TwinRivers
UNIFIED SCHOOL DISTRICT
California's newest unified school district

LETTER TO PARENTS

Science Fair 2011

Dear **PARENTS/GUARDIANS**,

Your child has been invited to participate in the Twin Rivers Unified School District Science Fair, an exciting event that encourages students to think and act like young scientists. During the next few weeks 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.

Each student will be given instructions and handouts during class for the various steps of his or her project. Most of the work will be completed at home, and students will receive a monthly calendar 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 various web sites, such as:

- www.sciencebuddies.org
- www.all-science-fair-projects.com
- http://school.discovery.com/sciencefaircentral/

We ask that you encourage your child and monitor his or her progress along the way. Your support is the 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, Guide your child whenever and wherever you can, but let the final project reflect your child's individual effort and design.

Please read the Science Fair Handbook with your child and sign the necessary forms. Let us know if you'd like more information on creating a successful science fair project. If you have any questions, do not hesitate to contact us.

Sincerely,

Science Fair Coordinator
School: _____
Contact Information: _____

District Science Fair
STUDENT PROJECT CONTRACT

-Student Agreement-

I, _____, from _____
(Name of Student) (Name of School and Grade)
agree to complete a science fair project on _____.
(Title of Project)
I also agree to do my own work and follow the guidelines for District Science Fair projects.
I understand that my project must be completed by _____.
(Date Assigned by Teacher)

_____
[Student's Signature]

-Parent or Guardian Agreement-

I agree to encourage my child's participation in the District Science Fair by providing guidance and support when needed. I will ensure that my child completes the project on or by the due date.

My signature below certifies that I have read all Science Fair Rules and Guidelines.

_____
[Parent or Guardian Signature]

List of Attachments:

- Letter to Parents
- Science Fair Rules & Guidelines
- Science Fair Timeline
- Project Proposal Form
- List of Projects to Avoid

SCIENCE FAIR GOALS

Excellent science educators all agree that students should be given numerous opportunities to practice or "do science." TRUSD science educators hope that Science Fair 2011 will...

- Stimulate students' interest, curiosity, and desire to explore the mysteries of the world.
- Provide students with opportunities to learn, understand, and apply the scientific method.
- Provide real experiences to students so that they would understand how scientific knowledge has been and is still being gathered.
- Encourage the development of essential skills in oral and written communication
- Help students develop skills that involve data interpretation and analysis
- Encourage the acquisition of important research skills using a wide variety of resources such as the Internet, interviews, books, magazines, etc.
- Show a connection between what is learned in the class and what happens in real life.
- Promote unique opportunities for teachers to work individually and collaboratively.
- Foster independence in the student by providing the opportunity for them to take initiative and responsibility in completing a long-range project.

California Content Standards:

Science
I&E. 1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop their own questions and perform investigations. Students will:
a. Select and use appropriate tools and technology (such as computer-linked probes, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.
b. Identify and communicate sources of unavoidable experimental error.
c. Identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions.
d. Formulate explanations by using logic and evidence.
j. Recognize the issues of statistical variability and the need for controlled tests.
l. Analyze situations and solve problems that require combining and applying concepts from more than one area of science.

SCIENCE PROJECT PROPOSAL FORM

I. The question I plan to investigate for my Science Fair Project is...

II. HYPOTHESIS:

III. MATERIALS LIST

IV. METHODS:

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

V. References:

PROJECTS TO AVOID

- Effect of colored light on plants (or anything else)
- Effect of music/talking on plants
- Effect of cigarette smoke on plants (ditto) -- NOW FORBIDDEN
- Mold growth
- Crystal growth
- Effect of cola, coffee, etc. on teeth
- Effect of running/music/videogames [almost anything!] on blood pressure
- Do we eat balanced diets? (data usually unreliable)
- Strength/absorbency of paper towels (and other products)
- Most consumer product testing of the "Which is best?" type -- approach generally without scientific merit
- Graphology
- Astrology
- ESP, especially standard card test
- Basic maze running
- Any project which boils down to simple preference.
- Effect of color on memory, emotion, mood / taste / strength
- Optical Illusions
- Reaction Times
- Many male/female comparisons, especially if bias shows
- Basic *Planaria* regrowth
- Detergents vs. stains
- Basic solar collectors
- Acid rain projects (Important: to be considered, thorough research into the composition of acid rain and a scientifically accurate simulation of it would be necessary.)
- Basic flight tests, e.g., planes, rockets
- Battery life (plug in and run down type)
- Basic popcorn volume tests
- Stills of any kind (PROHIBITED)
- Pyramid power
- Basic flower preservation techniques
- Taste comparisons, e.g., Coke vs. Pepsi
- Smelling vanilla, etc., to improve test scores
- Sleep learning
- Taste or paw-preferences of cats, dogs, etc.
- Color choices of goldfish, etc.
- Basic chromatography
- Wing, fin shape comparison with mass not considered
- Ball bounce tests with poor measurement techniques

