

GUIDELINES FOR THE LEARNING FAIR SCIENCE PROJECT

Why a Science Fair?

- Emphasis on using the scientific method
- Investigation by hands-on experimentation (inquiry-based learning)
- Development of critical thinking and research skills
- Opportunity for a positive learning experience
- Builds scientific confidence, and makes science fun and relevant
- Can spark interest in science or a specific field of science

Selecting a topic

This may be the most important part of the process, but one that often gets overlooked, and to which too little time is devoted. Remember, this is a project that you will be working on for the better part of three months. If you select a topic you enjoy and are interested in, the project will be fun! If you select a topic you have no interest in, the project can end up being a total headache. You will also have less motivation to get to the library or computer to do the work you need to do to turn in a quality project.

One aspect that is often a problem for students is that the title of the topic should be phrased in the form of an investigative question. The student should then be able to design an experiment using the steps of the scientific method to attempt to answer that question. Some questions are too difficult or too vague for 7th grade students to be able to answer by experimentation, or lend themselves more to models or demonstrations only. For example, the question, "How does a toaster work?" is a very good scientific question, however there is no independent variable involved, and it is difficult to answer via the scientific method. A question such as "Does human hair affect the growth of pea plants?" is better as a 7th grade student should be able to design an experiment to answer this question using the steps of the scientific method. All three variables are present here: independent (presence of hair), controlled (water, temperature, light, etc.), and dependent (height of plants, number of leaves, color).

All students who receive a 1st place or Grand Prize ribbon at the Learning Fair have the opportunity to advance to the Twin Cities Regional Science Fair. Because of this, and because the Regional Science Fair is only a few weeks after our learning fair, I have all students fill out the required Regional Science Fair paperwork, so that they are ready in case they are to go. Certain topics require more paperwork, and/or professional approval than do other topics. The extra work is not enough to prevent you from selecting a topic if you really want to do it, but keep it in the back of your mind. Topics for which extra paperwork/approval is required are as follows:

- Human subjects (even if they only take a survey)
- Non-human vertebrate animals (i.e. birds, hamsters, fish, lizards)
- Human or non-human vertebrate animal tissue (hair, blood, teeth, etc.)
- Pathogenic agents (i.e. bacteria, mold, fungi...I don't recommend these)
- Controlled substances (i.e. alcohol, tobacco, firearms)
- Recombinant DNA (I don't believe any of our students will tackle this)

Basic Information for the Written Science Project Material

A. Written Material

- i. **Typed** (if this is an absolute problem talk to me well in advance of the due date to make arrangements)
- ii. **Double-spaced** (except for Experiment), **one-inch margins** (this is standard), **12-point size, Times New Roman OR Arial font** (this is Arial)
- iii. Free of grammatical, spelling or punctuation errors

B. Organization

- i. Well organized; logical development of the subject
- ii. **NO PLAGIARISM** – This is a must! You cannot simply copy extended amounts of material from a resource word-for-word. Use note cards as directed below. If you put one fact on each note card you will be able to put the information into your own words when you go to organize and write your report.

C. Getting started – Index Cards (for History and Related Matter)

- i. Use several index cards (list source on each card)
- ii. Write one fact or idea on each card
- iii. Organize index cards by topic
- iv. Also keep research information and experiment data in a notebook
- v. You are now ready to write the report.

I. Specific Categories Included in the Science Project

D. INTRODUCTION – Statement of Purpose – Clear Objectives

- i. Title: Introduction, centered and underlined.
- ii. State the *title of your project* in question form. Ex.: “The question I am attempting to answer is, “Under What Conditions Does Mold Grow Best?”
- iii. Briefly state *why* you chose this topic.
- iv. Briefly write *how* you plan on doing your investigation (what your experiment will be). Make this simple and to the point so that someone can read it quickly.
- v. ½ page

E. HISTORY

- i. Give information on the people and institutions that have made discoveries or done any work/research in your area. Be sure to include dates.
- ii. Be sure you are naming people and giving dates, not just giving factual information on your subject.

- iii. The History must be done in paragraph format, like a report.
- iv. Must use index cards –
 - 1. One name and what they did on a card
 - 2. Make sure you list the source on the card
- v. 1-2 pages

F. RELATED MATTER

- i. Includes all of the information you can find on your subject. This is not a history. Explain facts, reasons, and explanations. The basic “research report” on your topic area.
- ii. To be done in paragraph form only
- iii. Make sure your ideas are organized and that it makes logical sense.
- iv. Some people may have to “stretch” what material is related to your topic more than others. For example, a student who constructs a solar-powered oven may research the sun, heat energy, convection, and cooking techniques among other topics. This is why it is called “Related” Matter.
- v. Include a title page (title and name centered horizontally and vertically). This does not count toward the 4 pages.
- vi. Must use index cards to do your research– one idea on a card – list the source of the idea on the card.
- vii. Is the subject covered thoroughly and in a logical order?
- viii. This paper will also be done in conjunction with Mrs. Larsen’s class. She will have more details
- ix. 4-8 pages

