Middle School Science Fair Project

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Fienberg-Fisher K-8 Center

Academic Year 2011-2012

Maria Zabala, Principal

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Science Fair Project Assignments and Due Dates

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|  | Assignments | Due Dates | Graded in: |
| 1 | TOPIC/PROBLEM STATEMENT | September 14th | Science |
| 2 | HYPOTHESIS | September 14th | Science |
| 3 | VARIABLES   * Manipulated (independent) * Responding (dependent) * Constants * Control | September 14th | Science |
| 4 | MATERIALS | September 19th or 20th | Science |
| 5 | PROCEDURES | September 19th or 20th | Science |
| 6 | BLANK DATA TABLE w/o data | September 19th or 20th | Science |
| 7 | BACKGROUND INFORMATION WITH  BIBLIOGRAPHY | October 26th | Language Arts and Science |
| 8 | DATA TABLES with data/and GRAPHS | October 31st or November 1st | Math and Science |
| 9 | CONCLUSION | November 2nd | Math and Science |
| 10 | PRACTICAL APPLICATION | November 2nd | Science |
| 11 | RESULTS | November 2nd | Science |
| 12 | ABSTRACT | November 9 | Science |

Completed Science Fair Project is due on:

**NOVEMBER 14th or NOVEMBER 15th, 2011**

**SCIENCE FAIR PROJECT REPORT AND DISPLAY BOARD MUST BE TYPED**

Selecting a Topic and Identifying the Problem

So, you’ve decided to enter the science fair, but you’re not sure where to begin. The first step, coming up with your project idea, could be the most important. Just remember, you’ll have a lot more fun (and probably learn more) if you start with a topic that interests you! Here are a few hints for coming up with a project idea:

1. **Think of a topic you’re interested in.** For example:

* Animals
* Plants
* Rocks
* Space
* Weather
* Electricity

1. Of course, you could develop a hundred projects on any one of those topics. Now try to focus **on one aspect of one topic in particular**. For example:

* Animals: How can I best train my pet?
* Plants: How can plants best be protected from animals?
* Rocks: What do the different colors in the rocks mean?
* Space: What is in the night sky?
* Weather: How does weather change?
* Electricity: How does electricity work?

1. That’s much better! **Now use this same idea, but be more specific.** What would you really like to figure out or show? Think of the most exact information you can discover and be very specific. In science, information has to be exact if it’s really going to matter. For example:

* Animals: Does the length of an animals training session make a difference?
* Plants: Can a companion planting protect beans from beetles?
* Rocks: How do you detect minerals in rocks?
* Weather: Show how different instruments measure weather.
* Electricity: Can a worn-out battery do work?

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(manipulated/independent variable)

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(responding/dependent variable)

Topic/Problem is due on: **September 14th**

Need Ideas?

<http://school.discoveryeducation.com/sciencefaircentral/>

<http://www.all-science-fair-projects.com/>

<http://www.ipl.org/div/projectguide/>

<http://sciserv.org/isef/>

<http://www.homeworkspot.com/sciencefair/>

<http://www.sciencebuddies.org/>

Remember information in these websites used as part of your research information must be appropriately cited in your reference page (bibliography).

Hypothesis

Create a hypothesis statement for each of the situations below using the ***If and then format*** (If = the CAUSE) and (then = the EFFECT). A **hypothesis** is an “educated guess” or “prediction” that can be tested.

Example Scenario: A student wants to see if the amount of sunlight affects the growth cycle of a pansy. The student places one pansy on a windowsill (natural light) and another in the living room (only artificial light).

Hypothesis: The scientist believes that ***if*** a pansy is placed in natural light ***then* it** will grow two inches higher than a pansy grown in the artificial light.

**Situation 1**

A student wants to know if a car’s gas mileage is affected by the amount of weight it carries. They drive a car around for two weeks and record the miles driven per gallon of gas used with only the driver inside. Then they do the same procedure with 200 kg. of extra weight in the car.

