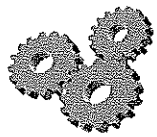
Mandatory for ALL NPUSC 4th Graders

Science and Engineering Fair

December 12-13, 2016

Important Information Packet



This packet will tell you some important guidelines.
Read and follow them carefully!

Some important things to think about: (Pages 1 - 2)

Also:

- A simple experiment is often better than a complicated one.
- Your experiment must use safe materials in a safe way.
- We cannot guarantee the safety of equipment. Avoid a topic that needs expensive equipment.

A Science Fair project has several parts. (Pages 3-5)

- A report giving background information about the topic
- A question about the topic
- A prediction of what you think the answer might be (hypothesis)
- A plan for testing (experimenting) to find the answer to your question
- A record of the data you collect when you do the experiment
- A graph or chart with a written explanation of your results
- A conclusion
- An exhibit to show all of this to people who come to the science fair

The 4th Grade Science Fair is competitive. First place in each category **will be selected to represent NPUSC at the Regional Science Fair at Notre Dame on March 4, 2017.**

Students must do the projects themselves. Parents or adults may help and advise, but the student is responsible for the work.

2016 Science and Engineering Fair Timeline

By this date	Have this completed
Week of Oct.3	**Science fair information goes home.**
Oct.3-Dec.11	Conduct your experiment and collect data.
Nov. 11	**ALL FORMS are DUE!!!**
Dec. 12	**ALL PROJECTS DUE by 4:30 p.m. CST-no exceptions**
Dec. 13	All FOURTH Graders to the gym to be judged. Third and Fifth grade will present as well. K-1-2 will be called to present if the judges need clarification.
Dec. 13	Bring your parents and friends to see the exhibits from 4:30-5:30 p.m. CST You will take your project home at the end of public viewing at 5:30 p.m. CST

Science and Engineering Fair
IMPORTANT PARTS

1. **Question:** You are investigating a question. You are not building things or demonstrating things. Each science fair project must test something, show data to prove something, and be clearly presented. Most experiments involve measuring differences when one variable is changed.

2. **Hypothesis**: Write a complete sentence telling what you think will happen and why you think it will happen. The hypothesis should be completed before you begin the experiment. It is OK if your experiment proves that the hypothesis was incorrect.

3. **Materials:** List everything you use during your experiment.

4. **Procedure (plan):** List step-by-step instructions. Number the steps. Do not write a paragraph. Make a list.

5. **Data:** As you do your experiment, record your results as a tally chart or other way of recording. This is not a paragraph.

6. **Results:** Explain your data in words and with a graph, if possible. Do not tell the conclusion in this section.

7. **Conclusion:** Write one or more paragraphs to clearly explain the results. This is the answer to the question you asked at the beginning. You may add what you would do differently another time, why this is important, or other ideas about the experiment.

Students must do the projects themselves. Parents or adults may help and advise, but the student is responsible for the work.

Variables

Every Experiment should have the three different variables listed/described below:

Scientists use an experiment to search for cause and effect. There are many items that could be altered to test the reaction of another. These changing quantities are called **variables**. A variable is any factor, trait, or condition that can exist in differing amounts or types. An experiment usually has three kinds of variables: independent, dependent, and controlled.

The **independent variable** is the one that is changed by the scientist. To insure a fair test, a good experiment has only **ONE** independent variable. As the scientist changes the independent variable, he or she records the data that they collect.

The **dependent variable** is the item that responds to the change of the independent variable. The dependent variable depends/changes when the independent variable is changed.

For example, if you open a faucet (the independent variable), the quantity of water flowing (dependent variable) changes in response--you observe that the water flow increases. The number of dependent variables in an experiment varies, but there is often more than one.

The **controlled variables** are quantities/items that you want to remain constant, and must observe them as carefully as the dependent variables.

For example, if we want to measure how much water flow increases when we open a faucet, it is important to make sure that the water pressure (the controlled variable) is held constant. That's because both the water pressure and the opening of a faucet have an impact on how much water flows. If we change both of them at the same time, we can't be sure how much of the change in water flow is because of the faucet opening and how much because of the water pressure. In other words, it would not be a fair test. Most experiments have more than one controlled variable. Some people refer to controlled variables as "constant variables." In a good experiment, the scientist must be able to **measure** the values for each variable. Weight or mass is an example of a variable that is very easy to measure. However, imagine trying to do an experiment where one of the variables is love. There is no such thing as a "love-meter." You might have a **belief** that someone is in love, but you cannot really be sure, and you would probably have friends that don't agree with you. So, love is not measurable in a scientific sense; therefore, it would be a poor variable to use in an experiment.

