

SAMPLE

SCIENCE FAIR PROJECT NOTEBOOK

↑Your Science Fair Project Title goes up here.↑

Be creative but keep it as short as possible, no more than 10 words!



Students looking at a winning project notebook!

Notice this relevant photo has no visible faces

A picture, that in some way characterizes your project, used on the title page of your notebook, is a nice touch, but is not absolutely necessary.

This *SAMPLE SCIENCE FAIR PROJECT NOTEBOOK* was developed by Wendy Gay, SDUSD Teacher/Librarian, Retired. She is currently GSDSEF Vice President for School Relations. Contact her at pahlwen@pacbell.com.

Feel free to make copies of this *SAMPLE SCIENCE FAIR PROJECT NOTEBOOK* found at:

<https://www.gsdsef.org/students/resources>

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SAMPLE SCIENCE FAIR PROJECT NOTEBOOK

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Below, in red, are Samples of pages you should have in your Project Notebook:

Use sample pages 11-27, below, as TEMPLATES to help you assemble YOUR Project Notebook:

You may download and/or print them to use as a guide.

see sample on page:

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A Word About Choosing a Science Fair Project TOPIC

Questions to ask yourself as you try to decide on a topic:

1. What thing(s) am I most interested in? Food? Baseball? Gardening/Plants? Pets? Robots? Computers? Skateboarding? Etc. What am I really “passionate” about?
2. Decide what part of the topic fascinates you the most? For instance, if you love skateboarding, what about skateboarding really intrigues you? Is it the design of the board? Or maybe safety issues? Or how to be the best in skateboard competitions? Or maybe you want to design a great skateboarding park?!
3. Be sure when choosing a topic, you consider things like: Is it manageable? Will you be able to do testing? For instance: If you decide you want to test the properties of snowdrifts, do you live near the snow? If not, maybe you need to choose another topic.

For ideas:

Browse through the library at your school AND visit your public library.
Look in newspapers, especially the *Science* articles in *The San Diego Union-Tribune* for local science ideas.

Look in magazines such as *Audubon*, *Discover*, *Horticulture*, *National Geographic*, *Organic Gardening*, *Popular Science*, *Popular Mechanics*, *Psychology Today*, *Science News*, *Scientific American*, *Sky & Telescope*, *Smithsonian*, *Sports Illustrated for Kids*, *Wired*, etc. and specific magazines for things like bicycling, cooking, diving, skateboarding, swimming, etc.

Talk to people, your parents, teachers, friends, neighbors, grandparents--ask them for project ideas. And of course browse the Internet using “Google” or any search engine you like.

And try online help sites like: “Science Buddies” at: <http://www.sciencebuddies.org/>

Feel free to e-mail any questions to:
Phil or Wendy Gay at pwlwen@pacbell.com

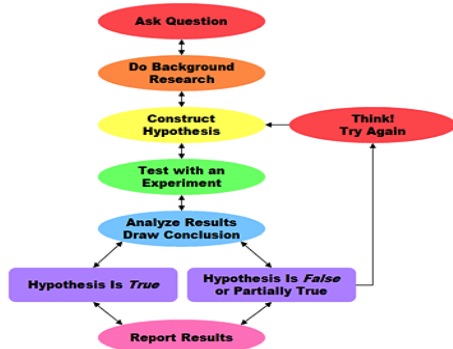
The Scientific Method:

Identify a problem, Research the problem, Formulate a hypothesis,
Conduct an experiment & Reach a conclusion

Steps of the Scientific Method

http://www.sciencebuddies.org/science-fair-projects/project_scientific_method.shtml

Thank you to *Science Buddies* for the information found at the above website and summarized below:



Key Info

The scientific method is a way to ask and answer scientific questions by making observations and doing experiments

The steps of the scientific method are to:

- Ask a Question**
- Do Background Research**
- Construct a Hypothesis**
- Test Your Hypothesis by Doing an Experiment**
- Analyze Your Data and Draw a Conclusion**
- Communicate Your Result**

Overview of the Scientific Method

The scientific method is a process for experimentation that is used to explore observations and answer questions. Scientists use the scientific method to search for **cause and effect** relationships in nature. In other words, they design an experiment so that changes to one item cause something else to vary in a predictable way. Just as it does for a professional scientist, the scientific method will help you to focus your science fair project question, construct a hypothesis, design, execute, and evaluate your experiment

Throughout the process of doing your science fair project, you should keep a journal containing all of your important ideas and information. This journal is called a lab book or raw data and should be inserted in the appendix of your project notebook.

Ask a Question: The scientific method starts when you ask a question about something that you observe: How, What, When, Where? The question must be about something that you can measure.

Do Background Research: Rather than starting from scratch in putting together a plan for answering your question, you want to be a savvy scientist using library and Internet research to help you find the best way to do things and insure that you don't repeat mistakes from the past.

Construct a Hypothesis: A hypothesis is an educated guess about how things work:

"If _____ [I do this] _____, then _____ [this] _____ will happen."

You must state your hypothesis in a way that you can easily measure, and of course, your hypothesis should be constructed in a way to help you answer your original question.

Test Your Hypothesis by Doing an Experiment: Your experiment tests whether your hypothesis is true or false. It is important for your experiment to be a fair test. You conduct a fair test by making sure that you change only one factor at a time while keeping all other conditions the same. Repeat experiment many times.

Analyze Your Data and Draw a Conclusion: Once your experiment is complete, you collect your measurements and analyze them to see if your hypothesis is true or false.

Communicate Your Results: Communicate your results to others in a final report and/or a display board

Information about 2019 GSDSEF FORMS

On the next three pages is a **SAMPLE** of the “**PROJECT PROPOSAL/SIGNATURE FORM**” (gsdsef form 1, 2019). You will find the actual form and any others you might need on the GSDSEF web site:

<https://www.gsdsef.org/students/how-to-participate>

The 2019 Proposal and Signature Form must be completed, and your teacher must sign it before you start actual work on your project.

To retrieve this fillable pdf form:

- Download the blank form to your computer
- Fill it out on your computer
- Save it
- Print the completed saved form
- Obtain the required signatures
- This completed form must be given to your teacher who will file it where, if needed, it can be retrieved quickly for reference if needed.**
- Remember, you **MUST** complete this form, before you start your project.