Hypothesis: The scientist believes that *if* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*then*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Situation 2**

An air force engineer wants to see if salt will reduce the amount of ice and snow buildup on the runway. She spreads 200 lbs of salt on a test runway and simulates an airplane landing by using test equipment. She then repeats the test on a runway without applying salt.

Hypothesis: The scientist believes that *if* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*then*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Situation 3**

Three detectives want to see if different smells travel at the same speed. They spray a can of hairspray, peppermint air freshener, and insect repellent at the same time. Six friends stand around them in a large circle, five feet from the center of the circle where the three detectives stood.

Hypothesis: *If* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Hypothesis is due on: **SEPTEMBER 14th**

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Science Fair TOPIC/PROBLEM STATEMENT

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(test/independent variable)

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(outcome/dependent variable)

HYPOTHESIS

The scientist believes that *if* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*then*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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VARIABLES

1. The **constant** variables (all of the factors or conditions that will be kept identical for all of the trials) will be

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1. The **independent (test) variable**, which will be changed and tested is

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1. The **dependent (outcome) variable**, which will be observed and measured, and will change as a result of the experiment, will be

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1. The **control**, which will receive NONE of the independent variable will be

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Due on: **SEPTEMBER 14th**

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MATERIALS

List all the materials necessary to complete the experiment – be SPECIFIC (**include amounts**, **size**, **type** – remember everything needs to be in **metric units**). If you have more than 10 items add numbers.

1. 6.

2. 7.

3. 8.

4. 9.

5. 10.

PROCEDURES

Write in order and be **specific**. Write as many steps as necessary to perform the experiment.

1.

2.

3.

4.

5.

6.

7.

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12.

13.

14. Due on: **SEPTEMBER 19th or 20th**

Background Information Guidelines

* Must be 3-5 typed pages
* Must be double spaced
* Font must be 12 pt (Arial or Times New Roman)
* Must have 1 inch margins all around
* Must include bibliography (use [www.easybib.com](http://www.easybib.com))
* Must have at least 3 different resources (books, journal, encyclopedias, internet)
* Must follow correct grammar and punctuation

PLAGIARIAM: to use and pass off (the ideas or writings of another) as one’s own. Do not do this, it is illegal and you will receive a zero on your project for doing it.

Background Information and bibliography are due on: **OCTOBER 26th**

Data Table

“Type Title Here”

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Manipulate/Independent  Variable  X-axis | Dependent/Responding Variable  Y-axis  Trials | | | Mean= average Dependent variable  “enter units here” |
| 1 | 2 | 3 |
|  |  |  |  |  |
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| Control goes here |  |  |  |  |

Blank Data Table without date: Due **SEPTEMBER 19th or 20th**

Data Table with data and Graphs are due on: **OCTOBER 31st or NOVEMBER 1st**

Constructing Graphs

Graphs are a useful tool in science. The visual characteristics of a graph make trends in data easy to see. One of the most valuable uses for graphs is to “predict” data that is not measured on the graph.

|  |  |  |
| --- | --- | --- |
| Step | What To Do | How To Do It |
| 1 | Identify the variables | 1. Independent Variable- (controlled by the experimenter)  * Goes on the X-axis (horizontal) * Should be on the left side of a data table  1. Dependent Variable- (changes because of the independent variable)  * Goes on the Y-axis (vertical) * Should be on the right side of the data table |
| 2 | Determine the variable range | 1. Subtract the lowest data value from the highest data value 2. Do each variable separately |
| 3 | Determine the scale of the graph | 1. Determine a scale (the numerical value for each square)that best fits the rage of each variable 2. Spread the graph to use MOST of the available space |
| 4 | Number and label each axis | This tells what data the lines on your graph represent. |
| 5 | Plot the data points | 1. Plot each data value on the graph with a dot 2. You can put the data number by the dot, if it does not clutter your graph |
| 6 | Draw the graph | 1. Draw a curve or a line that best fits the data points 2. Most graphs of experimental data are not drawn as “connect-the-dots” |
| 7 | Title the graph | 1. Your title should clearly tell what the graph is about 2. The title of your graph is often the same as the title of your table 3. If your graph has more than one set of data, provide a “key” to identify the different lines. |

