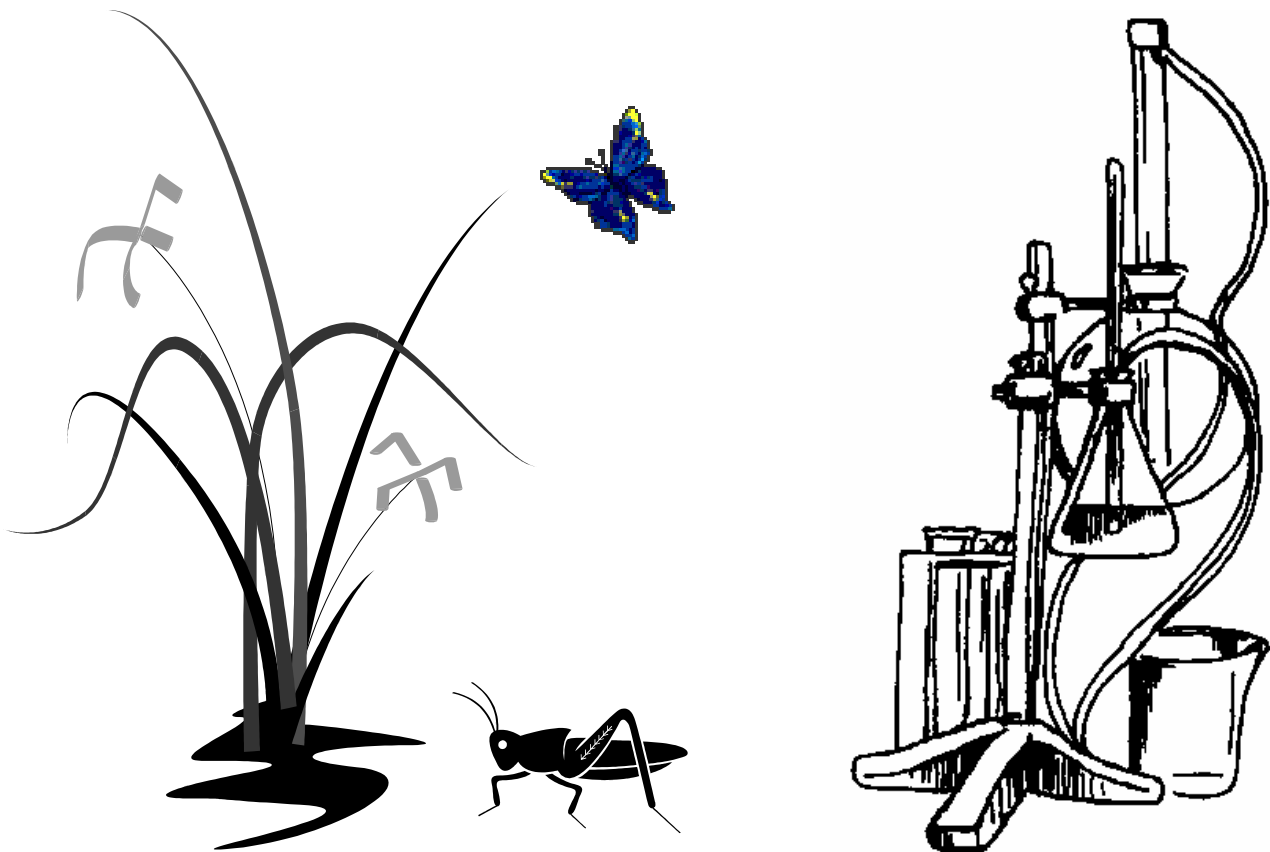




SECONDARY

SCIENCE FAIR TEACHERS' HANDBOOK

Revised 2009



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Revised 1997

Revisions made under the supervision of
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Revised 2009

for

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Preface

The purpose of the secondary Science Fair Handbook is to provide guidelines and suggestions for organizing and planning a site science fair. Participation in the LBUSD district level science fair, the Los Angeles County Science and Engineering Fair, and the California State Science Fair is also addressed and encouraged.

Please refer to the district web page for a downloadable version of this handbook. Go to www.lbschools.net. Click on “S” at the top; then on “Science” from the list; then under Upcoming Events, click on “Annual Science Fair Information” where you will find the Secondary Science Fair Teacher Handbook, Teacher Appendices, Science Fair Student Information Packets by project type, and Students Appendices.

