

St. Anne Science Fair  
January 25-26<sup>th</sup>, 2014  
7<sup>th</sup> and 8<sup>th</sup> grade  
2013-14

**Scientific method:** The tool that scientists use to find answers to questions. It is the process of thinking through possible solutions to a problem and testing each possibility for the best solution. The scientific method involves the following steps: doing research, identifying the problem (these first two steps can be alternated), stating a hypothesis, conducting experiments and/or investigations, collecting data and researching a conclusion.

**Research:** Research is the process of collecting information from your own experiences, knowledgeable sources and data from other exploratory experiments. Your first research will be used to select a topic. This is typically called topic research and it is one of the most important steps when starting your science fair project. Topics should be selected based on interest and experience. This is your time to test something that you are interested in, however, make sure that the topic you select is something that can be tested at home and does not require materials or testing equipment beyond your budget and experience.

**Research step 2:** Once your topic is selected you begin what is called project research. This is research to help you understand the topic, express a problem, propose a hypothesis and design one or more experiments to test your hypothesis.

**Problem:** The problem is the scientific question to be solved. It is best expressed as an "open-ended" question, which is a question that is answered with a statement, not just yes or no. For example, "How does light affect the reproduction of bread mold on white bread?" Be sure to find a problem that can be solved experimentally.

**Hypothesis:** The hypothesis is an idea about the solution to a problem, based on knowledge and research. While the hypothesis is a single statement, it is the key to a successful project. All of your project experimentation and testing will be performed to test your hypothesis. The hypothesis should then make a claim about how two factors relate. The two relating factors in the example are light and bread. For example, (referring back to the example problem) "I believe that bread mold does not need light for reproduction on white bread. I base my hypothesis on these facts: Organisms with chlorophyll need light to survive. Molds do not have chlorophyll. In my experiment, bread mold grew on white bread kept in a dark bread box."

**Experimentation:** Project experimentation is the process of testing a hypothesis. The things that have an effect on the experiment are called variables. There are three kinds of variables to be familiar with: independent, dependent and control. The independent variable is the variable that you purposely manipulate or change. The dependent variable is the variable being observed that changes in response to the manipulation of the independent variable. The variables that are not changed are the controlled variables. For example, the bread mold light experiment independent variable is the light and the dependent variable is the mold production. The control is a test where the independent variable is kept constant in order to measure changes in the dependent variable. In a control all factors are the same for each variable- your original setup- except for the independent variable. That is all conditions are the same so that the testing will only show changes in experiment that is directly associated with the independent variable. (All variable should be treated equally to ensure accurate observation and data based on the independent variable manipulation) Note: when designing the procedure of your experiment, include the steps for measuring the results.

**Conclusion:** The conclusion is a summary of the results of the project experiment and a statement of how the results relate to the hypothesis. Reasons for experimental results that are contrary to the hypothesis are included in your conclusion. Also, your hypothesis can end by giving ideas for further testing. If your results do not support your hypothesis: **Don't** change your hypothesis. **Don't** leave out experimental results that's do not support your hypothesis. **Do** give possible reasons for the difference between the results and your hypothesis. **Do** give ways that you can experiment further to confirm the results of your original experiment. Be sure to include data and procedure that either support or disprove your hypothesis. Remember, in science experimentation can

lead to incorrect conclusions. This does not mean that you did anything wrong or will get a lower grade because of the results. In science hypothesis will be either supported or refuted on a daily basis and it is a part of the scientific process.

### Categories

Astronomy: The study of the solar system, stars and the universe.

Biology: The study of living things.

- 1) Botany: The study of plants and plant life. Subtopics may include the following
  - a. Anatomy
  - b. Behaviorism
  - c. Physiology
- 2) Zoology: The study of animals and animal life. Subtopics may include the following
  - a. Anatomy
  - b. Behaviorism
  - c. Physiology
- 3) Ecology: The study of the relationship of living things to other living things and to their environment.
- 4) Microbiology: The study of microscopic living things or parts of living things.

Earth Science: The study of the Earth.

- 1) Geology: The study of the Earth, including the composition of its layers, its crust and its history. Subtopics may include the following:
  - a. Fossils
  - b. Mineralogy
  - c. Rocks
  - d. Seismology
  - e. Volcano logy
- 2) Meteorology: The study of the weather, climate and the Earth's atmosphere.

Engineering: The application of scientific knowledge for practical purposes.

Physical Science: The study of matter and energy.

- 1) Chemistry: The study of the materials substances are made of and how they change and combine.
- 2) Physics: The study of forms of energy and the laws of motion. Subtopics may include the following areas:
  - a. Electricity
  - b. Energy
  - c. Gravity
  - d. Machines
  - e. Magnetism

Mathematics: The use of numbers and symbols to study amounts and forms.

- 1) Geometry
- 2) Game theory
- 3) Probability
- 4) Statistics

All projects will be categorized into each appropriate area and prizes of first, second and third place will be awarded for each area. There will be one grand award given out to the overall best experiment.

