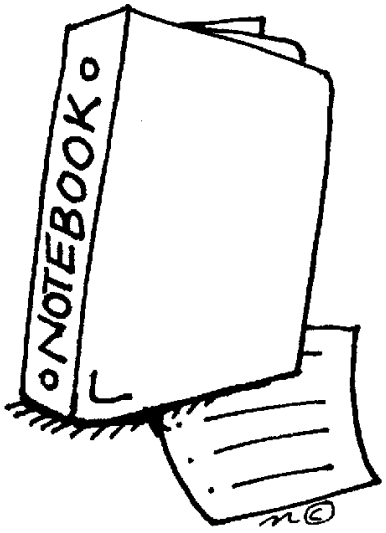
Elementary
Science Fair Notebook



Name: _____

Project Due Date: _____

Dear Parents and Guardians,

It is Science Fair time again. This year promises to be better than ever. In this packet you will find all the information that your child will need. Science Fair project is due January 18th with the school Science Fair being held January 18th from 9:30 – 11:30 am in the Gym at West Elementary.

We will provide one (1) packet of instructions to each student. We will also post this packet on the school website. If a student loses his/her packet, it will be his/her responsibility to print another off of the school website.

Having a **science fair project is required for all 5th and 6th grade students** and will be 50% of the science grade for 3rd term. A student **cannot** get a passing grade without doing a project.

District and state policy does not allow parents, teachers or others to be present while their child's project is being judged. So, during the school science fair, we ask that if your child's project is being judged, which includes an interview with your child, please remove yourself until the judging is over.

One display board will be provided to each student. If that display board needs to be replaced, it will be the student's responsibility.

Please read all documentation, fill out the parent permission form and have it back to your child's teacher by December 9th.

Remember, there is a **BIG difference** between a demonstration and an experiment. A demonstration has a known outcome. An experiment does not. An experiment starts with a question, and a hypothesis. Answer the question: If I do this _____, I think this _____ will happen because _____. Then make a plan to prove your hypothesis. Not all hypothesis are correct. You may prove that you were wrong. Thomas Edison proved 1000 hypothesis wrong before he proved one right.

There will be a short parent meeting for anyone who has questions on Wednesday, December 7th at 6:30 pm in Mr. Davis' classroom (rm. 22)

Approval by your child's teacher is required before he/she begins the project. All projects need to be submitted for approval by December 20th.

If you have any questions, please contact your child's teacher.

Sincerely,

Marsali Offill, Valerie Anderson, Patrick Kelly, Steven Boone, and Roger Davis

Elementary Division Project Categories

- Behavioral & Social Sciences
- Biology & Biochemistry
- Chemistry
- Energy & Transportation
- Engineering & Computer Science
- Environmental Sciences
- Medicine & Health Sciences
- Physics, Astronomy & Math
- Plant & Earth Sciences

Additional information can be found at http://slvsef.org/

Project ideas:

http://www.education.com/science-fair/fifth-grade+sixth-grade/

http://www.sciencebuddies.org/science-fair-projects/project_ideas.shtml

http://www.sciencebob.com/sciencefair/ideas.php

There are special requirements for some projects. Usually we try to stay away from in elementary school. These are:

- Growing bacteria – requires a special incubator.
- Experiments with animals – requires a vet's approval.
- Experiments with people – requires a doctor's approval.

If your student wishes to do one of these, he/she needs teacher approval.

Please sign and return the **bottom** portion of this letter so we know that you received and read it.

I have received and read the information letter regarding West's 2015/16Science Fair.

Name _____ Date _____

Student _____

Project Overview

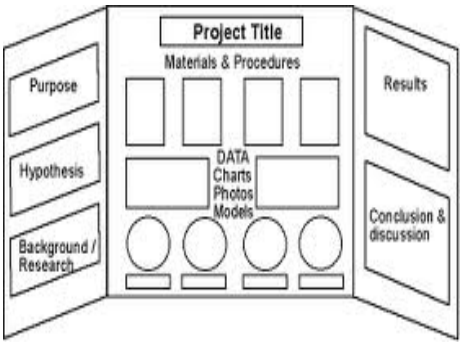
What is a science fair project?

