**3rd Annual Sciencepalooza at PJHS - Student Packet**

**Purpose:** This form must be submitted and approved for participation in the Sciencepalooza April 10\textsuperscript{th} from 6-7:30 pm. Participation is open to the PJHS 6\textsuperscript{th}-8\textsuperscript{th} grade students, working individually or with one partner (no groups of 3 or more). Student projects must be either \textbf{(A) Experimental} – following the scientific method, proposing and testing a hypothesis, presenting results and drawing conclusions or \textbf{(B) Illustrative} – breaking down a natural phenomenon in order to explain the scientific components that cause the phenomenon.

**Names: ________________________________  Science Teacher: ________________________________**

Student(s): I will complete my project and be prepared to present my project at the Sciencepalooza April 10\textsuperscript{th} from 6-7:30 pm.

Student Signature _____________________________________________________

Student Signature _____________________________________________________

**Science Project Choices**

**Topic Selection**

Topic/Question (1st Choice) ______________________________________________________________________________________________

____________________________________________________

Topic/Question (2nd Choice) ______________________________________________________________________________________________

____________________________________________________

Topic/Question (3rd Choice) ______________________________________________________________________________________________

____________________________________________________

Teacher Signature__________________________________________  Teacher approved project:  #1  #2  #3

**Final Project Title: ____________________________________________**

**Parent:** I will assist my child as needed \textit{(gathering materials, ensuring safety, providing transportation etc.)}, but will insure that my child completes his/her project on their own. \textit{If you are interested in volunteering please email Mrs. Beckman – beckmane@unit5.org}

Parent Signature ______________________________________________

Parent Signature ______________________________________________

Davenport 2013
**Scientific Method**

**Independent variable (Manipulated)** - The factor the scientist purposely changes in the experiment. It is expressed in the hypothesis after the word if.

My independent variable is ________________________________

**Dependent variable (Responded)** - The factor the scientist observes or measures in the experiment to gather results. It is expressed in the hypothesis after the word then.

My dependent variable is ________________________________

**Control Group** - the group that is not manipulated or changed and serves as the standard of comparison in the experiment.

My control group is ________________________________

**Constants** - factors that are the same in both the experimental group and the control group.

My constants are:

_____________________________________________________

_____________________________________________________

_____________________________________________________

**Purpose** (can be written as a question or objective):

Does ________________________________ (independent variable) affect ________________________________ (dependent variable).

**OR**

The purpose is to determine if ________________________________ (independent variable) affects ________________________________ (dependent variable).
Hypothesis

Hypothesis— a scientific prediction about the outcome of an experiment based on prior knowledge or researched information. Based on your background information, write a statement that predicts the outcome of the experiment. Many hypotheses are stated in an “if.....then” statement where the “if” statement pertains to the independent variable, and the “then” statement pertains to the dependent variable.

The hypothesis must be worded so that it can be tested in your experiment. Do this by expressing the hypothesis using your independent variable (the variable you change during your experiment) and your dependent variable (the variable you observe—changes in the dependent variable depend on changes in the independent variable). In fact, many hypotheses are stated exactly like this: "If a particular independent variable is changed, then there is also a change in a certain dependent variable."

Example Hypotheses

- "If I open the faucet [faucet opening size is the independent variable], then it will increase the flow of water [flow of water is the dependent variable]."
- "Raising the temperature of a cup of water [temperature is the independent variable] will increase the amount of sugar that dissolves [the amount of sugar is the dependent variable]."
- "If a plant receives fertilizer [having fertilizer is the independent variable], then it will grow to be bigger than a plant that does not receive fertilizer [plant size is the dependent variable]."
- "If I put fenders on a bicycle [having fenders is the independent variable], then they will keep the rider dry when riding through puddles [the dependent variable is how much water splashes on the rider]."
- Note: When you write your own hypothesis you can leave out the part in the above examples that is in brackets [ ].
- Notice that in each of the examples it will be easy to measure the independent variables. This is another important characteristic of a good hypothesis. If we can readily measure the variables in the hypothesis, then we say that the hypothesis is testable.

Develop a Hypothesis

If _________________________________________________________ (independent variable)
_________________________________________________________
then
______________________________________________________ (dependent variable)
_________________________________________________________

The evidence to support this is
______________________________________________________
______________________________________________________
______________________________________________________
The materials list is a complete list of all materials including details and amounts.
Be sure to include quantities (how much), length, volume, and mass.
List these in metric units.
Be specific in your description of the item needed.
Include photos or drawings of the materials if it helps the person to identify the material needed in the project.
Be specific to amount, size, and length.

