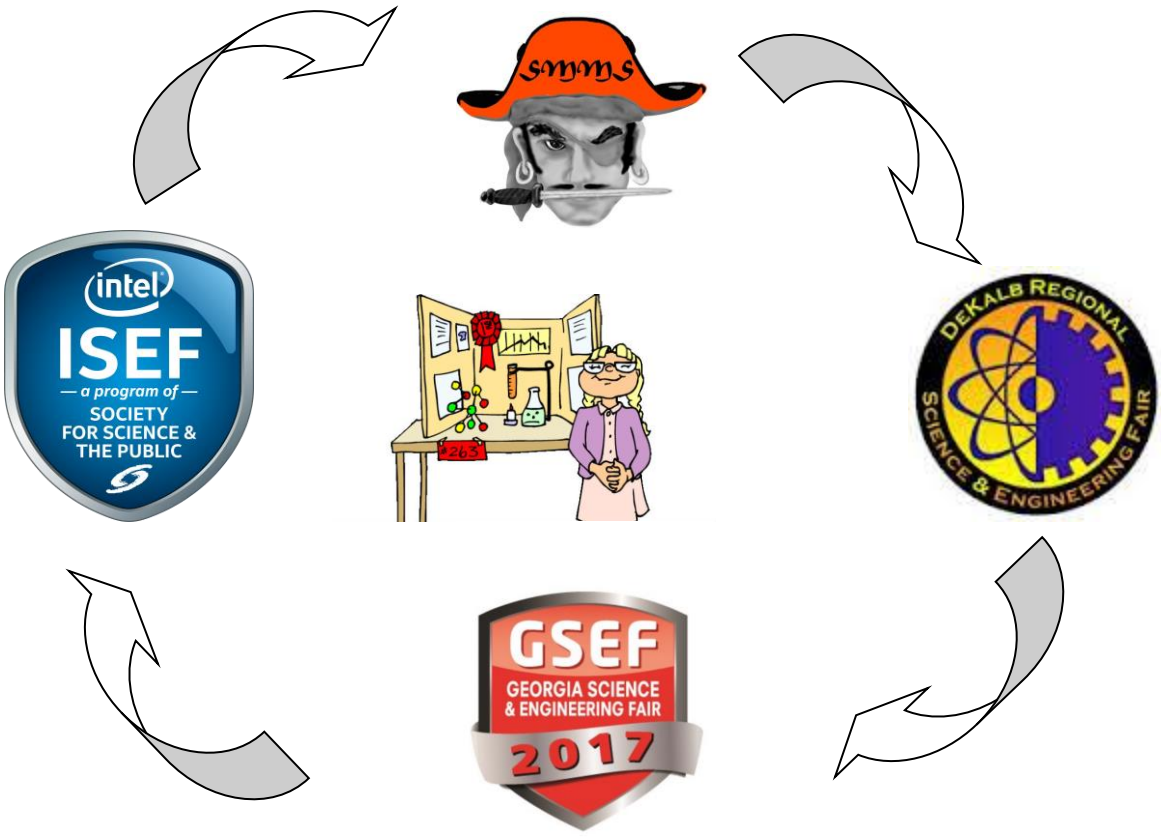


Stone Mountain Middle School
2016-2017 Science Fair Packet

Table of Contents

Just follow these easy steps and you, too, can create a wonderful award winning science project!!

Very Important: Before you turn this page, recruit an adult to help you. They come in very handy, especially if you are nice to them and tell them you won't blow up anything!!

My adult's name is _____

From this point forward you are now…A SCIENTIST!!

Suggested Task Timeline

Sept 12-16

Week 1: Choose an idea
Receive pertinent information on science fair project. Begin to research topic ideas. Choose a topic or **problem*** to investigate (**By September 15, 2016**). Make a list of resources. Select your reading materials

Sept 19-23

Week 2: Collect research
Science Fair Proposal Plan Due (September 21, 2016)
Review books, articles for additional ideas. Begin preliminary **investigations**; complete initial research. Contact and interview experts for more information. Decide how to set up your investigation or experiment. Start a bound notebook (composition book) for keeping records and notes. Write down what you have done so far **IN INK!** Date each entry and each page. Locate **12 references** for written report.

Sept 26-30

Week 3: Gather materials
Begin purchasing or acquiring the **materials** that you will need. Collect experiment materials and learn to use any equipment, apparatus you need. Keep progress current in your bound notebook. Decide if additional material from outside sources are needed. Check with experts contacted earlier as needed. Begin preparing signs, titles and labels for display.

Oct 3-7

Week 4: Begin Experimentation
Identify the **variables** in the investigation. Be able to identify your **independent variables**, **dependent variables** and **control variables**. Variables must be measurable. Set up your **experiment**. Make **observations** before, during and after the experiment. Complete your experiment at least 3 TIMES or more; record the **data** from each **trial** in a **table** or **chart**. Be sure to take lots of photos of your experiment.

