Dear Parents,

Your child will take part in a science fair, an exciting event that encourages students to think like young scientists. During the next few months your child will be designing a science project that uses the scientific method to solve a problem. We hope you agree that the educational benefits are numerous, as students develop skills in writing, oral presentation, creative thinking, and problem solving.

Most of the work will be completed at home, and students will receive a schedule noting due dates for each part of the project. For suggestions on helping your child through this process — from choosing a topic to the final report-see the Web site "Parents — Get Involved" at http://discoveryschool.com/sciencefaircentral/scifairstudio/parents.html. For complete rules and tips go to http://sciserv.org/isef/primer/. A nice overview is here at the following website. I recommend you and your child check it out.
http://school.discovery.com/sciencefaircentral/scifairstudio/handbook/index.html

I ask that you encourage your child and monitor his or her progress along the way. Your support is key to a successful project, but please do not allow your involvement to extend any further in order to assure equity and promote student learning! It is important that your child wrestles with problems and try to solve them. Guide your child whenever and wherever you can, but let the final project reflect your child's individual effort and design. Also, keep in mind that a successful project need not be expensive.

Please let me know if you'd like more information on creating a successful science fair project. If you have any questions, do not hesitate to contact me. I look forward to watching your child enjoy this unique opportunity for scientific discovery!

Sincerely,

Mrs. Neubauer.

Science fair projects to avoid

- Which soap or stain remover works best
- Anything to do with Mentos and Coke
- Anything to do with soap in a microwave
- How does sugar or salt affect plant growth.

Science Fair Project

Your science project can cover any topic in science. It does not need to be directly related to your science course. Find a topic that suits you.

The follow information has been gleaned from the internet {http://www.middleschoolscience.org/projects.htm and others}. This information may prove helpful depending on the topic of your project.

What is a controlled experiment?
A scientific investigation in which variables are regulated is a controlled experiment. In its simplest form, a controlled experiment is done when the investigator consciously changes one variable (the independent or manipulated variable), which will likely cause another variable to change (dependent or responding variable). To the extent possible, all other variables are kept the same (constants).

A good *question* for a controlled experiment can usually be phrased in this form: How does one thing (independent variable) affect another thing (dependent variable)? Consider the following example: "How does the temperature of water affect the ability of sugar to dissolve?" We might do some *preliminary research* that tells us that, generally, an increase in temperature leads to increased solubility but there are exceptions. We could form a *hypothesis* from that preliminary research which might include the follow predictive statement "if we increase the temperature of water then more sugar will dissolve." The temperature of water is the *independent variable*. We can further define the *levels of the independent variable* by selecting discrete temperatures for testing, i.e., 0^{o}, 25^{o}, 50^{o}, 75^{o}, etc. We could further designate 25^{o} as our *control group* ($25\ ^{o}$ Celsius is a standard temperature used in many chemistry problems). Three levels is a bare minimum. We can measure the *dependent variable* by keeping a record of the number of teaspoons or the grams of sugar that dissolve in each sample of water. In order to get a fair test, you would want to keep all variables other than the temperature of the water *constant*: For example we would want to see if different amounts of sugar dissolve in the same amounts of water and in the same kinds of containers. It would not be fair if you used a small amount of cold water and a greater amount of hot water. The question could not be answered because we would not know if the higher temperature or the greater volume of water caused the differences in solubility. Lastly, because measurement is always imperfect and human error common, we would need to perform our experiment several times (*trials*), or use a large number of *samples* of each of the levels, and look for trends within the *data* collected in order to draw meaningful *conclusions*.

What is a fieldwork project?
A fieldwork project requires that students go out into the "field" to make observations and collect data. Jane Goodall comes to mind. Goodall spent many years in the field observing and collecting data on chimpanzee populations in Tanzania. In certain areas of science, fieldwork is a crucial part of scientific endeavor. Think of environmental science, geology, and animal behavior, just to name a few. These topics cannot be studied strictly in a laboratory setting. Scientists must go out and collect information about these topics in the "real world."

