450

Science Fair Manual

Please Do Not Write in This Book

Science Fair Manual's are considered school textbooks and are **$2.00** if lost or damaged. By accepting this manual, you assume full responsibility.

Dear Students and Parents:

Thank your for your interest in the Mesita Science Fair. The knowledge you gain in these few short months will serve you well in the future.

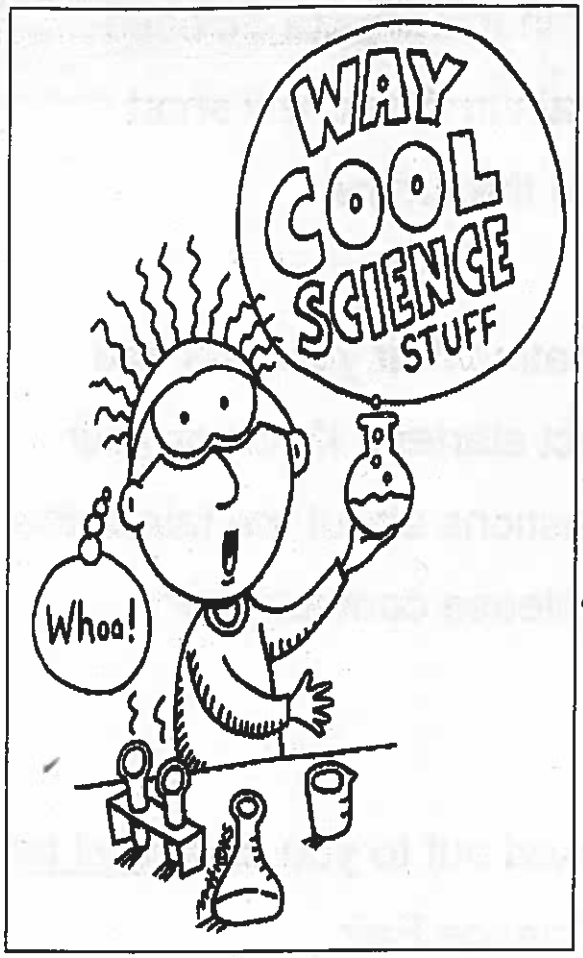
This packet contains information that you may find helpful in getting your project started. If you or your parents have additional questions about the fair or the project you have selected, please contact your science teacher.

This packet has been checked out to you and must be returned on or before the Science Fair.

Thank you for your time, interest, and cooperation with the Mesita Science Fair. We hope that you will have a good time preparing your entry.

Mesita Science Fair Committee

Okay, now get to work on your project!!
What's that? You still need help getting started?



Introducing:
The Most Fabulous, Scientific, All Helpful, Kid Friendly and Most Excellent Science Fair Project Planner Known to Kid Kind:

Elementary Science Fair Planning Guide

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

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!!

The Elementary Science Fair Planning Guide

By Lora Holt (a science lab teacher, pretty cool, for an adult)
With help from Tim Holt (a very smart science and technology dude)
Inspired by past EPISD science packets. [Thank you Margaret Johnson and all past EPISD Science Gurus]
Translated by Morayma Esquivel and Alma Veronica Ortega
(two very awesome science teachers who also happen to speak Spanish)

Table of Contents

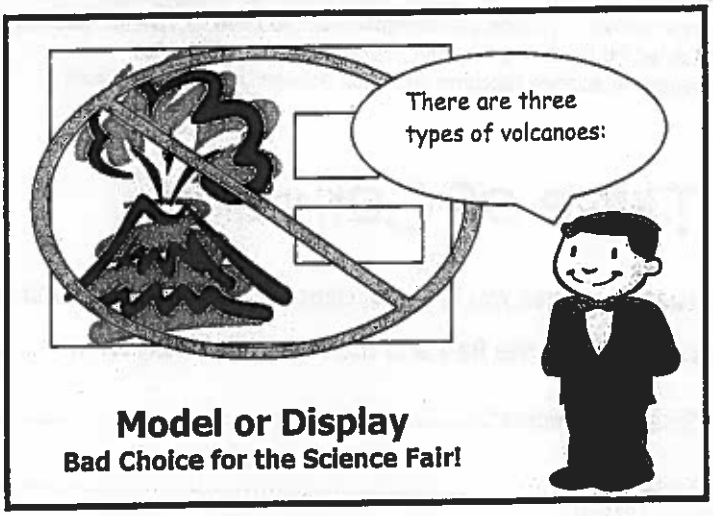
-Or-

What is inside this packet in case you are impatient and you want to jump around

Types of Science Projects:

There are two types of science projects: Models and Experiments. Here is the difference between the two:

BORING !!!!! DON'T DO THIS.....



Model or Display
Bad Choice for the Science Fair!

A Model, Display or Collection:

Shows how something works in the real world, but doesn't really test anything

Examples of display or collection projects can be: "The Solar System", "Types of Dinosaurs" , "Types of Rocks", "My gum collection..." Examples of models might be: "The solar system" or "How an Electric Motor Works", "Tornado in a Bottle"

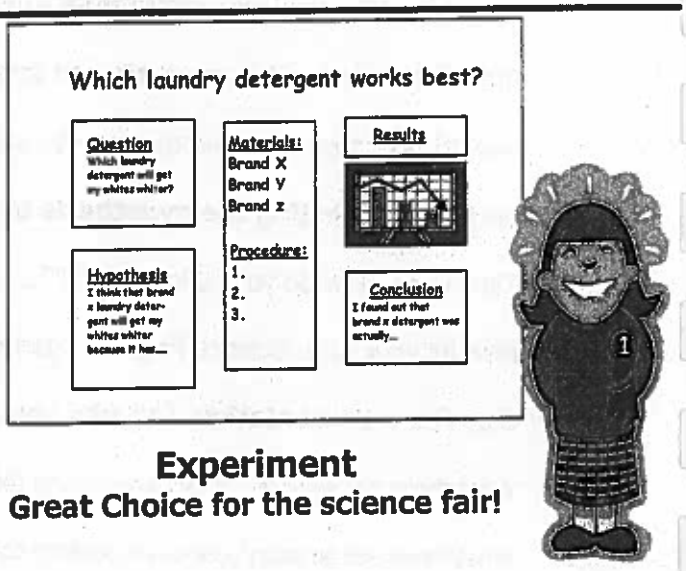
COOL!!!!! DO THIS

An Experiment:

Lots of information is given, **but it also has a project that shows testing being done and the gathering of data.**

Examples of experiments can be: "The Effects of Detergent on the Growth of Plants", "Which Paper Towel is more Absorbant" or "What Structure can Withstand the Most Amount of Weight"

You can tell you have an experiment if you are testing something several times and changing a variable to see what will happens. We'll talk about variables later....