Oct 10-14
Oct 17-21

Weeks 5-6: Organize your information
Continue making observations, recording notes and entering data into your bound notebook. Begin **analysis** of the data collected. Begin designing charts, graphs and other visual aids for your written report and your display. Work on the first draft of your paper. Be sure to include the title, **purpose**, **hypothesis**, **thesis**, and **citations** along with a reference list of the first 6 references.

Oct 24-28

Week 7: Complete experimentation, begin abstract and display board
Draft abstract for written report. Complete charts, graphs and visual aids. Plan the layout of your display board. Check spelling, grammar and punctuation on display board.

* **Underlined terms** are vocabulary essential to the science fair project. Students must become familiar with these terms and be comfortable using them throughout their presentations.

Suggested Task Timeline (continued)

Oct 31- Nov 4	**Week 8: Complete final draft** Complete reference list and citations. Write first, then type final draft of paper. Check and double check paper for correct spelling, grammar and punctuation. Revise abstract. **Final paper due November 16, 2016.**
Nov 7-11	**Week 9: Finalize paper, abstract and display** Revise abstract. Finish constructing display (NOTE: Set up display at home and check for any flaws. Leave display standing for 2 days to make sure nothing falls off the board.
Nov 14-18	**Week 10: Submit project** **Display Board due November 14, 2016.** **Final paper with 12 references due November 16, 2016.** **Classroom Presentations November 15-18, 2016.**
Nov 28- Dec 2	**Week 11: SMMS Local Science Fair (MEDIA CENTER)** Set up projects for display. **Judging November 31- December 2, 2016**
Dec 5-9	**Week 12: Declaration of winners** Winners announced **December 7, 2016**
Dec 12-16 **Dec 19-23**	**Weeks 13 and 14: Prepare for DeKalb County Regional Science and Engineering Fair** Students of winning projects from SMMS Fair that are recommended for the regional fair will begin working on the DeKalb County Regional Science Fair Paperwork. Forms will be sent electronically to you by your teacher (teachers will let you know which forms you will need to complete). You will also make any necessary corrections to the display board during this time and over the holiday break. Regional Forms are due January 9, 2017. Display boards are to be returned to school January 18, 2017.
Jan 9-13	**Week 15: Submit Regional Fair forms** All regional fair submissions must return their entry forms no later than January 9, 2016 to Dr. Mayberry.
Feb 10-11	**DeKalb County Science and Engineering Regional Junior/Senior Division Fair** **Date: February 10-11, 2017 Location: TBA**

FORWARD

Everything is science!

The annual science fair gives students the chance to answer the question

"How can I use the scientific method (or engineering design process) outside of the classroom?"

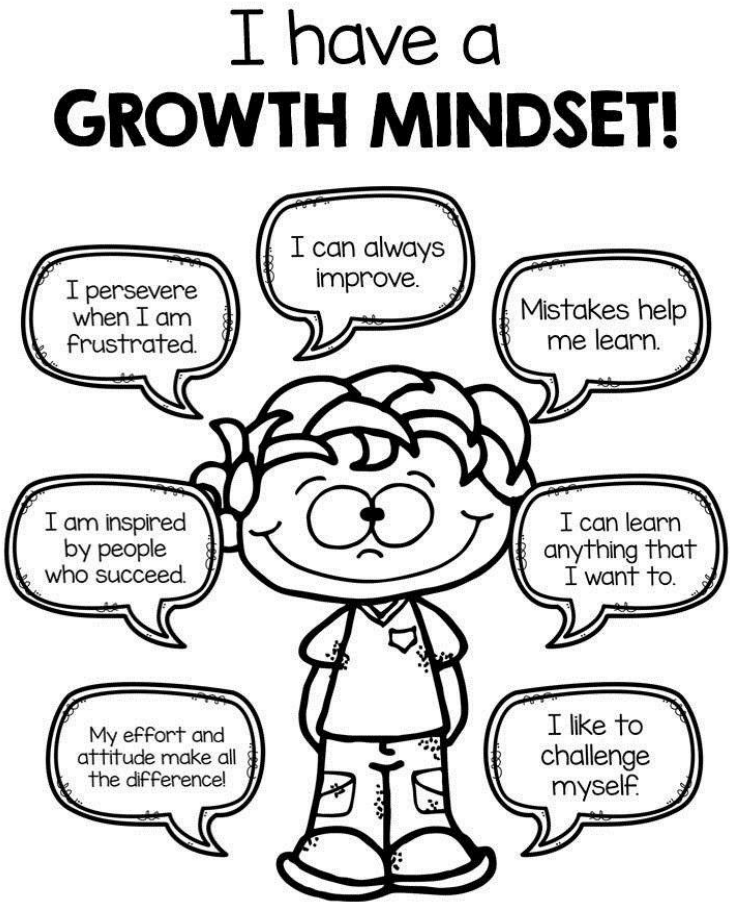
These hands-on, student guided investigations allow students to gain, organize, apply, and convey knowledge about the world within which we live. Science fair projects are integrated- meaning that students have to draw upon the skills they've learned in social studies, mathematics and English/Language arts while completing the project. This type of project helps students see how everything they learn in school is connected. The project also gives students the chance to understand the world around them, and to see how they can affect the world. Every great idea starts with wonder- this project lets students explore many of the things that fill them with wonder.

