Science Fair Project Ideas



1. How does changing the type of paper affect the flight of an airplane?
2. In what way do various types of music affect your respiration?
3. Will your drink stay colder longer in a can or a bottle?
4. How is the pitch of “water glass music” affected by using liquids other than water?
5. How does your sense of sight affect your ability to tell what your are drinking?
6. How does the band of soap affect how long the bubble last?
7. How is the absorbency of paper towels affected by their cost? Color?
8. How is the volume of popcorn affected b the brand of popcorn used? The method of popping? The temperature of the popcorn?
9. How does the temperature of a spilled liquid affect how much is absorbed y a paper towel?
10. Which brand of bandages sticks best under water?
11. How does changing the height of a ramp affect the distance a ball will roll? The speed a ball rolls?
12. Are triple-sized cotton balls three times as absorbent as regular cotton balls?
13. How does the thickness of a rubber band affect its strength?
14. What material makes the best ice cube keeper?
15. How does the size of a lemon affect the amount of juice it produces?
16. How does temperature affect the ripening time of bananas?
17. How is the internal temperature of your tennis shoe affected by the color of its exterior?
18. How does the use of hair conditioner affect the way your hair reacts to static electricity?

Project Ideas...continued

19. Which bag supports the most weight, paper or plastic?
20. What effect does temperature have on rubber band strength?
21. How does the beginning temperature of water affect the time it takes to freeze?
22. How does double-bagging affect the amount of weight a bag will hold?
23. What liquids will dissolve an Alka-Seltzer tablet fastest?
24. What type of disposable cups maintain the temperature of a liquid longer?
25. What are Styrofoam cups best suited for: keeping hot liquids hot, or keeping cold liquids cold?
26. How does wheel size affect the speed of a skateboard ride?
27. How does the distribution of weight affect the distance or speed a skateboard travels?
28. Do mealworms prefer rough or smooth surfaces?
29. Do mealworms prefer wet or dry surfaces?
30. What plowing patterns prevent erosion best?
31. How is the viscosity of cooking oil affected by changing its temperature?
32. Which ketchup is the slowest to pour?
33. How is the strength of an electromagnet affected by the size of the battery used?
34. How is the strength of an electromagnet affected by the number of coils?
35. Which fertilizer makes your grass greenest?
36. How does the outside color affect the inside temperature of a closed container?
37. Which color roof stays coolest?
38. What materials absorb the most solar energy? (sand, water, or oil)
39. What breakfast cereal absorbs the most milk? (sugared or not)

Project Ideas...continued

40. How is the falling time of a parachute affected by the size of the parachute itself?
41. Which colors show up best at night?
42. Which colors can be seen from the greatest distance?
43. How does the method of cooking (frying, broiling) affect the weight of a hamburger patty?
44. Which fragrances attract the most insects?
45. What color attracts the most insects?
46. What fresh fruits are flies attracted to most?
47. How does temperature affect the rate of cricket chirping?
48. Which exercise affects your pulse rate the most?
49. Who has the greatest lung capacity: smokers or non-smokers, athletes or non-athletes, adults or children, boys or girls?
50. Which brand of disposable diaper is most absorbent?
51. Which fabrics absorb dye best?
52. How does the boiling time of water change when salt is added to it?
53. What is the relationship between temperature and rising time of yeast dough?
54. Which melts slowest: ice cream, ice milk, or sherbet?
55. What colors do babies respond to most often?
56. How does the length of wire in a circuit affect the brightness of the light?
57. Which paper plates will hold more weight without buckling? (coated vs. non-coated, flat vs. fluted)
58. Which type of wood leaves the most ash after burning?
59. How does exposure to changing temperature affect the weight of an inflated balloon?
60. Which will produce the most juice, California or Florida oranges?

