

# Science Project Information

## Overview of Assignment Due Dates

### 2016-2017

Friday, September 9	Log book check #1 (follow directions outlined in handout)
Friday, September 23	Research Plan & Bibliography (see directions)
Friday, October 7	Background research report (follow directions outlined in handout)
Friday, October 21	Log book check #2 ( must contain evidence of starting experiment)
Friday, October 28	Research report due (follow directions outlined in handout)
Friday, November 4	Abstract due
Friday, November 11	Science Projects due
Thursday, November 17	WCMS Science Fair

Note: Students must allow adequate time to meet the above deadlines. Students who are working with plants or completing other lengthy projects must begin work in time to meet the above deadlines. Pictures are an excellent means of documenting the scientific process; however, projects (display boards) with pictures that show faces will not be allowed to enter the science fair.

The WCMS Science teachers will assist students during RampUp (7:30-8:00) and during the Extended Learning Time period. They also will have helpsessions afterschool until 4:30 pm on the following dates:

#### Help Sessions

October 17

November 7

## Science Project Information 2016-2017

### Purpose

Completion of science projects meets several of the new Georgia Performance Standards. Students will acquire or enhance the following skills during the completion of the science project:

1. **Research Skills:** Students will use world-wide information, connectivity to specialists through various resources, and utilization of a wealth of ideas for preparation of and synthesis into a unique science project.
2. **Logical and Creative Problem-solving:** Students will learn to solve problems logically and to use creative and or alternate solutions to situations encountered during the research project phases.
3. **Critical Thinking:** The students will identify and clarify research issues by following a line of reasoning; judging statements, conclusions, and observations of others before applying information and techniques to own research project.
4. **Communication Skills:** Students will communicate information, ideas, problems, and solutions of the independent research project through verbal, written and visual means.
5. **Self-direction Skills:** Students will use computer skills, graphics skills, determination, goal setting, and organization for information gathering, analysis, synthesis, and evaluation during the Science Fair process.
6. **Creative Thinking Skills:** Students will use techniques such as brainstorming to generate ideas for unique and/or original research-based directions.

### Roles & Responsibilities

#### *Students*

- Select a project that interests you, that is appropriate for your grade level, and that meets the approval of your parents.
- Complete all forms and assignments by the stated deadlines.
- Begin experimentation in time to complete three trials.

#### *Parents*

- Provide support and motivation for your child.
- Help make sure that your child understands the time involved and the materials needed to complete the project he/she chooses.
- Encourage your child to communicate difficulties or needs for extra support to the teacher.
- Help monitor the progress of the project.

#### *Teachers*

- Help students select a project that interests them and is appropriate for their grade level.

- Monitor the completion of appropriate forms and assignments.
- Provide feedback during the completion of the project.

## The Scientific Process

The Scientific Process may involve the following steps:

1. Find a problem
2. Research
3. Make a hypothesis
4. Experiment
5. Compile data
6. Form a conclusion
7. Maybe find an answer
8. Maybe find another problem (next year's science project)

## Judging Criteria

The attached rubrics will be used to grade your project. The following criteria will be used to judge your project for competition (taken from the Georgia Science and Engineering Fair Score Sheet).

**Creative Ability (30 points)**—originality, new methods, construction/design, materials used, new conclusions

**Scientific Thought and Engineering Goals (30 points)**—clear purpose & objective, searched for related facts, development of hypothesis, controlled & accurate observations, sufficient data, test for accuracy of data, conclusions limited to data (if completing an engineering project—clear objective, solution workable, acceptable and economic, improvement over existing methods, was solution tested)

**Thoroughness (15 points)**—purpose carried out, problem completely covered, conclusions based on single replication experiment, complete notes-log book, student(s) aware of other approaches/theories, familiar with related literature

**Skill (15 points)**—does student have skills to do work, where was the project done, was assistance received, from whom, reasonable amount?

**Clarity/Knowledge (10 points)**—was student able to discuss project, does written material reflect understanding, presented in an orderly manner, clear data/results, exhibit self explanatory, was all work done by student?