The science fair project is a long-term project where you will plan, conduct, and share results from your own independent investigation. The project includes complete the pre-planning steps, conducting a science experiment, recording your data in a science notebook, analyzing your data, and creating a tri-fold poster to share your project. You can use this notebook to help you with the project process.

What makes a good project?

The first step to completing a good science fair project is to choose a topic that interests you. Students that have excellent projects do research before they begin. They really understand the science behind their topic and use their knowledge to design an interesting experiment. Another thing that makes a great project is originality. Try to come up with your own question. There are a lot of examples of projects on the Internet. If you are stuck, use these as jumping off points, but try to make the project your own. When you conduct your experiment, do multiple trials. The more data you collect, the better. Also, if something doesn't go as planned and you have an idea to test why, keep going, this is what scientists do. Finally, you want your poster to be informative, clear, and attractive. You have put a lot of work into planning and conducting your experiment. A well-planned poster will help others see this.

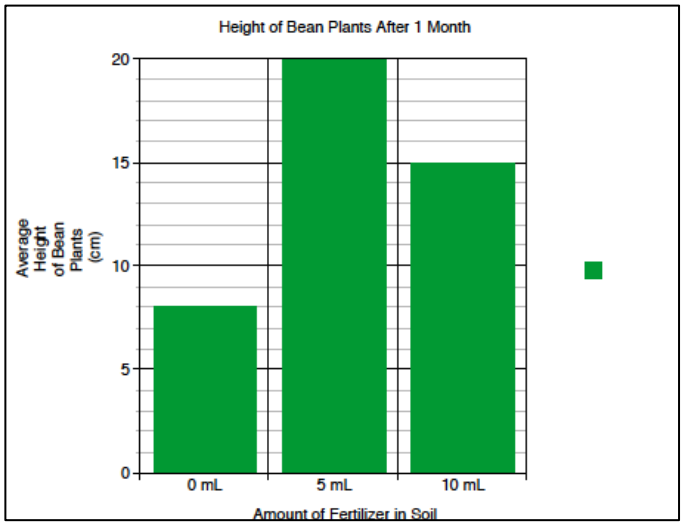
What should my poster look like?

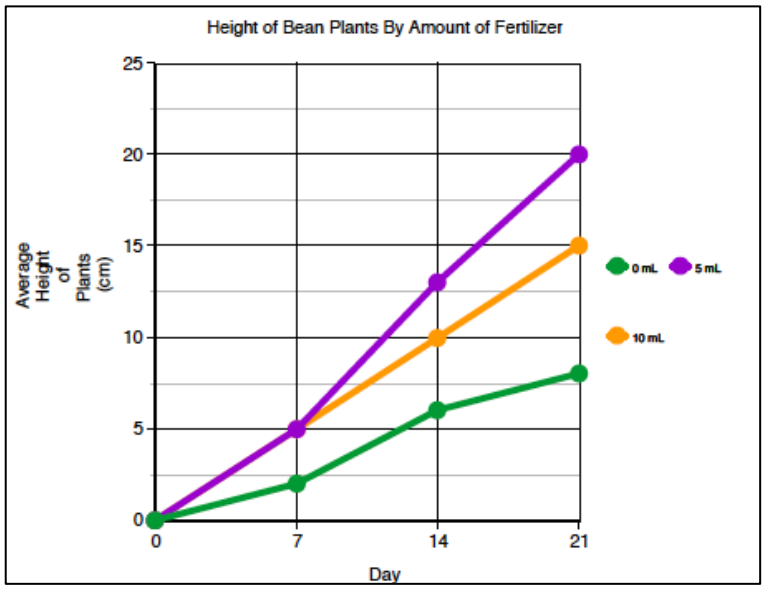


Your poster shares what you learned in your experiment. You will not be able to conduct your experiment during the science fair. In addition to your poster, you should have a science notebook with your research, sources, data, and observations. You can use this packet as your notebook or it could be a spiral notebook that you use while researching, collecting data and making observations.

