# Science Fair Project

September 11, 2015
Dear Families,

It's time for Science Fair Projects. This packet contains information that will be helpful to you while supervising your child's science fair project. Projects need to be displayed in a 3 pronged folder. **Your child will not be required to do a board unless his/her project is selected as one of the 5 top projects of his/her class.** The project (folder) is **due on Thursday December 3, 2015**. **If your child is chosen then project boards are due by Monday, December 7, 2015.**

**Here are some ways that you can help your child complete the project:**

- ✓ Supervise and use resources to ensure safety.
- ✓ Ask questions instead of giving answers:
  - Questions place the responsibility on your child.
  - Questions help your child explore dimensions of the problem.
  - Questions draw solutions from your child.
  - Questions communicate trust and confidence.
  - Questions help anticipate probable outcomes of different choices.
- ✓ Use these questions to guide self-evaluation in your child:
  - What do you want to happen?
  - Do you think doing this will get you what you want?
  - What other ways might you try?
- ✓ Be interested, encouraging, and positive.
- ✓ Explain concepts that are difficult to understand.
- ✓ Structure work time. Try to use the pace of the suggested timeline.
- ✓ Purchase any necessary materials.

Thank you for being a valued partner in your child's education. It is important for us to work together to make this a successful experience for your child.

Appreciative,
4th and 5th Grade Teachers

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Cut and Return to school by Friday, 9/15/15

I understand that my child is required to do a Science Fair Project and I have reviewed the Science Fair Project Informational Packet. **The project is worth 1 Test Grade.**

Student Name _____

Parent Signature _____

# 2015-2016 Science Fair Project Time Line

**Science Fair Notebook** **Due Date: Thursday, December 3rd**

Often, students wait until the weekend before the due date to complete the project. This creates a nightmare for the parent and student and many times the project is of poor quality. We would like this to be a positive learning experience for the student. Below is a table to use as a guide for completing the project in a timely manner.

| Due Date | Part of Science Fair | Completed | In Progress | Parent Signature |
|---|---|---|---|---|
| 9/30/2015 | Decide on a Topic | | | |
| 9/30/2015 | Problem | | | |
| 10/14/2015 | Research | | | |
| 10/14/2015 | Hypothesis | | | |
| 10/21/2015 | Materials | | | |
| 10/23/2015 | Procedures (Don't forget to include variables) | | | |
| 11/18/2015 | Testing Completed | | | |
| 11/18/2015 | Data Collection (Data Table & Graphs/Chart) | | | |
| 11/18/2015 | Conclusion | | | |
| 11/27/2015 | Put Notebook Together | | | |
| **Thursday, 12/3/2015** | **Project Due Date** | | | |

# Science Fair Project Grading Rubric

Project Title : _____ Student : _____

| **Project (Notebook)**<br>**0**=does not appear **1**=attempt made **2**=fairly addressed<br>**3**=adequately addressed **4**=addressed completely<br>**5**= Superior | Points Awarded | |
|---|---|---|
| **Title** reflects theme of project. | | |
| **Research Essay** | | |
| **Bibliography** (must include 2 sources) | | |
| **Problem** is stated as an open-ended question. | | |
| **Hypothesis** was supported by knowledge gained by research. | | |
| **Procedure**<br>a: lists all steps | | |
| b: minimum of three trials | | |
| c: uses metric measures | | |
| d: Independent Variable, Constants, and Control Group Identified | | |
| e: safety precautions given | | |
| **Materials** are listed specifically | | |
| **Results**<br>a: includes a data table | | |
| b: includes appropriate chart or graph | | |
| **Conclusion** (includes all six elements) | | |
| **Format**<br>a: neat and attractive | | |
| b: all components present and labeled | | |
| c: reflects student's work | | |
| **Comments** | | |
| Score out of 85 possible points: | Points | Grade |

# Science Fair Project Information

**Decide on a Topic:**

What are you interested in? Make an observation on something you are interested in. What is one variable that you could change to do an experiment with? Use the following brainstorming organizer to help you.