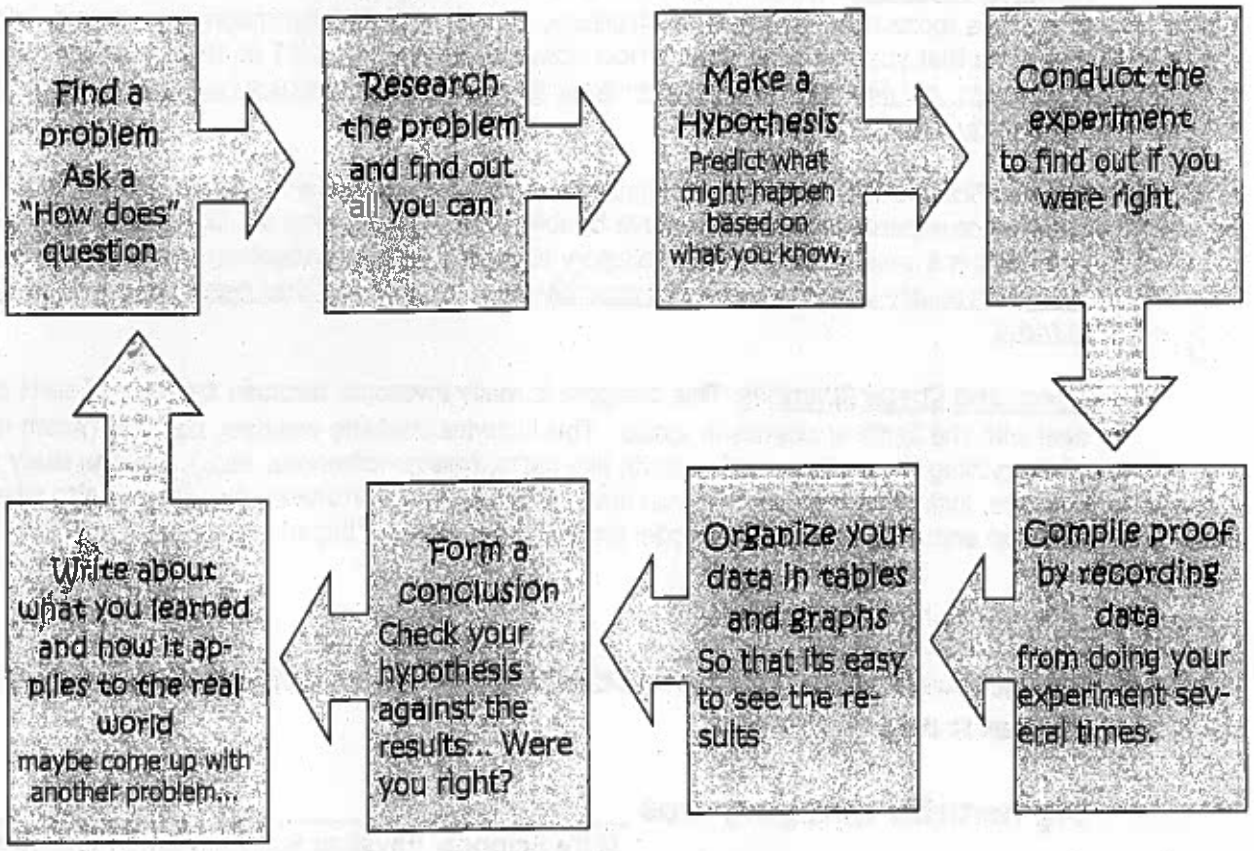


Experiment
Great Choice for the science fair!

So What Type of Project Should You Do?

Even though you can learn a lot from building a model or display, <u>we recommend that you do an **Experiment!!!**</u> Why? Well, they are fun, they are more interesting and most of all, they take you through the **SCIENTIFIC METHOD,** which is the way real scientists investigate in real science labs. Besides that, the **scientific method** is what the judges are looking for!!

So What the Heck is the Scientific Method?



Choosing a Category that interests you...

All Great Projects start with great questions but before you get started on a great question you nee to pick a subject or topic that you like. There are three different categories of the Science Fair to choose from. They are:

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 that it is against Science Fair Rules to inter tionally hurt an animal during an experiment. If you are dealing with animals, please let an adult a sist you. It is okay to do experiment on plants, as long as they don't belong to someone else, like don't do an experiment on your mom's rose bushes unless you ask her first...

Life science also includes studying behaviors, so its a perfect category to try taste tests, opinion sur veys, animal behavior training (or even training behavior in humans...like baby brothers or sisters.

Physical Science: If you like trying to figure out how things work, then this is the category for yo It includes topics about matter and structure, as well as electricity, magnetism, sound, light or any- thing else that you might question, "How does it work and what if I do this to it, will it still work?" *remember, you always need to ask an adult first (and always make sure there is one of those adu guys with you when you try it.)*

Physical Science also includes the composition of matter and how it reacts to each other. These a the science experiments that may have bubbling and oozing going on, like figuring out what is an a and what is a base. It is a perfect category to try to mix things together to see what will happen. *Again, if you are experimenting with possibly dangerous things, you need to recruit an adult to he you out.*

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

Now It's Your Turn:

Write down your favorite Science Fair Category and what it is you w to learn more about:

My favorite Category was _____
(Life Science, Physical Science, Earth and Space Scie

I want to do an experiment involving

_____

_____

_____

_____

Step 1: Coming up with a Good Question...

Now that you have picked out a topic that you like and that you are interested in, it's time to write a question or identify a problem within that topic. To give you an idea of what we mean you can start off by filling in the question blanks with the following list of words:

The Effect Question:

What is the effect of _____ on _____?

sunlight	on the growth of plants
eye color	pupil dialation
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) _____?

paper towel	is	most absorbent
foods	do	meal worms prefer
detergent	makes	the most bubbles
paper towel	is	strongest
peanut butter	tastes	the best

Now its your turn:

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

_____

_____

_____

Step 2 : Doing the Research and forming a Hypothesis

So you've picked your category and you've chosen a topic. You even wrote a question using our cool fill in the blank template. Now it is time to research your problem as much as possible. Becoming an expert at your topic is what real scientists do in real labs.

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. Take note of any new science words you learn and use them. It makes you sound more like a real scientist. Keep Track of all the books and articles you read. You'll need that list for later.

YOU DISCUSS!!
Talk about it with your parents. Talk about it with your teachers. Talk about it with experts like Veterinarians, Doctors, Weathermen or others who work with the things you are studying. Sometimes websites will give you e-mail addresses to experts who can answer questions.... *But again, do not write to anyone on the internet without letting an adult supervise it.* (*hint: take pictures of yourself interviewing people)

Whew.....

Then when you think that you can't possibly learn anymore and the information just keeps repeating itself.. You are ready to...

Write a Hypothesis

Now it is the 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. Using this fancy word will amaze your friends and will have you thinking like a full fledged scientist.

So how do you begin? Well, just answer this very simple question:

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

Example Problem: *Which Paper Towel is more absorbent?*

Example Hypothesis: *I think Brand X will be more absorbent because it's a more popular brand, it is thicker and the people I interviewed said that the more expensive brands would work better*

(This hypothesis not only predicts what will happen in the experiment, but also shows that the "Scientist" used research to back up his prediction.)

Now its your turn:

Write down the problem and create a Hypothesis based on what you have researched.

Problem:_____

_____

Research: My problem is about this subject: _____
(sample topics could be magnetism, electricity, buoyancy, absorbency, taste, plant growth, simple machines or other scientific topics that relate to your problem. If you are having problems finding out what the topic is, ask your teacher or an adult to help you on this one....)