Your project may require one or more of the following forms:

CERTIFICATION OF HUMANE TREATMENT OF LIVE VERTEBRATE ANIMALS
(GSDSEF form 2, 2019)

CERTIFICATION OF COMPLIANCE OF RESEARCH INVOLVING HUMANS
(GSDSEF form 3, 2019)

CERTIFICATION OF HAZARDS CONTROL
(GSDSEF form 4, 2019)

CERTIFICATION OF VERTEBRATE TISSUE SOURCE AND SAFETY
(GSDSEF form 5, 2019)

Remember, these four forms are also found on the GSDSEF Website: <http://www.gsdsef.org/participate>
Download the forms you need for your project, and complete them in the same way you completed the **Project Proposal/Signature Form** (see above).

GREATER SAN DIEGO SCIENCE & ENGINEERING FAIR (GSDSEF)

PROJECT PROPOSAL/SIGNATURE* FORM (GSDSEF form 1, 2019)

This form should be completed and signed prior to starting project work. It must be given to your Teacher who will file it for quick reference if needed.

(Use the “Tab” key to move from line to line)

1. Project Title _____
Is this a continuation of a previous project? Yes No

2. STUDENT'S NAME (Last, First, Middle) _____

2a. Partner's Name (for Senior Division 2 person projects only) _____
EACH SENIOR DIVISION PARTNER MUST SUBMIT a separate project proposal form.

3. Address, City, Zip _____

4. Phone _____ email _____

5. School _____ Grade _____

6. Teacher _____

7. This project involves (check all that apply):

- Live Vertebrate Animals (GSDSEF-form 2, 2019)
- Humans as subjects, helpers, or interviewees (GSDSEF-form 3, 2019)
- Hazardous Substances (anything that could cause injury) (GSDSEF form 4, 2019)
 - Chemicals
 - Infectious Agents
 - Bacteria, Fungi and/or Molds
 - Mutagenic Agents
 - Carcinogenic Agents
 - Teratogenic Agents
- Human or Other Vertebrate Tissue (GSDSEF 5, 2019)

8. WHERE REQUIRED (see #7 above), the following supplemental forms must be completed and included with the project proposal form (CHECK ALL THAT APPLY):

- _____ *Certification of Humane Treatment of Live Vertebrate Animals* (GSDSEF form 2, 2019)
- _____ *Certification of Compliance of Research Involving Humans* (GSDSEF form 3, 2019)
- _____ *Certification of Hazards Control* (GSDSEF form 4, 2019)
- _____ *Certification of Vertebrate Tissue Source & Safety* (GSDSEF form 5, 2019)

9. Location where experimental procedures will take place: _____

10. People, companies, etc. providing equipment, materials, workspace: _____

11. Proposed project Category: _____
(see “Category Description” on page 10 of this notebook or on the GSDSEF website)

12. Describe your planned project/experiment and the procedures to be used:

When your project is completed you must prepare a 200-250 word ABSTRACT of your project and include it on a SINGLE slide for the Google Slides or PowerPoint Presentation you submit for screening. If your project is selected to participate in the GSDSEF in Balboa Park, you will place a copy of your ABSTRACT in the front of your notebook for judges to review.

**Continue to next page for required SIGNATURES for this form*

GREATER SAN DIEGO SCIENCE & ENGINEERING FAIR (GSDSEF)

PROJECT PROPOSAL/ SIGNATURE FORM (GSDSEF form 1, 2019)

REQUIRED SIGNATURES:

Student:

I have read the [Rules and Regulations](#) of the GREATER SAN DIEGO SCIENCE AND ENGINEERING FAIR and certify that my project complies with them. I understand that failure to meet the terms of these rules and regulations will result in the disqualification of my project.

SENIOR DIVISION: GSDSEF forms meet the requirements of California law; therefore, all Senior Division students agree that, should they be selected to compete at the 2016 *Intel International Science and Engineering Fair (Intel ISEF)*, when they sign all required *Intel ISEF* forms they will predate them to agree with the date on this form.

Student Signature/Date

Parent/Guardian:

I am aware of all potential safety hazards connected with this project, approve the precautions being taken to ensure my student's safety and will, when appropriate, provide guidance and/or supervision. I understand that failure to comply with the [Rules and Regulations](#) of the GREATER SAN DIEGO SCIENCE AND ENGINEERING FAIR will result in the disqualification of the project.

Parent Signature/Date

Teacher:

I approved this project prior to the student beginning work on it and verified that it complies with the [Rules And Regulations](#) of the GREATER SAN DIEGO SCIENCE AND ENGINEERING FAIR. Any concerns about the project's design, appropriateness, safety, or legality were submitted to the GSDSEF Scientific Review Committee (SRC) at PhilSciFr@gmail.com or approval prior to allowing the student to proceed. I understand that failure to comply with the Fair's *Rules And Regulations* will result in the disqualification of the project. I will provide all needed supervision (other than that specified on other included forms) and will ensure that this proposal form and all required supplemental forms are turned into me for safe keeping, before their Screening PowerPoint is submitted. If the SRC needs to see a form they will request it from you.

Teacher Signature/Date

Additional Advisor (if required)

When certification forms (*GSDSEF 2, 3, 4 or 5, 2019*) are signed by someone in addition to the science teacher, a signature here ensures that the procedures described on these forms will be followed.

Additional Advisor Signature/Date

OTHER GSDSEF FORMS (2-5) When & How to Use Them

In addition to the PROJECT PROPOSAL/ SIGNATURE FORM (GSDSEF 1, 2019) you may need to complete one or several of the following forms after you decide exactly what your project will be. Decide which forms you need and be sure to complete and sign them before you begin your project/experimentation:

These forms are located on the GSDSEF website at: <https://www.gsdsef.org/students/how-to-participate>

CERTIFICATION OF HUMANE TREATMENT OF LIVE VERTEBRATE ANIMALS FORM (GSDSEF form 2, 2019)

The student must complete and sign the Live Vertebrate Animal form GSDSEF 2, 2019.

This form must also be approved and signed by both a teacher/advisor and a parent/guardian.

The signature of an animal care supervisor/biomedical scientist must be obtained if required by the GSDSEF [Rules and Regulations](#).

The completed form 2, if required for your project, must be given to your teacher who will file it for quick reference if needed.