Each and every student represents a voice of tomorrow. By completing science fair projects, students learn how to share that voice in a way that can be clearly heard and understood. This handbook was designed to provide assistance and guidelines to teachers, students and parents who are going to participate in the Stone Mountain Middle School Science Fair. This handbook will help everyone keep up with information on the rules/regulations, forms, and submission deadlines.

MISSION STATEMENT

The Stone Mountain Middle School Science Fair's mission is to:

- Demonstrate to students how science and investigation is part of every part of their world.
- Motivate and stimulate the interests of all students in the fields of science, technology, engineering, and mathematics, or unique applications of those fields (including the arts).
- Recognize outstanding effort and investigative achievement by students through their science fair projects.
- Provide guidance and an educational experience for all students.
- Foster a growth mindset within students as they confront challenges.



RULES AND REGULATIONS

The Stone Mountain Middle School Science Fair believes that all students have the right and opportunity to compete fairly for all awards. The following regulations will keep projects uniform for judging, ensure that they abide by federal, state, and local laws, and follow DeKalb County Regional Science and Engineering Fair regulations. For these reasons, the following will be strictly enforced:

In general, the display of anything that could be hazardous to the public is PROHIBITED, including the following:

- Anything that is ALIVE (animals, plants, molds, etc)
- Plant materials in their raw state (living or dried) not secured in a sealed container
- Taxidermy specimens or parts; preserved vertebrate or invertebrate animals (dead bugs, rabbit's foot); Human/animal parts or body fluids
- Food items (people or pet food, etc)
- Containers filled with water or any other kind of liquid
- Sharp items (needles, knives, syringes) including glass or glass objects
- Small, loose pieces sitting on the table that could be picked up by a child (choking hazard) or fall to the floor posing a tripping/slipping hazard to members of the public.
- Photos of people, including the student's family, without their (and if a minor, their parent's) written consent to be displayed.
- Soil, sand, or rock samples except in a sealed Petri dish or baggie securely affixed to the display board
- All chemicals (laboratory/household), cleaners, poisons, toxic substances
- Drugs or controlled substances; hazardous substances or devices (ie firearms)
- Dry ice or other sublimating solids
- Flames, fire, highly flammable materials
- Any apparatus deemed unsafe including empty tanks that previously contained combustible liquids or gases.
- Batteries with open top cells
- Projects with moving parts that have unprotected belts and pulleys
- Class 3 and 4 lasers; Class 2 lasers must follow rules in ISEF handbook

DISPLAY BOARD RULES

1. All exhibits should be sturdily constructed and self-supporting.
2. Size limits are 30” deep front to back; 48” side to side; 108” floor to top
3. All electrical wiring must be of an approved, insulated type. Electric cords are the responsibility of the exhibitor.
4. Experiments are recommended over collections and models
5. Display must be self-standing of reinforced cardboard, plywood, or other materials. The project cannot lean on the table, wall, or other projects. Nail, glue, or tape cannot be placed on the tables.

*Although Stone Mountain Middle School will take precautions to protect the exhibits, there will be no assumed responsibility for any items lost or damaged during the fair. Valuable material and equipment should be simulated or pictured. Note: it is advisable to have extra copies of notebooks and other printed materials.

**Ethics Statement: Scientific fraud and misconduct is not condoned at any level of research or competition. Plagiarism, use or presentation of another researcher’s work as one’s own and fabrication or falsification of data will not be tolerated. Fraudulent projects will fail to qualify for competition

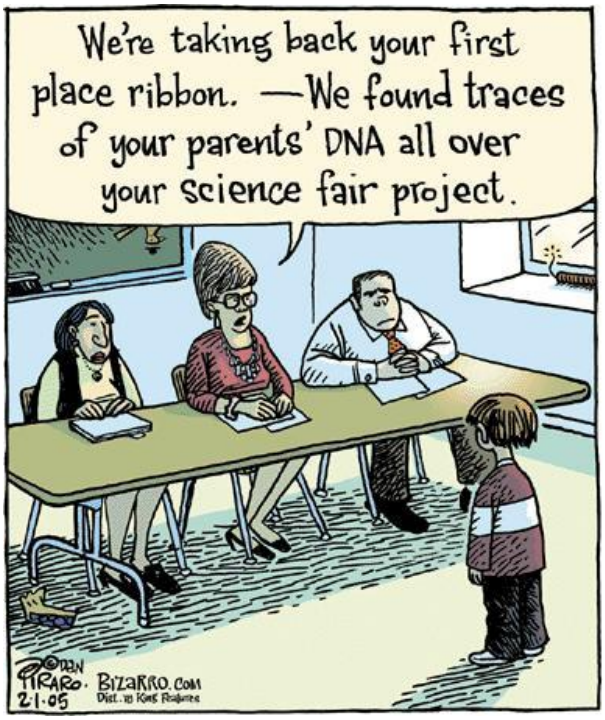
Important Information!

