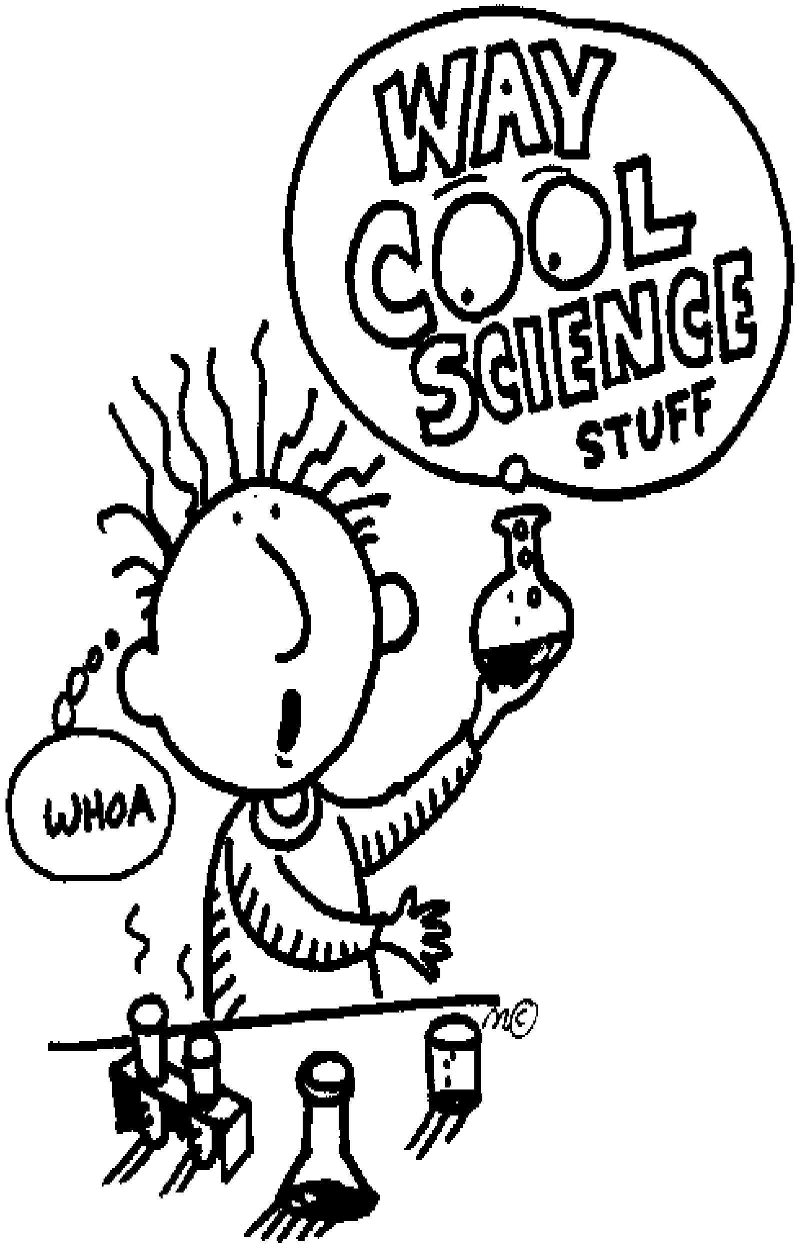


5th Grade Science Fair Planning Guide

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….

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

5th Grade Due Dates

Please be advised that due dates are strictly enforced and late penalties apply*

Wednesday, October 31st

- Science Folder brought to class
- Planning Packet printed, contract signed and brought to class

Friday, November 2nd:

- Step 1, pg.6 (Question/Problem Statement)

Thursday, November 8th:

- Step 2, pg. 7-8 (Research and Hypothesis)

Thursday, November 15th:

- Step 3, pg. 9-10 (Materials/Procedure/Variables)

Thursday, December 6th:

- Step 4, pg. 11-12 (Experiment/Data/Conclusion/Application)

Thursday, December 6th:

- Pg. 3 (Research paper due. Put it all together, nice and neat)

Tuesday, January 8th:

- Step 5, pg. 13 (Project Display Board/Research Paper)

Thursday, January 10th: Science Fair Night (Times TBA)

I have read the rules and attached packet thoroughly with my child:

Parent Signature & Date: ____

Student Signature: ____

Science Fair Rules and Regulations

- Number one rule… think safety first before you start. Make sure you have recruited your adult to help you.
- **Remember**: The face of an individual is not permitted in any photograph that is displayed.
- Wear protective goggles when doing any experiment that could lead to eye injury.
- Do not touch, taste or inhale chemicals or chemical solutions. Always wash your hands.
- Respect all life forms. Do not perform an experiment that will harm an animal.
- All experiments should be supervised by an adult!
- Any project that involves drugs, firearms, or explosives is not permitted.
- Any project that breaks district policy, and/or local, state or federal laws are not permitted.
- **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.
- Students may also enhance their project by using the computer for illustrations (in the form of tables, graphs, clip art, etc.)
- Finally, we encourage parental assistance; however, we do not support parents doing the project for their child. The students will be presenting their experiment in class and they will have to answer questions about their project. Be there to help prioritize activities and effectively manage their time.

Research Paper Requirements:

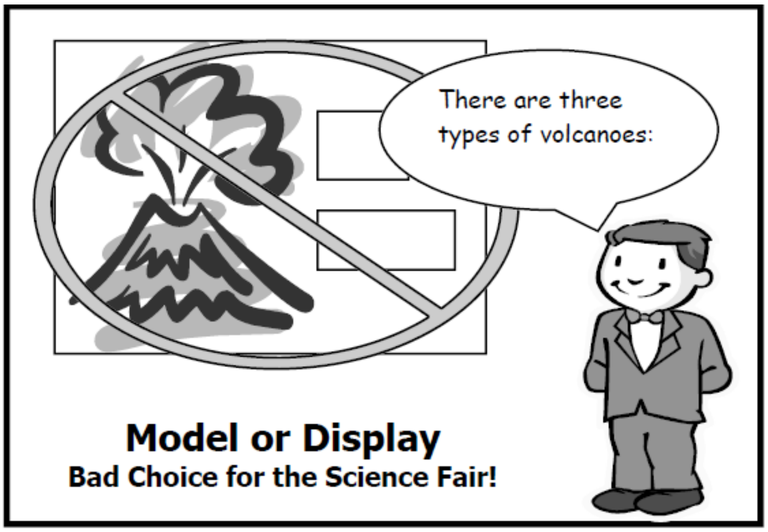
Students may type the information that will go on the display board/packet. If they wish to write it, it must be very neat and print, no cursive.

- **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.
- **Scientific Method page(s):** Problem Statement, Hypothesis, Materials, Variables, Procedure, Data, Conclusion, Application and Recommendations.
- **A Bibliography and Acknowledgement Page:** at the end, listing all the research sources such as books, authors, websites and people interviewed for the project.

Types of Science Projects

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

DON'T DO!!!



<u>A Model, Display or Collection</u>:
Shows how something works in the real world, but doesn't really test anything

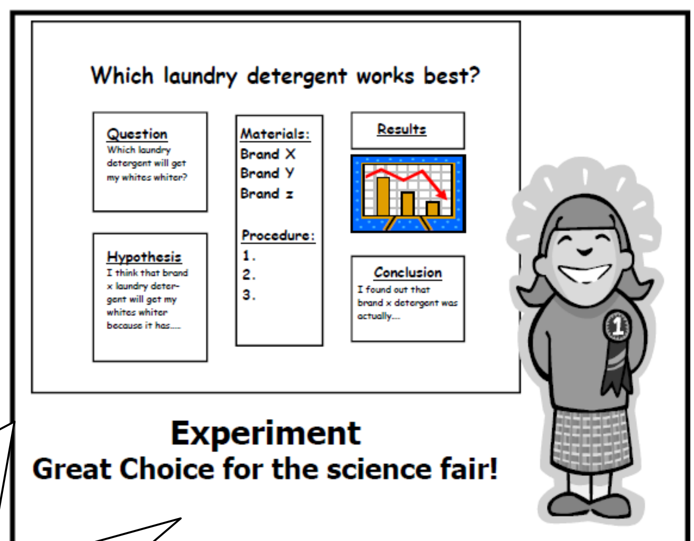
Examples of display or collection projects:

- The Solar System
- Rock Collection

Examples of models might be:

- The Solar System
- How an Electric Motor Works
- Tornado in a Bottle

DO!!!