Completed Graphs and Tables with Data are due on: **OCTOBER 31st or NOVEMBER 1st**

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DATA TABLE

BLANK DATA TABLE w/o data: Due **SEPTEMBER 19th or 20th**

DATA TABLE w/ DATA: Due **OCTOBER 31st or NOVEMBER 1st**

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GRAPH

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GRAPH w/ DATA: Due **OCTOBER 31st or NOVEMBER 1st**

CONCLUSION

Remember the conclusion must be written in the past tense because you have already finished the experimentation. The following questions need to be answered in paragraph format:

1. What was investigated?
2. Was the hypothesis supported or not supported by the data?
3. What were the major findings?
4. How did your findings compare with other researchers?
5. What possible explanations can you offer for any errors in your findings? Can you identify any bias in your investigation?
6. What recommendations do you have for further study and improving the experiment?
7. What are some possible applications of this experiment?

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Conclusion due on: **NOVEMBER 2nd**

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PRACTICAL APPLICATION

How can your project be applied in the real world?

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RESULTS

The results of the experiment \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ support the hypothesis.

(did or did not)

Conclusion, Practical Application and Results due on: **NOVEMBER 2nd**

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ABSTRACT

The problem was\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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It was hypothesized that if\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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The procedure followed was: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (Write in paragraph format)

I concluded that\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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The results of the experiment\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_support the hypothesis.

Abstract: due **NOVEMBER 9th**

SCIENCE FAIR REPORT CHECKLIST

This report is placed at the base of your project board.

\_\_\_\_\_\_\_ Cover page and Heading

\_\_\_\_\_\_\_ Table of contents: list form with page numbers.

\_\_\_\_\_\_\_ Scientific title: The effect of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_\_\_ Problem: Question form---- What is the effect of \_\_\_(Indep. Variable)\_\_\_\_\_\_\_\_\_\_\_\_\_ on

\_\_\_\_\_(Dep. Variable)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_?

\_\_\_\_\_\_\_ Hypothesis: It is hypothesized that if \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ then

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_\_\_ Variables: Independent, Dependent, Control, Constants

\_\_\_\_\_\_\_ Materials: be very specific and use the metric system

\_\_\_\_\_\_\_ Procedures: be very specific, include taking pictures, include trials.

\_\_\_\_\_\_\_ Data: Table (needs title, units, include three-five trials, mean)

\_\_\_\_\_\_\_ Data: Graph (needs title, axis labeled, units, ----either 4 graphs---one for each trial

and one for the mean or 1 graph----that contains all of the trials and mean)

\_\_\_\_\_\_\_ Results: Discuss the findings, what numbers did you obtain? Discuss the data

obtained for the mean.

\_\_\_\_\_\_\_ Conclusion: follow the format given to you.

\_\_\_\_\_\_\_ Practical Application: what real application does your project have in real life?

Who would be interested in knowing about your findings, and why?

\_\_\_\_\_\_\_ Abstract: follow the format given to you.

\_\_\_\_\_\_\_ Background Information Paper: 3-5 pages

\_\_\_\_\_\_\_ Bibliography: minimum 3 references

\_\_\_\_\_\_\_ Science Fair Packet at your LOG BOOK (rough draft)

Science Fair Report and Project is due on: **NOVEMER 14th or 15th**

Sample Science Fair Project Board Set-up

**Helpful Hints:**

* **Take photographs**: Many projects involve elements that may not be safely exhibited at the fair, but are an important part of the project. Photographs should be taken of important parts/phases of the experiment to use in the display.
* **Be organized**: Make sure the display is logically presented and easy to read. A glance should permit anyone (particularly the judges) to locate quickly the title, experiments, results, and conclusions.
* **Eye-catching**: Make the display stand out. Use neat, colorful headings, charts, and graphs to present the project. Pay special attention to labeling, graphs, charts, diagrams, and tables. Each item must have a descriptive title. Anyone should be able to understand the visuals without further explanation.