1. If your science fair project involves human subjects or animals - - you MUST check with your teacher to make sure you are following the ethical guidelines provided by the Intel International Science and Engineering Fair Committee. These rules can be found at https://student.societyforscience.org/international-rules-pre-college-science-research

2. If your project is chosen for the Regional Science Fair you will need to submit your registration forms for the fair to Dr. Mayberry no later than January 9, 2017. Your teacher will provide the forms to you electronically to complete.

3. If you would like to use photos of friends/relatives/helpers in your science fair project, you have to fill out the “consent to have photos displayed” paper, have the people sign it, and affix it to the back of your display. The form is found at the end of this packet or from your science teachers.

Science Fair Tips for Parents – Some Helpful Dos and Don'ts



Here are some tips to keep your sanity, keep order in the house, and to help your would-be scientists do a really good project, and perhaps even win an award. The goal is to have your willing and exuberant involvement help your child to avoid a stressful experience and instead have an exciting learning experience.

- DON'T do the research for your student. Let your child find the project that he/she just cannot resist doing
- DON'T do any of the work for your child, but DO give him/her guidance, encouragement, and support whenever needed.
- DON'T stress the award factor. The most important aspect of the entire exercise is discovery, excitement, and learning.
- DON'T let your child do a project that uses dangerous chemicals, or is otherwise unsafe.
- DO make certain that your child allows enough time from start to finish. Six weeks is a good idea.
- DO make sure that your child follows the "scientific method". This will include such topics as research, problem, hypothesis, experiment, and conclusion.
- DO make sure that your child has learned how to make the presentation (PRACTICE!!!)
- DO make certain that the child knows it is his/her project
- DO give your child the help they need in going to libraries, getting available computer time, making funds available for materials and the like
- DO volunteer to help with the science fair
- DO instill a sense of pride and accomplishment to your child for their efforts, but DON'T be afraid to give your child constructive criticism
- Be aware of the "perfect project" syndrome; allow yourself and your child to make mistakes

Repeat Your Mantra: "It's my child's project, not my project. It's my child's project, not my project…"

A Science Fair Project – "What it is and isn't"

There are two types of science projects: Models and Experiments.

A model, display or collection:

Shows how something works in the real world, but doesn't really test anything.
Examples of these include:
The Solar System, Types of Dinosaurs, Types of Rocks, How an Electric Motor Works.

Boring!!!!! Don't do this →

An experiment:

An attempt to answer a question by designing and conducting an experiment. A systematic approach to solving a problem using the Scientific Method or the Engineering Design Process.