Example:
- 3 - 1 liter bowls
- 90 ml of water
- 3 - 8 cm x 8 cm squares of polyester in different colors
- 3 - 8 cm x 8 cm squares of cotton in different colors
- 3 - 8 cm x 8 cm squares of nylon in different colors
- 1 - Celsius thermometer
- 1 - Dry Stand
- 9 - Clothespins
- 1 - Notebook to record data
- 1 – Timer

Write your material list below:

- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
Procedure

- Write the experimental procedure like a step-by-step recipe for your science experiment. A good procedure is so detailed and complete that it lets someone else duplicate your experiment exactly!
- Steps should be written in complete sentences with correct capitalization and punctuation.
- Do NOT use “I” in your procedure.
- The first word in each step should be a verb.
- Repeating a science experiment is an important step to verify that your results are consistent and not just an accident.
- For a typical experiment, you should plan to repeat it at least three times (more is better).
- If you are doing something like growing plants, then you should do the experiment on at least three plants in separate pots (that’s the same as doing the experiment three times).

Write your procedure below:

1. __________________________________________________________________________________________________________________________
2. _____________________________________________________________________________________________________________________
3. _____________________________________________________________________________________________________________________
4. _____________________________________________________________________________________________________________________
5. _____________________________________________________________________________________________________________________
6. _____________________________________________________________________________________________________________________
7. _____________________________________________________________________________________________________________________
8. _____________________________________________________________________________________________________________________
9. _____________________________________________________________________________________________________________________
10. ___________________________________________________________________________________________________________________ 
11. __________________________________________________________________________________________________________________ 
12. __________________________________________________________________________________________________________________ 
13. __________________________________________________________________________________________________________________ 
14. __________________________________________________________________________________________________________________ 
15. __________________________________________________________________________________________________________________ 

Example Procedure

1. Gather materials.
2. Tell the student to stand with both of their arms straight to the side of their body touching their leg. The palms of the hands should be against their thigh.
3. State to the student that you will be holding the meter stick where it touches the ceiling and without warning you will drop it and they are to catch it with their right hand between their thumb and forefinger.
4. Place meter stick so that it is touching the ceiling with 100 centimeters at the top.
5. Drop the meter stick without warning.
6. Record the number on the meter stick where they caught it (use the lowest point).
7. If the student does not catch the meter stick the trial must be repeated.
8. Repeat the procedure four more times until the student has caught the meter stick a total of five times with their right hand.
9. Record data after each drop.
10. Tell the student that you are now going to check their reaction time with their left hand and they must catch the meter stick with their left hand in the same manner as before.
11. Repeat the procedure with the left hand four more times.
12. Record data after each drop.
13. Calculate averages for right hand distance and left hand distance and record in the data table.
14. Use the Conversion chart to convert distance into reaction time and find the averages for each hand.

For experimental projects:

- Minimum of three trials is required. Example: If working with plants, then you should have 3 plants for each variable tested.
- Report your data using at least one data table and one graph. Be sure to include units for any measurements made. You must have a specific title for each and label your axes.

Science Display Board Information

- For every science fair project, you need to prepare a display board to communicate your work to others. In most cases you will use a standard, three-panel display board that unfolds to be 36" tall by 48" wide.
- Organize your information like a newspaper so that your audience can quickly follow the thread of your experiment by reading from top to bottom, then left to right. Include each step of your science fair project: Abstract, question, hypothesis, variables, background research, and so on.
- Use a font size of at least 16 points for the text on your display board, so that it is easy to read from a few feet away. It’s OK to use slightly smaller fonts for captions on picture and tables.
- The title should be big and easily read from across the room. Choose one that accurately describes your work, but also grabs peoples’ attention.
- A picture speaks a thousand words! Use photos or draw diagrams to present non-numerical data, to propose models that explain your results, or just to show your experimental setup. But, don’t put text on top of photographs or images. It can be very difficult to read.
- The most important objective for your board is to effectively communicate the facts about your project. You can only achieve that objective if it’s easy to read. Over the years, expert newspaper editors, as well as advertisers (Ogilvy 1983, 90) have formulated many rules of thumb for readability that we have translated for use on science project display boards.
- Stick with traditional fonts like Arial, Times New Roman, or similar typefaces.
- Use italics or bold for emphasis, not for all your text.
- Don’t use ALL CAPS; THEY ARE MUCH HARDER TO READ.
- It is hard to read. Use black characters on a white (or pastel) background.

Suggestions for a Typical Science Project Display Board

<table>
<thead>
<tr>
<th>Item</th>
<th>Font Size</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>150+</td>
<td>You want your title to be visible from across the room!</td>
</tr>
<tr>
<td>Heading</td>
<td>32+</td>
<td>Should be easily readable from 5 feet away by someone just walking by.</td>
</tr>
<tr>
<td>Subheading</td>
<td>20+</td>
<td>This text is smaller than headings, but more noticeable than main text size.</td>
</tr>
<tr>
<td>Main Body Text</td>
<td>16-18</td>
<td>This is a comfortable text size for someone who comes closer to read more.</td>
</tr>
<tr>
<td>Captions</td>
<td>12-16</td>
<td>It’s OK to make these a bit smaller than the body text if necessary.</td>
</tr>
</tbody>
</table>