CERTIFICATION OF COMPLIANCE OF RESEARCH INVOLVING HUMANS FORM (GSDSEF form 3, 2019)

NOTE: This form includes a copy of the “GSDSEF Consent to Participate in Science Fair Project Testing” form. (see p 32 of this Sample Notebook)

The student must complete and sign the Human Subjects form GSDSEF form 3, 2019. The form must also be approved and signed by the teacher/advisor, a parent/guardian, and a biomedical scientist if required by the GSDSEF [Rules and Regulations](#).

The completed form 3, if required for your project, must be given to your teacher who will file it for quick reference if needed.

Copies of all Consent Forms MUST be available and signed by subject if adult, or signed by parents or guardians if subjects are minors, or signed by teachers involved if done in class with permission. A blank sample copy of the Consent Form must be included in notebook. Student should retain original Consent Forms for possible use in apply to State and/or International Science Fairs. (See p. 33 of this Notebook for a sample Consent Form)

CERTIFICATION OF HAZARDS CONTROL FORM (GSDSEF 4, 2019)

Prohibited projects include those involving tobacco; tobacco products; smokeless powder; black powder explosives; the manufacture of rocket fuel, alcohol/other intoxicants or gasohol.

PLEASE NOTE: STUDENTS MAY NOT LOAD OR RELOAD ANY AMMUNITION

The student must complete and sign GSDSEF form 4, 2019. The form must also be approved and signed by a teacher/advisor and a parent/guardian. The signature of a supervising scientist must be obtained if required by the GSDSEF [Rules and Regulations](#), as explained on the form.

The completed form 4, if required for your project, must be given to your teacher who will file it for quick reference if needed.

CERTIFICATION OF VERTEBRATE TISSUE SOURCE AND SAFETY FORM (GSDSEF 5, 2019)

The student must complete and sign Tissue Form GSDSEF 5, 2019. The form must also be approved and signed by both a teacher/advisor and a parent/guardian. The signature of a supervising scientist must be obtained, if required by the GSDSEF [Rules and Regulations](#) as explained on the form.

The completed form 5, if required for your project, must be given to your teacher who will file it for quick reference if needed.

2019 GSDSEF Categories and Descriptions

Category descriptions have been adapted from the Intel ISEF Handbook. Final placement will be resolved by the SRC

- 1. Animal Sciences:** Study of animal behavior, classification, development, pathology, taxonomy; animal ecology, animal genetics, animal husbandry, circadian rhythms, cytology, entomology, herpetology, histology, ichthyology, ornithology, paleontology, physiology, studies of invertebrates, etc.
- 2. Behavioral and Social Sciences:** Human behavior, social and community relationships; anthropology, archaeology, circadian rhythms, educational testing, ethnology, learning, linguistics, perception, psychology, sociology, urban issues, etc.
- 3. Biochemistry:** Chemistry of life processes; enzymes, food chemistry, hormones, metabolism, molecular biology, molecular genetics, photosynthesis, protein chemistry, etc.
- 4. Chemistry:** Study of nature and composition of matter and laws governing it; fuels; inorganic chemistry, organic chemistry (other than biochemistry), physical chemistry; materials, metallurgy, pesticides, plastics, soil chemistry, etc.
- 5. Computer Science:** Study and development of computer hardware; programming languages; networking and communications; robotics control systems; simulations/virtual reality or computations science (including data structures, encryption, coding and information theory); algorithms, artificial intelligence, data bases, graphics, software engineering, etc.
- 6. Earth & Planetary Science:** Climatology, geography, geology, geophysics, meteorology, mineralogy, oceanography, paleontology, physiography, seismology, speleology, tectonics, etc.
- 7. Engineering, Electrical & Mechanical:** Computer engineering, controls, electrical engineering, mechanical engineering, robot mechanics, solar electric generation, thermodynamics, etc.
- 8. Engineering, Energy & Transport:** Aerodynamics, aerospace and aeronautical engineering, alternative fuels, automotive & marine vehicle development, fossil fuel energy, heating & refrigeration, renewable energies, solar heating, wind energy, etc.
- 9. Engineering Materials & Bioengineering:** Acoustics, bioengineering, civil & construction engineering, chemical engineering, environmental engineering, ergonomics, industrial engineering & processing, material science, etc.
- 10. Environmental Sciences & Management:** Air pollution and air quality, bioremediation (i.e., oil spill cleanup, etc.), ecology, ecosystems management, environmental engineering, land resource management, forestry, recycling, waste management, soil contamination and soil quality, water pollution and water quality, etc.
- 11. Mathematical Sciences:** Science of numbers and their operations; algorithms, development of formal logical systems or various numerical and algebraic computations and the application of these principles; algebra, calculus, complex analysis, geometry, number theory, probability, statistics, etc.
- 12. Medicine and Health Sciences:** Study of diseases and health of humans; allergies, cellular & molecular biology, dermatology, dentistry, epidemiology, genetics, immunology, nutrition, ophthalmology, pathology, pediatrics, pharmacology, physiology, sanitation, speech and hearing, etc.
- 13. Microbiology:** Biology of microorganisms; antibiotics/microbials, bacterial genetics, bacteriology, fungi, molds, protozoology, virology, yeast, etc.
- 14. Physics & Astronomy:** Theories, principles and laws governing energy and the effect of energy on matter; acoustics; atoms, molecules, nuclear, plasma, solids; biophysics; fluid and gas dynamics; instrumentation and electronics; magnetism; optics, lasers, masers; particle, quantum mechanics; semiconductors, solid state, superconductivity, thermodynamics; theoretical or computational astronomy, planetary science, etc.
- 15. Plant Sciences:** Study of plant life; agriculture/agronomy, algae, circadian rhythms, ecology, forestry, horticulture, hydroponics, plant evolution, plant genetics, plant pathology, plant physiology, plant taxonomy, etc.
- 16. Product Testing/Consumer Science (JUNIOR DIVISION ONLY):** Quality control, comparison studies of product designs; using accepted scientific tests to obtain quantifiable results, etc.

Sample/Template for the “Table of Contents” of your Project Notebook:

Use this *Sample* “Table of Contents” as a template or guide when you create your Project Notebook. Arrange the “Table of Contents” when all parts and pages of your Project Notebook are complete. The “**Table of Contents**” is the last thing you will do when assembling your notebook.