SCIENCE FAIR DISPLAY BOARD

The function of a backboard is to inform judges and visitors, but also to attract as many spectators as possible. To make it easy for spectators and judges to understand your research, you want your backboard to be clear and eye-catching. Make headings stand out. Use neat, colorful headings, charts, and graphs. You might want to include photographs of important parts/phases in your investigation. You are free to choose your colors and format, but there are a few aspects judges are looking for. Your backboard must include:

TITLE

Your title is an extremely important attention-grabber. A good title should simply and accurately present your research. Avoid making your title too long. Write several titles on paper and think about them for a few days before making a final decision. The title should make the casual observer want to know more.

PURPOSE or QUESTION

A question or statement showing what you are trying to find out. Formulate your question very specific, including the subjects to be tested and the variables you will be measuring.

ABSTRACT

- A brief, written explanation of the research project, consisting of a succinct description of the project's purpose, the procedures followed, the data collected, and the conclusions reached.
- A clear and simple summary statement of the main points of the experiment
- A self-contained statement that must make sense all by itself.

HYPOTHESIS

The hypothesis is a prediction of the outcome you expect from your investigation. Just as in your question, formulate the hypothesis very explicitly. Include the subjects to be tested, the experimental variable you will change and the variable you will measure.

MATERIALS

List your equipment, chemicals, foods, and other materials used during your experiment. Include the amount you used of each, using proper units (SI units if possible).

PROCEDURE

The procedure is a list of steps followed during the experimentation or investigation. Make sure to use proper language grammar and spelling. Refer to any experiment in your science textbook for an example of appropriate wording.

From:
http://www.peaktopeak.org/Content/Homework/gsafrane/Safranek_files/Student%20Guidelines%200809.doc

OBSERVATIONS or DATA

These are the data collected in the investigation. As a scientist, you must keep record of everything you are doing in a notebook. Follow these suggestions for keeping a notebook:

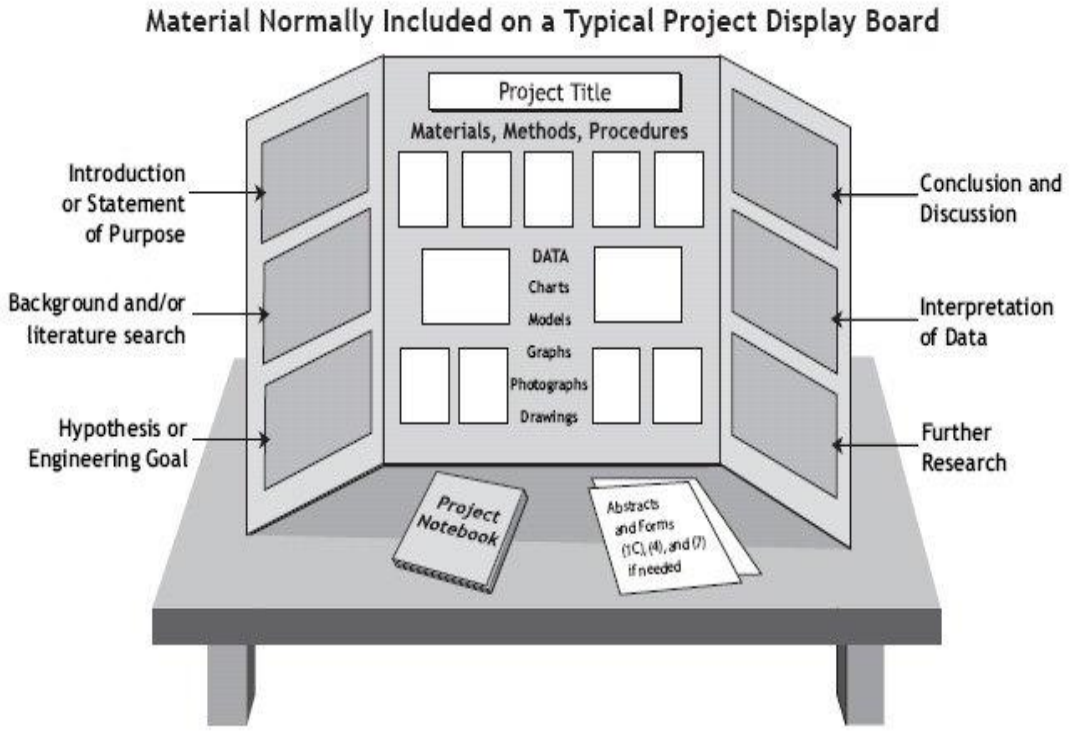
- Use a sturdy and permanently bound notebook.
- Date all notes.
- Complete notes are an absolute necessity. Don't rely on your memory.
- Write up all work, including failures. It is important to write in pen and to not erase anything or remove pages from your notebook. Something that seems an error now, may turn out to be correct later.
- Include the notebook with your exhibit, so you can refer to it during the judging. Judges will be impressed by a complete and well-organized data book.