Eric Brundin, District Science Curriculum Leader, is available to answer further questions concerning the handbook’s content. Contact him at ebrundin@lbschools.net or phone 562-997-8000, Ext. 2963.

Statement of Philosophy

This project grew out of a realization that many kinds of learning experiences, both in and beyond the classroom and laboratory, contribute significantly to the education of students. Science fairs provide a valuable opportunity for young people to be creative, to have pride in their work, and to experience the hands-on use of the scientific method. The goal of having a K-12 science fair is to help students become more and more proficient in their scientific method and communication skills so that by eighth grade, and continuing into high school, students are adept at generating and solving highly challenging problems with original experimentation.

Objectives of Site and District Science Fairs

1. To emphasize and support state science standards and literacy skills.
2. To provide a focus for students to apply skills and concepts learned in science, art, computer science, mathematics, reading and language arts.
3. To help students develop self-reliance, organizational skills, and productive work habits.
4. To provide our schools and community with the opportunity to recognize and encourage student interest in science.



SECONDARY SCIENCE FAIR TEACHERS' HANDBOOK

Revised 2010

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Preparation for Judging Site Fairs

Judges Score/Comment Sheets

- MIDDLE SCHOOL - Career Shadow Gr. 6-8, Experiment Gr. 6-8, Invention Gr. 6-8, Rube Goldberg Device Gr. 6-8, Scientific Survey Gr. 7
- HIGH SCHOOL – Experiment Gr. 9-12, Invention Gr. 9-12

Rubrics Guide

Rubrics for School Site Science Fair

- MIDDLE SCHOOL - Career Shadow Gr. 6-8, Experiment Gr. 6-8, Invention Gr. 6-8 DRAFT, Rube Goldberg Device Gr. 6-8, Scientific Survey Gr. 7
- HIGH SCHOOL – Experiment Gr. 9-12, Invention Gr. 9-12 DRAFT

Resources

- Science Topics for Grades 6-12
- Materials Sources
- Community Resources
- Internet References
- Library References

Helping Students Choose an ORIGINAL Project Topic



Getting Started:

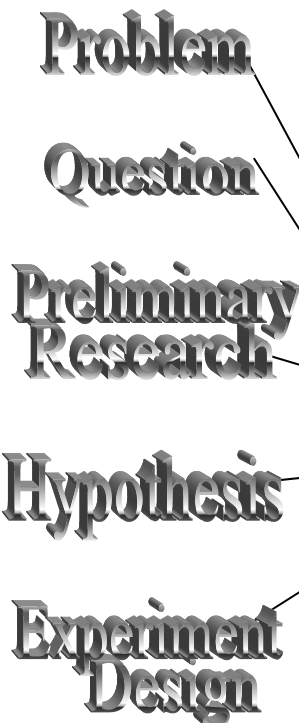
Where do you go to get ideas?

Personal Interests	sports, hobbies, music, sources of products, realism (?) of TV, social interactions, environmentalism, entertainment, developing new products	Personal Experience	travel, observations of events, chores, study habits, physical activities, health, visits to zoos, museums, or professional offices
Science Journals, Periodicals & Textbooks Students Have Now		&	past, current, and future technology, medicine, consumer products, transportation, agriculture
Advertisement	proving advertisers' product claims, fact vs. opinion, testing new products	Current Events and News	social issues, discoveries, natural disasters, conservation, national/personal security
* Family		heredity, nutrition, parent/relative professions	

An example of how to model the process in class:

Advertisements:

1. Bring in an example of a commercial jingle (videos of old commercials [Nickelodeon], magazine, newspaper). Explain, very briefly, what a jingle is.
2. Assignment for homework => Every student has to bring at least two or three jingles that catch their attention from TV, radio, magazines, newspapers, etc.
3. The teacher compiles the student ideas on the front board.
4. Form students into groups.
5. Have each group select their favorite jingle (or have the whole class select one).
6. Have the students write, in their own words, a claim being made in the jingle.
7. Have students turn the claim into a question.
8. Then have students discuss and collect personal experiences with the claim. (The teacher may need to help students get rolling on this.)
9. Students form a testable, educated guess as to whether the claim is true or not with the information collected.
10. Students will then design a way to test the product claim.
11. Have each group share what they have come up with.
12. Remind students that on their own projects, they need to move on to performing the experiment, observing and recording data, organizing the results to show patterns, drawing conclusions, and revising the hypothesis if necessary.

