DR. ROLANDO ESPINOSA K-8 CENTER

SCIENCE
FAIR PACKET

STUDENT HANDBOOK
2011-2012
<table>
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<tr>
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<td><strong>All Science Projects must be turned in by this date</strong></td>
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<tr>
<td>Tuesday, January 24, 2012 -</td>
<td>Oral Presentations in Class!</td>
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<tr>
<td>Tuesday, January 31, 2012</td>
<td>Science Fair Night</td>
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<tr>
<td>Wednesday, February 1, 2012</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
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<tr>
<td>How much salt does it take to float an egg?</td>
<td>Which materials absorb the most water?</td>
</tr>
<tr>
<td>What kind of juice cleans pennies best?</td>
<td>Do wheels reduce friction?</td>
</tr>
<tr>
<td>What dish soap makes the most bubbles?</td>
<td>What materials dissolve in water?</td>
</tr>
<tr>
<td>Do watches keep time the same?</td>
<td>What is the soil in my schoolyard made of?</td>
</tr>
<tr>
<td>On which surface can a snail move faster – dirt or cement?</td>
<td>Do plants grow better with tap water or distilled water?</td>
</tr>
<tr>
<td>What brand of raisin cereal has the most raisins?</td>
<td>What color of birdseed do birds like best?</td>
</tr>
<tr>
<td>How can you measure the strength of a magnet?</td>
<td>What holds two boards' together better - a nail or a screw?</td>
</tr>
<tr>
<td>Do ants like cheese or sugar better?</td>
<td>Will bananas brown faster on the counter or in the refrigerator?</td>
</tr>
<tr>
<td>Can the design of a paper airplane make it fly farther?</td>
<td>Does temperature affect the growth of plants?</td>
</tr>
<tr>
<td>Do roots of a plant always grow downward?</td>
<td>Do mint leaves repel ants?</td>
</tr>
<tr>
<td>Can you tell what something is just by touching it?</td>
<td>Does a ball roll farther on grass or dirt?</td>
</tr>
<tr>
<td>What kind of things do magnets attract?</td>
<td>Do all objects fall to the ground at the same speed?</td>
</tr>
<tr>
<td>What foods do mealworms prefer?</td>
<td>Does anyone in my class have the same fingerprints?</td>
</tr>
<tr>
<td>How long will it take a drop of food dye to color a glass of water?</td>
<td>Which travels faster - a snail or a worm?</td>
</tr>
<tr>
<td>What is the best air pressure for tires on an A.T.V., three-wheeler?</td>
<td>Which paper towel is the strongest?</td>
</tr>
<tr>
<td>Can you tell where sound comes from when you are blindfolded?</td>
<td>Can plants grow from leaves?</td>
</tr>
<tr>
<td>Can plants grow without soil?</td>
<td>Which dissolves better in water-salt or baking soda?</td>
</tr>
<tr>
<td>Does warm water freeze faster than cool water?</td>
<td>Can things be identified by just their smell?</td>
</tr>
<tr>
<td>In my class who is taller - boys or girls?</td>
<td>With which type of battery do toys run longest?</td>
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<tr>
<td>Do different types of apples have the same number of seeds?</td>
<td>What type of line carries sound waves best?</td>
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<tr>
<td>Do bigger seeds produce bigger plants?</td>
<td>Can the sun’s energy be used to clean water?</td>
</tr>
<tr>
<td>Does a green plant add oxygen to its environment?</td>
<td>Does it matter in which direction seeds are planted?</td>
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<tr>
<td>Science Project Ideas</td>
<td></td>
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<tr>
<td><strong>Which metal conducts heat best?</strong></td>
<td><strong>Which cheese grows mold the fastest?</strong></td>
</tr>
<tr>
<td><strong>What percentage of corn seeds in a package will germinate?</strong></td>
<td><strong>Do all colors fade at the same rate?</strong></td>
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<tr>
<td><strong>Does an earthworm react to light and darkness?</strong></td>
<td><strong>Which brand of diaper hold the most water?</strong></td>
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<tr>
<td><strong>Does the human tongue have definite areas for certain tastes?</strong></td>
<td><strong>In my class, who has the smallest hands—boys or girls?</strong></td>
</tr>
<tr>
<td><strong>Can same-type balloons withstand the same amount of pressure?</strong></td>
<td><strong>Which kind of cleaner removes ink stains best?</strong></td>
</tr>
<tr>
<td><strong>Does the viscosity of a liquid affect its boiling point?</strong></td>
<td><strong>Does a plant grow bigger if watered by milk or water?</strong></td>
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<tr>
<td><strong>Does surrounding color affect an insect’s eating habits?</strong></td>
<td><strong>How long are yellow lights at various intersections?</strong></td>
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<tr>
<td><strong>Do children’s heart rates increase as they get older?</strong></td>
<td><strong>Does a baseball go farther when hit by a wood or metal bat?</strong></td>
</tr>
<tr>
<td><strong>Can you use a strand of human hair to measure air moisture?</strong></td>
<td><strong>Do living plants give off moisture?</strong></td>
</tr>
<tr>
<td><strong>What materials provide the best insulation?</strong></td>