RESULTS or DISCUSSION

Include an explanation of why the investigation turned out as it did. Neatly presented, clear results make it easy to draw conclusions and earn higher scores on your project. Show how your observations or data relate to the hypothesis. Note that a hypothesis is never wrong. If your results are not what you expected, you should say that your

CONCLUSION

The conclusion is a summary of the most significant results of the project. Be specific, do not generalize. You could suggest what your next step would be or how you would improve the project.



NOTE: The Background or Literature Search may contain the Abstract Section instead.

Image from: http://synopsys.championship.googlepages.com/DisplayBoard.jpg/DisplayBoard-full.jpg

Science Fair Display Board Label

Cut out and place this information on upper left corner of back of the display board of your project.

Name(s): _____

School: _____

Grade: _____

Teacher: _____

Title:

_____

_____

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TRUSD SCIENCE FAIR RULES

All exhibits must conform to the following rules and regulations to qualify for the TRUSD Science Fair. These rules and regulations should be considered as your project is developed. These are the rules and regulations that also apply to the Sacramento Regional Science Fair.

1. The project to be presented must be the work of students and must concern itself with a single subject.

2. Students are expected to keep a step by step notebook recording the development of the project, including references, original data, etc. Original data are of great value in all projects.

3. No exhibit should be larger than 122 cm. wide by 76 cm. deep by 274 cm. high from the floor. No oversize projects are allowed to the exhibit.

4. Wall space for posters, tape, tacks, etc. is not available. Students should construct their exhibits so that wall space is not necessary. Exhibitors must supply their own thumb tacks, tape and other tools.

5. Because of space limitations, antenna lines and other long leads are prohibited.

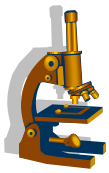
6. No lighting is permitted on displays.

7. No running water is available.

8. After a project is inspected for compliance with these rules and regulations no changes are permitted.

9. Student names should be posted at the back of the display board, using the label provided.

From: http://users.rcn.com/tedrowan/Rules.html



Sample Science Fair Judges' Scorecard

Name:	**Grade:**
Project Category:	**Date:**
Project Title:	**Project Number:**
Judge's Name:	**Final Score:**

I. Scientific Method

	Superior	Above Average	Average	Below Average	No Evidence
a. Presented a question that can be answered through experimentation.	***4***	***3***	***2***	***1***	***0***
b. Developed a hypothesis that identifies the dependent and independent variables.	***4***	***3***	***2***	***1***	***0***
c. Developed good procedure for testing the hypothesis, including the use of controlled variables.	***4***	***3***	***2***	***1***	***0***
d. Ran sufficient trials [at least 3].	***4***	***3***	***2***	***1***	***0***
e. Derived conclusions from appropriately organized and summarized data.	***4***	***3***	***2***	***1***	***0***
f. Related conclusions back to the hypothesis.	***4***	***3***	***2***	***1***	***0***
Opportunities for Improvement:					

II. Scientific Knowledge

	Superior	Above Average	Average	Below Average	No Evidence
a. Accessed a minimum of three reliable, accurate resources for background research.	***4***	***3***	***2***	***1***	***0***

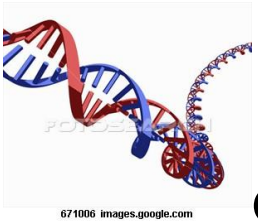
b. Used scientific principles and/or mathematical formulas correctly in the experiment.	***4***	***3***	***2***	***1***	***0***
Opportunities for Improvement:					