Step 1: What are you interested in and going to observe? _____

Step 2: Make observations of it.

Step 3: What are some things that I could change or vary?

_____

Step 4: Things I could measure or observe:

_____

Step 5: Choose variables for your experiment:

I will change [ ] on purpose. This is my **independent variable**.

I will measure the [ ] to get my results of the experiment.

I will keep all of the following (**constants)** the same to make my experiment fair:

_____

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## Problem

This is what your project is about, stated as a question. It should be written as an open-ended **question,** not just answered with a yes or no.

You can use the following formats:

How does _____ affect the _____ of a _____?

Independent — What you are

Examples: How does the amount of sunlight affect the growth rate of a plant?

How does the wing shape affect the flying distance of an airplane?

**OR**

What is the effect of _____ on the _____ of _____?

Independent — What you are

Examples:

What is the effect of water temperature on the dissolving rate of food coloring?

What is the effect of storm water runoff on the water clarity of Lake Panasoffkee?

**You aren't limited to these formats; however, the problem MUST be open-ended.**

**RESEARCH (WRITTEN REPORT)**

Read at least 2 books or articles related to *the topic* to give you background information. Summarize the information that you read. The report must be at least one page (handwritten). You may type it if you want. You must include a bibliography (the format for this is included in the back of this packet).

## HYPOTHESIS

This is a 1 sentence prediction of what you think will happen when the experiment is completed. Use the research to help you write the hypothesis. Avoid statements like "I think" and "I predict". Make sure you tell why (using "because") you think this is going to happen. You may choose one of the following formats:

If _____ then_____ because _____.

Examples:

- If I place the plant outside in direct sunlight then it will have the fastest growth rate because plants need sunlight to help make their own food.
- If I drop food coloring in hot water, it will have the fastest dissolving rate because the particles in hot water move the fastest.

OR

_____ will _____ because _____.

Examples:

- The plant placed outside in the direct sunlight will have the fastest growth rate because plants need sunlight to help make their own food.
- The food coloring will dissolve fastest in hot water because the particles in hot water are moving the fastest.

## MATERIALS

List very specific information about the materials, equipment, & measurement tools being used.

## PROCEDURE

**Step-by-step directions-** written clearly and specifically. A good procedure is very detailed – like a good recipe. This makes it easy for other scientists to duplicate your experiment so they can verify your results.

**The procedure steps should be listed like the following:**

1.
2. (etc...)

*Use **METRIC MEASUREMENTS**.* *Repeat the experiment at least **3 times (trials)**

* **List safety precautions***

**List the following information below your step-by-step directions)**

A) **Independent Variable**- This is what you are testing. It is the one part in the experiment being intentionally changed. There should only be one thing that you intentionally change. Example: amount of sunlight

C) **Constants-** These are the parts of the experiment that stay the same throughout all of the experiment. This keeps your experiment "fair" Example: types of plants, initial height of plants, amount of water given to plants

D) **Control/Control Group:** Most experiments have this. This is a standard against which change can be measured. This is the group that doesn't get exposed to the independent variable. (Example: No sunlight)

## RUN YOUR EXPERIMENT

Run your procedure carefully to ensure fair, scientific testing. While testing, record all of your data in a data table. Be accurate and exact as you observe, measure, describe, count, and/or photograph. Work safely.

## RESULTS

This is a detailed description of what was observed and what was measured during all 3 trials (label all 3 trials and average) of the experiment. This should be placed in an organized data table. **The data table should be drawn prior to conducting the experiment.**

Example of Data Table:

| | **Total Plant Growth During 1 Month Period (in cm)** | | | |
|---|---|---|---|---|
| | Trial 1 | Trial 2 | Trial 3 | Average Growth |
| 10 Hours of Direct Sunlight | | | | |
| 7 Hours of Direct Sunlight | | | | |
| 3 Hours of Direct Sunlight | | | | |
| No Sunlight (Control Group) | | | | |

Once you have organized the data into a data table, you must create **a graph (bar, line, or circle) or chart** to visually represent the data. Show the results of what happened in Trial 1, Trial 2, and Trial 3 and an average of them on a graph or chart. Include a key or legend. Don't forget to identify all 3 trials. The data will help you decide whether your hypothesis is supported or not.