G. VOCABULARY

- i. The words you choose should be *words that are important to your project, even if you already know the meaning(s)*.
- ii. Underline the vocabulary words in your report. You only need to do this the first time the word is used in your report.
- iii. When you come across a vocabulary word in your reading, write it on your index card, along with the definition.
- iv. List each word on a separate line, and then define each vocabulary word.
- v. Place them in alphabetical order.
- vi. 10-25 words

H. BIBLIOGRAPHY – 1994 sources or more recent

- i. List the titles of books, videos, magazine articles, people, web pages, etc. that you used. The more the better!
- ii. Encyclopedias may be used, and must be cited if they are used - however only one may be counted toward the required minimum of 5 sources.

- iii. You must have a minimum of 3 non-Internet sources.
- iv. Use the sample bibliography given to you for guidance.
- v. Resources that you use must have a publication date of 1994 or later. If you need an exception to this, talk to me. I will probably ask to see the material.
- vi. Here are some general rules:
 - 1. Put author's name, title of book (underlined), where it was published, who published it, when published
 - 2. If the article is signed give the author first; if unsigned give the title first. Put author's name, "title of article" (in quotations), magazine title (underlined), when published, page numbers
- vii. Some suggestions for magazines (not exhaustive): Newsweek, Time, National Geographic, Nature, Today's Health, Scientific American, Discover, Popular Science, etc. There are also many other science magazines and journals. Ask a librarian for help. Try using the Reader's Guide to Periodical Literature. ***Or try the Science Resource Center at www.hclib.org. It's under "Reference & Research", then, "Databases A-Z".***
- viii. 5+ (non-encyclopedia) sources, at least 3 of which must be non-internet

II. EXPERIMENT (SCIENTIFIC METHOD) (*Single-space* the experiment)

- A. The **title** of the experiment is the title of your project.
- B. State the **Question**.
- C. **Hypothesis** – the statement you are testing – your educated guess as to the answer to your question. Also tell me *why* you think what you think.
- D. Make a list of **Materials** used
 Example: Materials: 10 ft. rubber tubing
 8 nails
 100 mL water
 pump
 red food coloring
 scissors
- E. Write your **Procedures** *in detail*. Start each numbered step on a new line. Give amounts of materials where appropriate. Procedure includes clearly defined controlled, dependent and independent variables.

- F. Your **Observations** of all that is happening. Include all that you see, smell, taste, etc. (whatever is relevant). In almost all cases, a good project needs to have **quantitative observations** in addition to qualitative. **Organize your data** in data tables, graphs, and/or charts if applicable. These look great on your backboard as well (if done nicely and neatly). **Take pictures** of the experiment as you do it, and include these on the backboard (don't have people in the pictures).
- G. State your **Conclusions**. Summarize your observations. Be sure that your experiment answers the question, states whether or not your hypothesis was proven, and identifies anything that you might change about your experiment if you did it again. Follow the format on the sample scientific method sheet you have been given.

III. **BACKBOARD**

- Students will need to purchase a backboard to display and communicate their research and findings at the Learning Fair. Backboards may (but don't have to) be purchased through school.
- All written work must be displayed on the backboard as shown on the page later in this packet.
- The title of the project must be ***in question form*** and must be displayed neatly and clearly across the top of the backboard.
- Pictures, data tables, graphs etc. may (and should) be displayed neatly and in a manner that enhances the project and presentation.
- The student's name should be written on the back of the backboard.

IV. **ORAL PRESENTATION:**

- All students must present their research and experimental findings to the class.
- Class presentations must be 6-15 minutes in length.
- Experiments or demonstrations that can be shown during the presentation are accepted and encouraged, if possible.
- Note cards may be used as an aid during the presentation; however you *must not read directly* from the note cards. Use them as a reference only. The presentation should be conducted as if you are having a conversation with or teaching your audience.
- Start by introducing your project. Then touch upon elements from your history and related matter. The most important part of the presentation is your experiment. Go into this in detail, especially the conclusion.
- Practice your presentation ahead of time. It is obvious which students do this and which don't.

V. NOTEBOOK:

- The Twin Cities Regional Science Fair encourages the creation and use of a student **notebook** while doing your science fair project. The notebook is not required for grade by Mr. Stock, but *highly* suggested for those who plan to go on to, and do well in, the Twin Cities Regional Science Fair.
- The notebook (can be a regular spiral-bound notebook) should be for this project only. It contains basically all of your notes that you take while doing the project. This includes, but is not limited to:
 - Research notes
 - Bibliography notes
 - Interview notes
 - Question/Hypothesis
 - Materials/Procedure
 - Data
 - Conclusion rough draft
 - Anything else you add!
- The notebook can be a “sloppy copy” of this material, but all data should be accurate.
- Bring the notebook with you to the Regional Science Fair. The judges will likely look at it.