<td><strong>Using a lever, can one student lift another student who is bigger?</strong></td>
</tr>
<tr>
<td><strong>Is using two eyes to judge distance more accurate than using one eye?</strong></td>
<td><strong>What gets warmer—sand or soap?</strong></td>
</tr>
<tr>
<td><strong>Do different kinds of caterpillars eat different amounts of food?</strong></td>
<td><strong>Which kind of glue holds two boards together better?</strong></td>
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<tr>
<td><strong>What plant foods contain starch?</strong></td>
<td><strong>Do pre-wash products get clothes cleaner?</strong></td>
</tr>
<tr>
<td><strong>What keeps things colder—plastic wrap or aluminum foil?</strong></td>
<td><strong>What waterproofing agents work best?</strong></td>
</tr>
<tr>
<td><strong>Does heart rate increase with increasing sound volume?</strong></td>
<td><strong>How does deodorant effect clothes?</strong></td>
</tr>
<tr>
<td><strong>Do boys or girls have a higher resting heart rate?</strong></td>
<td><strong>Which paint protects wood the best?</strong></td>
</tr>
<tr>
<td><strong>Do liquids cool as they evaporate?</strong></td>
<td><strong>Does one brand of shampoo get hair cleaner than another brand of shampoo?</strong></td>
</tr>
<tr>
<td><strong>Which way does the wind blow most frequently?</strong></td>
<td><strong>Does one brand of suntan lotion absorb water more quickly that another brand of suntan lotion?</strong></td>
</tr>
<tr>
<td><strong>Does the size of a light bulb affect its energy use?</strong></td>
<td><strong>Do plants grow better with artificial or natural light?</strong></td>
</tr>
<tr>
<td><strong>For how long a distance can speech be transmitted through a tube?</strong></td>
<td><strong>What are the effects of root bounding on plant growth?</strong></td>
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<tr>
<td><strong>Which grows mold faster—moist bread or dry bread?</strong></td>
<td><strong>Under which color cellophane do plants grow best?</strong></td>
</tr>
<tr>
<td><strong>What type of soil filters water best?</strong></td>
<td><strong>What baseball bat hits the farthest—wood or aluminum?</strong></td>
</tr>
<tr>
<td>Science Project Ideas</td>
<td>Does the color of a material affect its absorption of heat?</td>
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<tr>
<td>Does the shape of a kite affect its flight?</td>
<td>Does acid rain affect the germination of seeds?</td>
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<td>---------------------------------------------------------------</td>
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</tr>
<tr>
<td>How does gravity affect the growth of seeds?</td>
<td>Do parking meters give the amount of time we paid for?</td>
</tr>
<tr>
<td>Which container (or wrapping) preserves food best?</td>
<td>Does a magnetic field affect the growth of beans?</td>
</tr>
<tr>
<td>Which diaper is best?</td>
<td>Does electricity affect the growth of beans?</td>
</tr>
<tr>
<td>Which door lock works best?</td>
<td>Does temperature affect the growth of plants?</td>
</tr>
</tbody>
</table>
1. What keeps things colder plastic wrap or aluminum foil?
2. Does the color of a material affect its absorption of heat?
3. Do sugar crystals grow faster in tap water or distilled water?
4. Does the length of a vibrating object affect water?
5. How accurately do people judge temperatures?
6. Do watches keep time the same?
7. How can you measure the strength of a magnet?
8. Do ants like cheese or sugar better?
9. Do roots of a plant always grow downward?
10. Can you tell what something is just by touching it?
11. What kind of things do magnets attract?
12. How long will it take a drop of food dye to color a glass of still water?
13. Can you tell where sound comes from when you are blindfolded?
14. Do bigger seeds produce bigger plants?
15. What materials dissolve in water?
16. Does a ball roll farther on grass or dirt?
17. Which dissolves better in water, salt or baking soda?
18. Can things be identified by just their smell?
19. Where on school grounds does the grass grow greener?
20. What brand of eraser is most effective in removing pencil marks?
21. What is the effect of color cellophane on the growth of lima beans?
1. Which metal conducts heat best?
2. Is using two eyes to judge distance more accurate than using one eye?
3. Which way does the wind blow most frequently?
4. Does the size of a light bulb affect its energy use?
5. What type of soil filters water best?
6. Does sound travel best through solids, liquids, or gases?
7. Can you see better if you limit the light that gets to your eye?
8. What common liquids are acid, base, or neutral?
9. What type of oil has the greatest density?
10. Can plants grow without soil?
11. Does warm water freeze faster than cool water?
12. What holds two boards together better—a nail or a screw?
13. Does temperature affect the growth of plants?
14. Do all objects fall to the ground at the same speed?
15. Does anyone in my class have the same fingerprints?
16. Which rocks best resist cracking from the impact of a weigh?
17. What brand of tape hold the most weight?
18. What brand of tape hold the most weight?
19. How does temperature affect the height that a dropped ball bounces?
20. Which plants and vegetables make the best dye?
21. Which color of light causes green beans to grow best?
Science Project Ideas