## CONCLUSION

This is a summary of the results of the experiments. There are certain elements that should be included. Please use the ***6 Elements of a Good Conclusion*** to help you.

# 6 Elements of a Good Conclusion

When writing a conclusion to an investigation or experiment, you need to answer the following questions in paragraph form:

1. What was investigated?

Sentence Starter: Through this experiment, I was trying to find out...

2. Was your hypothesis supported by the data or observations?

Sentence Starter: I thought _____ would happen; therefore my hypothesis was supported/not supported.

3. What were your major findings?

Sentence Starter: I was surprised to see that... **OR** Like I thought,... (use data and observations to describe what happened)

4. What explanations can you offer for your findings?

Sentence Starter: I think the reason that this happened was because...

5. What recommendations do you have for further study or for improving the experiment?

Sentence Starter: If I were to do this experiment again, I would change how... **OR** Now that I know this, I would like to find out if...

6. What are some possible applications of the experiment?

One way that I could use this knowledge is by...

# Notebook Requirements

- The notebook should be made from a 3 pronged folder.
- The notebook should be organized and follow the format given in the Science Fair Packet.
- The notebook should be **written in your best handwriting or typed.**
- The following pages show the format that your notebook should follow.

**Your notebook should be organized as follows:**

| | **Example Pages** |
|---|---|
| **Page 1 will be your cover page** | 2015-2015<br>Science Fair Project<br>Notebook<br><br>By: |
| **Page 2 will be your Title Page** | (Create a Title for your project. Should be creative and reflect the topic of your project) |
| **Page 3 will be your Table of Contents** | Table of Contents<br>Subject Page #<br>Research Report…… 1<br>Bibliography……..<br>Problem……<br>Hypothesis……..<br>Materials……..<br>Procedures……..<br>Results……..<br>Conclusions……..<br>Pictures (if taken)……. |
| **All remaining portions of your notebook are listed in the example Table of Contents above.** | |

# Bibliography Format

Note: If you cannot find part of your entry, like the author of a website, SKIP that part! Do not write "Unknown." Everything on your Works Cited page should be double-spaced, and all of your sources should be listed in alphabetical order by the first word (or name) in the entry. Dates are written like this: 19 Oct. 2008. (day, month abbreviated, year).

**A book by a single author**

Author. Book Title. Place: Publisher, Year.
Example: Jones, Barry. Sleepers, Wake!: Technology and the Future of Work. New York: Oxford UP, 1995.

**A book by two or more authors**

Author, and other author. Book Title. Place: Publisher, Year.
Example: Cole, George F. and Christopher E. Smith. Criminal Justice in America. Belmont, CA: Wadsworth Pub. Co., 1996.

**An article in a reference book**

Entry author. "Entry Title." Book Title. Book author/editor. Place: Publisher, Date.
Example: Fabri, Marcel Y. "Population." Collier's Encyclopedia. New York: Collier's Publishing, 1996.

**An article in a magazine**

Author. "Article Title." Magazine Title. day mon. year: page numbers.
Example: Mukerjee, Madhusree. "Wall Street: Refugees from Physics." Scientific American. Oct,1994: 126-127.

**Material from a CD-Rom**

"Article." CD-Rom Title. CD-ROM. Place: Publisher, Date.
Example: "Picasso, Pablo." The 1997 Grolier Multimedia Encyclopedia. CD-ROM. Danbury: Grolier, 1997.