## Getting Started

1. **SELECT A TOPIC.** Often finding the problem is the most difficult step. Keep the following ideas in mind:
  - a. Choose a topic you like.
  - b. Choose a topic your parents will approve.
  - c. Narrow the topic to a single aspect.
  - d. Plan your time wisely to allow for completion.
  - e. Choose a project that interests you, that can be finished in the amount of time you have, and that you can carry out with the materials available to you.

Your project should be as original as possible. Do not do a project that has been done over and over. Throughout your project you may receive advice and direction from your teacher and others, but the project must represent your effort. You may receive limited assistance in the construction of the exhibit. Proper acknowledgment for all assistance received should be given in your report.

Write a paragraph description of your topic and a rough plan for your project.

2. **Due Friday, September 25 and November 6**

**THE LOG BOOK.** Your log book should contain accurate and detailed notes of everything you do for your research project. Good notes will show that you are consistent and thorough. It will also help you when you write your **ABSTRACT**, **RESEARCH PAPER**, and **DISPLAY**.

1. A log book is a notebook that must be bound with stitching or glue so that the pages are not removable.
2. Your log book should be written in ink only. Do not use pencil or printouts from a computer (except graphs and charts).
3. Do not put your name on the log book. Put the number that your teacher assigns you.
4. Include notes on readings and bibliographic information.
5. Include your thoughts, ideas, and trials.

6. Include your raw data (all of the measurements you collect during your experimental trials). All measurements should include appropriate METRIC units.
7. Staple in copies of graphs or charts.
8. Attach photos and label them.
9. Date every entry and enter each science activity you do.
10. Do not try to make your log book neat. It should be readable, but you may cross out information you don't want as you work. Never remove pages from your log.

Write about your topic in your log book. Write all of your thoughts, ideas, what you know already about your topic. Remember to date the page.

You can start looking up information about your topic. Web sites and reference books are a good start. If you can, contact someone who works with anything to do with your topic. This is a great source of information and a possible way to work with an expert.

Add any information you gather to your log book. Turn in the Log Book Rubric with your log book for each check.

### 3. Due Friday, October 9

**RESEARCH PLAN AND BIBLIOGRAPHY.** While your project is not limited to research, it is a very important part of your project. You must exhaust all sources available to you on your topic. Periodicals, newspapers, the Internet and experts make wonderful resources. Your preliminary research will help give your project direction.

You should check the information available at the school's media center, and the Margaret Jones Library in Sylvester. Be sure that you keep accurate records of your sources for your bibliography.

You should have a minimum of 5 sources related to your topic. At least one of these should be from a source other than a website.

Your Research Plan and Bibliography should be typed and include the following\*:

**A. Question or Problem being addressed**

**B. Hypothesis OR Engineering Goals**

**C. Description in detail of method or procedures** (The following are important and key items that should be included when formulating ANY AND ALL research plans.)

**Procedures:** Detail all procedures and experimental design to be used for data collection

**Data Analysis:** Describe the procedures you will use to analyze the data that answer research question or hypothesis

**D. Bibliography:** List at least five (5) major references (e.g. science journal articles, books, internet sites) from your literature review. If you plan to use vertebrate animals, one of these references must be an animal care reference.

o Choose one style and use it consistently to reference the literature used in the research plan

o Guidelines can be found in the Student Handbook

\*Items 1-4 below are subject-specific guidelines for additional items to be included in your research plan as applicable:

#### 1. Human subjects research:

- o **Subjects.** Describe who will participate in your study (age range, gender, racial/ethnic composition). Identify any vulnerable populations (minors, pregnant women, prisoners, mentally disabled or economically disadvantaged).
- o **Recruitment.** Where will you find your subjects? How will they be invited to participate?
- o **Methods.** What will participants be asked to do? Will you use any surveys, questionnaires or tests? What is the frequency and length of time involved for each subject?
- o **Risks.** What are the risks or potential discomforts (physical, psychological, time involved, social, legal etc) to participants? How will you minimize the risks?
- o **Benefits.** List any benefits to society or each participant.
- o **Protection of Privacy.** Will any identifiable information (e.g., names, telephone numbers, birthdates, email addresses) be collected? Will data be confidential or anonymous? If anonymous, describe how the data will be collected anonymously. If not anonymous, what procedures are in place for safeguarding confidentiality? Where will the data be stored? Who will have access to the data? What will you do with the data at the end of the study?
- o **Informed Consent Process.** Describe how you will inform participants about the purpose of the study, what they will be asked to do, that their participation is voluntary and they have the right to stop at any time.

#### 2. Vertebrate animal research:

- o Briefly discuss potential ALTERNATIVES to vertebrate animal use and present a detailed justification for use of vertebrate animals
- o Explain potential impact or contribution this research may have
- o Detail all procedures to be used. Include methods used to minimize potential discomfort, distress, pain and injury to the animals during the course of experimentation
- o Detailed chemical concentrations and drug dosages
- o Detail animal numbers, species, strain, sex, age, etc. Include justification of the numbers planned for the research

- Describe housing and oversight of daily care
- Discuss disposition of the animals at the termination of the study
- 3. Potentially Hazardous Biological Agents:
  - Describe Biosafety Level Assessment process and resultant BSL determination
  - Give source of agent, source of specific cell line, etc.
  - Detail safety precautions
  - Discuss methods of disposal
- 4. Hazardous Chemicals, Activities & Devices:
  - Describe Risk Assessment process and results
  - Detail chemical concentrations and drug dosages
  - Describe safety precautions and procedures to minimize risk
  - Discuss methods of disposal

4. Due Friday, October 23

**BACKGROUND RESEARCH REPORT.** A formal (typed) summary of your research and bibliography will be submitted. **This will become the introduction to your research paper displayed with your project—be sure to save it so that you can edit it later.** See attached rubric to view how your report will be graded. Turn in the rubric with your report.

Name \_\_\_\_\_

## Log Book Rubrics

Check #1	Logbook is a notebook bound with stitching so that the pages are not removable. 20		Logbook is not a notebook bound with stitching so that the pages are not removable. 10	Total points:  Comments:
	Log book is written in ink only. 20	Log book is written in ink and pencil. 15	Log book is not written in ink at all. 10	
	All entries are dated. 20	Some entries are dated. 15	No entries are dated. 10	
	Log book includes readings and bibliographic information. 20	Log book includes minimal readings and bibliographic information. 15	Log book does not include readings and bibliographic readings. 10	
	Logbook includes thoughts and ideas. All data is recorded neatly with metric units. 20	Logbook includes some thoughts and ideas. Data includes metric units, but is not very neat. 15	Logbook includes thoughts and ideas. Data is not recorded neatly with metric units. 10	

Check #2	Logbook is a notebook bound with stitching so that the pages are not removable. 20		Logbook is not a notebook bound with stitching so that the pages are not removable. 10	Total points:  Comments:
	Log book is written in ink only. 20	Log book is written in ink and pencil. 15	Log book is not written in ink at all. 10	
	All entries are dated. 20	Some entries are dated. 15	No entries are dated. 10	
	Log book includes readings and bibliographic information. 20	Log book includes minimal readings and bibliographic information. 15	Log book does not include readings and bibliographic readings. 10	
	Logbook includes thoughts and ideas. All data is recorded neatly with metric units. 20	Logbook includes some thoughts and ideas. Data includes metric units, but is not very neat. 15	Logbook includes thoughts and ideas. Data is not recorded neatly with metric units. 10	