Insert your own page numbers in this column:

Table of Contents.....	11
Student Checklist/Timeline.....	12
Abstract (written last, but included here).....	13
Acknowledgements.....	14
Introduction.....	15
Review of Literature (aka: Background Information).....	16
Statement of Problem or Purpose.....	17
Hypothesis.....	18
Materials.....	19
Procedures.....	20
Findings.....	21
Conclusion.....	23
Recommendations.....	24
Bibliography.....	25 - 26
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RAW DATA.....	28 - 32

Student Checklist /Timeline

Insert Teacher assigned

Date Due

here:



Check off items as you complete them

- _____ 1. Your **Topic/Idea** must be approved by your teacher before you start work on a project! Complete the **Project Proposal/Signature Form (GSDSEF 1, 2019)**
- _____ 2. **Abstract**, a brief, no more than 250 words, summary of the main points of your project, including your hypothesis, procedures, results and conclusion. THIS IS **WRITTEN last** but goes in the **front** of your Project Notebook.
- _____ 3. **Acknowledgements**, a place for you to give credit to those who helped you with advice or supplies.
- _____ 4. **Introduction**, a brief look at the background and goals of your research.
- _____ 5. **Review of the Literature** (aka: background research), this is your written report about the information you discovered when you researched your topic. 5-10 or more pages.
- _____ 6. **Statement of the Problem or Purpose**, the question you want to answer during this project.
- _____ 7. **Hypothesis**, an educated guess or prediction about the answer to your problem.
- _____ 8. **Materials**, everything you used for your experiment.
- _____ 9. **Procedures**, a step-by-step description of how you did your project.
- _____ 10. **Findings**, this is the **DATA** that you collected, the responses, reactions and results you observed. Keep your rough handwritten notes, drawings, and your daily log etc. (These all go in the appendix of your Project Notebook).
- _____ 11. **Graphs, Charts, Results/Data Analysis**, organize your data into appropriate graphs, then write a summary based on the trends, patterns, and any calculations of the data.
- _____ 12. **Conclusions**, how did your tests and experiments work out? Did your findings support or not support your hypothesis? Include a statement based on your results.
- _____ 13. **Recommendations**, your ideas on possible uses for your findings and any additional tests which should be made. Would you do this project again, or could you continue this project another year?
- _____ 14. **Bibliography**, an alphabetical list of at least 10 items referenced/used as you researched this project. (See page 25 of this sample Project Notebook).
- _____ 15. **Appendices**, selected photos, graphs, your Daily Log **and all Raw Data**.
- _____ 16. **Completed Project Notebook and Display are ready for school fair.**

Abstract

The **abstract** is a summary of your project and is written--AFTER ALL YOUR WORK IS COMPLETED--using 200 to 250 words--one page or less, be succinct!

Type your title and your hypothesis then briefly describe your procedures and results, then summarize your conclusions.

You do your abstract LAST but it goes in the FRONT of your Project Notebook AND is included as a slide at the beginning of your 10 slide Google Slide or PowerPoint submission

NOTE:

AFTER your Google Slide or PowerPoint submission has been evaluated and you are invited to participate in the 2019 GSDSEF, you will include a copy of your abstract with your ***GSDSEF online Application Form.***

REMINDER:

Your abstract is an important part of your work and must appear in the front of your notebook, in your Google Slide or PowerPoint submission and you should also attach a copy of it to your display board; or put it in a plastic sleeve and lay it in front of your display board where judges will see it first as they begin to evaluate your project.

Acknowledgements

This is where you thank all the people who helped you. No more than a single page.

Example:

“I’d like to thank my parents, teacher(s), my librarian and all my friends for their wonderful help and support. I would also like to thank Prof. John Smith for allowing me to use a portion of his laboratory at State University to run my experiments. And I give a big thank you to the *Home Improvement Store* for donating the materials I needed to build my test ramp!”

Introduction

Here you tell why and how your project came to be.

In no more than a single page give a brief overview of the background and goals of your project.

Why did you choose this topic?

Examples:

“Ever since I was a little kid I’ve dreamed of being a world class skate boarding champion!” And so.....

“I’ve also worried about the dangers of skate boarding”

Hint: Judges like to ask this question:

“Does this topic have social and/or scientific implications/relevance in our/your daily life?”
Explain.....

Review of Literature (aka: Background Information)

This section of your notebook is a report on the topic you have researched for your project. Write it so that a reader (judge/teacher) can see how much work you have done. This report should be 5 to 10+ typed pages and will summarize the information you found about your topic before you start your experiment. This report should be double-spaced and in a readable 12 pt font. "Times New Roman" or "Times" would be good choices. Remember to use the writing skills you have learned in English classes, including:

1. Start with an introductory paragraph that generates interest and indicates what is coming.
2. The main body of your report should be written in complete paragraphs that describe information you found while researching your topic.
3. Give credit where credit is due! Copying, rephrasing or reporting on someone else's work or idea is fine as long as you give the original "thinker" credit for their thought or work.
4. Have a concluding paragraph that "pulls" it all together.

Make sure you proof-read your work AND have someone you trust (Mom or Dad) also proof-read your work!

REMEMBER- Keep track of your sources! The "old school" tried and true method is to use a "note card" for each source on which you list the information you will need for your bibliography. (see pp 24-25 of this sample notebook for help with formatting a bibliography). Sort/arrange the cards as needed.

Sample Note Cards (you can of course keep this information electronically on your computer):

*Levaren, Maxine. Science Fair Projects for Dummies.
New York: Wiley Publishing, Inc. 2009.*

Note:

This book was a great help and had good info about biblio's

Smith, John. "Skateboard Wheels." Popular Mechanics. April 1, 2004, pp. 78-82.

Not so much! But has some good stat's, etc.

"Skateboarding Safety Tips"

[www.ncs.org/Factsheets/hl/](http://www.ncs.org/Factsheets/hl/skateboard_safety.aspx)

skateboard_safety.aspx, 1995-2008

good information/pictures

Statement of Problem or Purpose

This is where you state what "intrigued" you about your topic, why you are so "passionate" about it. State the problem for which you want to find an answer.

Example:

"Half of all the teenagers between the ages of 13 and 18 in our country use a skateboard on a daily basis! The purpose of this project is to see if there is a way to make them safer."

OR

"Many societies use sun dried adobe bricks made of clay or dirt for building houses because it is a cheap and available material. The purpose of this project is to see if there is a way to make them stronger and longer lasting."

Hypothesis

What is a Hypothesis?

A hypothesis is a tentative, testable answer to a scientific question. Once a scientist has a scientific question she/he is interested in, the scientist does research by reading to find out what is already known on the topic. Then she/he uses that information to form a tentative answer to her/his scientific question, but keep in mind, that the hypothesis also has to be testable since the next step is to do an experiment to determine whether or not the hypothesis is right!