Books I found in the library on my topic are:
Title: Author:

_____

_____

_____

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...)_____

_____

_____

_____

Step 3: Testing your Hypothesis by doing an experiment

Now we've come to the good part. The part that all scientists can't wait to get their grubby little hands on... you guessed it... The EXPERIMENT!

Designing an experiment is really cool because you get to use your imagination to come up with a test for your problem, and most of all, you get to prove (or disprove) your Hypothesis. **Now 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.**

First: ***Gather up your materials***: What will you need to perform your experiment? The safest way to do this is get that adult you recruited to help you get the stuff you need. Oh, did we mention to take pictures or draw pictures of your materials. This will come in handy when you are making your board display.

Second: ***Write a PROCEDURE.*** A procedure is a list of steps that you did to perform an experiment. Why do you need to write it down? Well it's like giving someone a recipe to your favorite dish. If they want to try it, they can follow your steps to test if its true. Scientists do this so that people will believe that they did the experiment and also to let other people test what they found out. Did we mention to take pictures of yourself doing the steps?

Third: ***Identify your variables.*** The variables are any factors that can change in an experiment. Remember that when you are testing your 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 type of dirt, same type of plant, same type of location, same amount of sunlight, etc. The only variable you would change from plant to plant would be the amount of water it received. This is called the **independent or manipulated variable.** The independent variable is the factor you are testing. The results of the test that you do are called the **dependent or responding variables.** The responding variable is what happens as a result of your test. Knowing what your variables are is very important because if you don't know them you won't be able to collect your data or read your results.

Fourth: ***TEST, TEST, TEST.*** Remember that the judges expect your results to be consistent in order to be a good experiment, in other words, when you cook from a recipe you expect the outcomes to be the same if you followed the directions (or procedure) step by step. So that means you need to do the experiment more than once in order to test it properly. We recommend five times or more. More is better! Don't forget to take pictures of the science project being done and the results.

Fifth: ***Collect your DATA.*** This means write down or record the results of the experiment every time you test it. Be sure You also need to organize it in a way that it is easy to read the results. Most scientists use tables, graphs and other organizers to show their results. Organizing makes the results easy to read, and much easier to recognize patterns that might be occurring in your results. (Besides, it impresses the judges when you use them.) But don't make a graph or table because we asked you to, use it to benefit your project and to help you make sense of the results. There is nothing worse than having graphs and tables that have nothing to do with answering the question of a science project.

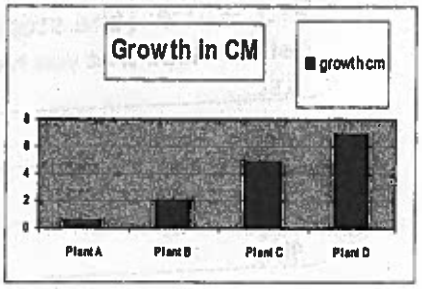
Time out: How Do You Collect Data?!?

- **Keep a science journal:** A science journal is a type of science diary that you can keep especially if your experiment is taking place over a long period of time. We suggest you do that if your experiment is over a period of a week or more. In your journal you can record observations, collect research, draw and diagram pictures and jot down any additional questions you might have for later.
- **Have the right tools to do the job:** make sure you have the stuff you need to take accurate measurements like rulers, meter tapes, thermometers, graduated cylinders or measuring cups that measure volume. The recommended standard of measurement in science is metric so if you can keep your measurements in meters, liters, Celsius, grams, etc, you are doing great!
- **Tables, charts and diagrams** are generally the way a good scientist like you would keep track of your experiment trials. Remember you are testing at least 5 times or more. A table is organized in columns and rows and **ALWAYS** has labels or headings telling what the columns or rows mean. You will probably need a row for every time you did the experiment and a column telling what the independent variable was (what you tested) and the responding variable (the result that happened because of the independent variable)

Plant	Amount of water per day	Size it grew in two weeks
(controlled variable)	(independent variable)	(responding variable)
Plant A	none	.5 cm
Plant B	5 ml	2 cm
Plant C	10 ml	5 cm
Plant D	20 ml	7 cm

- **Be accurate and neat!** When you are writing your tables and charts please make sure that you record your data in the correct column or row, that you write neatly, and most of all that you record your data as soon as you collect it **SO YOU DON'T FORGET WHAT HAPPENED!!!!** Sometimes an experiment might be hard to explain with just a table, so if you have to draw and label a diagram (or picture) to explain what happened, it is recommended that you do.
- **Use the right graph for your experiment.** There is nothing worse than a bad graph. There are all types of graph designs, but these seem to be easy to use for science fair experiments.
  - **Pie graphs** are good to use if you are showing percentages of groups. Remember that you can't have more than 100% and all the pieces need to add up to 100%. This type of graph is great if you are doing surveys

  - **Bar graphs** are good to use if you are comparing amounts of things because the bars show those amounts in an easy to read way. This way the judges will be able to tell your results at a glance. Usually the bars go up and down. The x axis (or horizontal axis) is where you label what is being measured, (like plant A, B, C and D) and the y axis (or vertical axis) is labeled to show the unit being measured (in this case it would be centimeters that the plant grew)



  - **Line graphs** are good to use if you are showing how changes occurred in your experiments over time. In this particular case you would be using the x axis to show the time increments (minutes, hours, days, weeks, months) and then you would use the Y axis to show what you were measuring at that point in time.

....And Now back to the Experiment Steps

Sixth: ***Write a Conclusion:*** tell us what happened. Was your hypothesis right or wrong or neither? Were you successful, did it turn out okay? Would you change anything about the experiment or are you curious about something else now that you've completed your experiment. And most of all, **TELL WHAT YOU LEARNED FROM DOING THIS.**

Seventh: ***Understand its Application***. Write about how this experiment can be used in a real life situation. Why was it important to know about it?

Now it's your turn

Materials: (take pictures!)

List the Materials that you will need for your science experiment here:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Variables:

List the variables that you will control, the variable that you will change and the variables that will be the results of your experiment:

My controlled variables are (the stuff that will always stay the same): _____

_____

_____

My independent variable is (this is the thing that changes from one experiment to the next, it is what you are testing): _____

My responding variables might be (in other words, the results of the experiment)

Procedure: (the steps.... Don't forget to take pictures)

List the steps that you have to do in order to perform the experiment here:

1st....

_____

2nd

_____

3rd

_____

4th

_____

5th....

_____

_____

_____

_____

Design a table or chart here to collect your information

(Did we mention that you needed to take pictures of you doing the actual experiment?)

Use the Graph paper at the end of this booklet to make a graph of your results from your table.

Conclusion:

Now tell us what you learned from this and if you were able to prove your hypothesis. Did it work? Why did it work or why didn't it work? What did the results tell you? Sometimes not being able to prove a hypothesis is important because you still proved something. What did you prove?

Application:

(How does this apply to real life?)
Its important to know about this experiment because.....

Step 4: The Presentation or Why you needed all those pictures....

But First, a school Fable....