Name \_\_\_\_\_

## Background Research Report

Background Research	Content	Information is complete, accurate, and stated clearly  40	Information is complete, but is not state clearly  30	Information is complete, contains inaccuracies and is not clear  20
	Conventions	Correct capitalization; correct grammar and usage contribute to clarity and style; very little need for editing  20	Punctuation, spelling, and capitalization are generally correct; occasional lapses in correct grammar or usage; moderate need for editing  15	Basic punctuation tends to be omitted, haphazard, or incorrect; frequent spelling errors; capitalization is inconsistent or incorrect; errors in grammar or usage interferes with readability and meaning; substantial need for editing  10
	Presentation	Enhances the ability for reader to understand and connect with message; pleasing to the eye; formatting suits purpose; followed format  20	Message is understandable at times; appears empty, fussy, or cluttered; consistent layout; followed format somewhat  15	Garbled message due to problems relating to the presentation; very difficult to read and understand; major distractions; random or confusing layout; did not follow format at all  10
	Format	Paper is double spaced, one inch margins, 12 point type, standard font  20	Paper includes some of the formatting requirements.  15	Paper includes very few of the formatting requirements.  10
	Comments:		Total Points:	

Name \_\_\_\_\_

## Abstract Rubric

The abstract should be completed after experimentation and typed on the official form which is available at the same website as other forms. Use the rubric below as a guide for completing the abstract. Turn in the rubric with your abstract.

<b>Abstract</b>	<b>Format</b>	The abstract is on the official form and is less than 250 words. It is written in third person and past tense. 10	The abstract contains some of the important formatting elements. 7	The abstract contains only one of the important formatting elements. 5	Total Points:          Comments:
	<b>Title</b>	The title is limited to 65 characters and spaces. It is brief and descriptive. (The same title must be used for all forms and displays.) 10	The title contains some of the important elements. 7	The title contains none or only one of the important elements. 5	
	<b>Problem</b>	The statement of the problem tells the reader what specific questions are addressed in the study. The variables and limitations are identified. The intent and objectives of the research effort are made explicit in this statement. 10	The statement of the problem contains some of the important elements. 7	The statement of the problem contains none or one of the important elements. 5	
	<b>Purpose</b>	The purpose states the usefulness of the study. It answers the question why the project was undertaken. 15	The purpose of the project is mentioned, but is not clear. 10	The purpose of the project is not mentioned. 7	
	<b>Hypothesis</b>	The hypothesis limits the scope of the investigation and unifies the research design. 15	The hypothesis is stated clearly, but does not limit the scope of investigation or unify the research design. 10	The hypothesis is not focused and clear. 7	
	<b>Procedure</b>	A brief summary of what was done is provided. (This is not a step by step procedure.) 10	The procedure is mentioned, but is not clear 7	The procedure is not mentioned 5	
	<b>Data</b>	The data is summarized in a clear and understandable way 15	Some data is mentioned, but it is not clearly summarized 10	There is no mention of any data 7	
	<b>Conclusion</b>	The conclusion provides a concise statement of the outcomes of the investigation. It is written in nontechnical language and relates directly to the hypothesis. The conclusion identifies unsolved aspects of the original problem or identifies any new problems. 15	The conclusion contains some of the important elements. 10	There is no clear, reasonable conclusion 7	