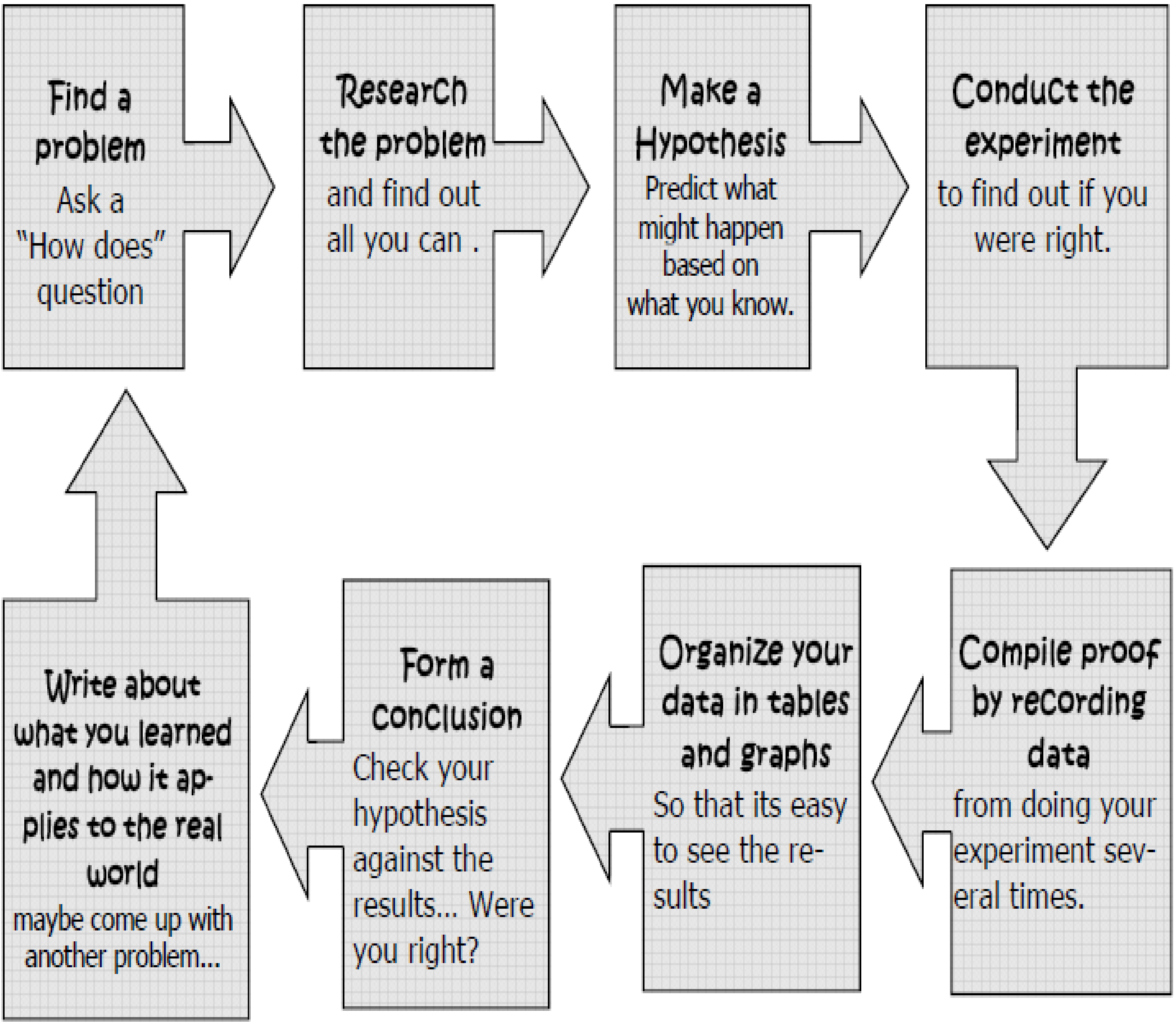
<u>An Experiment</u>
Lots of information is given, **but it also has a project that shows testing being done and the gathering of data.**

Examples of experiments can be:

- Does fertilizer effect the speed of plant growth?
- 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….