Graphs

The purpose of a graph is to create a visual display of your data. Graphs are helpful because they show patterns. The type of graph that you make will depend on the data that you want to display. **Bar graphs** are best for discrete data, e.g. comparing objects or events. **Line graphs** are best for continuous data, e.g. changes over time. Below is a sample of a bar graph and a line graph.

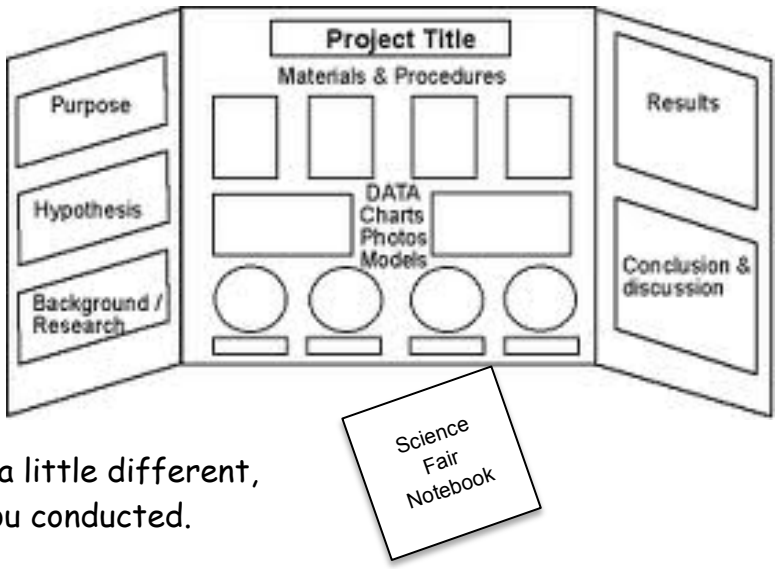




When you make a graph be sure that it has a title and that both the x- and y-axis are labeled. On the next page create your graph or make one on-line and paste it in this notebook. Click here or do a Google search for the Create A Graph website.

Display Board

Your display board should demonstrate all of the hard work that you have put into your science fair project. Don't wait until the last minute! Use the information that you have recorded in this science fair notebook to help you decide what to write on each section of your board. The picture shows one example of how to set up your board. Your board may look a little different, depending on the experiment that you conducted.



SECTIONS FOR THE DISPLAY BOARD

Question/Purpose: An excellent question is interesting, creative, and worded scientifically.

Research: This section should include why you chose this project or what makes it interesting. Also include the information you learned about your topic by doing background research.

Hypothesis: An excellent hypothesis provides a possible answer to your question. The hypothesis is based on your background research.

Materials and Procedures: In this section you explain what you did to test your hypothesis. Include your materials and procedures. Be specific so that others understand what you controlled to make a fair experiment. If you did multiple trials be sure to include that in your procedures. Pictures are very appropriate in this section, but your pictures should not show people's faces.

Data and Observations: Include a chart or graph to represent the data that you collected.

Results: Explain what your data shows. Describe patterns, trends, and any data that is unexpected.

Conclusions: A good conclusion will be 1 – 3 paragraphs long. Your conclusion should share what you learned through your investigation and why your findings are important.

Science Fair Notebook: Your science notebook should include the research you did for the project, a list of sources that you used for research, and all of the data and observations you recorded while conducting the experiment.

Pre Approval: Grades 5-8 School Common Sense Safety Approval-Page 1

All projects must be PRE-approved by the **school** before any project can get started. See the back of this sheet for ALL the details.

Students-fill the top out and give to your teacher. PRINT CLEARLY.