Name \_\_\_\_\_

## Research Report Rubric

The research report should be in a notebook (three-ring binder). It should contain the following information (in the order indicated). Each section should begin on a new page. Use 1 inch margins and 10 or 12 pt. type. The title page may include larger type.				Total Points:
Title page & table of contents (separate pages)	Title page and table of contents present. The TOC allows reader to follow the organization of the paper quickly. 10	The title page and table of contents are present, but are not very helpful in following the paper. 7	The title page and table of contents are not complete or not included 5	Comments
Introduction	The introduction sets the scene for the report. This includes the background information, hypothesis, problem, and explanation of what prompted the research. 10	Some of the elements of an introduction are present. 7	Very few or none of the elements of an introduction are present. 5	
Materials & methods	The methodology used to collect data and/or make observations is described in detail. The description is detailed enough that someone would be able to repeat the experiment from the information. 10	Some of the elements of the description of the materials and methods are present. 7	The methods and materials are not described clearly. 5	
Results	The data and/or observations are listed neatly and clearly in tables and graphs if applicable. 10	The data are included, but is not in an organized way. 7	The data are missing or very incomplete and unorganized. 5	
Discussion	The results are compared with expected results. Possible errors are included. Ideas for other experiments to be conducted are discussed. 15	Some of the elements of a good discussion are present. 10	Only one or none of the elements of a good discussion are present. 7	
Conclusion	The conclusion is a brief summary of results. It is specific, not generalized. Nothing is introduced in the conclusion that was not discussed earlier. 10	Some of the elements of a good conclusion are present. 7	Only one or none of the elements of a good conclusion are present. 5	
Acknowledgments	Individuals, businesses, and educational or research institutions that provided assistance are credited. 15	Acknowledgments are present, but incomplete. 3	No acknowledgments are given. 0	
References/bibliography	References are listed in an appropriate format. 10	References are listed, but not in an appropriate format. 7	References are not included. 0	
Presentation	Directions (see top of page) for completing the research report were followed. 10	Some of the directions for completing the research report were followed. 7	Very few of the directions for completing the research report were followed. 5	



Name \_\_\_\_\_

## Science Project Information—The Display

Your display should attract and inform. Make it easy for readers to assess what you have done and the results you have obtained. Use your limited space well with concise language and compact visuals. Make headings stand out to guide your reader through your research. Make all text and graphics large enough to read from 2-3 feet away. Display data in graphs and include photographs if possible. **Display boards with pictures that show faces will not be allowed to enter the science fair.**

Below is the minimum information that should be part of your display.

Items to be displayed with backboard— Notebook with originals of required forms and research paper, logbook, & abstract	All three are present  10	Only two of the three items are present  6	Only one of the three items is present  3	None of these items are displayed with the backboard  0	Total Points:          Comments:
<b>Title</b>	Easy to read and clear 10	Easy to read or clear 6	Not easy to read and not clear 3	Not present 0	
<b>Background information &amp; question</b>	Easy to read and well developed 10	Easy to read, but not well developed 6	Not easy to read and not well developed 3	Not present 0	
<b>Purpose</b>	Easy to read and well developed 10	Easy to read, but not well developed 6	Not easy to read and not well developed 3	Not present 0	
<b>Hypothesis</b>	Easy to read and well developed 10	Easy to read, but not well developed 6	Not easy to read and not well developed 3	Not present 0	
<b>Materials &amp; Methods</b>	Easy to read and well developed 10	Easy to read, but not well developed 6	Not easy to read and not well developed 3	Not present 0	
<b>Results</b>	Easy to read and well developed 10	Easy to read, but not well developed 6	Not easy to read and not developed 3	Not present 0	
<b>Conclusion</b>	Easy to read and well developed 10	Easy to read, but not well developed 6	Not easy to read and not clear 3	Not present 0	
<b>Overall Appearance</b>	Neat, attractive, and easy to follow 20	Somewhat neat, attractive, and easy to follow 12	Not neat, attractive, nor easy to follow 6	Displays human faces on display board. 0	

## Science Fair Help Packet

### Topic Selection:

Topic must be approved by the teacher. Topics need to be related to something that you can do a hands on project with. Building a model or other topics like "the solar system" or "volcanoes" are not projects, they are models. Observations and investigations are made with a science project. A topic such as what would happen to our solar system if the Sun was smaller/larger or how an erupting supervolcano effect Earth's atmosphere is a more appropriate science fair topic since research can be done and then a model could be made to show what people (and computers) think would potentially happen in this scenario.

### Logbook:

Whether you are a research scientist, an engineer, or a first-time science fair student, you should use a lab notebook to document your science investigations, experiments, and product designs. A lab notebook is an important part of any research or engineering project. Used properly, your lab notebook contains a detailed and permanent account of every step of your project, from the initial brainstorming to the final data analysis and research report. Many science projects require a number of steps and multiple trials. By recording the steps of your procedure, your observations, and any questions that arise *as you go*, you create a record of the project that documents *exactly* what you did and when you did it. With a complete record of the project in your lab notebook, you can look back at your notes later if a question arises or if you decide to pursue a related project based on something you observed. Similarly, writing down your product design ideas, engineering challenges, and product testing data will help you keep track of all of your ideas, what you have already tried, and how well a particular design performed. Never remove pages from the logbook. If you need to dismiss a page, simply draw a large X on the entire page.