III. Presentation & Creativity

	Superior	Above Average	Average	Below Average	No Evidence
a. Neat, well-organized, and visually-appealing.	***4***	***3***	***2***	***1***	***0***
b. Included all key components to provide a thorough picture of the project [Abstract, Introduction, Results, Discussion, etc].	***4***	***3***	***2***	***1***	***0***
c. Included a lab notebook or journal.	***4***	***3***	***2***	***1***	***0***
d. Investigated an original question or used an original approach or technique.	***4***	***3***	***2***	***1***	***0***
Opportunities for Improvement:					

TOTAL SCORE:

General Comments:



Choosing a Science Fair Topic

Finding an idea for your project can be the most difficult part of your science fair project. Some students spend more time looking for a topic than doing the actual experiment. Ideas for science fair projects can come from many sources, of course, but the World Wide Web is a great place to start to look for topic ideas!

Try the following websites:

1. Cool-Science-Projects http://www.cool-science-projects.com/Science-Fair-Project-Ideas.html Find your motivation. Learn how to get good topic ideas by thinking about what you enjoy, what you're really curious about, asking questions, and turning a hobby into a project.
2. Cyber Fair Idea Generation http://www.isd77.k12.mn.us/resources/cf/ideas.html Offers sample topics, as well as tips and hints for thinking up your own ideas. Also shows how to find topics that are interesting to you. Let your imagination run wild.
3. Science Buddies Topic Selection Wizard http://www.sciencebuddies.org/mentoring/register_guest.php The Topic Selection Wizard will help ask you enough questions to decide what kind of science you'll most enjoy doing. An excellent aid!
4. Twin Groves Middle School http://www.twingroves.district96.k12.il.us/ScienceInternet/GetStarted.html Gives excellent advice on using your own observations to generate a broad idea and then narrow it down to a workable idea. With many links to topics, organized by category.
5. All Science Fair Projects http://www.all-science-fair-projects.com/ Find hundreds of projects under Biology, Chemistry, Physics, Earth Sciences, and Engineering. Browse through the projects, or use the search engine to find a specific topic and complete instructions.

The following websites deal with projects under a specific science discipline:

1. Agricultural Ideas for Science Fair Projects http://www.ars.usda.gov/is/kids/fair/ideasframe.htm Agriculture usually doesn't get a category at science fairs, but the ideas here for agricultural science fair projects can lead you to projects in botany, chemistry, environmental science, or even medicine.
2. Interested in Bugs? Science Fair Project Suggestions http://www.si.edu/resource/faq/nmnh/buginfo/scifair.htm Love bugs? BugInfo describes several projects and explains how to conduct them.

3. Love Math? Math Projects

http://camel.math.ca/Education/mpsf/

Math projects, including numbering systems, geometry, game theory, and more, at various levels of difficulty. Some of these ideas are probably best left for high school projects, but some topics include links to helpful reference sites.

4. Electronics for Kids

http://users.stargate.net/~eit/kidspage.htm

Here are a dozen projects you can do that will teach you about electricity and magnetism. These are simple and don't require much money or equipment.

5. Energy Quest Science Fair Projects

http://www.energyquest.ca.gov/projects/index.html#chemical

Ideas from the California Energy Commission on all kinds of energy topics: Chemical/Stored, Electrical, Geothermal, Hydrological (Water), Nuclear, Solar, and Wind Energy. Also ideas on Saving Energy and Transportation.

http://www.pnm.com/sciencefair/investigation.htm

If you're interested in energy, here are some questions that can easily be turned into a research project.

6. Electrochemistry Experiments

http://www.funsci.com/fun3_en/electro/electro.htm

Learn to measure electrical conductivity and make several kinds of battery. (Did you know you can get electricity from a lemon?) Good projects if you like to work with your hands and build things.

7. Neuroscience for Kids

http://faculty.washington.edu/chudler/experi.html

Can your eyes deceive you? Do you remember your dreams? Can you build a model of the nervous system? Dr. Chudler publishes a long list of games and creative ideas for Neuroscience science fair projects. Projects are good for grades 3-12.

8. Photosynthesis Science Fair Ideas: Arizona State University

http://photoscience.la.asu.edu/photosyn/education/sciencefair.html

Questions that might help you start a science fair project on photosynthesis. (Not sure what that is? Follow the link to "What is Photosynthesis?") These ideas are just to get you started – you'll have to work out the project yourself.