Project Ideas...continued

61. Which fabric absorbs moisture the fastest?
62. How do fabrics differ in their ability to provide warmth?
63. How does changing the type of paper affect the flight of a paper airplane?
64. What is the best way to keep flowers fresh the longest?
65. Which paper towel brand is the strongest?
66. Which dog food do dogs prefer best?
67. How much weight can the surface tension of water hold?
68. Does the color of hair affect how much static electricity it can carry? (test with balloons)
69. Which brands of bubble gum produce the largest bubbles?
70. Do white candles burn faster than colored candles?
71. What affect does the type of sugar used have on crystal growth?
72. What metal is most affected by salt water?
73. How does smell affect taste?
74. How does color influence taste?
75. How effective are automobile sunshades?
76. What is the effect of different types of soda on teeth? (test with calcium tablets)
77. Which brands of colored markers last the longest?
78. Does a double roll or triple roll of toilet paper actually have 2-3 times more paper?
79. What affects the speed of ice melting the most? (hot water, cold water, sugar, salt, steam)
80. Do golf balls that cost more go farther?
81. How does color affect recall?

Project Ideas...continued

82. Does noise affect coordination?
83. How does screen color and text color affect retention?
84. Is sensitivity heightened on your dominant side?
85. Which works best at killing germs: soap and water or hand sanitizer?
86. Which cleaner works best on grease?
87. Which cleaner works best to kill germs?
88. Does bread mold grow faster on wet bread or dry bread?
89. How can you keep ice from melting for a longer time?
90. Does playing video games increase an individual's heart rate?
91. What is the effect of music on plant growth?
92. What packing materials are better for food preservation?
93. Which brands of popcorn pops best?
94. Does the amount of light affect the speed that food spoils?
95. What is the fastest way to cool a room temperature can of soda? (bucket of ice, ice water, or freezer)
96. What brand of glue holds best?
97. Does consuming caffeine affect typing speed?
98. Does the type of font affect memory?
99. Snow, Ice or Salt water - which among the three melt faster and why?
100. What is the best laundry detergent for removing stains such as grease, oil, clay, grass, grape juice, chocolate?





Science Fair Project



In order to get ready for your project, you must first choose a topic that interests you. You will then need to do some research on your topic to find out a little bit about it. Some good places to look for this might be in your Science books, magazines, encyclopedias, library books, and newspapers.

As you are gathering information about your topic, it is important for you to keep notes. A journal-type notebook will work, or a collection of index cards. In any case, you need to always write down your resource along with the important information.

At this point, you should be able to come up with a question that you would be interested in investigating. This is your **PURPOSE**.

Example:

Question: Do ants prefer sugar to artificial sweetener?

PURPOSE: The purpose of my project is to try and determine if ants prefer sugar to artificial sweetener.

Once you have a purpose, you can then come up with a **HYPOTHESIS**. A hypothesis is an educated guess. Since you have already done some reading up on your topic, you should be able to make an educated guess. There are always several possibilities.

- A. Ant prefer sugar to artificial sweetener.
- B. Ants prefer artificial sweetener to sugar.
- C. Ants will not show a preference for either artificial sweetener or sugar.

HYPOTHESIS: Ants prefer sugar to artificial sweetener.

You are now almost ready to begin your investigation. However, before you start, you will need to write a list of **MATERIALS** that you will need in order to conduct the experiment. This list must be very precise. For instance, if you are going to use sugar, will it be white, brown, or powdered sugar? Do you need a bagful, or 50 ml? Be sure to use metric units of measurements.