NOW, based on what you have read as you did a review of the literature on your topic, the research paper you have written, and the problem you have identified, you are ready to ask a question about your topic. You will be making a “prediction” as to what the answer or outcome will be.

This is called your hypothesis and it goes here in your notebook!

Examples:

“Based on my research on skateboard wheels I believe that Brand X wheels will enable a skateboard to stop faster than Brands A, B, C, D, E, because they have the fattest tread.”

OR

"Based on my research on adobe building bricks, I believe that adding various binders, such as straw, wood shavings, crushed rock or cement will strengthen the bricks in measurable ways--this information will help people choose the best binder to make the strongest brick."

NOTE: If you are doing a Computer, Engineering, or a Mathematics Project you may also see a hypothesis for these projects referred to as a question or prediction. Based on what you find by doing research on your topic, you will write a “Hypothesis” for your notebook and also for your Google Slide/ PowerPoint presentation, and to put on your backboard.

Materials

Everything you used in your experiment should be listed on this page.

Example List:

- Skateboard (as many as needed)
- 6 sets of skateboard wheels (or more)
- testing ramp
- stop-watch
- note pad
 - pencils
 - pens
 - tape-measure
 - etc.:

Procedures

On this page give a step-by-step description of how you tested your Hypothesis.

Example:

1. I assembled my materials:
 - Skateboard (s)
 - Sets of wheels
 - 2 Ramps
2. I figured out how to control the environment like light, temperature etc. (These are called variables and you need to account for as many as you can think of)
3. I began testing and recording my results (save results-rough notes etc., you will place these in the appendix of your notebook. See page 26 for a description of your notebook's appendix)
4. I changed wheels after 20 trials of each set of wheels until I reached a total of 100* trials

***MORE IS ALWAYS BETTER WHEN YOU DO YOUR EXPERIMENT!**

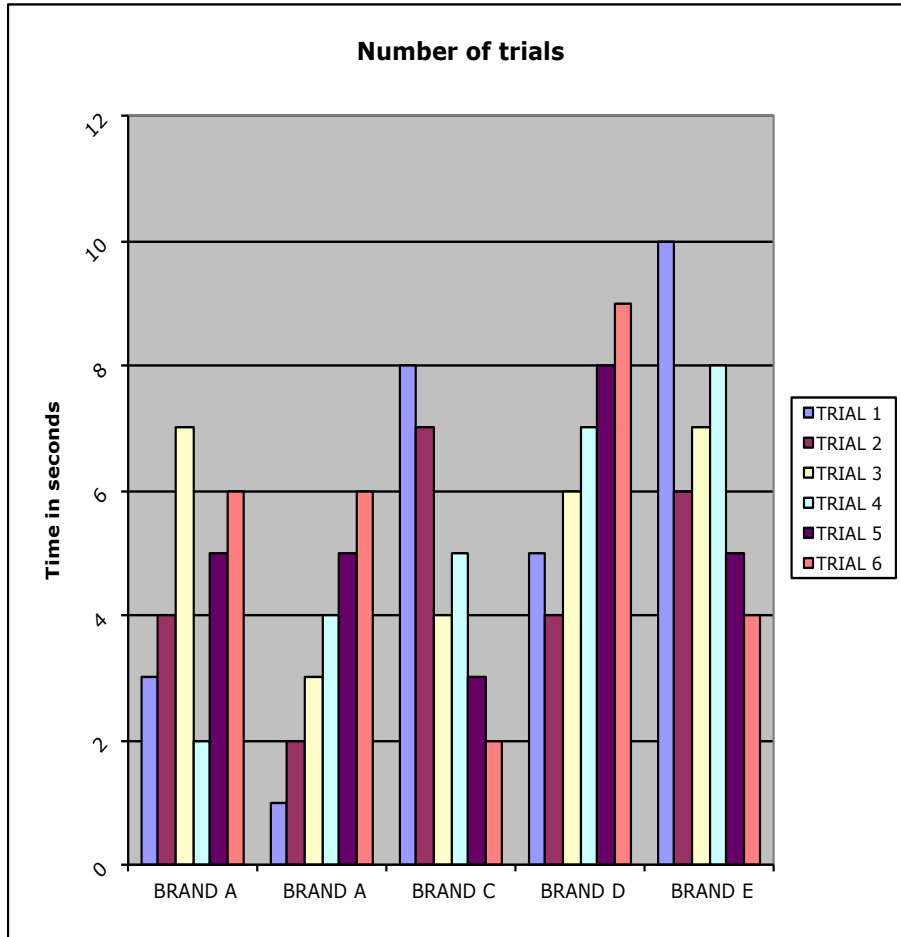
Findings

A "pretty/polished" version of the "raw" data you have collected, like responses, reactions, results you observed and recorded goes here. You may need many pages for all your findings. KEEP the raw data (hand scribbled notes, photos, etc.) as is and include it at the end of your notebook. (see the Table of Contents—RAW DATA)

Example *chart and a graph*:

Time trials are shown in seconds

Wheels:	TRIAL 1	TRIAL 2	TRIAL 3	TRIAL 4	TRIAL 5	TRIAL 6
BRAND A	3	4	7	2	5	6
BRAND B	1	2	3	4	5	6
BRAND C	8	7	4	5	3	2
BRAND D	5	4	6	7	8	9
BRAND E	10	6	7	8	5	4



Note:

Be sure to label all parts of your graph(s) appropriately

Results/Data Analysis

You've just organized your data into tables and graphs. What information does the data you collected tell you? What trends or patterns do you see? Did you get the results you expected?

By closely analyzing your data and identifying any patterns, you will be able to draw and support a conclusion.

In your Results/Data Analysis summary, identify and discuss any trends or patterns that you see in your data.

You may have to make some calculations to interpret your findings. Compare and contrast the trials data. If appropriate for your project, calculate averages/mean, median, mode, and/or standard deviation as needed, or you may summarize your data as ratios or percentages.

The statements in your summary need to be objective and only based on the data. Do not give an opinion or try to explain your data results. Save your opinions and explanation of the results for your Conclusion.

Then use the information you described in your Data Analysis summary to support your Conclusion.