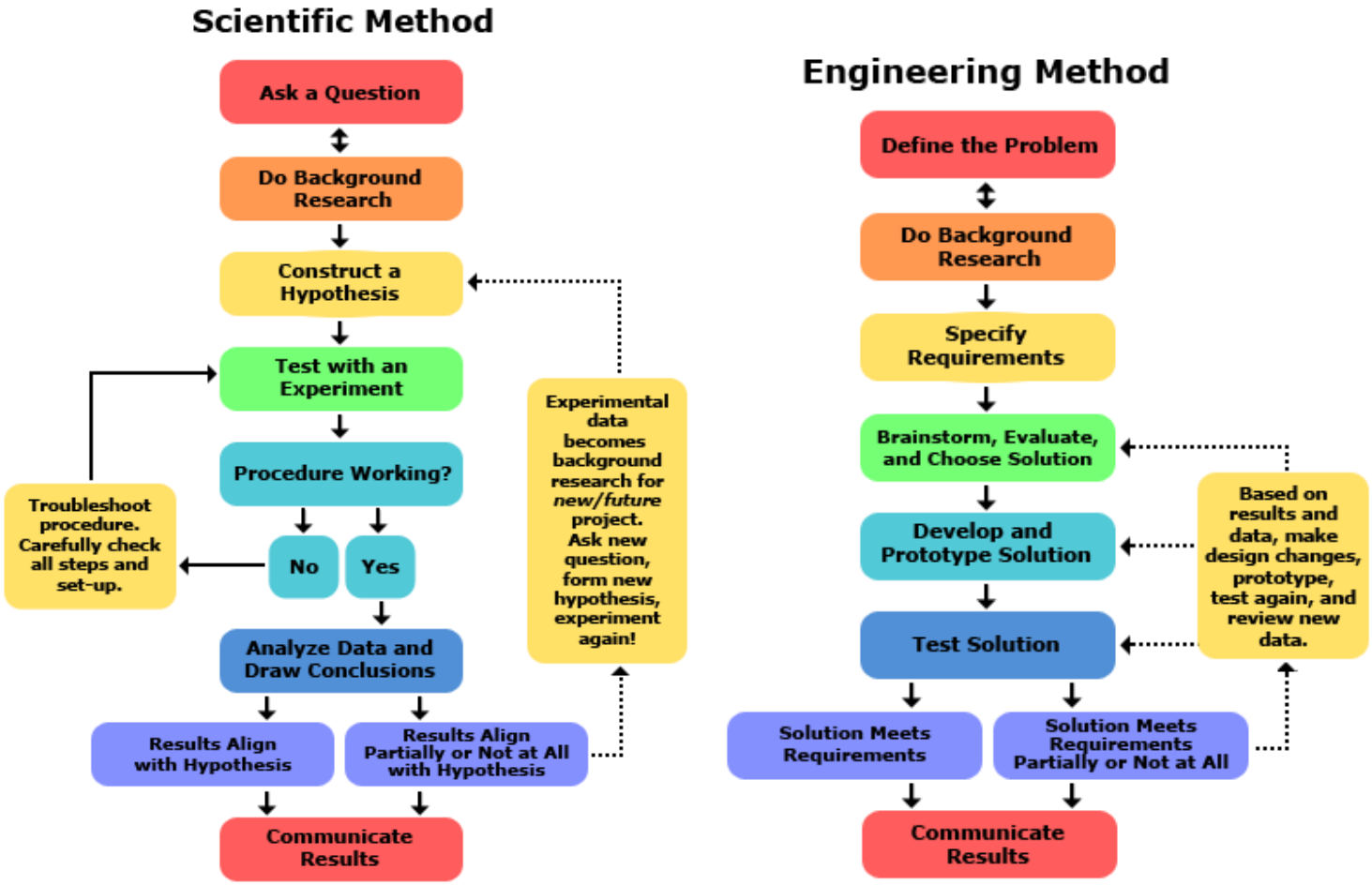
Cool!!! Interesting...Do This →

NO VOLCANO PROJECTS!!!

AFTER ALL,
WE ARE MIDDLE SCHOOL STUDENTS!

Scientific Method vs. Engineering Design Process

While scientists study how nature works, engineers create new things, such as products, websites, environments, and experiences. Because engineers and scientists have different objectives, they follow different processes in their work. Scientists perform experiments using the **scientific method**; whereas, engineers follow the creativity-based **engineering design process**.
Both processes can be broken down into a series of steps, as seen in the diagram and table. Determine which process is best for your project.



Keep in mind that although the steps are listed in sequential order, you will likely return to previous steps multiple times throughout a project. It is often necessary to revisit stages or steps in order to improve that aspect of a project.

*Adapted from ScienceBuddies.org Comparing the Engineering Design Process and the Scientific Method

SIX KEY ASPECTS OF A SUCCESSFUL PROJECT

Successful, award winning science fair projects are created by completing six key project aspects:

1)choosing a category that interests you,
2)coming up with a good question,
3)doing the research and forming a hypothesis,
4)testing the hypothesis by doing an experiment,
5)writing a clear written report for your project,
6) creating an interesting presentation.

The following pages will guide you through this process step by step. **All of the information filled out in these pages should be placed inside your log book (bound notebook).** The weeks in which each task is suggested to be completed are also included below.

Week 1: Choose an Idea

Key Aspect 1. Choosing a category that interests you…

What are some things in which you are interested? Basketball? Gaming? Food? Stars?
Can you find the science in these interests? It is important for you to choose a topic in which you are already interested. This will help keep you motivated throughout the project, because you will be gaining knowledge about something you really enjoy! Now, in what category does your interest fall? Here are 3 general categories

Life Science: This category deals with all animal, plant, and human body questions that you might have and want to do an experiment about. Remember, it is against Science Fair Rules to intentionally hurt an animal during an experiment. Life sciences also includes studying behaviors, so it's a perfect category to try taste tastes, opinion surveys, animal behavior training, etc.

Physical Science: If you like trying to figure out how things work, then this is the category for you. It includes topics about matter and structure, as well as electricity, magnetism, sound, light, or anything else you might question, "How does it work and what if I do this to it, will it still work?" Physical science also includes the composition of matter and how they react to each other. These are scientific experiments that may have bubbling and oozing going on, like figuring out what is an acid and what is a base.

Earth and Space Sciences: This category is really awesome because it covers all sorts of topics that deal with the Earth or objects in space. This includes studying weather, geology (which is the study of everything that makes up the Earth, like rocks, fossils, volcanoes, etc), and the study of all that is in space, including the stars, our sun, and our planets. Unfortunately, this is the topic where most kids mess up and do a collection or model project instead of an "Experiment," so be careful.

Now it's Your Turn:

In your log book, the following information. Use complete sentences.
I am interested in _____
The category my interest falls in is _____
(Life Science, Physical Science, or Earth and Space Science)
I want to do an experiment involving _____

Key Aspect 2. Coming up with a good question…

A good question is clear and direct and helps you see what experiment to do to answer it. Here are some "fill in the blank" examples:

The Effect Question:

What is the effect of _____ on _____?

sunlight	the growth of plants
eye color	pupil dilation
brands of soda	a piece of meat
temperature	the size of a balloon
oil	a ramp

The How Does Affect Question:

How does the _____ affect _____?

color of light	the growth of plants
humidity	the growth of fungi
color of a material	its absorption of heat

The Which/What and Verb Question:

Which/What _____ (verb) _____?

foods	do	meal worms prefer
liquid	makes	plants grow best
salt	dissolves	ice the fastest

Now it's your turn.