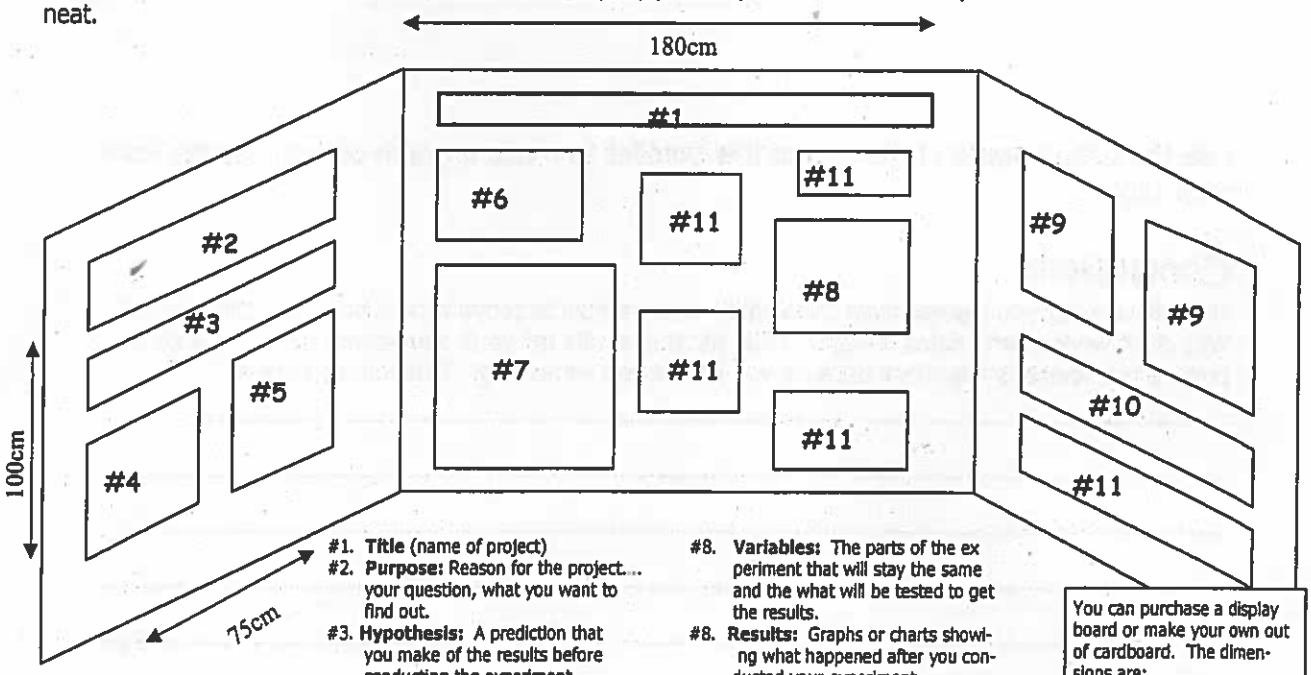
Sammy and Sally both baked cakes for the bake sale with the same cake mix and by following the same directions. When Sammy got his cake out of the oven, he carefully took it out of the pan, smoothed the chocolate frosting neatly and decorated his cake so that it looked delicious. Sally on the other hand, smashed her cake slightly when getting it out of the pan and globbed the frosting on parts of the cake. As you may have already guessed, everyone wanted some of Sammy's cake and no one wanted Sally's. Sally couldn't figure out why, because she tasted both and they both tasted the same...

A good display is a Piece o'cake

You may have become the leading expert of your topic and had the most interesting experiment results, but if you don't make your science project look delicious for the judges eyes to see, well, your chances of winning sweepstakes will crumble like Sally's cake. Your display board is kind of like an advertisement for all your hard work. So take our advice: **BE NEAT!!** The judges like to see a nice, easy to read display, that has neat writing, easy to read graphs and tables and you guessed it.... lots and lots of pictures!! (Did you remember to take pictures?)

MAKING A MOUTH WATERING DISPLAY

This is an example of a neat looking Science Fair Display Board. It is just an example. Depending on your information and the amount pictures, tables and graphs, you may have a different layout. Just make sure it is neat.



#1. **Title** (name of project)
#2. **Purpose:** Reason for the project... your question, what you want to find out.
#3. **Hypothesis:** A prediction that you make of the results before conducting the experiment.
#4. **A report** of your research on the subject.
#5. **Books and Resources:** A list of the.books you read and websites you used. Also list your inter views.
#6. **Materials:** a list of the supplies needed for the experiment.
#7 **Procedure:** The steps or directions that you used to conduct the experiment.
#8. **Variables:** The parts of the ex periment that will stay the same and the what will be tested to get the results.
#8. **Results:** Graphs or charts showing what happened after you conducted your experiment.
#9. **Conclusion:** Telling what happened.. Did it work, were you right about the hypothesis? What did you learn?
#10. **Application:** Explain how your experiment relates to the real world.
#11. **Pictures,** pictures and more pictures...

You can purchase a display board or make your own out of cardboard. The dimensions are:

Height: 100 CM

Length: 180 CM

Depth: 75 CM

It has to be able to stand on its own

Display Beauty Secrets:

- Use a computer to type out your information, but if you can't, write out your information in your best writing. Printing the titles is usually best. If you are using a computer, make sure the fonts are readable and only use one or two type faces.
- Use spray adhesive or glue stick to paste up your papers. It is less messy
- Mount white paper, pictures, graphs and tables on colored papers (making sure the colored paper is larger so it creates a border for the white paper.) Do not

What those not so scary Judges are looking for

What you should do the day of the Science Fair (PK-3rd grade)

A lot of kids are scared of talking to a judge. Just imagine the judge as a fellow scientist who just wants you to share what you learned... But just so it's not such a mystery, we've listed all the stuff that is on the judges form that they want you to do:

Relax, smile and have fun, remember you are the expert and you had fun doing the project. But if you are a little nervous, we listed the stuff you need to do during the presentation to meet the criteria of the judges form.

Helpful Hint: Look sharp, feel sharp and you will be sharp. Dress nice that day, be polite and speak clearly and you will show the judges that you have confidence. Don't forget to look them in the eyes, they really are quite nice.

Criteria	Worth how many points?	
1. Display well organized	2 points	*Stand to the side of the display so that the judge can see it*
2. Clearly stated title, purpose and reasonable hypothesis	2 points	*Introduce yourself, point out the title of your display and tell the judge why you chose to study this. State your problem that you studied (your question) Also tell them about your hypothesis (what you think might happen)*
3. Background information on science topic with at least 3 sources cited	2 points	*Hand a copy of your report to the judge so that they can review your research. Talk about the sources (books, websites and interviews) that helped you understand your topic. To get top marks you need to have at least 3 sources.*
4. Clearly explained experimental procedures	3 points	*Tell about your experiment, the steps you took to do it . Use all those fancy science words you just learned.. They love that.*
5. Measurable data that includes 3 or more trials	3 points	*Be sure to show them that you tested your experiment at least 3 times. Show them all of the cool graphic organizers that you made, like your tables and charts.*
6. Effective analysis of data clearly stated results (graphs charts and tables)	3 points	*Be sure and explain what your data means. Make sure you can read your graphs and tables. Let them know if you were surprised by the results, or if you knew what would happen because you studied about it.*
7..In-depth knowledge base of topic with use of related vocabulary at grade level	3 points	*Make sure you sound like an expert at your topic. Always use the appropriate vocabulary especially by using words from the Scientific Method like: Problem, Hypothesis, Procedure, Results and Conclusion.*
8. Well elaborated conclusion based on results	3 points	*Let the judge know if you were right about your hypothesis. What did you conclude about your problem? Did you find another problem to investigate based on what you learned?*
9. Stated real life connections.	2 points	*Judges love this one, because it gives a real world purpose to your topic. It makes you sound like a real scientist in a real lab... which you are!! "My experiment about paper towel absorbancy could help people save money by buying the right type of paper towels"*
10. Effective closure of presentation	2 points	*Nothing makes a judge feel worse than to make a kid so nervous that they repeat themselves or they stop their presentation before they are really done. If you get lost or forget where you are, look at your display and follow it piece by piece. It is better to discuss everything than to forget to tell the judge something. When you are done, shake hands with the judge and thank them for their time, remember that they are volunteers who care about you!*