Examples of Results/Data Analysis:

a) The most frequent response was "a" and the least frequent was "c." 64% of the respondents chose "a" compared to 22% who selected "b" and 14% who selected "c." The median ranking was ...

b) According to my experiments, the Energizer maintained its voltage (dependent variable) for approximately a 3% longer period of time (independent variable) than Duracell in a low current drain device. For a medium drain device, the Energizer maintained its voltage for approximately 10% longer than Duracell. For a high drain device, the Energizer maintained its voltage for approximately 29% longer than Duracell. Basically, the Energizer performs with increasing superiority, the higher the current drain of the device.

The heavy-duty non-alkaline batteries do not maintain their voltage as long as either alkaline battery at any level of current drain...

c) The graph showed...

Conclusions

How did all your testing and experimenting work out? This is where you give the answer to your hypothesis (question or prediction).

Restate your Hypothesis, and then follow it with your findings:

Example:

“Based on my research on skateboard wheels I believe that Brand E wheels will allow a skateboard to stop faster than Brands A, B, C, D, because they are the fattest”.

Express your thoughts on the whole process using phrases like:

“My hypothesis was correct/incorrect.

I was surprised by...

I had not anticipated...

I am pleased at...

I am not pleased by...

This experiment worked better than I expected because...

This experiment did not work very well because...”

Although I expected... to happen... the data showed ...

Use the information from your Results/Data Analysis summary to support your Conclusion!

NOTE:

Sometimes the results of your project do not support your hypothesis. This happens to professional scientists also and they use the unexpected results to construct a new hypothesis. If that happens in your project, simply explain why you think things didn't go as you expected, if you think you need additional experimentation, and describe what you think should happen next.

Scientific research is an ongoing learning and discovery process. By proving your hypothesis is not true, you are still making advances in your learning about science which will lead you to ask more questions and do more experimentation. Science Fair judges want to find out what and how much you learned from doing your project.

Recommendations

If you were to do this project again, how would you improve it? How would you change your testing procedure? Would you do more research?

1. How could you improve this project?
2. Could you extend it into a “continuation” project for next year?
3. Why would you not do it again?
4. Did this project turn out so well that you might think about protecting it with a patent, copyright, or get advice from someone you trust?

Bibliography

This is an alpha list of (at least 10) references including books, encyclopedias, internet sources, magazines, interviews etc., you utilized to as you did research on your subject. You may list any or all items you looked at even though they did not become an actual part of your project.

Samples:

A BOOK:

Author's last name, first name. Title of book. Place of publication: Publisher, copyright year.

example:

Fader, Mark. Amazing Skateboards. New York: DK Publishing, 2002, pp. 40-55.

AN ENCYCLOPEDIA ARTICLE THAT IS SIGNED:

Article author's last name, first name. "Title of article." Name of encyclopedia. Copyright year. Volume number, page(s).

example:

Clark, William W. "Gothic Art." World Book Encyclopedia. 2004. Volume 8, pp. 277-278.

AN ENCYCLOPEDIA ARTICLE THAT IS NOT SIGNED:

"Title of article." Name of encyclopedia. Copyright year. Volume number, page(s).

example:

"Golden Retriever." World Book Encyclopedia. 2003. Volume 8, p.111.

A MAGAZINE OR NEWSPAPER ARTICLE:

Article author's last name, first name. "Title or headline of article." Name of magazine or newspaper. Date of magazine or newspaper, page(s).

example:

Moore, John. "Skateboard Wheels." Popular Mechanics. April 1, 2016, pp. xx-xi.

AN INTERNET SOURCE:

Author(s)."Article Title." Name of web site. Date of posting. Name of institution/organization affiliated with site. Date of access <electronic address>.

example:

Poland, Dave. "The Hot Button." Roughcut. October 26, 1998. Turner Network Television. October 30, 1998 <<http://www.roughcut.com>>.

OTHER MEDIA:

Title of material. Type of material. Place of publication: Publisher, copyright date

examples:

"Baldwin's Music." Videotape. New York: Sony Wonder, 1999.

"World War II." Encarta. CD-ROM. Seattle: Microsoft, 1999

AN INTERVIEW:

Name of person interviewed (last name first). Type of interview. Date.

example:

Yancey, Cindy. Personal interview. September 19, 2013.

See next page for how to present/alphabetize your bibliography

Alphabetize your finished bibliography by the first word of each entry, it should look something like this:

“Baldwin’s Music.” Videotape. New York: Sony Wonder, 1999.

Crawford, Mary B. "Mexican Art." World Book Encyclopedia. 2004. Volume 8, pp. 284-286.

Fader, Mark. Amazing Skateboards. New York: DK Publishing, 2002, pp. 50-55.

"Golden Retriever." World Book Encyclopedia. 2004. Volume 8, p.255.

Moore, John. "Skateboard Wheels." Popular Mechanics. April 1, 2016, pp. xx-xi.

Poland, Dave. "The Hot Button." Roughcut. October 26, 1998. Turner Network Television. October 30, 1998 <<http://www.roughcut.com>>.

"World War II." Encarta. CD-ROM. Seattle: Microsoft, 1999.

Yancey, Cindy. Personal interview. September 19, 2013.

More bibliography help:

Are you looking for an automatic bibliography maker? Try: easybib.com or Google “bibliography” to see other helpful websites

For more information on writing bibliographies see:
<http://www.bialik.netaxis.qc.ca/homework/stylesheet2.htm>

For more than you ever thought you would need to know about writing a bibliography and a research paper see:
<http://owl.english.purdue.edu/handouts/research/rmla.html>

Appendix

An appendix is a section at the end of your work that includes supplementary information that you, the author, thinks may be of interest to the reader. All sorts of information can be included in an appendix.

As a general rule, this portion of your notebook contains information that would not have been appropriate in the primary text, but is still important.

This is where you put all of your raw data including notes, logs, graphs, pictures, photographs etc.

Place things in an organized manner and use as many pages as you need.

Note:

Be SURE to KEEP all your ORIGINAL RAW DATA SHEETS (do not re-copy them!) and include them as part of your Appendix, and/or add a separate lab book with your display.

This “raw data” is VERY IMPORTANT because it shows your original findings and how, when and where you were working!

RAW DATA defined:

Raw data is anything you recorded like notes, pictures, quotes; it is Information that you have collected but is not formatted or organized. All this “stuff” goes here in the appendix at the end of your notebook.