Our class will also have a written report that must be submitted by each student including the following sections (see table). Each section will be submitted separately according to the tentative schedule (see below). The sections will be graded and then returned with any comments for **revisions**. The paper will then be submitted as whole.

(Title Page) **Title** Name Date Class	**Abstract** An abstract is a paragraph or so summarizing the entire project (what you did and why, overall result, what it means).	**Introduction** Discuss science concepts as they relate to your topic, i.e. write a summary of preliminary research and include your hypothesis.	**Materials & Methods** Discuss procedure in narrative format (paragraph not a bulleted list), and include the materials used (quantities, temperatures, etc. as appropriate).
Results Present raw and processed data in table and graph format as appropriate. Make sure all tables and graphs are clearly labeled and appropriate to the data. **Include written summary**.	**Discussion** Analyze data to answer question, explain anomalies/discrepancies, and suggest further investigations. Include secondary research which is the gathering and comparative study of data collected by others. Additional evidence of student conceptual understanding in the form of diagrams, concept maps, etc.	**Conclusions** Conclusions should directly answer the question, addressing the hypothesis and conceptual understanding.	**Bibliography** List of sources. 5 for earth science 3 for life science

THINGS YOU WILL NEED

- ✓ **Time**. A good project will take about 2-3 months to complete. This *tentative* time line will give everyone time to complete a great project. You are encouraged to accomplish tasks ahead of schedule. Some projects will require more time than others.
- ✓ **NOTEBOOK**. It will be your science projects log. Everything you do for your project will be kept in your log. Keep it as neat as possible. You will use the information in this notebook to write your report. It will be handed into your teacher. It will be on display with your science project.

THE BASICS

- ✓ **Choose a Topic** (**September 21, 2011**)
  - You will be working on this for some time. Pick something that interests you.
- ✓ Do some preliminary research (**October 3, 2011**)
  - Find out what information already exists on your topic. Read books, magazines or ask professionals who might know in order to learn about the area of study**. Keep track of where you got your information.**
- ✓ Form a hypothesis (**October 10, 2011**)
  - A hypothesis is an explanation that is based on prior scientific research or observations and that can be tested by an experiment or observation.
  - **Turn in 1st draft of the 'Introduction' of the written report.**
- ✓ Design
  - Your experiment needs to be laid our exactly (**October 24, 2011**). Be prepared to go over the design with the teacher to make sure it is a controlled experiment or an adequate field study.
  - **Turn in 1st draft of Material & Methods.**
- ✓ Test the hypothesis
  - conduct an experiment or observation schedule (by **November 22, 2011**). Record data.

  Turn in 2st draft of Material & Methods of written report and some raw data.
- ✓ Formulate results (finished by **December 5, 2011**)
  - Do any calculations needed from your raw data to obtain the numbers you need to draw your conclusions. Summarize what happened verbally and in the form of a table of processed numerical data, or graphs.
  - **Turn in 1st draft of Results (i.e. what did your experiment yield) and revised drafts of the sections.**
- ✓ **Turn in 1st draft of Discussion and Conclusions (i.e. what did it all mean? January 9, 2012**)
- ✓ **Finished report due** including all necessary revisions from the first drafts, the abstract and the bibliography. (Finished by **January 18, 2012**)
- ✓
- ✓ Present your findings at the science fair (**February**)
  - Visually appealing
  - Easy to read at a distance
  - Large figures, etc

The Internet is full of useful sites

Name _____

Honor_____

The topic of my science fair is _____

_____

_____

I have read and understand the requirements for the science fair. I understand that various sections are due throughout the year. Writing revisions may be necessary.

The completed science fair PAPER is worth 1/3 of my grade in the 3rd marking period and each individual section is worth points in the 1st and 2nd marking periods.

I have shared this information with my parent/guardian.

Student Signature _____

Parent Signature_____