POOR LIST

Sugar
Artificial Sweetener
Dishes
Water

GOOD LIST

30 ml white sugar
30 ml Splenda artificial sweetener
2 plastic Petri dishes
100 ml water

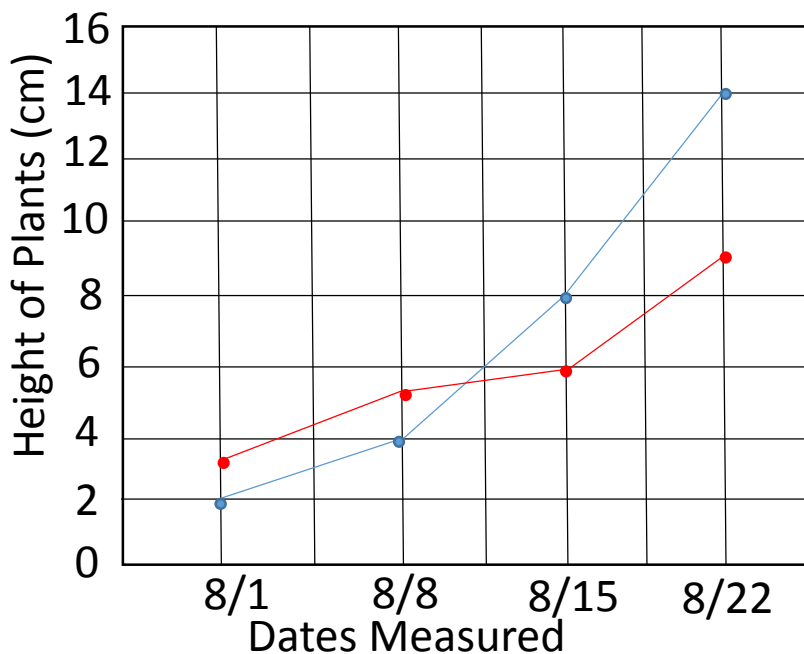
Science Fair Project...cont.

Your next step as an investigator is to come up with a set of “step-by-step” directions. This is your **PROCEDURE**. You need to list all of the steps, one at a time, so that another investigator could repeat your experiment without your assistance.

As you plan your step-by-step directions, you must be sure you are conducting a fair test. Remember to keep all of the conditions the same for both subjects. These conditions are the variables. Unless you keep the conditions the same for each, you will not be able to draw a conclusion at the end of the experiment that you have validated.

In some experiments, the **DATA** is all closely related to each other. You should record your data on a **GRAPH**. If you are recording the hourly temperatures all day long, the temperature of one hour increases or decreases from what it was the hour before. Data that occurs continuously like that must be graphed in a line graph.

Here is an example of a line graph. It shows the height of two groups of plants that were measured once a week for four weeks.



Group A = Red
Group B = Blue

It is necessary to use two different colors for the two groups so that everyone could understand your results and see how each group grew.

Now, you are almost through. You chose a topic, researched it, came up with a question, formed a hypothesis, compiled a list of materials, designed a procedure, tested it, collected data, and transferred your data to a graph. Now you need to look closely at the graph and decide what the data means, and make a **CONCLUSION**. Compare your results with your hypothesis. Does your data agree or disagree with it? You need to tell in your own words what your graph shows. Then you can conclude by saying whether your data **SUPPORTS** or **REJECTS** your hypothesis. For example: “My data rejects my hypothesis.”

Science Fair Project...cont.

IMPORTANT: If your data rejects your hypothesis, you **MUST** include a **REVISED HYPOTHESIS**. Do not go back and change your original hypothesis. For example: "My revised hypothesis is that Brand Z absorbs more water."