1. What type of line carries sound waves best?
2. Can same-type balloons withstand the same amount of pressure?
3. What materials provide the best insulation?
4. What are the effects of chlorine on plant growth?
5. Do wheels reduce friction?
6. What is the soil in my schoolyard made of?
7. Can plants grow from leaves?
8. What conditions cause iron nails to rust faster?
9. What common substances prevent the rusting of iron nails?
10. What are the effects of caffeine on the germination and growth of bacterial?
11. What is the effect of various antiseptics on the growth of bacteria?
12. What conditions affect the strength of adhesives?
13. How does the number of coils affect the strength of a magnetic field?
14. Which lubricant best reduces friction?
15. Does the shape of the container affect the freezing rate of water?
16. How does the PH of soil affect the rate of seed germination?
17. Heat transfer-Which is the best conductor?
18. What effect does temperature and water composition have on crystal growth?
19. Which type of wild flower grows best under artificial light?
20. Is there a relationship between phases of the moon and our weather?
21. Does the carbonation in soda cause the soda cans to corrode?
Middle school students must select their top three science fair project ideas and present them to the teacher. (Teacher will assign due date)

**Helpful Websites**

http://science.dadeschools.net/scifair/
http://scienceprojects.com
http://rossarts.org/naples/ideas.htm
http://terimore.com
http://www.all-science-fair-projects.com
http://www.factmonster.com
http://www.sciencebuddies.org
Assignment 1

Problem Statement
(Topic)

Select a topic that can be answered only by experimenting. Write your topic as a question to be investigated.

Example: “Which brand of paper towels is the most absorbent?”

**Good Topics:**

1. Do different colored mints dissolve at the same rate?
   This is a good topic because it required experimentation that you can do yourself. You must use the scientific method in completing this project.

2. What surface do mealworms prefer?
   This topic suggests the use of an experimental method. Asking a question is a good approach toward developing your topic.

3. Do all brands of paper towels absorb water at the same rate?
   This is an investigation where only one variable is being manipulated.

**Poor Topics:**

1. How volcanoes erupt.
   This topic will not allow experimentation without visiting real volcanoes. Making a model that erupts is a demonstration not an experiment.