Total possible points 25 Points
24-25 points= Sweepstakes!!!!

What those not so scary Judges are looking for

What you should do the day of the Science Fair (4th & 5th grade)

A lot of kids are scared of talking to a judge. Just imagine the judge as a fellow scientist who just wants you to share what you learned... But just so it's not such a mystery, we've listed all the stuff that is on the judges form that they want you to do:

Relax, smile and have fun, remember you are the expert and you had fun doing the project. But if you are a little nervous, we listed the stuff you need to do during the presentation to meet the criteria of the judges form.

Helpful Hint: Look sharp, feel sharp and you will be sharp. Dress nice that day, be polite and speak clearly and you will show the judges that you have confidence. Don't forget to look them in the eyes, they really are quite nice.

Criteria	Worth how many points?	
1. Clearly stated title, purpose and reasonable hypothesis	2 points	*Introduce yourself, point out the title of your display and tell the judge why you chose to study this. State your problem that you studied (your question) Also tell them about your hypothesis (what you think might happen)*
2. In depth report on science topic	2 points	*Hand a copy of your report to the judge so that they can review your research. Talk about what you learned while researching your topic*
3. 3 or more resources cited	2 points	*Talk about the sources (books, websites and interviews) that helped you understand your topic. To get top marks you need to have at least 3 sources.*
4. Thoroughly stated procedures and materials	2 points	*Tell about your experiment, the steps you took to do it . Be sure to mention all the materials involved and point out all of those lovely pictures!*
5. Clearly stated variables and controls	2 points	*Point out the controlled variables, independent variable and responding variables to the experiment, (you know the stuff you kept the same, the thing you tested and the results)*
6. Measurable data that includes 3 or more trials or when testing human subjects, 10 people or more	3 points	*Be sure to show them that you tested your experiment at least 3 times. Show them all of the cool graphic organizers that you made, like your tables and charts. Remember to point out the labeled parts of your graph or table to show that you know what it represents.*
7. Effective analysis of data clearly stated results (graphs charts and tables)	3 points	*Be sure and explain what your data means. Make sure you can read your graphs and tables. Let them know if you were surprised by the results, or if you knew what would happen because you studied about it.*
8. In-depth knowledge base of topic with use of related vocabulary at grade level	3 points	*Make sure you sound like an expert at your topic. Always use the appropriate vocabulary especially by using words from the Scientific Method like: Problem, Hypothesis, Procedure, Variables, Results and Conclusion.*
9. Well elaborated conclusion based on results	3 points	*Let the judge know if you were right about your hypothesis. What did you conclude about your problem? Did you find another problem to investigate based on what you learned? The conclusion is all about what you learned from doing this.*
10. Stated real life connections.	2 points	*Judges love this one, because it gives a real world purpose to your topic. It makes you sound like a real scientist in a real lab.. which you are!! For example, "My experiment about paper towel absorbency could help people save money by buying the right type of paper towels" See how useful that sounds?*
11. Effective closure of presentation	2 points	*Nothing makes a judge feel worse than to make a kid so nervous that they repeat themselves or they stop their presentation before they are really done. If you get lost or forget where you are, look at your display and follow it piece by piece. It is better to discuss everything than to forget to tell the judge something. When you are done, shake hands with the judge and thank them for their time, remember that they are volunteers who care about you!*

Total possible points 25 Points
24-25 points= Sweepstakes!!!!

Science Fair Rules and Regulations

Aw!, you mean there are rules? Of course there are, silly, this is made by adults!

Safety Rules First

1. Number one rule... think safety first before you start. Make sure you have recruited your adult to help you.
2. Never eat or drink during an experiment and always keep your work area clean.
3. Wear protective goggles when doing any experiment that could lead to eye injury.
4. Do not touch, taste or inhale chemicals or chemical solutions.
5. Respect all life forms. Do not perform an experiment that will harm an animal.
6. All experiments should be supervised by an adult!
7. Always wash your hands after doing the experiment, especially if you have been handling chemicals or animals.
8. Dispose waste properly.
9. Any project that involves drugs, firearms, or explosives are not permitted.
10. Any project that breaks district policy, and/or local, state or federal laws are not permitted.
11. Use safety on the internet! Never write to anyone without an adult knowing about it. Be sure to let an adult know about what websites you will be visiting, or have them help you search.
12. If there are dangerous aspects of your experiment, like using sharp tools or experimenting with electricity, please have an adult help you or have them do the dangerous parts. That's what adults are for, so use them correctly. (Besides, it makes them feel important!)

Science Fair Rules

1. Only one student per entry, you can't work in a team of two until you get to middle school, sorry.
2. Adults can help, in fact we want them to get involved. They can help gather materials, supervise your experiment and even help build the display. They just can't be with you during the judging. (So parents, no peeking!)
3. Experiments are recommended over collections and models. You will not score very high unless you do an experiment, so save the models and collections for a class project. You will be judged on the use of the Scientific Method (we told you that on page 2.)
4. You cannot bring the materials of your experiment for the display or perform the experiment live. You will only be judged on your presentation and board. You can however, mount things on your board in a type of 3D display, but remember that your board has to be able to stand by itself, so don't get carried away. If you do mount things on the board, try not to mount something expensive that you bought and make sure you have things mounted securely so they don't fall off. YOU MAY NOT MOUNT ANY FOOD OR ORGANIC MATERIALS!
5. Displays must be on display boards or can be made with cardboard. They can be no longer than 100cm in height, 180 cm in length and 75cm deep. They must stand alone. See the display making page if you need a diagram.
6. Limit your presentation to 12 minutes at the most, 5-7 minutes on speaking and the rest for the judges to ask questions.
7. No recording or transmitting devices are permitted.. (no tape recorders or secret walkie talkies, cell phones or other James Bond toys.)
8. Respect all adults involved in the fair... especially the judges!
9. All decisions of the judges and science fair committee are final.
10. All Sweepstakes winners are eligible for entry in the district wide science fair. If you do win sweepstakes, you are responsible for maintaining your presentation board and getting yourself and the board to the district competition.

Sweepstakes Research Requirements:

All Sweepstakes winners are required to have a research paper written according to the following guidelines:

Title Page: This contains the title, the name of the student, grade level and date.

