Science Fair Projects
The Scientific Process

- Title/ Problem Statement
- Research
- Hypothesis
- Materials/Equipment
- Procedure
- Variables/Constants
- Controls
- Data (minimum 3 trials)
- Results
- Conclusion
- Application
- Abstract
- Log Book
- Bibliography
Title/Problem Statement

- **Problem Statement**: What do you want to find out? It should be in the form a question.
- You must be able to measure the experiment each day.
- Title summarizes the project
- Make the title catchy!
 EXAMPLES

Poor Problem Statement:
What affects the life of cut flowers?

Better Problem Statement:
How does sugar affect the life of cut flowers?
Hypothesis

An educated guess about the problem statement based on research and prior knowledge.

What do you think might happen?
Write as an “If…, then…” statement
Ex: If sugar is added to the water, then the cut flowers will live longer.
Materials

A vertical list of qualitative and quantifiable materials used to perform the experiment—using the metric measurement

Ex:
10 g sugar
50 ml distilled water
6 cut carnations
1 metric measuring cup
Procedures

• A step-by-step description of the experiment. Remember, the idea behind the procedure is to allow another scientist to replicate the experiment.

• Begins with an action word/verb

• Example: 1. Mix 10g of sugar with 50ml of distilled water.
Variables
(Not for 2\textsuperscript{nd} grade)

Variables – the part of the experiment you change. Displayed in a list form

2 types:

1- Independent variable (manipulated)- the one you control or are changing.
   
   Ex: the sugar

2- Dependent Variable (responding)

   Ex: the number of days the carnation lived
Constants
(Not for 2\textsuperscript{nd} grade)

• The constants are things that stay the same throughout the experiment. Displayed in a list form

• Example:
  – Room temperature
  – Sunlight
  – Location of flowers
  – Amount of water
Controls

**Controls** – the part of the experiment you do not change so that you can compare the results of your test.

*Ex: the cut flower which was not given sugar*
Data

Record observations using a measuring tool
Ex: metric ruler, Celsius thermometer, balance

Design a data table to keep track of your results.
Ex: graphs, charts, written summaries and photographs (no faces in the photographs).
Results – State the findings of the experiment based on the data you collected and analyzed.

*How does sugar affect the life of cut flowers?*

**Ex:** The data revealed that the carnations given sugar lived “x” amount of days longer than the carnations given no sugar.
Conclusion

Conclusion – Compare your results with your hypothesis. The conclusion should answer the following questions:

• What was investigated?
• Was the hypothesis supported/not supported by the data?
• What were the major findings?
• Why did this happen?
• How can the experiment be improved?
• What recommendations do you have for further study?
Application

**Application** – state how the project and its results will be beneficial and who might benefit from this research. What field of study or persons could benefit from the information gained from this experiment.
Abstract

Abstract: a short summary of the entire project. (no more than 250 words)

Paragraph 1—Purpose of the experiment. Describe the purpose and hypothesis.
Paragraphs 2—Procedures used. Summarize the key points of the procedure and how the investigation was conducted. Do not list materials.
Paragraph 3– Observation/Data/Results. Describe and explain the key results that led directly to the conclusions drawn. Graphs should not be displayed.

Paragraph 4– Conclusions. Should be described briefly. The summary paragraph should state some possible applications and extensions.
Log Book

- Composition Notebook that is used to record all of their information, with every step of the project.
- A daily log with their observations of the experiment.
- To be turned in with the project.
Bibliography

*(THIS IS NOT A SECTION ON THE DISPLAY BOARD)*

• Placed in the Report
• Put your bibliography of at least 5 different sources on the same page
• Refer to page 9 of the student packet for MLA format for citations.
• [http://www.citationmachine.com](http://www.citationmachine.com)
Report

This is a short summary of the entire project. Includes the following:
Title page
Table of Contents
Introduction
• Problem Statement
• Background information
• Hypothesis
• Explanation of what prompted the research and what you hoped to achieve.
• Encourage Participation
• Monitor Due Dates
• Support Research Efforts
  – Visits to the library
  – Internet research
  – Interviews
Things Parents Can Do

• Help Secure Materials
• Brainstorm with your child
• Supervise experiments
• Contact the teacher
Things Not To Do

- Don’t do the work for your child
- Don’t focus on winning
- Don’t copy a project
HAVE FUN