Raw data could also include things like hand written notes, diagrams, drawings, observation records and photos, etc. **KEEP EVERYTHING!**

Remember it is raw data so leave it as is. If you have a lot of raw data put it in a separate notebook(s) and have it available with your display and project notebook.

Information for Screening

“Google Slide/PowerPoint Presentation”

If your teacher selects your project to go through the GSDSEF screening process you will then create a 10-slide digital project summary using Google Slides or PowerPoint (converted into a pdf) following the TEMPLATE on the gsdsef.org website. This digital project must be submitted by the deadline date assigned to your school.

This 10-slide presentation should give an OVERVIEW of your complete project.

You must include a **title slide** with the following information:

Title of Project, Student Name, Proposed Category, Grade, School, Student email, Teacher Name, Teacher email, and (new for 2019) Teacher Certification that forms have been received

On the remaining slides tell screeners about your project by including something about:

- **Abstract (200-250 words)**
- **Statement of Problem or Purpose/Question**
- **Hypothesis (Science Project)/Design Criteria (Engineering Project)**
- **Materials**
- **Procedures (Development of Prototype and Test and Redesign)**
- **Findings: Charts, Graphs, Results/Data Analysis (Data of each Testing Result, Identify Problems and Solutions)**
- **Conclusion (Evaluate Procedure/Design, and Its Successes/Effectiveness)**
- **Recommendations**
- **Bibliography**

DOING BACKGROUND RESEARCH AT THE PUBLIC LIBRARY (SDPL)

See: Science & Industry, and the Government Publications Departments at the San Diego Public Library.

BOOKS (Check copy right dates for latest editions).

In addition to books specifically on the subject of your project, like *soap, heat, air pressure* or *enzymes*, encyclopedias and other reference books provide general background information for your experiment or project. Textbooks are also a good source of background information, so are encyclopedias. Here are a few recent reference titles:

Biology. Macmillan Reference USA, 2003. R570/BIOLOGY (also an eBook version)

Chemistry. Foundations and Applications. Macmillan Reference USA, 2004. R540.3/CHEMISTRY
Encyclopedia of Microbiology. Academic Press, 2009- R579.03/ENCYCLOPEDIA

Kirk-Othmer Encyclopedia of Chemical Technology. Wiley-Interscience, 2004-R660.03/KIRK

McGraw-Hill Encyclopedia of Science & Technology. McGraw-Hill, 2012. R503/MCGRAW (also an eBook version)

Macmillan Encyclopedia of Weather. Macmillan Reference USA, 2001. R551.503/STEIN

The New Book of Popular Science. Grolier, 2004. R500/NEW

Plant Sciences. Macmillan Reference USA, 2001. R580/PLANT

World of Microbiology and Immunology. Gale, 2003. R579.03/WORLD

World of Physics. Gale Group, 2001. R530.03/WORLD

MAGAZINE ARTICLES

Science Fulltext Select, a database of full-text articles from over 300 science journals, is available for searching at the Central Library. Additional databases with full text articles in many fields which are available for searching at branch libraries and from home for SDPL cardholders include **Master FILE Premier** and **Academic Search Elite**.

You may search these databases by subject or keyword.

CHOOSING AND DOING A SCIENCE FAIR PROJECT (check for recent editions)

Here is a sample list of books on science fair projects:

The complete Idiot's Guide to Science Fair Projects. Wiley Publishing Inc., 2009. 507.8/O'LEARY

Design and Analysis of Experiments. Wiley, 2001. 001.434/MONTGOMERY

How To Make Your Science Project Scientific. Wiley, 2002. 507.8/MOORMAN

More Award-Winning Science Fair Projects. Wiley, 2004. 507.8/BOCHINSKI

Myth Busters Science Fair book- 2011

Background Research con't:

Science Experiments on File: experiments, demonstrations, and projects for school and home. Facts on File, 2000. 507.8/SCIENCE

Science Experiments Index for Young People. Libraries Unlimited, 2005. 507.8016/PILGER (

Science Fair Projects for Dummies. Wiley Publishing Inc., 2003, Maxine Levaren

Science Project Ideas in the House. Enslow, 2002. 507.8/GARDNER--- Out of Print

Using Statistics in Science Projects, Internet enhanced. Enslow c2002. 507.8/KRIEGER

Janice Van Cleave's A+ Science Fair Projects. Wiley, 2003 507.8/VANCLEAVE

AND you can Google “Science Fair Projects” and find help on your own!

WEBSITES:

Internet Public Library: Science Fair Project Resource Guide

A variety of web site resources, leading you through the necessary steps to successfully choose and complete a science experiment. Has links to resources and several “ask an expert” web sites:

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

California State Science Fair

Lots of resources about and for science fair projects, general and by subject, links to other science fairs sites, history of previous science fairs, and more. This is the final science fair of the academic year for students throughout the State of California in grades 7 – 12. Includes the results for previous California State Science Fairs.

Science Fair Central

DiscoverySchool.com has ideas and projects for kids, and tips and help **for teachers and parents:**

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

Science News for Kids

From the makers of the weekly magazine, “Science News”, is a kid-friendly site devoted to a variety of science topics, puzzles, games, and science fair project suggestions:

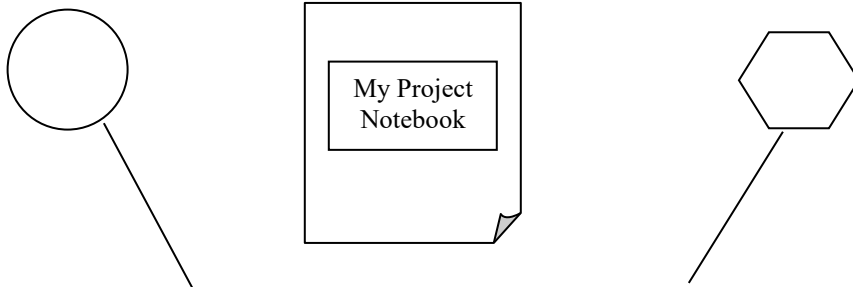
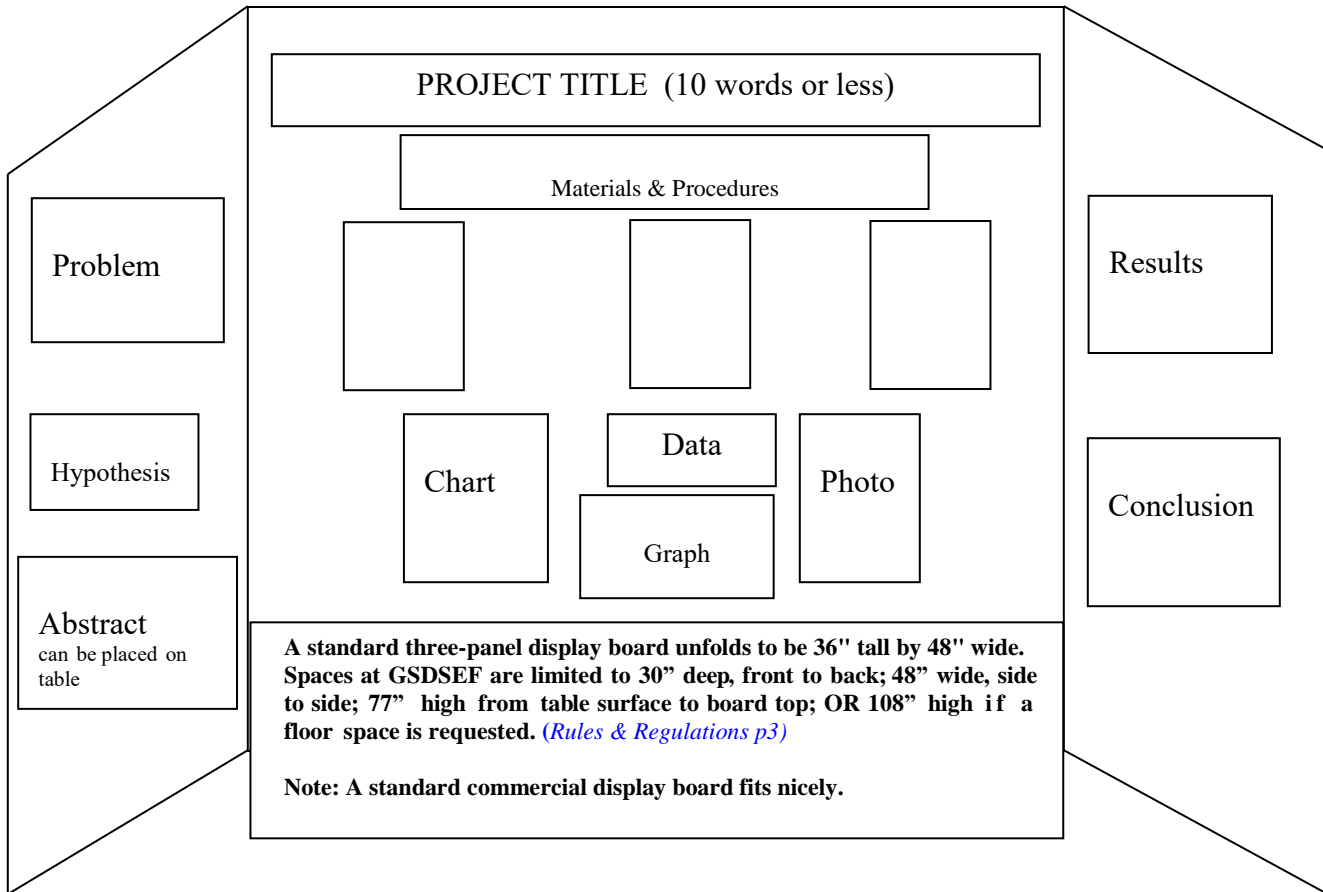
<http://www.sciencenewsforkids.org/>

HOMEWORK HELP

Databases are available on the San Diego Public Library website and can provide students with homework help:

<http://www.sandiego.gov/public-library/services/> Click on Homework Help Center

DISPLAY and BACKBOARD DESIGN SAMPLE format



NOTE: The *Rules & Regulations p3* for the Greater San Diego Science and Engineering Fair outline what objects can and cannot be displayed on/in front of your backboard at the fair; for example NO liquid, open flame, food, sharp object, etc.

GSDSEF Consent to Participate in Science Fair Project Testing

INSTRUCTIONS: Consent is required for any testing done with human subjects in a Science fair project. Each test subject must complete this form.

Project Title _____

Student Conducting Project Testing _____ School _____

(A brief description of the Project's procedures that the test subjects will be performing goes here)

Human Test Subject Consent

- I, (name of test subject) _____ understand that the student named above is conducting an experiment for a science fair project. This student has asked me to be a test subject.
- The student developing this project has explained this study to me and I voluntarily consent to be a test subject. I have my parent's or teacher's consent to participate if I am under 18 years of age.
- I realize that I can withdraw from this study at any time and there will be no negative consequences.

Test Subject Name: _____ Test Subject Age: _____

Test Subject Signature:

Test Subject Signature

Date

Parent/Guardian Signature (required if test subject is under 18 years of age):

Parent/Guardian Signature

Date

For a "whole class" experiment, Teacher signs only one consent form:

Teacher Signature

Date

*All Consent Forms will be filed in a secure manner to maintain confidentiality (not in the Notebook).

** A blank Consent Form needs to be in the Notebook.

Standards for Judging Science Fair Projects

(As established by the International Science & Engineering Fair):

1. Creativeness:

Originality of problem, uniqueness of approach. The handling and interpretation of data should be commensurate with the grade level of the student. Ingenious use of equipment and materials is considered without regard to the cost of the items involved.

2. Scientific Thought, Engineering Goals and Computer Project goals:

A. Scientific Method:

The project shows evidence of depth of study and effort in employing the scientific method in the solution of a clearly defined problem including study of background, organized procedures, appropriate sampling, orderly recording and analysis of data and the formulation of logical conclusions

B. Engineering Goals:

The project has a clear objective relevant to the needs of a potential user. The product or process has been tested and is workable and feasible both economically and environmentally.

C. Computer Project goals:

The project has a clear objective, has been thoroughly tested and documented and clearly, especially in the case of new programming, is the work of the student, is workable and is practical.

3. Thoroughness:

The study is complete within the scope of the problem. Scientific literature has been searched, experiments have been repeated and careful records have been kept.

4. Skills:

Credit is given for special skills needed for the construction or use of equipment and for mathematical, computational, observational and design skills.

5. Clarity:

The purpose, procedures and conclusions are clearly explained orally and through a display. The project notebook is well organized, neat and accurate. Sources of ideas, data **and assistance are clearly identified.**

NOTE:

In depth mathematics, computer and engineering project guidelines may be found on the GSDSEF website.