(http://www.sciencebuddies.org/science-fair-projects/project_variables.shtml)

Science and Engineering Fair
Experiment Form to Help You Be Organized

Experiment Question:

Hypothesis (Predicted Answer):

Experiment Plan:

Equipment and Materials:

Data: Make a tally chart or other record of what happened in the experiment.

Results: Make a chart or graph to show your data, then use words to describe it. You may also include other observations that might be important.

Conclusions: Answer the Experiment Question in one or two paragraphs. Be sure to support your answer with information from your experiment.

Science and Engineering Fair: The Exhibit

The exhibit must be on sturdy tri-fold cardboard and must stand-alone. It should be about three feet tall and about the same width.

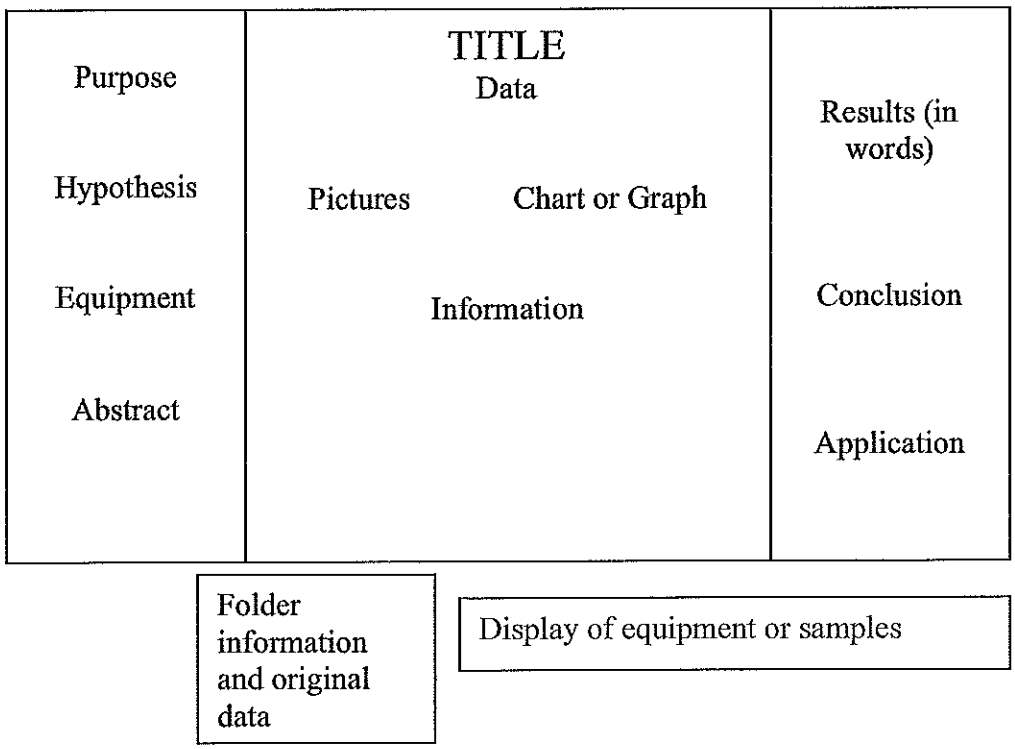
You may purchase a science and engineering fair poster board at school. Or you may choose to purchase your own science fair poster board at United Art and Education (Indian Ridge Plaza) or elsewhere.

The completed poster should be neat and attractive. If at all possible, the information should be typed (neatly printed in ink is OK). Graphs should be on graph paper or computer generated (student work – not a parent's!!)

Colored paper backing makes a nice-looking frame for each section, but is not necessary.

The most important part of the exhibit is the student's understanding and interest in the topic. Please practice at home so you will be able to answer any questions that the judges may have!

A poster layout suggestion:



Building an Abstract

The **1st** sentence should restate the purpose of your experiment. What was your question, why did you want to learn more about this topic?
The **2nd** sentence should restate your hypothesis. What did you think was going to happen?
The **3rd** sentence should tell whether or not your hypothesis was correct, incorrect, or inconclusive (you need more experimenting/information to know).
The **4th – 5th** sentences summarize your procedure. How did you test your hypothesis, what was your control? Use sentences please, no lists!
The **6th – 8th** sentences summarize your data. Use sentences to explain what you found out. This includes any measurements or observations made during the course of your experiment. No opinions, just the facts!
The **9th – 10th** sentences summarize your conclusion. What do you think the data means? Be sure to mention any data that supports your conclusion and whether or not your conclusion supports your hypothesis.