2. Microscopes.
   This topic is too general. Telling how one works is not experimentation.

3. Do different brands of paper towels soak up different temperatures of water at the same rate?
   This topic needs to be narrowed down to one investigation. Only one variable should be manipulated in an investigation.

Notes: _______________________________________________________
_________________________________________________________________
_________________________________________________________________
Assignment 2

Hypothesis

A hypothesis states what you think is going to happen when you investigate a question.

Example: “If Brawny, Viva, and Bounty paper towels are tested for their absorbency, then Bounty paper towels will be the most absorbent.”

Notes:

Assignment 3

Background Information

Once you have chosen your topic, it is important to research the written materials on your subject. By finding out as much information about the subject, you will gain a better understanding of your problem.

*Follow these guidelines for conducting your research:

1. Read books and articles on your subject. Make sure this information is up to date (not older than 5-10 years).
2. Interview and talk with people who are knowledgeable about your subject.

*This section is not included on your Display Board.

Notes:
Bibliography

Make a list of all the books, magazines, internet articles, interviews, or other sources that were used.

*Write our bibliography using the following format:

**Books**

**Format:**
Author's last name, first name. *Book title*. Additional information. City of publication: Publishing company, publication date.

**Examples:**


**Encyclopedia & Dictionary**

**Format:**
Author's last name, first name. "Title of Article." *Title of Encyclopedia*. Date.

Note: If the dictionary or encyclopedia arranges articles alphabetically, you may omit volume and page numbers.

**Examples:**


**Magazine & Newspaper Articles**

**Format:**
Author’s last name, first name. "Article title." *Periodical title* Volume # Date: inclusive pages.

Note: If an edition is named on the masthead, add a comma after the date and specify the edition.

**Examples:**


**Website or Webpage**

**Format:**
Author's last name, first name (if available). "Title of work within a project or database." *Title of site, project, or database*. Editor (if available). Electronic publication information (Date of publication or of the latest update, and name of any sponsoring institution or organization). Date of access and <full URL>.

Note: If you cannot find some of this information, cite what is available.

**Examples:**


**Notes:**
Assignment 4

Materials

List all the materials used in your investigation. Include specific details such as size and quantity. Remember to use only metric units.

*Write our bibliography using the following format:

<table>
<thead>
<tr>
<th>Good Example:</th>
<th>Poor Example:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 3 – 15x15 cm. sheets of each paper Towel: Brawny, Viva, and Bounty.</td>
<td>1. Paper Towels</td>
</tr>
<tr>
<td>2. 1 20x20 cm. square cake pan</td>
<td>2. Measuring Cup</td>
</tr>
<tr>
<td>3. 750 ml water, 20° Celsius</td>
<td>3. Water</td>
</tr>
<tr>
<td>5. Clock with a second hand</td>
<td>5. Thermometer</td>
</tr>
<tr>
<td></td>
<td>6. Clock</td>
</tr>
</tbody>
</table>

Notes: 

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__________________________________________________________________________________________

__________________________________________________________________________________________
Assignment 5

Procedures

List your step-by-step directions like a recipe. Anyone who reads them should be able to duplicate your investigation. Do not write what YOU did (avoid words such as “I” and “me”)

Example:

1. Cut 3 – 15x15 cm. Sq. from each brand of paper towels.
2. Label each cut piece with brand name.
3. Pour 50 ml. of 20° Celsius water into 20x20 cm. sq. pan
4. Place 1 square of generic brand paper towel into the water and pan
5. Leave for 30 seconds
6. Remove paper towel
7. Measure water remaining in pan and record
8. Dry the cake pan
9. Repeat steps 4 through 8 for each brand of paper towel
10. Repeat entire process twice more for each brand of paper towel

Notes: ____________________________________________________________
______________________________________________________________
______________________________________________________________
______________________________________________________________
Variables

Variables are all the factors that affect your investigation. There are three types of variables.

**Manipulated Variable:** What you can change on purpose in an investigation

*Example:* Brand of paper towels

**Responding Variable:** What changes by itself because you manipulated (changed) something in your investigation.

*Example:* Amount of water that is absorbed by each paper towel.