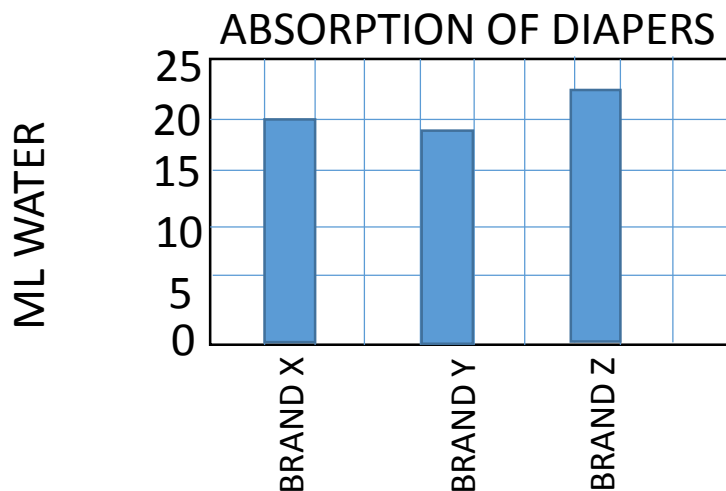
Some of your investigations will require only one test. However, a good investigation is the one where a lot of data has been gathered. If you are growing plants, you will need to have a measurement every three or four days, for a month. Your measurements should also be recorded along with your observations about the plants. This should be recorded in your journal or on your cards and labeled **DATA**. Be sure that you date each entry and refer to specific plants, containers, etc. in your writing. (Don't forget to label you plants containers, dishes, bottles, or whatever else you are using.) Taking photographs to go along with your journaling is also a good idea.

When your investigation can be conducted in just one day, the test results get measured and recorded right away. However, you should repeat all of the tests three times. Then you can find the average of the three tests. These are called **TRIALS**.

For example: Here is some data from a baby diaper experiment.

Brands	Trial 1	Trial 2	Trial 3	Average
x	20 ml	25 ml	15 ml	20 ml
y	20 ml	15 ml	22 ml	19 ml
z	25 ml	25 ml	16 ml	22 ml

Once you have conducted your investigation, whether it took you a month or a day, you need to do something with all of the data you have collected. It's time to decide what the data means. The best way to display the data you have collected is to put it on a graph. The variable you manipulated or controlled in the experiment is always written on the bottom of the graph. This is the horizontal axis. The responding variable (what you measured, weighed, or timed), is always on the vertical axis of the graph. In the case of the diaper experiment, only the averages would be graphed. Make sure the graph has a title.



Science Fair Project

Project Requirements:

A top-notch science project includes four major elements:

1. **Project Logbook** – The logbook is your most treasured piece of work. All of your information, dates, ideas, experiment data, or anything else that has to do with your project is recorded in your logbook. Good notes show thoroughness to the judges, and will help you when you write your formal paper.
2. **Abstract** – After finishing all your research and experimentation, you need to write a 250 word maximum abstract. An abstract is a brief overview or summary of your project that can be easily read and understood. It usually includes the purpose, hypothesis, a summary of your procedure, and your conclusion. It may also include possible applications for research.
3. **Formal Report or Research Paper** – A formal paper is written to present a neat and organized summary of your project to accurately give facts, descriptions, and results. The formal research report is to be a part of your science fair project display.
4. **Visual Display Exhibit**- You want your science fair project display to be attractive and informative. It should be easy for interested spectators and judges to assess your project and your results. Make the most of limited space by being very clear and concise. Headings should stand out and graphs and diagrams should be colorful and neat. Pay careful attention that they are labeled correctly.

Logbook

You should include these sections in your logbook. Some will be longer than others, but all of them are important. Be sure to write neatly and in pen. Your entire logbook must be in black or blue ink. If you make a mistake, mark through it neatly with one line, and continue. Do not use whiteout.

1. Title Page – Title of your project, your name, school, teacher. Be neat. This is the judges first impression of your work.
2. Table of Contents- This is the last section you do. After the entire logbook has been completed, number the pages and correctly list them in your table of contents.
3. Statement of Purpose- In this section, write a paragraph about why you chose this project.
4. Problem- Write the question you are asking.
5. Experimental plan- state your problem, a brief hypothesis, your procedure and your bibliography.
6. Hypothesis – write a paragraph and make sure to give information to back up your educated guess.
7. Materials – List your materials in a column.
8. Procedure- In a numbered list, write down the steps to your procedure in sentence form.
9. Variables- Name the different variables in your experiment. Distinguish between dependent and independent variables, and list your controls.
10. Results- This section should contain several tables and graphs indicating all of the data you collected over the course of your experiment. Make sure everything is clear and labeled correctly, and write a few sentences to explain the data as necessary.
11. Conclusion – Write down your conclusions from the experiment. State whether or not your hypothesis was proven. Be sure to give all details, and if you were incorrect, a revised hypothesis.
12. Bibliography – Using formal format (APA recommended), credit your sources.
13. Research – All your notes and research are put in this section. They can be written or taped in if you used note cards. Provide the source of the information, and the dates on which you gathered information.