### Background Research Plan

Key Info:

Background research is necessary so that you know how to design and understand your experiment. To make a background research plan — a roadmap of the research questions you need to answer — follow these steps:

1. Identify the keywords in the question for your science fair project. Brainstorm additional keywords and concepts.
2. Use a table with the "question words" (why, how, who, what, when, where) to generate research questions from your keywords. For example:

What is the difference between a series and parallel circuit?

When does a plant grow the most, during the day or night?

Where is the focal point of a lens?

How does a java applet work?

Does a truss make a bridge stronger?

Why are moths attracted to light?

Which cleaning products kill the most bacteria?

Throw out irrelevant questions.

3. Add to your background research plan a list of mathematical formulas or equations (if any) that you will need to describe the results of your experiment.
4. You should also plan to do background research on the history of similar experiments or inventions.
5. Network with other people with more experience than yourself: your mentors, parents, and teachers. Ask them: "What science concepts should I study to better understand my science fair project?" and "What area of science covers my project?" Better yet, ask even more specific questions.

### Bibliography:

Key Info:

- Make a list to keep track of ALL the books, magazines, and websites you read as you follow your background research plan. Later this list of sources will become your bibliography.
- Most teachers want you to have at least three written sources of information.
- Write down, photocopy, or print the following information for each source you find. You can use the Science Buddies Bibliography Worksheet to help you.

### Research Report (Final Report) and Abstract:

Key Info:

At this point, you are in the home stretch. Except for writing the abstract, preparing your science fair project final report will just entail pulling together the information you have already collected into one large document.

- Your final report will include these sections:
  - Title page.
  - Abstract. An abstract is an abbreviated version of your final report.
  - Table of contents.
  - Question, variables, and hypothesis.
  - Background research. This is the Research paper you wrote before you started your experiment.
  - Materials list.
  - Experimental procedure.

## Science Fair Help Packet

- Data analysis and discussion. This section is a summary of what you found out in your experiment, focusing on your observations, data table, and graph(s), which should be included at this location in the report.
  - Conclusions.
  - Ideas for future research. Some science fairs want you to discuss what additional research you might want to do based on what you learned.
  - Acknowledgments. This is your opportunity to thank anyone who helped you with your science fair project, from a single individual to a company or government agency.
  - Bibliography.
- Write the abstract section last, even though it will be one of the first sections of your final report.
  - Your final report will be several pages long, but don't be overwhelmed! Most of the sections are made up of information that you have already written. Gather up the information for each section and type it in a word processor if you haven't already.
  - Save your document often! You do not want to work hard getting something written the perfect way, only to have your computer crash and the information lost. Frequent file saving could save you a lot of trouble!
  - Remember to do a spelling and grammar check in your word processor. Also, have a few people proof read your final report. They may have some helpful comments!

An abstract is an abbreviated version of your science fair project final report. For most science fairs it is limited to a maximum of 250 words (check the rules for your competition). The science fair project abstract appears at the beginning of the report as well as on your display board.

Almost all scientists and engineers agree that an abstract should have the following five pieces:

- **Introduction.** This is where you describe the purpose for doing your science fair project or invention. Why should anyone care about the work you did? You have to tell them why. Did you explain something that should cause people to change the way they go about their daily business? If you made an invention or developed a new procedure how is it better, faster, or cheaper than what is already out there? Motivate the reader to finish the abstract and read the entire paper or display board.
- **Problem Statement.** Identify the problem you solved or the hypothesis you investigated.
- **Procedures.** What was your approach for investigating the problem? Don't go into detail about materials unless they were critical to your success. Do describe the most important variables if you have room.
- **Results.** What answer did you obtain? Be specific and use numbers to describe your results. Do not use vague terms like "most" or "some."
- **Conclusions.** State what your science fair project or invention contributes to the area you worked in. Did you meet your objectives? For an engineering project state whether you met your design criteria.