**Variables Held Constant:** Everything else in your investigation must be kept the same (the controlled variable)

*Example:* Size of paper towel
Amount of water poured on each towel
Temperature of the water used
Container towels are placed in
Data

Data refers to information gathered during your investigation. Writing in a spiral notebook is the most convenient way to keep a log.

*Your log should include:

1. A list of all materials you use.
2. Notes on the preparations you made prior to starting your investigation.
3. Information about the resources you use (books, people, library, museum, universities, etc.)
4. Detailed day-by-day notes on the progress of your project.
   a. What you are actually doing
   b. Problems you have with your investigation
   c. Things you would change if you were doing this investigation again.
5. Any drawings that you feel might help explain your work.
6. Data that you gather from your investigation (notes, table, charts, graphs)

Be sure that you date each entry in your log.

*The data collected during the course of your investigation needs to be quantifiable (measurable).
*All measurements in your investigation must be made in metric units.

Volume: milliliter (ml) 1000 mL = 1L
        Liter (L)

Length: millimeter (mm) 10mm=1cm
        Centimeter (cm)
        Meter (m) 1000m =1km
        Kilometer (km)

Mass:  milligram (mg) 10mg=1cg
       Centigram (cg) 100cg=1g
       Gram (g) 1000g=1kg
       Kilogram (kg)
Sample Graphs

**Title:** The Title is a short description of the data being displayed.

### Line Graph

**Flashlights (medium drain device)**

- **Voltage (Volts)**
  - 0.0
  - 0.2
  - 0.4
  - 0.6
  - 0.8
  - 1.0
  - 1.2
  - 1.4
  - 1.6
  - 1.8

- **Hours of battery use**
  - 0.0
  - 2.0
  - 4.0
  - 6.0
  - 8.0
  - 10.0

- **Legend:**
  - Duracell (Alkaline)
  - Energizer (Alkaline)
  - Panasonic (Heavy Duty)

*Line Graphs* are used to show change over a period of time.

### Circle Graph

1. **Four Most Popular Pets Among Students in Ms. Green’s Fifth Grade Class**

- **Rabbits**
  - 7%
- **Hamsters**
  - 7%
- **Cats**
  - 31%
- **Dogs**
  - 40%

*Pie Graphs* use percents to show how parts are compared to a whole.
Bar Graph

*Bar Graphs are used to compare quantities or amounts of similar things.*

Data Table

*Data Table shows an organized way to calculate and record this information.*

Notes: 

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__________________________________________________________________________

__________________________________________________________________________
Assignment 7

Results

Write the results of the experiment based on the information you have observed.

Example: A sheet of Viva paper towel absorbed an average of 50ml of water. A sheet of Suave paper towel absorbed an average of 36ml of water.

Notes: __________________________________________________________


Conclusion

Before you write your conclusion, carefully examine all your data (graphs, charts, tables).

As yourself these questions:

1. Did you get the results you expected to get? If not-how were the results different?
2. Were there any unexpected problems or occurrences that may have affected the results of your investigation?
3. Do you think you collected sufficient data? (Were there enough trials? Samples?)
4. Do I need to revise my original hypothesis? (If you write a revised hypothesis, DO NOT use it to replace your original hypothesis for this project!)

Your conclusion should include:

1. Statement of support or non-support of the original hypothesis.
2. Description of any problems or unusual events that occurred during your investigation.
3. What you would do differently next time.
4. Revised hypothesis (if data did not support original hypothesis)

Notes: __________________________________________________________


Assignment 8

Title

Choose a title for your project that tells what your project is about. It should be “catchy” and get a viewers attention.

Example:  “A Mixing Mystery”
“Density Dilemma”
“Let’s Play Ball!”

*THE TITLE SHOULD NOT BE THE SAME AS THE PROBLEM STATEMENT!

Notes:  

Abstract

The abstract is a summary of the entire project. It is written in three paragraphs.

**Paragraph #1**  Purpose of the experiment and the Hypothesis
**Paragraph #2**  Procedures
**Paragraph #3**  Results and the Conclusion

Example:

The purpose of this project is to determine which type of chocolate chip cookie third grade students like best. It is hypothesized that third graders will like home-made chocolate chip cookies best.