In your log book, create your Science Fair question using either the "Effect Question," the "How does Affect Question," or the "Which/What and Verb Question":

_____

Week 2: Collect the Research

Key Aspect 3. Doing the research and forming the hypothesis:

So, how do you become an expert?

YOU READ!!! Read about your topic. READ encyclopedias. READ magazine articles and books from the library. READ articles from the internet. Make a list of all the books and articles you read.

YOU DISCUSS!!! Talk about it with your parents. Talk about it with your teachers. Talk about it with experts in the field (Veterinarians, Doctors, Weathermen, etc).

Now it is time to predict what you think will happen if you test your problem. This type of "smart guess" or PREDICTION is what real scientists call a hypothesis. Just answer this very simple question:

What do you think will happen (even before you start your experiment?)

Now it's your turn….
In your log book, write down the problem and create a hypothesis based on what you have researched:

Problem: _____
Hypothesis_____

In your log book, write down information on the references you are going to use for Research:

Books I found in the library on my topic are: _____
Internet sites that I found on my topic are: _____
People I talked to about my topic are: _____
Some important points that I learned about my topic are: _____

Hypothesis: I think that (will happen) _____ because (my research shows)
_____

Organizing Your Research

Below are examples of how to organize research you gather from different sources.

Research Notes from a Book

Author(s) _____, _____ .
Editor: _____
Title: _____
City of Publication: _____ Publisher: _____
Year of Publication: _____ Page #s _____
****

Research notes from an Encyclopedia

Author(s) _____, _____ .
Title of Article _____
Title of Encyclopedia _____
Edition Date _____ (on spine or back of title page ~ use most recent date)
****

Research Notes from a Web Site

Author (last name) , Author (first name) . [Record Author's name if it is given.]
_____, _____ .

Title of Web Site (underline title) Date site was last updated [if given]
_____ . _____.

Date you visited site URL (address of site; starts with "http://") _____ <
_____>.
****

Research notes from an Online Database

Author(s) _____
Title of Article _____
Title of Reference Book, Encyclopedia, Magazine
_____
Date _____ Page #s _____
Database Name _____ Publisher of Database _____
Date of Access _____ (Date you did your research)
URL (shortened form) _____
****

Online image/Sound Videoclip (Source Form)

Artist/Creator (if noted) _____
Description or Title of Media _____
Date Image/Sound/Clip was Created _____
Online Image/Online Sound/Online Videoclip _____
Date of Electronic Publication/Last Update/Posting _____
Title of Larger Site _____
Date of Access _____ URL _____

Week 3: Gather Materials

Key Aspect 4. Testing your hypothesis by doing an experiment

Science Fair Rules state that you cannot perform your experiment live, so you'll have to take plenty of pictures as you go through these seven very simple steps:

1. **Gather up your materials**. Make a list **in your log book** that looks like this:

Item Name	Description	Cost	Where to find it?

Week 4: Begin Experimentation

The following steps should be recorded **in your log book**.

2. **Write a procedure**. Make a list of steps that you did to run the experiment.
3. **Identify your variables**. Variables are any factor that can change in an experiment. You should only test one variable at a time in order to get accurate results. In other words, if you want to test the affect that water has on plant growth, then all the plants you test should be in the same conditions (these are called controlled variables: same dirt, same type of plant, same type of location, same amount of sunlight, etc). The only variable that you would change from plant to plant would be the amount of water it received. This is called the independent variable or manipulated variable. The results of the test that you do are called the dependent or responding variables.
4. **Test, Test, Test**. The judges expect your results to be consistent in order to be a good experiment. You need to do the experiment more than once in order to test it properly. More is better!
5. **Collect your DATA**. Write down the results of the experiment every time you test it **in your log book**. Be sure to organize it in a way that it is easy to read the results. You may use tables, graphs, and other organizers to show your results.

a. Have the right tools to do the job – have the right tools to take accurate measurements, like rulers, thermometers, graduated cylinders, or measuring cups that measure volume. The recommended standard of measurement in science is METRIC (meters, liters, Celsius, grams, etc).

b. Tables, charts, and diagrams: Example

Plant (controlled variable)	Amount of Water per day (ml) (independent variable)	Growth in two weeks (cm) (dependent variable
Plant A	None	0.5
Plant B	5	2

Week 5 and 6: Organize your information

Key Aspect 5. Writing a clear written report for your project

Your written paper should include all of the information you have gathered so far, and should organize that information so that the reader can understand your project's purpose, design, experiment, analysis and conclusion. Create an outline with the following headers to guide you through your writing process**. All papers should be 4-5 pages long, typed, double spaced, Times New Roman Font, 12 pt Font Size, with 1 inch margins**.