9. Earth Science

http://interactive2.usgs.gov/learningweb/students/project.htm

Learn how to build a table-top model that demonstrates the causes of an earthquake, a model that demonstrates the spreading of the ocean floor, your own weather station, or how to collect fascinating slimes off the rocks in your neighborhood.

http://earthquake.usgs.gov/learning/kids/sciencefair.php

The U.S. Geological Survey provides a fun list of project ideas for studying earthquakes and other types of ground movement. You can also find instructions for building an earthquake simulator.

http://volcano.und.nodak.edu/vwdocs/volc_models/models.html

Complete how-to instructions for building several different types of model volcano. Projects for all ages.

From: http://www.ipl.org/div/kidspace/projectguide/choosingatopic.html

Here are some more tips for choosing a science fair project topic...

a. **List your interests.** When beginning your search for a science fair project, you should start by making a list of your true interests. After all, you'll be spending a lot of time on this project, so you'll want to find something that you can live with for quite awhile.

Start by brainstorming some ideas and recording them in a pad. Be sure to keep your mind wide open and ask yourself many questions, like what sort of TV shows intrigue you? What do you like to do in your spare time?

b. Find intriguing facts about each topic.

Once you have finished a list of things that interest you, start thinking about some odd or intriguing facts about each topic. If you do like to grow plants, for instance, or if you just think plants are interesting in some way, ask yourself what intrigues you most. Is it the way they grow? Their potential benefits or harm to humans?

Keep brainstorming, jotting down some intriguing facts or ideas related to plants, like the one below. Any of these could lead to a project.

c. Research a few topics.

Once you pick a few topics that sound interesting, do some quick research to find out how feasible your topic will be. Consider things like:

Is there a point that I can prove?
Will this make an attractive display?
Are there visual items I can use for my display?
Can I make a chart from this information?

Remember, the science fair is a competition, of sorts. Try to select a topic that interests you, but also one that will create an attractive visual experience for the judges.

From: ***http://homeworktips.about.com/od/sciencefair/a/sciencefair.htm***

How to Write an Abstract

What is an abstract?

The Abstract is a summary of your science fair project. Your abstract is made up of a brief statement of the essential, or most important, thoughts about your project. Abstracts should summarize, clearly and simply, the main points of the experiment. Spelling, grammar, punctuation, neatness, and originality are important. It should be 250 to 300 words in length. It is one of the last parts of your science fair project that you will complete. It is an easy part if you are using a computer to record and type your journal entries and other parts of the project. If you are using a computer then you will only have to cut and paste this information into the abstract.

What should be included in the abstract?

-Your projects purpose statement.
-The hypothesis
-A description of your variables and the control / constants.
-A description of what variable you are manipulating (changing) in your experiment.
-How you went about measuring and observing the variables / controls.
-Your results and data collected from your experiment.
-Your conclusion

Complete the following statements as a guide to writing your abstract:

The purpose of my science fair project was _____
_____
_____
_____

My hypothesis for this project was_____
_____
_____

The constants and controls in my experiment were_____
_____
_____

The variable in my experiment was _____
_____
_____

The way that I measured the responding or dependent variable was _____
_____
_____
_____
_____
The results of this experiment were _____
_____
_____
The results show that my hypothesis should be (give brief reason why to accept or not) _____
_____
If I were going to do this experiment again in the future or expand on this _____ experiment I would _____
_____
_____
_____

From: ***http://www.williamsclass.com/ScienceFair/ScienceFairAbstract.htm***

Example of an Abstract:

Title: The Effect of Surface Finish on Rocket Drag
Abstract: The objective of this project was to determine if surface finish has an effect on the drag of a model rocket. I believe that a model with a smooth surface will have lower drag and will reach higher altitudes.
Five model rockets with identical size and shape, but different surface preparations, were constructed. One rocket was left with an unfinished surface, three had surfaces finished to various degrees of smoothness, and the fifth rocket had its surface sealed, primed, sanded to 600 grit, painted, and covered with clear gloss. The rockets were ballasted to weigh the same and flown 10 times each with B5-4 motors.
The rocket with the clear gloss finish consistently reached the highest altitudes of all 5 rockets, while the unfinished rocket consistently reached the lowest altitude.
This project provided evidence that surface finish has an important role in model rocket drag and rockets with carefully prepared surfaces will reach higher altitudes.

From: ***http://www.usc.edu/CSSF/Info_Genl/Abst_Ex.html***