Two different types of cookies were bought from Publix. Also, my mother and I baked some. The three types of cookies were put in bags marked A, B, and C. All third grade students were given one cookie from each bag and asked to fill out a slip selecting the best cookie and indicating themselves as a boy or a girl.

The results showed that third grade boys like homemade cookies best, and girls like Keebler Cookies best. The hypothesis was not correct. To improve this study, I would collect data at different times of the day.

Notes:  


Application

An application is how the project relates to real life.

Having tested three brands of paper towels, Brawny, Viva, and Bounty for the best absorbency, it is now known from this experiment that the from these three branded paper towels Bounty paper towel has the most absorbency. With this information consumers may now be able to make a more scientific decision when choosing the brand of paper towel. If the consumer wishes to purchase a paper towel product with more absorbency then Bounty is the paper towel to purchase. However, not always does a consumer want the most absorbent paper towel and therefore knowing this information the consumer will not purchase the Bounty paper towel but rather another brand, perhaps Viva which absorbed the least from the three tested.

Oral Presentation

1. Introduce yourself.
2. Give the title of your project and its purpose.
3. Briefly explain why you became interested in this project.
4. Explain your procedures, relate the number of trials, and show your results using tables, charts, or graphs.
5. Explain your conclusions (what you’ve proven). If there were any errors or problems, explain how this may have affected the experiment’s outcome.
6. Tell what you might do differently next time.
7. Explain how your project can help others.

**Suggestions**
Smile and be polite
Stand straight and still
Keep eye contact with your audience
Project your voice so that everyone can hear you
Stand to the side of the display board
Show enthusiasm!

Notes:  

_________________________________________________________________________________________

_________________________________________________________________________________________

_________________________________________________________________________________________
Do's and Don'ts For Your Display Board

Do's and Don'ts

Do use computer-generated graphs.

Do display photos representing the procedure and the results.

Do use contrasting colors.

Do limit the number of colors used.

Do display models when applicable. If possible, make the models match the color scheme of the backboard.

Do attach charts neatly. If there are many, place them on top of each other so that the top chart can be lifted to reveal the ones below.

Do balance the arrangement of materials on the backboard. This means evenly distributing the materials on the board so that they cover about the same amount of space on each panel.

Do use rubber cement or double-sided tape to attach papers. White school glue causes the paper to wrinkle.

Don't leave large empty spaces on the backboard.

Don't leave the table in front of the backboard empty. Display your models (if any), report, copies of your abstract, and your journal here.

Don't hang electrical equipment on the backboard so that the electric cord runs down the front of the backboard.

Don't make the title or headings hard to read by using uneven lettering, words with letters of different colors, or disorganized placement of materials.

Don't hand-print the letters on the backboard.

Don't attach folders that fall open on the backboard.

Don't make mistakes in spelling words or writing formulas.

Example of a Bad Display

Example of a Good Display
Elementary Science, Mathematics, Engineering, and Invention Fair
Board Set-up for a Project

Title of the Project

- Procedures
- Materials
- Variables
- Constants

Results

Conclusions

Applications

Charts, graphs and or photographs

Problem Statement

Hypothesis

Required Position of the Abstract & Bibliography

Data Log book(s), report of background material, and literature search or project report should be attached to the display board by a binder clip.
Science Fair Assignments
2011-2012

Assignment #1: due Wednesday, November 30, 2011
Problem Statement: ______________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

Assignment #2: due Monday, December 5, 2011
Hypothesis: __________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

Assignment #3: due Monday, December 12, 2011
Background Information: ________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
Student Name: ____________________________  Section/Period: ____________
Teacher: ________________________________  Dr. Rolando Espinosa K-8 Center

Bibliography: (You need at least three sources)

________________________________________
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Assignment #4: due Tuesday, January 3, 2012

Materials: ____________________________________________
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Assignment #5: due Tuesday, January 3, 2012

Procedures:

Variables:

Manipulated Variables:

Responding Variables:

Variables Held Constant:
Assignment #6: due Monday, January 9, 2012

Data:

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Assignment #7: due Tuesday, January 17, 2012

Results: __________________________________________

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Conclusion: ______________________________________

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Assignment #8: due Friday, January 20, 2012

Title: ________________________________________________________________

Abstract: _____________________________________________________________

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