All written papers for science fair projects will be judged based on the following criteria:

Title page: The front page should include the name of the project, your name, the name of your school (Stone Mountain Middle School), your grade level and the date you submitted the paper.

Abstract: Your abstract should give the reader a brief overview of the paper. Answers to bold questions below should be included here. Your abstract should be between 200-250 words. **THE ABSTRACT SHOULD BE WRITTEN LAST!**

Table of Contents: Your table should include on which pages your Introduction, Purpose, Hypothesis, Background Research**, Methods & Procedure,** Materials List, Experimental Procedure**, Data Analysis,** Observations, Charts and Tables**, Discussion,** Conclusion, Application**, Acknowledgements** and **Bibliography** can be found. Items in **bold** should be **main headings** and items underlined should be subheadings.

Example:

Table of Contents

Introduction: Your Introduction should state the Purpose and for your project. In it, you should state your research question succinctly, but thoroughly. Tell us why it is important to address this question. Answer the question **"Why would this research be significant?"** Your Hypothesis should be clearly stated in your introduction**.** You should also include your Background Research, which is a review information and views already presented by other researchers, policy-makers, and opinion leaders to develop your justification, but in the Introduction you should cite only the most important references. The Introduction should tell us about what you propose to study, how your findings might apply in the real world and thus, what potential impact it might have.

Methods / Procedure

Describe the design of your study and why that design was the most practical or appropriate to solve your research question. Describe the procedures for data collection (or selection), including setting and timeframe of the data collection (e.g., general community, national sample, during what period of time, etc.). You should also include your Materials List of materials needed, safety precautions, and your Experimental Procedure with the proper order of the procedure listed.

Briefly state how and why you chose the source of your data. Generally, you should determine how you will measure the outcome before you begin collecting data. Answer the question **"How would this design be defined and measured?"** If applicable, describe what material you want to obtain from subjects and how you obtained it. For more information on designing your procedure, see your **science teacher**.

Data Analysis

Define the primary outcome measure for the study. Describe the analytical methods you used to reach that outcome. Tell us why the analyses you carried out were appropriate for your study design. Give your Observations here and include the Charts and Tables you used to collect and organize your data. Answer the question "What information did I gather?" For more information on how to organize charts and graphs, see your **math teacher**.

Discussion

In this section, you should include your Conclusion, which should explain what happened during the experiment. Answer the question **"What can I conclude based on this project?"** Your reader should know whether or not the data you collected agrees with and/or supports your hypothesis. This section should end with your Application. Answer the question **"How can this research be used?"** Suggest ways the research can change the topic area in which it was conducted. For help with the application section, see your **social studies teacher** on ways the project can affect the world.