So What IS the Scientific Method?



Step 1: Question/Problem Statement

It's time to write a question or identify a problem. 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
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 it's your turn:

Create your Science Fair question using the above guideline:

____

____

____

Step 2: Research and Hypothesis

So you 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.

1. **Research:**
   - READ about your topic. READ magazine articles and books from the library. READ articles from the internet.

*** Keep Track of all the books and articles you read. You'll need that list for later.

   - 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….

2. **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.

Example Problem: Which Paper Towel is more absorbent?

Example Hypothesis: I think Brand X will be more absorbent because the research shows it uses higher quality materials that allow for better absorption. It also feels thicker than the other brands.

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

Step 2: Research and Hypothesis

Now it's your turn:

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

Problem: ____

____?

Research: My problem is about ____________ ______________________________________

(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….)

Bibliography:

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: Materials/Procedure/Variables

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.

1. Gather up your materials. What will you need to perform your experiment? 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.
2. Write a PROCEDURE. A procedure is a list of steps that you did to perform an experiment.
3. Identify your variables. The variables are any factors that can change in an experiment.

- **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 variable.** The independent variable is the factor you are testing.
- The results of the test that you do are called the **dependent variables.** The dependent variable is what happens as a result of your test.

Now it's your turn:

Materials: (take pictures!)

1. ________________________
2. ________________________
3. ________________________
4. ________________________
5. ________________________
6. ________________________
7. ________________________
8. ________________________

Procedure: (take pictures, be specific!)

1. ____
____
2. ____
____
3. ____
____
4. ____
____
5. ____
____
6. ____
____
7. ____
____

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:

1. **Controlled variables** (the stuff that will always stay the same):
____
____
2. **Independent variable** (this is the one thing that changes; it is what you are testing):
____
3. **Dependent variables** (in other words, the results of the experiment):
____
4. **Control Group** (the "normal" condition/the group unaffected by your independent variable):
____

Step 4: Experiment/Data/Conclusion/Application

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!

1. <u>TEST, TEST, TEST</u>. Results should be consistent in order to be a good experiment.

When you cook using a recipe, you expect the outcomes to be the same if you followed the procedure step by step. So that means, do the experiment more than once in order to test it properly. Do the experiment 3 times to show validity.

2. <u>Collect your DATA</u>. Scientists use tables, graphs and other organizers to show their results. Organizing makes the results easy to read, and your teachers like that!

<u>Use the right graph for your experiment</u>.

- **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%.

- **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.

- **Line graphs** are good to use if you are showing how changes occurred in your experiments over time.

4.

3. <u>Write a CONCLUSION.</u> Tell us what happened. Was your hypothesis right or wrong or neither?

4. <u>Understand its APPLICATION</u>. Write about how this experiment can be used in a real life situation. Why was it important to know about it?

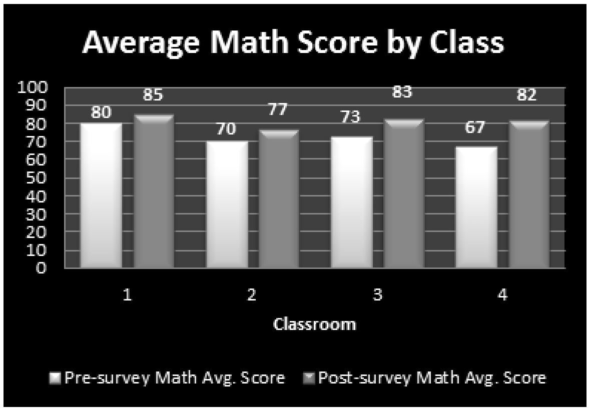
Now it's your turn:

1. Do the experiment.

2. Design a table or chart to collect your information (attach your data to this packet)

Example of data:

Classroom	Pre-survey Math Avg. Score	Post-survey Math Avg. Score
1	80	85
2	70	77
3	73	83
4	67	82



3. 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?