### Things to Avoid

- Avoid jargon or any technical terms that most readers won't understand.
- Avoid abbreviations or acronyms that are not commonly understood unless you describe what they mean.
- Abstracts do not have a bibliography or citations.
- Abstracts do not contain tables or graphs.
- For most science fairs, the abstract must focus on the previous 12 months' research (or less), and give only minimal reference to any earlier work.
- If you are working with a scientist or mentor, your abstract should only include procedures done by you, and you should not put acknowledgements to anyone in your abstract.

### Why Is an Abstract Important?

Your science fair project abstract lets people quickly determine if they want to read the entire report. Consequently, at least ten times as many people will read your abstract as any other part of your work. It's like an advertisement for what you've done. If you want judges and the public to be excited about your science fair project, then write an exciting, engaging abstract!

Since an abstract is so short, each section is usually only one or two sentences long. Consequently, every word is important to conveying your message. If a word is boring or vague, refer to a thesaurus and find a better one! If a word is not adding something important, cut it! But, even with the abstract's brief length, don't be afraid to reinforce a key point by stating it in more than one way or referring to it in more than one section.

### Example of an abstract:

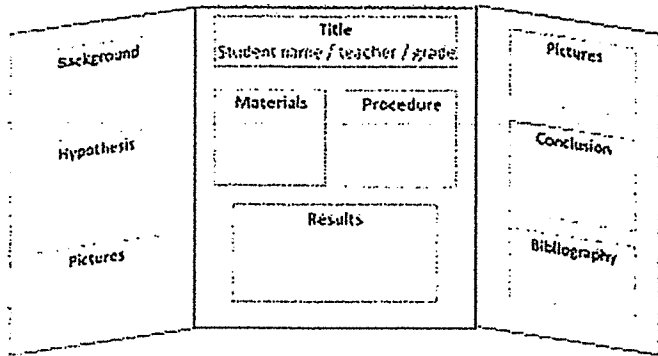
Advertisers are always touting more powerful and longer lasting batteries, but which batteries really do last longer, and is battery life impacted by the speed of the current drain? This project looks at which AA battery maintains its voltage for the longest period of time in low, medium, and high current drain devices. The batteries were tested in a CD player (low drain device), a flashlight (medium drain device), and a camera flash (high drain device) by measuring the battery voltage (dependent variable) at different time intervals (independent variable) for each of the battery types in each of the devices.

## Science Fair Help Packet

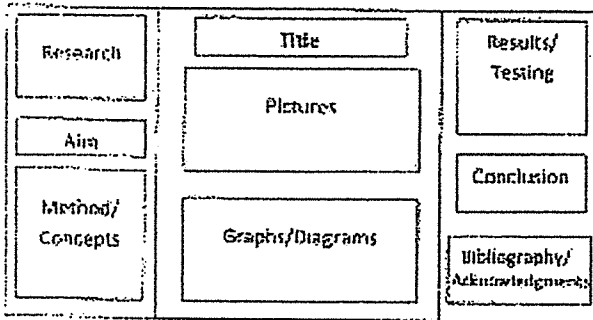
My hypothesis was that Energizer would last the longest in all of the devices tested. The experimental results supported my hypothesis by showing that the Energizer performs with increasing superiority, the higher the current drain of the device. The experiment also showed that the heavy-duty non-alkaline batteries do not maintain their voltage as long as either alkaline battery at any level of current drain.

[http://www.sciencebuddies.org/science-fair-projects/project\\_final\\_report.shtml](http://www.sciencebuddies.org/science-fair-projects/project_final_report.shtml)

Different tri-board layouts:



TEST: Science Fair Board... How should I look??



Tips:

It is best to keep it simple and to focus on the main aspects of the project. Don't use too many pictures!