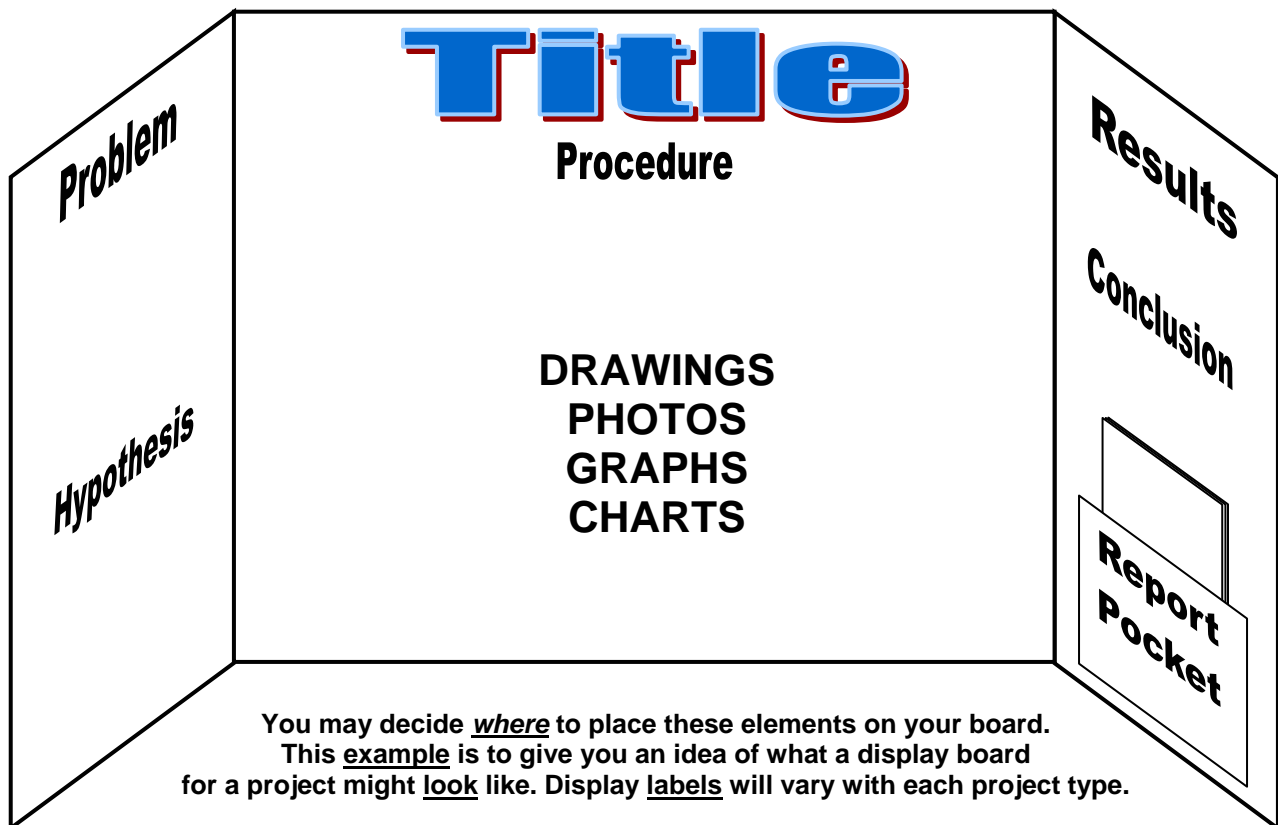
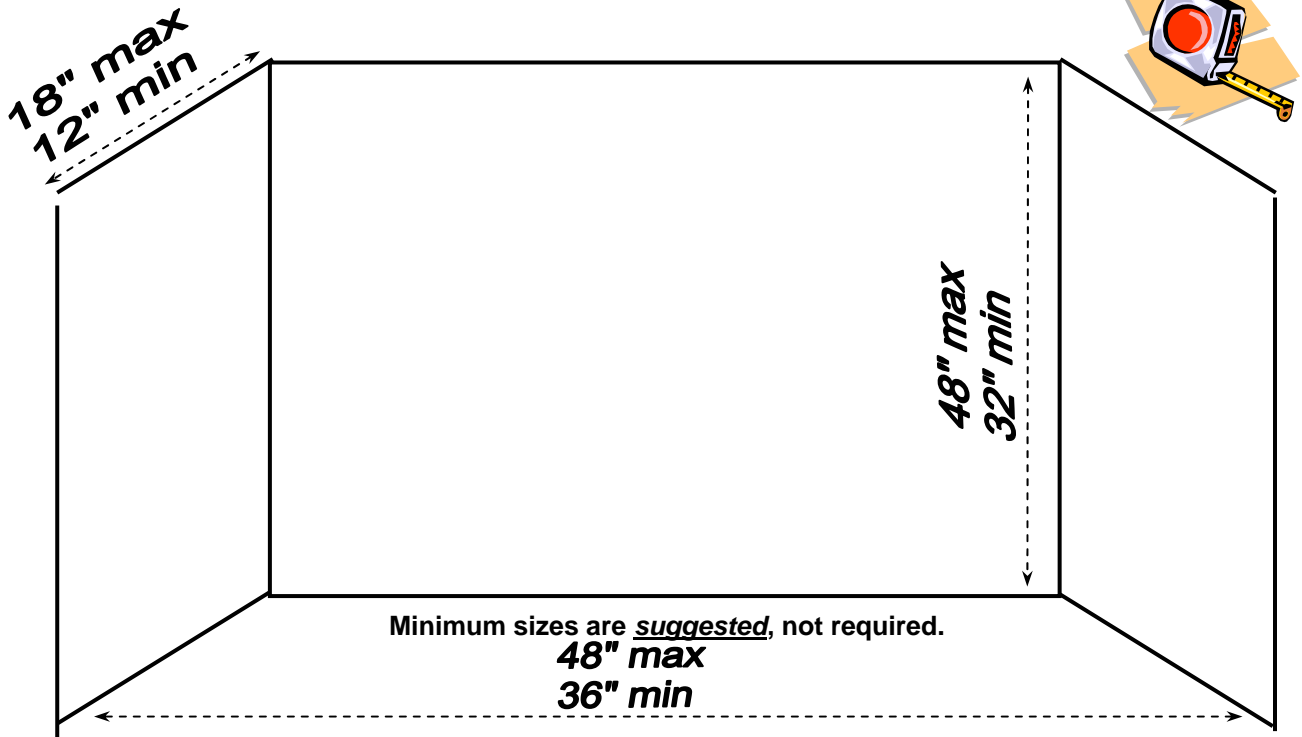