___

___

___

___

4. Application: (How does this apply to real life?)

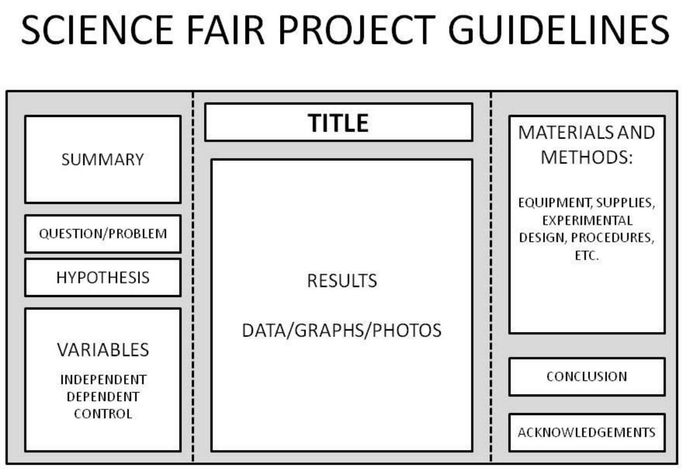
It's important to know about this experiment because……

___

___

___

Step 5: Project Display Board



1. Title: be creative!
2. Purpose: your question, what you want to find out
3. Hypothesis: your prediction
4. Materials: a list of supplies
5. Procedure: the steps or directions that you used to conduct the experiment
6. Variables: Independent, Dependent and Controlled
7. Data: graphs or charts showing what happened after you conducted the experiment.
8. Pictures
9. Conclusion: what happened? Did it work? Was your hypothesis correct?
10. Acknowledgments: Who would you like to thank for helping you with your project?

**Put your name and teacher on the BACK of the display board.

__cut____

Name: ______________________________

Grade: 5th

Homeroom Teacher: ______________________________

Websites

Internet Public Library
http://www.ipl.org/div/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.

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

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

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

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

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.

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 Rubric

	1	2	3	Score
Knowledge Gained	Demonstrates little/no knowledge gained, nor scientific skills.	Shows some understanding of topic and demonstrates scientific skills.	Clearly understands topic and demonstrates scientific skills.	
Scientific Approach	Problem not defined and did not use the scientific method.	Has an acceptable defined problem and used the scientific method to solve it.	Has a well-defined problem and used an orderly method for solving the problem.	
Experimental Approach	Experiment was not performed. It was a demonstration or model.	Experiment was attempted.	Experiment was performed.	
Validity of Data	Little or no data collected.	Data not necessarily reliable. Number of tests not adequate. (Only 1 or 2 trials)	More than adequate data collected by repeated tests. Data reliable. Data charted using table or graph.	
Validity of Conclusion	Conclusion inconsistent with data or no conclusion present.	Conclusion has valid points, but is not totally consistent with the data.	Conclusion is consistent with data and/or observations.	
Variable Knowledge	Little or no variable knowledge demonstrated.	Some variable knowledge demonstrated.	Very knowledgeable. Student is able to identify the independent, dependent and controlled variables.	
Research Paper	Did not include a Research Paper.	A Research Paper was included, but important aspects (Introduction, Scientific Method) were missing or incomplete.	Research Paper was complete and consistent.	
Display Information	Missing essential information (title, results, conclusion, etc.). Mechanics – many distracting spelling errors.	Adequate information is present. Mechanics – there are some distracting spelling errors.	All elements present (question/purpose, hypothesis, procedure, materials, results, conclusion, title). Display must include graphs, tables or charts.	
Oral Presentation	No eye contact. No information relayed.	Relied heavily on notes.	Good eye contact. Little use of notes.	