**WWW Sites**

Author. "Title of Web Page." Site Sponsor. Date of last update. Date you went to the site. <Full http address>.
Example: Dixon, Geri. "South Sumter Middle School Website." Sumter County School Board. 25 Aug. 2008. 10 Sept. 2008.
<http://www.sumter.k12.fl.us/schools/ssm>.

**Personal Interview**

Name. Personal interview. day mon. year.
Wilson, Andrea. Personal interview. 13 Aug. 1999.
If you used a source that is not listed here, see your teacher for more information about that type of source.

# The Metric System

Scientists use the metric system, or the International System of Measurement. The metric system uses different base units for type of measurement. The base units and the type of measurement they are used for can be seen in the following table:

| Type of Measurement | Metric Unit and Symbol | Tool Used to Measure |
|---|---|---|
| Length | Meter (m)<br>Centimeter (cm)<br>Millimeter (mm) | Meter stick<br>Ruler<br>Tape Measure |
| Volume of a Liquid or Powder | Liter (L)<br>Milliliter (mL) | Graduated Cylinder<br>Metric Measuring Spoons |
| Volume of a Solid | Cubic Meter ($m^3$)<br>Cubic Centimeter ($cm^3$) | Meter stick<br>Ruler<br>Tape Measure |
| Volume of a Irregular Shaped Solid | Milliliter (mL) | Graduated Cylinder |
| Mass | Grams (g)<br>Kilograms (kg) | Balance |
| Weight | Newtons (N) | Spring Scale |
| Time | Second (s) | Stopwatch or other timer |
| Temperature | Degrees Celsius (°C) | thermometer |

# Science Fair Glossary

1. **Problem**- what you are trying to investigate. Should be written as an open-ended question.

2. **Hypothesis**- what you think will happen in your experiment. Make sure you tell why (because) you think this will happen.

3. **Procedures**- step-by-step list of what to do to perform the experiment. Be sure to include variables and at least 3 trials. Make sure your measuring in metric units.

4. **Variables-** information that can be changed.

5. **Independent Variable**- the one variable that you have changed in your experiment; What did you purposefully do different?

6. **Constants-** the variables that are the same throughout the experiment.

7. **Control / Control Group-** used for comparison, not found in all experiments.

8. **Observation-** information gathered through your senses or technology.

9. **Data-** information collected.

10. **Quantitative Data-** information gathered using measurement & numbers.

11. **Qualitative Data-** information that is gathered using the senses.

12. **Data Table-** used to organize and collect data; graphs are created from it.

13. **Line Graph-** used to show information over time.

14. **Bar Graph-** used for comparison of amounts.

15. **Inference-** a conclusion based on an observation.

16. **Conclusion-** decision based upon the results of the experiment. Use the "6 Elements of a Good Conclusion" to help you write it.

# Science Fair Websites

If you are struggling to come up with an idea for your experiment try looking at a few of these websites. There are a lot of great ideas!

1.) Science Buddies

http://www.sciencebuddies.com/

2.) Science Fair center -

http://www.sciencefaircenter.com/science_fair_planning.tpl?cart=11249928173913392#1

3.) Science Fair center for nonscientist parents

http://www.sciencefaircenter.com/science_fair_basics.tpl?cart=11249928173913392

4.) What Makes a Good Science Fair Project?

http://www.usc.edu/CSSF/Resources/?Good_Project.html

5.) Discovery School.com –

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

6.) Elementary Projects -

http://www.cdli.ca/sciencefairs/elem.html

7.) IPL – Science Fair Resource Guide -

http://www.ipl.org/youth/projectguide/displayingyourproject.html

8.) Successful Science Fair Projects –

http://faculty.washington.edu/chudler/fair.html

9.) Agricultural Ideas for Science Fair Projects -

http://www.ars.usda.gov/is/kids/fair/ideasframe.htm

10.) Creating a Graph for your display –

http://nces.ed.gov/nceskids/createagraph/default.aspx