Table of Contents: list all the pages of your research paper and what they contain.

Introduction: Background research to your project. (See step 2) One to three pages long.

A Works Cited and Acknowledgement page is at the end listing all the research sources such as books, authors, websites and people interviewed for the project.

If you completed everything in this packet you probably have a terrific science fair project, and you are now a real scientist! Good Job!
But...

If you still need more ideas, here is a list websites that you can check out about science fair projects to give you even more ideas.

Websites

Internet Public Library
http://www.ipl.org/div/kidspace/projectguide/
Are you looking for some help with a science fair project? If so, then you have come to the right place. The IPL will guide you to a variety of web site resources, leading you through the necessary steps to successfully complete a science experiment.

Discovery.com: Science Fair Central
http://school.discovery.com/sciencefaircentral/
"Creative investigations into the real world." This site provides a complete guide to science fair projects. Check out the 'Handbook' which features information from Janice VanCleave, a popular author who provides everything you need to know for success. You can even send her a question about your project.

Science Fair Idea Exchange
http://www.halcyon.com/sciclub/cgi-pvt/scifair/guestbook.html
This site has lists of science fair project ideas and a chance to share your ideas with others on the web!

Cyber-Fair
http://www.isd77.k12.mn.us/resources/cf/welcome.html
This site has one-sentence explanations of each part of a science fair. One of the steps described is presenting your project to judges. This may or may not be a part of your science fair. The site also has an explanation of what makes a good project and an explanation of how to come up with your own science fair project.

Try Science
http://tryscience.com
Science resource for home that gives you labs to try and 400 helpful links all related to science

The Yuckiest Site in the Internet
http://yucky.kids.discovery.com/
Brought to you by Discovery Kids, this site gives you lots of ideas on how to do the messiest yuckiest experiments

Experimental Science Projects: An Introductory Level Guide
http://www.isd77.k12.mn.us/resources/cf/SciProjIntro.html
An excellent resource for students doing an experiment-based science fair project. There are links on this page to a more advanced guide and an example of an actual experiment-based project.

Gateway to Educational Materials: Science Fair Projects
http://members.ozemail.com.au/~macinnis/scifun/projects.htm
The Gateway to Educational Materials extensive and detailed step-by-step guide to doing a science fair project.

Science Fair Primer
http://users.rcn.com/tedrowan/primer.html
A site to help students get started and run a science fair project.

Science Fair Project Guidebook
http://www.energy.sc.gov/K-12/science_fair.htm
The State of South Carolina publishes a K-12 science fair guidebook. It can be viewed using Adobe Acrobat Reader.

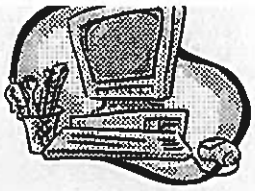
Science Project Guidelines
http://www.thesciencefair.com/guidelines.html
The scientists at the Kennedy Space Center have participated in judging local school science fairs for many years and have some great suggestions for student research projects. This information by Elizabeth Stryjewski of the Kennedy Space Center is now provided on a commercial site.

The Ultimate Science Fair Resource
http://www.scifair.org/
A variety of resources and advice.

What Makes A Good Science Fair Project
http://www.usc.edu/CSSF/Resources/Good_Project.html
A website from USC that gives a lot of good tips and ideas to think about regarding what makes a good science fair project. Advice for students as well as teachers and parents is included.

Mr. McLaren's Science Fair Survival Page
http://www.ri.net/schools/East_Greenwich/Cole/sciencefair.html
Tips from Archie R. Cole Junior High school on what makes a good project.

Neuroscience for Kids: Successful Science Fair Projects
http://faculty.washington.edu/chudler/fair.html
Site made by Lynne Bleeker a former science teacher, science fair organizer, and judge. Gives a thorough and detailed description of the steps to a successful science fair project



SCIENCE FAIR WEBSITES

EPISD Virtual Library
Click on the "Science" tab and scroll to find many helpful sites.
http://library.episd.org

Ultimate Science Fair Resource
http://www.scifair.org/

Science Fair Resources for Students
http://www.exploratorium.edu/ls/pathfinders/scifairs/scifair-student.html

Science Fair Central
school.discovery.com/sciencefaircentral/

Cyber-Fair
http://www.isd77.k12.mn.us/resources/cf/steps.html

IPL: Science Fair Project Resource Guide
http://www.ipl.org/div/kidspace/projectguide/

All Science Fair Projects-Over 500 free sample project ideas
http://www.all-science-fair-projects.com/ednote2.html

Science Fair Projects Resources for the Experimenter.
www.clarke.public.lib.ga.us/pathfinders/scienceprojects/scifair.html-24k

Database Searching..... Made Easy

A Better Way to Internet Search....IS HERE!
Login to these *Free* Internet and database sites from home or school.

Britannica Online

- A user-friendly encyclopedia designed for Elementary age students.
- Available in Spanish
- URL: www.new.school.eb.com/elementary
- Spanish: www.spanish.eb.com
- UserId: mesitaes
- Password: Ktwelve (case sensitive)

EBSCO Online

- Valuable resources designed for research in core subject areas.
- Information is easily translated from one language to another.
- URL: http://search.ebscohost.com
- UserId: s6770126
- Password: mesita

NetTrekker

- Award winning search engine that is safe, fast and easy to use for students, parents, and teachers.
- URL: http://school.nettrekker.com
- UserId and Password: crrhoade

Student Name		Total Score
Grade Level		
Project Title		

Campus Science Fair

Judging Form 4-5

24-25 = Sweepstakes
22-23 = First Place
18-21 = Second Place
<17 = Third Place

Judges Please:

**Judge only projects where the student is present.*

Do **NOT reveal scores to students.*

**Ask for clarification when necessary.*

Points Awarded	3 Points	2 Points	1 Point
	N/A	Clearly stated title, purpose and reasonable hypothesis	Stated title, purpose and limited hypothesis
	N/A	Indepth report on topic	Adequate report on topic
	N/A	3 or more resources cited	0-2 resources cited
	N/A	Thoroughly stated procedure and materials	Incomplete procedures or materials
	N/A	Clearly stated variables and controls	Unclear variables and experimental controls
	Measurable data must include 3 or more trials or when testing human subjects, 10 people or more	Measurable data done in less than 2 trials (or less than 10 human subjects)	No Measurable data or only completed one trial
	Effective analysis of data clearly stated results (graphs, charts and tables)	Reasonable analysis of stated results (graphs, charts and tables)	Unsatisfactory analysis of data (graphs, charts and tables)
	Well elaborated conclusion based on results	Reasonably elaborated conclusion	Inadequate elaboration of conclusion
	N/A	Stated real-life connections	No real-life connections
	N/A	Effective use of related vocabulary at grade level appropriate understanding	Limited use of related vocabulary at grade level
	N/A	Creative topic selection, research and design	Average topic research, selection and design
	Total Points		

Judge's Comments (Required with 25 Point Total)

_____

_____

_____

Judge's Name (Please Print) _____

Student Name		Total Score
Grade Level		
Project Title		

Campus Science Fair
Judging Form PK-3

24-25 = Sweepstakes
21-23 = First Place
17-20 = Second Place
<16 = Third Place

Judges Please:

**Judge only projects where the student is present.*

Do **NOT reveal scores to students.*

**Ask for clarification when necessary.*

Points Awarded	3 Points	2 Points	1 Point
	N/A	Display well-organized	Disorganized display
	N/A	Clearly stated title, purpose and reasonable hypothesis	Stated title and purpose with limited hypothesis
	N/A	Background information on science topic with 3 resources cited	Background information, 0-2 sources cited
	Clearly explained experimental procedures	Stated experimental procedures	Incomplete procedures
	Measurable data that includes a total of 3 or more trials	Measurable data that includes a total of 2 trials	Measurable data that includes less than 2 trials
	Effective analysis of data clearly stated results (graphs, charts and tables)	Reasonable analysis of stated results (graphs, charts and tables)	Unsatisfactory analysis of data (graphs, charts and tables)
	In-depth knowledge base of topic with use of related vocabulary **at grade level**	Adequate use of related vocabulary at grade level appropriate understanding	Limited use of related vocabulary at grade level
	Well elaborated conclusion based on results	Reasonably elaborated conclusion	Inadequate elaboration of conclusion
	N/A	Stated real-life connections	No real-life connections
	N/A	Effective closure of presentation	Ineffective closure of presentation
	Total Points		

Judge's Comments (Required with 24-25 Point Total)

_____

_____

_____

Judge's Name (Please Print) _____

_____

_____

How to Write a Scientific Paper

INE SECTIONS.
Your scientific paper will contain at least nine sections: (1) Title page, (2) Table of Contents, (3) ummary, (4) Introduction, (5) Experimental, (6) Discussion, (7) Conclusions, (8) Credits, and (9) References. But cheer up; only two of these ctions are very long!

HE TITLE IS THE BEGINNING.
ou have already picked a good title for your roject. Use the same one or your paper. Center e title near the middle of the page. Towards the wer right hand corner, place your name you home ddress, the name of the school you attend and your ade level.

HE SUMMARY IS AN OVERVIEW.
s strange as it might seem, the first part of your per is the part you write last. Your summary is an xtremely short section. It contains clear, brief atements which summarize: (a) the problem or uestions you are studying, (b) the action that you ook in your investigation, (c) the results of your xperiments, and (d) your most important onclusions based on the result of YOUR work.

HE INTRODUCTION TELLS WHAT YOU RE GOING TO DO.
The first part of the Introduction tells the reader our understanding of the subject when you started e project. Next, you might want to tell how you ecame interested in your project, or describe any common knowledge" or "old wives tales" you ant to prove or disprove. Tell some items that you ound as you studied about your subject, such as: storical and scientific background, what similar xperiments have been already done by other eople, and any contradictions or unanswered uestions you may have found. Wrap up this ection with a few precise statements that: (1) escribe exactly what you want to prove or isprove, (2) tell whey this proof should be done, nd (3) detail the information that you need to btain from your experiment so you can answer our question. As you clearly can see, the time to write the initial version of the introduction is while you are planning and starting your project.

THE EXPERIMENTAL PROCEDURE TELLS HOW YOU DID YOUR EXPERIMENT.
The experimental procedure gives all the details of how the experiment was conducted. It is so precise that someone could repeat your work without additional communication with you! Apparatus constructed should be photographed and discussed. Sketches and diagrams are very useful. Answer questions that apply to your project, such as:

- What was measured and how?
- For which variables were data collected?
- How was your control experiment run?
- What chemicals, plants, or animals were used?
- How or where were you supplies mixed, made, or grown?
- What equipment was used or built?

If laboratory equipment is used, it should be described, its function discussed and manufacturer and model number given.

THE DISCUSSION TALKS ABOUT YOUR DATA.
The discussion of your project is the heart of your paper. It usually contains several subsections. Begin by presenting all of your observations and data, in both the as-collected and processed forms. Discuss how and why your data was processed. Explain anything you assumed to process the data. Tables, charts, and graphs are very helpful. All graphics should be placed in the paper near the paragraphs in which they are discussed. An area needing extra attention is the labeling of graphs, charts, diagrams, and tables. Each must have its own descriptive title. All columns, axes, and data must be labeled clearly and identified.

Make comparison with theoretical values, published data, commonly held beliefs and/or expected results. Your conclusions and implications should flow smoothly and logically from your data. Be

thorough. Let your readers know exactly what you did. Let them follow your train of thought.

A complete paper will include a discussion of possible errors. How did the data vary between repeated observations of similar events? How were your results affected by uncontrolled events? What are sources of possible error and how large were these errors? What would you do differently if you were to repeat this project? What other experiments remain to be conducted?

The results and conclusions from your experiments should appear smoothly and logically throughout this discussion of your data, your method, your comparisons, and your errors.

THE CONCLUSION IS A SUMMARY OF YOUR RESULTS.

The conclusion restates briefly the findings and results detailed in your discussions. No new topics or speculations are to be mentioned unless they were first justified back in the discussion. Remember that these conclusions are based on your work and experiments, not drawn from news articles and textbooks.

GIVE CREDIT WHERE CREDIT IS DUE.

The last two sections of your paper give credit to other people for their work and assistance. First, a list of credits recognizes the aid given to your by people, businesses, and institutions. Second, a list of references recognizes the information taken form the work and writings of other people. There are standard forms of references. See your English teacher for help.

THE FIRST-CLASS LOOK.

Carefully put together your first draft. Check for correct spelling. Since you are familiar with your project, it is easy to leave out important details. Let your teacher and another adult read your paper. If they have trouble understanding your paper, maybe you left something out. Subheadings help the reader follow the flow of the paper. Type the final draft with double-spaced lines. If you can't type, get help from someone who can. Use one inch margins all around. Add your tables and graphs, and number all pages except the title page. Complete the Table of Contents. You may want to add a cover to protect your pages. Then have your paper proofread a final time, Take a deep breath and smile. You've done a fantastic job!

Science Fair Project Ideas

/hat is the best home insulator?
<egeneration in planaria
olors effect on heat absorption
/ing design for balsa planes
What is the best chemical battery?
low can you prevent iron from rusting?
Electroplating
istillation of alcohol
uilding a homemade hygrometer
onductivity of various substances
omparison of reaction time
ffects of temperature on density
ffects of ultraviolet light on bacteria
ite design and aerodynamics
H comparisons of antacids
est design for reduced wind drag
oes color effect memory?
Which is best smoke detection system?
oes sound affect plant growth?
Mineral content of drinking water
robability
ercent of body fat
aste sensitivity of smokers/non-smokers?
Which bleach works best?
esting for nutrients
low does lack of sleep affect behavior?
Design of robotics equipment
esting for ESP
Earthworm distribution in a field
low different paints hold up to weathering
ocial behavior of ants
Best nose cone shape for model rockets
s it possible to learn while sleeping?
Does temperature affect crystal growth?
Making fabrics fire resistant
Getting the viscosity of liquid using a sphere
low acids affect metals
Which detergent works best?
Designing a solar engine
Which is better front or rear wheel drive?
Does oil stain or oil paint provide better protection?
Does cigarette smoke affect house plants?
Solar distillation
Porosity of soils
Sugar content of food
Effect of light on reproductive growth of paramecia
Comparison of blood pressure variation
Effects of fertilizers on earthworms
Plant tolerance to salt
Fat content of margarines
What material is best for road construction?
How does television viewing effect behavior?
Are rats social animals?
How are seeds affected by radiation?
Suspension bridge design
Flammability testing of household goods
Color preferences of gerbils
Paper recycling
Temperature's effect on seed germination
Which soil type is best for plant growth?
Design of color blindness test
Purifying water
Spider web construction
Comparison of biodegradable detergents
Airplane wing design for greatest lift
Does magnetism effect seed germination?
Does TV change kid's moods?
Optical illusions
Desalting water
Are dogs colorblind?
Do soap bubbles last longer on cold or warm days?
Are hot air balloons different from blimps?
What is the best method, other than heat, to melt ice?
What effect does oil have on water plants?
Do aquarium chemicals really do their job?