Name(s):
School:

My project uses:

- ☐ Animals
- ☐ People
- ☐ Bacteria/Pathogens
- ☐ Hazardous materials (weapons, fire, chemicals etc…)
- ☐ None of these

This is what my project is about:

- -

Teacher/Fair Coordinator

☐ Approved: I have reviewed the project and talked with the student (and parents if needed) and feel that it is safe and reasonable for the student to do. Steps are in place to get permission from participants, keep animals safe, avoid creating a pandemic of super-bacteria or burning down the school. I checked with the District or Regional Fair in case I wasn't sure. Signatures on back of document.

☐ Denied: I have reviewed the project and DO NOT approve it due to safety concerns. I checked with the District and Regional Fair and they concur that this project is going to get a student disqualified or worse, hurt. Pick another idea.

____

Printed Name of School Fair Coordinator
(Coordinator: Send your entire school's forms to Stephanie Wood in a bundle)

PRE APPROVAL-GRADES 5-8 SAFETY APPROVAL SCIENCE FAIR PROJECT RULES PAGE 2

My Experiment will Involve the Following (check all that apply):

☐ Human Subjects

All human research projects must be **reviewed** and **approved** by a science teacher, a school administrator and one of the following: a psychologist, psychiatrist, medical doctor, physician's assistant or registered nurse **before the student begins experimentation**. If they determine that there is more than minimal psychological or physical risk to the human subjects involved in the project, the student must receive written consent from each of the participants and written parental consent for students under 18 years old. If they determine that there are unacceptable risks involved the student must revise his or her project. *Please attach a copy of the surveys or tests* you intend to use with your research plan. Students may not publish or display information that identifies the human subjects.

☐ Non-Human Vertebrate Animals

All projects involving non-human vertebrate animals must be **reviewed** and **approved** by two science teachers and a biomedical scientist (ex. a local veterinarian) **before the student begins experimentation.** Alternatives to the use of vertebrate animals must be explored and included in the student's research plan. Experiments involving laboratory animals (rats, mice, hamsters, gerbils, rabbits, etc) cannot be conducted in a student's home except for behavior studies on pets. Proper animal care must be provided daily, including weekends, holidays and vacations. Experimental procedures that cause unnecessary pain or discomfort are prohibited. Experiments designed to kill vertebrate animals are not permitted. Students may not perform euthanasia, except in emergency situations. Alcohol, acid rain, insecticide, herbicide and heavy metal toxicity studies are prohibited. Experiments with a death rate of 30 percent or higher are not permitted. Behavioral studies or supplemental nutritional studies involving pets or livestock may be done at home.

☐ Controlled Substances (Prescription Drugs, Tobacco, Alcohol, etc)

All projects involving controlled substances must be **reviewed** and **approved** by two science teachers and a school administrator or biomedical scientist **before the student begins experimentation**. Students must adhere to all federal, state and local laws when acquiring and handling controlled substances. Only under the direction of a qualified scientist or designated supervisor may a student use federally controlled or experimental substances for therapy or experimentation. Students under 21 may not handle or purchase smokeless powder or black powder for science projects.

☐ Hazardous Substances or Devices (Chemicals, Firearms, Welders, Lasers, Radioactive Substances, Radiation)

Students must adhere to federal and state regulations governing hazardous substances or devices. An adult must directly supervise experiments. Students working with hazardous substances or devices must follow proper safety procedures for each chemical or device used in the research.

☐ Potentially Hazardous Biological Agents

(Bacteria, Mold, Fungi, Viruses, Parasites, Recombinant DNA (rDNA), Human or Animal fresh tissues, blood or body fluids, etc)

All projects involving potentially hazardous biological agents must be **reviewed** and **approved** by two science teachers and a biomedical scientist **before the student begins experimentation**. It is the responsibility of the student and the adults involved with the project to conduct a risk assessment. Risk assessment defines the potential level of harm, injury or disease to plants, animals and humans that may occur when working with biological agents. Risk assessment involves:

1. Assignment of the biological agent to a biosafety level risk group. **Students in grades 5-8 may only conduct research with biological agents determined to be at Biosafety Level 1 (BSL-1).** BSL-1 agents pose low risk to students or the environment and are highly unlikely to cause disease in healthy people, animals or plants. Examples of BSL-1 Microorganisms include: *Agrobacterium radiobacter, Aspergillus niger, Bacillus thuringiensis, Escherichia coli strain K12, Lactobacillus acidophilus, Micrococcus leuteus, Neurospora crassa, Pseudomonas fluorescens, and Serratia marcescens.* **Studies involving unknown microorganisms can be determined BSL-1 if the organism is collected in a plastic Petri dish or other non-breakable container and is sealed and remains sealed during the entire experiment.** Examples of BSL-1 rDNA studies include: Cloning of DNA in *E. coli K12, S. cerevesiae*, and *B. subtilis* host vector systems. Examples of BSL-1 Tissue studies involve the collection of non-infectious fresh tissues (not including blood or blood products) with little likelihood of microorganisms present. Projects involving blood or blood products are considered Biosafey Level 2. Plant tissues, established cell lines and cultures, meat from food stores or restaurants or packing houses, hair, teeth that have been sterilized, and fossilized tissue do not need to be treated as potentially hazardous biological agents.

2. Determine the level of biological containment available to the student researcher. **Biosafety Level 1 projects can be performed in a school laboratory but are prohibited in the home environment.** Standard microbiological practices must be used and all hazardous agents must be properly disposed of at the end of experimentation. The experiment must be supervised by a qualified scientist or a trained designated supervisor.

***For a complete list of rules regarding all of the subjects listed above please visit the following website:**
http://www.societyforscience.org/page.aspx?pid=312
If your project will include any of the subjects listed above, you must get all these signatures before you begin.

_____	_____	_____
Science Teacher Date	**School Fair Coordinator Date**	**Other professional (i.e. doctor, vet, scientist)**

Projects to Avoid

SLVSEF Teacher Workshops

Projects should NOT be demonstrations or repeat previously done experiments, but rather should be a collection and analysis of DATA.

1. Effect of music on plants
2. Effect of talking to plants
3. Effect of dark vs. light on plants or colored lights, etc.
4. Effect of giving plants other things than water, e.g. milk, soda, salt water, etc.
5. Effect of cola, coffee, etc. on teeth; tooth decay, coloring, etc.
6. Effect of running, jumping, music, video games, movies, etc. on blood pressure
7. Balanced diets (data usually unreliable)
8. Strength/absorbency of paper towels (and other products)
9. "Which is best?" - Approach generally without scientific merit (which popcorn pops better, which soap, fertilizer, etc.)
10. Basic maze running
11. Any project which boils down to simple preference; what do girls/boys/cats/dogs like better. ..
12. Effect of color on memory, emotion, mood, etc.
13. Effect of color on food taste, e.g. changing the color of Jell-0 to effect the taste
14. Optical illusions
15. Reaction times in general and distractions effecting reaction speed
16. Many male/female comparisons, especially if bias shows
17. Basic planaria regeneration
18. Detergents vs. stains
19. Basic solar collectors
20. Acid rain projects (To be considered, thorough research into the composition of acid rain and a scientifically accurate simulation of it would be necessary.)
21. Basic flight tests, e.g. planes, rockets
22. Battery life (plug in and run down)
23. Basic popcorn volume tests
24. Taste comparisons, e.g. Coke vs. Pepsi can you tell the difference?
25. Sleep learning
26. Music effecting learning
27. Taste or paw-preferences of cats, dogs, etc.
28. Color choices of goldfish, etc.
29. Basic chromatography
30. Wing or fin shape comparison with mass, surface area, etc. not considered
31. Ball bounce tests with poor measurement techniques
32. Fingerprints and heredity
33. Hovercraft design
34. Colonizing bacteria from doorknobs, student's hands, places around the school, etc.
35. Memory Tests
36. Penny polishing; what cleans pennies the best
37. Insulation effectiveness
38. Coke & Mentos
39. Hand sanitizers and bacteria; which sanitizer is best?