**Lab Report:** Your project report is the written record of your entire project from start to finish. When read by a person unfamiliar with your project, the report should be clear and detailed enough for the reader to know exactly what you did, why you did it, what the results were, whether the experiment evidence supported your hypothesis and where you got your research information. Much of your report will be taken from your journal so the more organized you are the easier it will be to organize your thoughts to prepare your report. Science Fair Project Report

\* Using your notes you can easily prepare a project report, which explains what you did.

### **Title Page**

\*Your projects name (it can be in the form of a question) your name, topic, date and Research Paper

### **Table of Contents**

\*List the parts of your report (Introduction, Hypothesis and Research, Procedure/Experiment, etc) and the page numbers where they begin. You'll have to make this page after the others.

### **Introduction**

\*One paragraph that tells the whole story. One way to do this is to write a sentence for each idea in the scientific method. One for the purpose, one telling what experiment or test you did, etc.

### **Hypothesis and Background Research**

\*States your PURPOSE in more detail, what made you think of this project? Tell what you found out from the books or other sources you used to learn about your topic and be sure those sources are listed in your bibliography.

### **Procedure/Experiment**

\*List the materials you used and what you did. If drawings will make it clearer, draw on separate pages and put in this section. Explain in detail things you made.

### **Results**

\*Describe what happened, what you observed. Show your data, which can include diagrams.

### **Conclusion**

\*Describe your interpretation of your results. Look over your notes, charts, and log and write what you think your data shows. You can put your opinions here. Was your hypothesis (what you expected to happen) correct? Don't be afraid to say that you might have made a mistake somewhere. Great discoveries can come from what we learn from mistakes!

Be sure to state the limitations of your project. (For example, if your project was to find out something about dogs and you used your dog, you can say "My dog did this. This might not be the same for other dogs." You can't say that all dogs would behave the same as yours because you didn't check all dogs.)

### **Credits/References**

\*List of books, articles, pamphlets, people you talked to and any other sources you used for researching your idea and writing your paper. Sources

They are written or typed in this form:

Last name of author (or person you talked to), First name, "Title of article or chapter", Title of source (book title , magazine title or "Conversation"), Place where published: Publisher name, Date, volume: pages.

Examples:

Jones, Thomas A., "The Development of the Chick" Animal Development Magazine, June 1976, Vol. 16:27-34.

Peracchio, Laura, Telephone Conversation, Feb. 15, 1993.

Reports should be:

- Type written
- Double spaced
- 12 pt font

**Abstract:** The abstract is a brief overview of the project. It should be no more than 1 page and roughly 250 words. It should include the project title, a statement of the purpose, a hypothesis, a brief description of the procedure and the results. There is no one way to write an abstract, but it should be brief. An abstract must be included with your science fair project in order for it to be included in the judging. You will need several copies of your abstract (on your display board, for judges and for your teacher.) The abstract will be what judges will be referring to when making final decisions.

### Science Fair Project Tips for Parents

**Do** present a positive attitude about learning about science. You might admit that science may not have been your favorite subject when you were a kid, but the new science experiment books certainly look like science can be fun. Suggest selecting an experiment from a book and doing it together.

**Do** be encouraging.

**Do** spend time with your child discussing the project. If possible, have a scheduled "together time" for investigating all the "I wonder—" questions asked during the day.

**Do** make a conscious effort to observe and wonder about the science around you. Then use science books to further investigate and learn about the topics most interesting to your children.

**Do** make an effort to encourage your children to ask "I wonder" questions about the scientific world around them. Do this by asking them questions, such as "I wonder... Why is the sky blue?" or "I wonder...What causes a cake to rise?"

**Do** give your child time to give answers to your exploring questions. **Don't** be too quick to give an answer if you know it and don't be afraid to ask questions yourself. The fun part will be spending time with your children finding the answers in books.

**Do** keep a record of ideas you and your child discuss. You don't always have the time to stop and find answers to questions asked by children. Keep a journal with questions to be answered later.

**REMEMBER:** Your positive, supportive attitude will make this a fun learning experience. Your time together will be memorable.

### Organizer

Name:

Homeroom:

**Directions:** This is an information worksheet designed to help you become organized so that you will create a **QUALITY** science fair project. You should use this sheet help keep you organized along with working in your scientific notebooks.

- 1) My topic for research is...
- 2) My hypothesis is...
- 3) The outcome I believe I shall achieve is...
- 4) Instruments and equipment I will need for my experiment/research will include...
- 5) Steps involved in my procedure...
- 6) List of websites and sources...
- 7) Remember to use Noodle tools and Noodle Bib for your works cited/reference page.
- 8) Don't forget your title page, and be creative on your display boards.

**Science Fair Display Board**

**Order Form \$5/each**

**Name:**

**Homeroom:**

**Display board:      Yes / No**

**Color preference: Please # each choice from 1-3 (1 being first choice and 3 being last choice)**

**Red \_\_\_\_\_ Light Blue \_\_\_\_\_ White \_\_\_\_\_ Green \_\_\_\_\_ Purple \_\_\_\_\_ Pink \_\_\_\_\_**

**Please include \$5 cash or checks written out to Matthew Marion return by 11/25/13**

Projects due Friday January 24<sup>th</sup> for setup in the cafeteria.

\* Deadlines will be given periodically during the term to make sure students are continually working on projects/experiments.