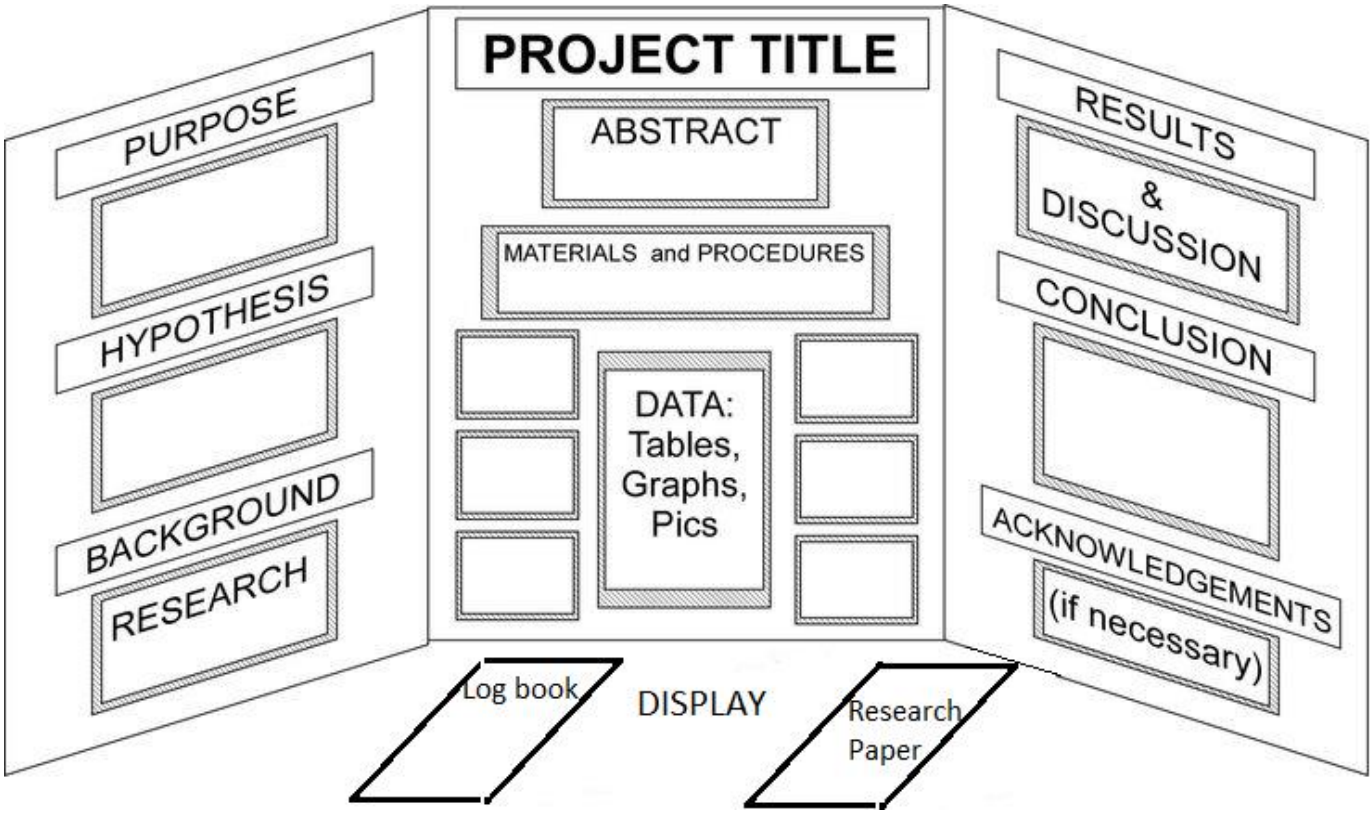
Bibliography

This section should include your 12 references and should be in MLA format. For more information on MLA format, visit https://owl.english.purdue.edu/owl/resource/747/01/ or your knowledgeable **ELA teacher**.

Week 7: Complete Experimentation, Begin Abstract and Display Board

Key Aspect 6. Creating an interesting presentation

Your display board is kind of like an advertisement for all your hard work. HOWEVER, keep in mind a Science Fair Project is not an ART PROJECT. It should be neat and legible, but the emphasis should be on understanding and applying the scientific process. Below is the layout for the project display



All displays and presentations will be judged on the following information:

Did the student provide a clear introduction for the project?
Did the student discuss the purpose (reason) for the project?
Did the student detail the research question and hypothesis for the project?
Did the student explain the design of the project and the methods of data collection?
Did the student provide an analysis of the data collected?
Did the student share a conclusion drawn from the project and an application of the research?
Was the information organized in a logical and interesting sequence that the audience could follow?
Did the student demonstrate full knowledge of the topic, answering all questions with explanation and elaboration?

What you should do the day of Presentations?

Relax, smile, and have fun! Remember, you are the expert, and you had fun doing the project. But, if you are a little nervous, here is the stuff you need to do during the fair:

Helpful hint: Look sharp, feel sharp, and you will be sharp.

Dress nice that day, be polite, and speak clearly.

- **Stand to the side of your display**
- **Introduce yourself, point out the title of your display and why you chose to study this. State your problem that you studied (your question) and your hypothesis (what you think might happen)**
- **Talk about the sources (books, websites, and interviews) that helped you understand your topic.**
- **Tell about your experiment (the steps you took to do it). Be sure to show you tested your experiment at least 3 times. Show your data (graphs and charts)**
- **Be sure and explain what your data means. Were you surprised by your results or did you know what would happen because you studied it? Make sure you sound like an expert at your topic.**
- **Were you right about your hypothesis? What did you conclude about your problem? Did you find another problem to investigate based on what you learned? Include real life connections.**

The remaining project weeks should be spent following the suggested task timeline to complete, revise and refine your experiment, written report, display board and presentation.

Photograph & Video Release Form

I hereby grant permission to the rights of my image, likeness and sound of my voice as recorded on audio or video tape without payment or any other consideration. I understand that my image may be edited, copied, exhibited, published or distributed and waive the right to inspect or approve the finished product wherein my likeness appears. Additionally, I waive any right to royalties or other compensation arising or related to the use of my image or recording. I also understand that this material may be used in diverse educational settings within an unrestricted geographic area.

Photographic, audio or video recordings may be used for the following purposes:
Stone Mountain Middle School 2017 Science Fair Project for

_____
First Name Last Name and Grade of Student

By signing this release, I understand this permission signifies that photographic or video recordings of me may be electronically displayed via the Internet or in the public educational setting.

I will be consulted about the use of the photographs or video recording for any purpose other than those listed above.

There is no time limit on the validity of this release nor is there any geographic limitation on where these materials may be distributed.

This release applies to photographic, audio or video recordings collected as part of the sessions listed on this document only.

By signing this form I acknowledge that I have completely read and fully understand the above release and agree to be bound thereby. I hereby release any and all claims against any person or organization utilizing this material for educational purposes.

Full Name_____

Street Address/P.O. Box_____

City _____ State & Zip Code_____

Phone _____ Email Address_____

Signature_____ Date_____

If this release is obtained from a participant under the age of 19, then the signature of that participant's parent or legal guardian is also required.

Parent's Signature_____ Date_____