Logbook Rubric

Title page	/5
Table of Contents	/5
Statement of Purpose	/5
Problem	/10
Hypothesis	/10
Materials	/5
Procedure	/10
Variables	/5
Results	/10
Conclusion	/5
Bibliography	/5
Acknowledgments	/5
Research	/10
Daily log	/10
<hr/>	
TOTAL	/100



Graphing Reminders

1. Choose the type of graph that is most appropriate for the kind of experiment you did.
2. Keep the spacing uniform on your graph. Always number starting at zero. Then mark the graph by ones, twos, threes, or whatever suits your data best. Sometimes this is hard to decide, so you might want to ask your parents or teacher for advice about this.
3. Label all parts of your graph carefully. The vertical and horizontal lines must both have labels. The vertical axis must always indicate what unit of measure is used. (cm, ml, seconds...)
4. Title your graph so it explains what was recorded.
5. If you are using more than one line on a line graph, use color to help people tell them apart.
6. Be neat! Do your graphs over if you need to for neatness. Take your time and do it right. It's often difficult to get it just right on the first try. It's worth the extra effort to do it over.



Checking Myself



1. Is my topic question something I can investigate?
2. Did I find background information about my topic?
3. Did I restate my question in the form: “The purpose of this investigation is to...” ?
4. Did I make a hypothesis (prediction) about what would happen in the investigation?
5. Did I list all my materials in metric units?
6. Have I identified all the variables in my experiment ? (manipulated, responding, held constant)
7. Are my step-by-step directions of my procedure clear enough for someone else to follow?
8. Did I record my measurements and other observations in a log or journal?
9. Have I collected enough data (used enough samples or repeated the investigation at least three times?)
10. Have I graphed my data accurately?
11. Do my conclusions included a summary of the data, a comparison of data and my hypothesis, and a statement of support or rejection? (and a revised hypothesis if my first hypothesis was rejected)
12. Did I follow all the rules for my school fair?

How Will I Display My Project?

You will need to construct or purchase a 3-sided display board. You will mount all the parts of your project on this board.

HINTS for a good Display Board:

1. The board must be sturdy and stand on its own.
2. The lettering on the board needs to be neat and bold enough for others to read easily.
3. Each component (Topic, Purpose, Hypothesis, Procedure - materials, variables, and step-by-step directions, Data Charts, Graphs, and Conclusions) should be written on plain white paper and mounted on construction paper before being mounted on the board.
4. Only use one or two colors of construction paper so the color does not overwhelm the project.
5. Using rubber cement instead of glue will allow you to peel things apart and redo them again if you need to.
6. If you have a journal or log and a research paper, they can be displayed on the table in front of your display board.