Science Fair Project Ideas

How can a tomato plant be grafted onto a potato plant?
How is sound obtained from a compact disk?
How does a nuclear reactor work?
How is a 2-yr old infant's talk different from ours?
How does burning gasoline make a car move?
How do we tell how far away a star is from Earth?
What soils are best to build a house on?
How do plants react to different kinds of music, light, or/and colors?
What is the best way to dispose of paper?
Do plants move?
Regeneration in Clam Worms
Predator/prey interactions
Small ecosystem succession
Enzyme activity studies
Growth spurts in children
Are cats right pawed?
Gender differences in memory tests
How to clean up oil spills
Is there really a difference between Coke and Pepsi?

Science Project Ideas – Level I

1. How much salt does it take an egg to float?
2. What kind of juice cleans a pennies best?
3. Which dish soap makes the most bubbles?
4. Do watches keep time the same?
5. On which surface can a snail move faster dirt or cement?
6. What bran of raisin cereal has the most raisins?
7. How can you measure the strength of a magnet?
8. Do ants like cheese or sugar better?
9. Can the design of paper airplanes make it fly farther?
10. Do the roots of a plant always grow downward?
11. Can you tell what something is just by touching it?
12. What kinds of things do magnets attract?
13. What foods do mealworms prefer?
14. How long will it take a teaspoon of food dye to color a glass of still water?
15. Does a bath take less water than a shower?
16. Can you tell where sound comes from when you are blindfolded?
17. Can plants grow without soil?
18. Does warm water freeze faster than cool water?
19. In my class who is taller – the boys or the girls?
20. Do different types of apples have the same number of seed?
21. Do bigger seeds produce bigger plants?
22. Which materials absorb the most water?
23. Do wheels reduce friction?
24. Which materials absorb the most water?
25. Does holding a mirror in front of a fish change what the fish does?
26. What color birdseed do birds like the best?
27. What holds two boards together better a nail or a screw?
28. Will bananas brown faster on the counter or in the refrigerator?
29. Does temperature affect the growth of plants?
30. Do mint leaves repel ants?
31. Does a ball roll farther on grass or dirt?
32. Do all objects fall to the ground at the same speed?
33. Which travels faster a snail or a worm?
34. Which brand of paper towel is the strongest?
35. Can plants grow from leaves?
36. Which dissolves better in water salt or baking soda?
37. Can things be identified by just their odor?
38. Which type of battery do toys run longest on?

Science Project Ideas Level II

1. How far does a snail travel in 1 minute?
2. Do different types of soil hold different amounts of water?
3. Will adding bleach to the water of a plant reduce fungus growth?
4. Does water with salt boil faster than plane water?
5. How far can a person lean without falling?
6. How far can a water balloon be tossed to someone before it breaks?
7. Does the shape of a kite affect its flight?
8. Does an ice cube melt faster in air or water?
9. Does sugar prolong the life of cut flowers?
10. How much of an orange is water?
11. Which liquid has the highest viscosity?
12. Will more air inside a basketball make it bounce higher?
13. Does the color of light affect plant growth?
14. Does baking soda lower the temperature of water?
15. Which brand of popcorn pops the fastest?
16. Which brand of popcorn pops the most Kernels?
17. How much can a caterpillar in one day?
18. In my class who has the biggest feet?
19. Do plants grow bigger in soil or water?
20. Does the color of water affect its evaporation?
21. Can you separate salt from water by freezing?
22. How does omitting an ingredient affect the taste of a cookie?
23. Do suction cups stick equally well to different surfaces?
24. Which student in the class has the greatest lung capacity?
25. How much weight can a growing plant lift?
26. Will water with salt evaporate faster than water without salt?
27. Does it matter in which directions seeds are planted?
28. Which cheese grows mold faster?
29. Do all colors fade at the same rate?
30. Which brand of diapers holds the most water?
31. In my class who has the smallest hands – the boys or the girls?
32. Which kind of cleaner removes ink stains the best?
33. Does a plant grow bigger if watered by milk or water?
34. Which brand of soap makes the most suds?
35. Does a baseball go farther when hit by a wooden or metal bat?
36. Do living plants give off moisture?
37. Using a lever (simple machine), can one student lift another student that is bigger?
38. Which gets warmer sand or dirt?
39. What kind of glue holds two boards together better?

Science Projects Level III

1. What type of line carries sound waves best?
2. Can the sun's energy be used to clean water?
3. Does a green plant add oxygen to its environment?
4. Which metal conducts heat the best?
5. What percentage of corn seeds in a package will germinate?
6. Does an earthworm react to light and darkness?
7. Does the human tongue have definite areas for certain tastes?
8. Can same type balloons withstand the same amount of pressure?
9. Does the viscosity of a liquid affect its boiling point?
10. Does surrounding color affect an insects eating habits?
11. Do children's heart rates increase as they get older?
12. Can you use a strand of human hair to measure air moisture?
13. What material provides the best insulation?
14. Is using two eyes to judge distance more accurate than using one eye?
15. Do different kinds of caterpillars eat different amounts of food?
16. What plant foods contain starch?
17. What keeps colder plastic wrap or aluminum foil?
18. Does heart rate increase with increasing sound volume?
19. Do boys or girls have a higher resting heart rate?
20. Do liquids cool as they evaporate?
21. Which ways does the wind blow most frequently?
22. Does the size of a light bulb affect its energy?
23. For how long a distance can speech be transmitted through a tube?
24. Which grows mold faster moist bread or dry bread?
25. What type of soil filters water best?
26. Does the color of a material affect its absorption of heat?
27. Does sound travel best through solids, liquids or gases?
28. Do sugar crystals grow faster in tap or distilled water?
29. Can you see better if you limit the light that gets to your eyes?
30. How much of an apple is water?
31. What common liquids are acids, bases or neutral?
32. Do taller people run faster than shorter people?
33. Does the length of a vibrating object affect sound?
34. Does a plant need some darkness to grow?
35. Who can balance better on the balls of their feet – boys or girls?
36. Does exercise affect heart rate?
37. Which dish soap makes the longest lasting suds?
38. What are the affect of chlorine on plant growth?
39. Which type of oil has the greatest density?
40. How accurately can people judge temperature?