REQUIREMENTS OVERVIEW

- ½ page introduction
- 1-2 page history (with research note cards)
- 4+ page related material, no longer than 9 pages, with title page (with research note cards)
- 10+ vocabulary words
- 5+ non-encyclopedia sources (3 sources must be non-internet)
- Experiment written up in our scientific method format (single-spaced). *All* pages of your experiment write-up should be immediately visible on the backboard.
- Backboard: title, neat, legible, attractive, creative, pictures/graphs/charts, written material attached. Written material that is multiple pages (except the experiment) should be stapled in the upper left *and* right corners.
- Notebook: Kept and added to for the entire length of the project. Not required for grade by Mr. Stock, but encouraged for those planning to attend, and do well at, the Twin Cities Regional Science Fair.
- Oral presentation: 6-15 minutes, note cards may be used, backboard
- Behavior and attitude: working class time, class presentation, day *and* night of the fair

POINTS BREAKDOWN

Introduction:	5 pts
History:	20 pts
Vocabulary:	10 pts
Sources:	10 pts
Experiment:	25 pts
Related Matter:	40 pts
Oral Presentation:	40 pts
Visual Display:	30 pts
Behavior/Attitude*	20 pts

	200 pts

IDEAS AND SUGGESTIONS

Selecting a topic:

- What area of science interests you the most?
- What kinds of things do you enjoy doing?
- How hard will the topic be for you to understand? To find background information on? To formulate a question about? To come up with an experiment on?
- **BE SPECIFIC WHEN SELECTING A TOPIC. YOUR QUESTION NEEDS TO BE SOMETHING YOU CAN TEST** (design an experiment for). A good idea is to pick a general topic of interest, and then narrow it down. For example:

Drugs	Too general
Over-the-counter drugs	better...
Cold remedies	better still...
Aspirin	pretty specific...
Dissolved aspirin	Very specific – good!

- Now state your topic in the form of a question...
How will _____ affect _____?
What are the effects of _____ on _____?
Does _____ when _____?
These are just some examples of how to write a question.
*Note that “**affect**” is a verb and “**effect**” is a noun!
- Will you be able to work in this area for over three months?
- Are you interested enough in the topic to spend a great deal of time on it?
- What special materials will you need for this project? Can you get all of them? How much will they cost?

- How much help will you need on this topic?
- How much time will the experiment take?
- Will you need to contact people that work in your field?
- Will you be able to follow safety rules while completing this project? (this especially applies to live animals and chemicals among many other things)
- There are many science fair project sources out there if you are struggling for an idea. Check libraries for books on science fair projects and experiments. Do a web search for “science fair projects”. If you know what topic you’re interested in add a “+ _____” to the search. You can also check the science resource center at www.hclib.org. Remember, your project title needs to be in the form of a question that you can test.

Other random ideas:

- It is very important that you keep track of information as you find it. Keep track of your sources on your note cards. It is very frustrating to go back and find the publisher of that book or the web address of that Internet site after the fact!
- For your bibliography, web addresses need to be exact (yes, even if they are very long). I should (and do) be able to type in the web address you have written down and be taken to the exact page where you got your information. Addresses such as “www.google.com” are NOT sources. These are tools to find sources.
- Proofread your report. I repeat...proofread your report. Then have a family member proofread it. Then proofread it again yourself. Do not hand in material fresh off the printer. Make sure you use correct spelling and grammar.
- Make sure you USE YOUR OWN WORDS as you type your report! You cannot copy material from sources and claim it as your own.
- Don’t wait to do something until the day before it is due. This will cause undue heartache and frustration, as well as result in a product that is probably not your best work. Spend a little time several times a week and the project will be much easier to do – *trust me*.
- There are many books in the classroom that have ideas for interesting science fair projects if you cannot think of one. You can also check out the library or Internet for many more options. Remember you need to have a testable hypothesis to a question. Simply making a model or demonstration won’t work.
- Here are a few formatting issues I’ve run in to in the past.
 - Do not put an extra space between paragraphs
 - The History and Related Matter are written in the third person. Do not refer to yourself or the reader (the words “I”

and “you” should not be used). You may use first person in the Introduction and Experiment.

- Paragraphs are indented 5 spaces (default on the tab key)
- Hit the space bar twice after a period, once after a comma
- “cause” or “cuz” are not acceptable replacements for the word “because”. Use proper English, not slang.
- If you have a question on something, don’t wait until the day it was due (or after) to tell me you didn’t get it. Ask me well in advance.
- Have fun and enjoy the project! You will remember this experience for the rest of your life!