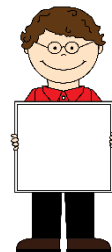
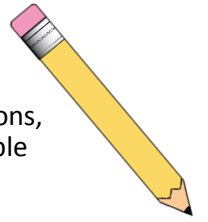
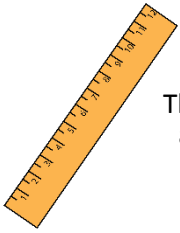
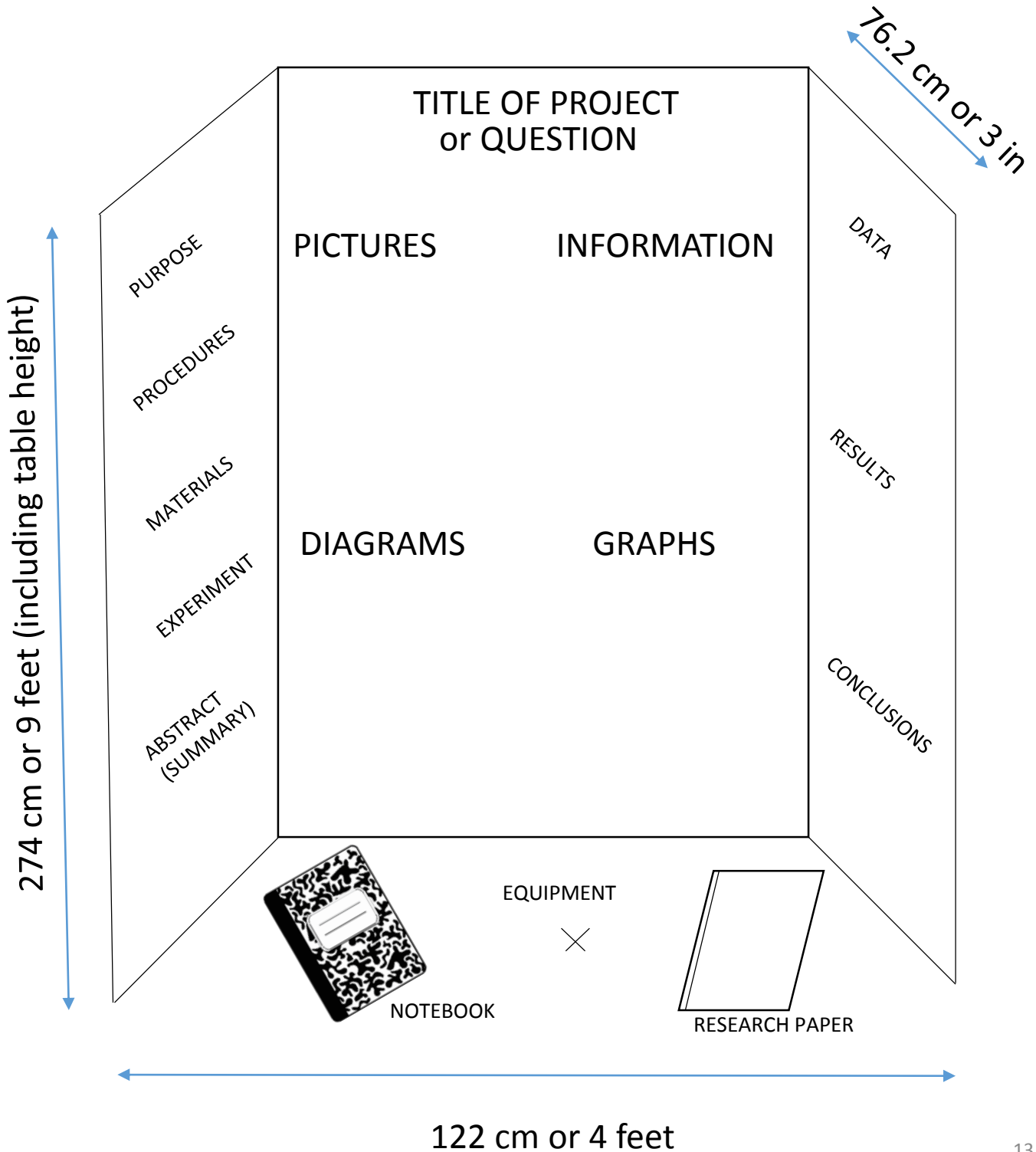


Diagram of Display Board



The diagram below shows suggested arrangements for titles and subtitles, board dimensions, and placement of supporting materials. The dimensions represent the *maximum* allowable size, but smaller exhibits may be entered.



Note to Parents

Dear Parent/Guardian:

Please keep in mind that as your child develops this year's science project, he will be working on important life skills. The most important ingredients in any successful project is the amount of work the student accomplishes, how much knowledge he/she acquires, and how much initiative is displayed. The involvement in researching, organizing, outlining, measuring, calculating, reporting, and presenting will help your student grow in the areas of reading, writing, math, and social skills, which are requirements for successful daily living. Here are a few suggestions for success:

1. Although it this is to be the students' effort, there is no substitute for a parent's support.
2. Don't worry about whether or not the project wins a prize at the science fair. If the student has gained stronger thinking skills and increased knowledge, then they have already won a prize.
3. Parents assistance will be necessary for:
 - a. Safety. Make sure dangerous materials and fires are avoided.
 - b. Transportation. Help will be needed for transportation of materials to and from the science fair.
4. Parents assistance will be welcome for:

Suggestions for project ideas; transportation to libraries, museums, nature centers, or other places for project information; technical work such as construction or photography; and being a good listener.

Thank you for supporting your student in this educational endeavor.

Sincerely,

Parents Guide to Helping Students with *Their* Science Fair Projects

Things you can do:

1. Be positive and give encouragement, support, and guidance.
2. Make sure the project is primarily the work of the student, and make sure the student feels it is his or her project.
3. Understand that the main purpose of the science fair project is to help the student use and strengthen basic skills, but that some of these skills may be new and the student may need help. (For instance, organizing notes, measuring, calculating...)
4. Realize that the teacher works with 20 - 30 students and may not be able to give your child a large amount of individual attention. You can help by being a guide and supporter.
5. Develop a schedule right from the beginning to help prevent a last minute project and a disruption to the household. A 4 week plan with a checklist is a good way to get a handle on this. Look over the requirements for the project and develop a checklist so that all items get completed in a timely manner.
6. Help your child a safe project that is not hazardous in any way.
7. Provide transportation as needed for your child to have access to information that will help complete the project.
8. Help your child write letters to people who can help with the project and mail them.
9. Make sure your child states in the Acknowledgments section of the logbook any specific help they were given. This will help the judges make a fair evaluation of the project.
10. Look over the project for good grammar, neatness, spelling and accuracy, and make suggestions on how it can be corrected.
11. Buy or help find the materials needed to complete the project.
12. Help your child complete the logbook by recording everything in writing, and listing all sources of information.
13. Make sure there is an area in the house where your child can work on the project without interruptions or interference from pets or siblings.
14. Have your child present the project to you before taking it to school.
15. Be proud of your child's accomplishments when the project and the science fair are finished.

Volunteer Form

Dear Parents,

If you would like to help with this year's science fair, please check where you can help and send this form back to your child's teacher.

Thank you!

_____ Science Fair Committee

_____ Help set up where exhibit will be held

_____ Help supply refreshments

_____ Supervise students setting up their projects

_____ Help clean up after the fair

Name _____

Email address _____

Home phone _____

Cell phone _____

Please return this form by _____.

Useful Science Fair Websites

<http://www.sciencefair-projects.org/>

<http://www.education.com/science-fair/>

<http://www.sciencefairadventure.com/>

<http://www.sciencebuddies.org/>

<http://www.terimore.com/>

<http://www.sciencekids.co.nz/projects.html>

<http://school.discoveryeducation.com/sciencefaircentral/>

<http://www.energyquest.ca.gov/projects/index.html>

<http://sciencefair.math.iit.edu/projects/>

<http://www.ipl.org/div/projectguide/>

sciencefairproject.virtualave.ne

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<http://www.education.com/science-fair/>

<http://www.sciencefairadventure.com/>

<http://www.sciencebuddies.org/>

<http://www.terimore.com/>

<http://www.sciencekids.co.nz/projects.html>

<http://school.discoveryeducation.com/sciencefaircentral/>

<http://www.energyquest.ca.gov/projects/index.html>

<http://sciencefair.math.iit.edu/projects/>

<http://www.ipl.org/div/projectguide/>

sciencefairproject.virtualave.ne

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Deborah Hayes
aka HappyEduator



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