** Make sure that projects do not expose personal family information.*

DISPLAY SIZE & SET-UP

This page is also included in Student Information Packets.

FOR SCHOOL SITE AND IUSD SCIENCE FAIRS

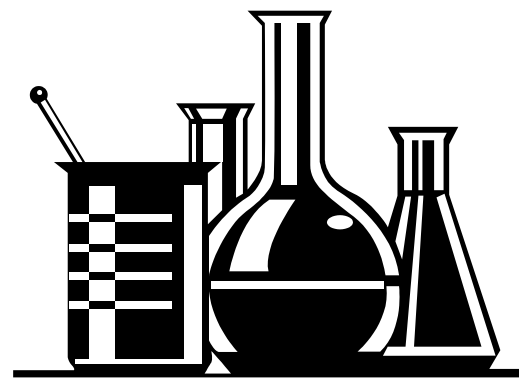


LBUSD

DISTRICT LEVEL

SCIENCE FAIR

INFORMATION



The district level science fair provides a unique setting where selected student projects from elementary through high school are displayed and viewed in a common public area. Projects are reviewed by local scientists, professionals, and dignitaries and receive individual oral and written feedback. All students receive recognition for their work and each participating school will receive an engraved plaque. Rather than being competitive in nature, the district level fair is a showcase of the very best LBUSD science projects from the schools. It is intended to *celebrate the achievement* of all the outstanding students chosen as the best at their schools.

Specific details about each year's District Science Fair are sent to each school in the fall.

Those schools participating in the district level fair must choose a Coordinator (teacher, parent, administrator, etc.) to head up a school site team or committee which will be responsible for:



- Notifying staff, students, parents, and community about the fair.
- Encouraging staff, student, and parent communication.
- Determining how to choose projects to be displayed at the district level fair (there *will* be a limit). (See Teacher Appendices section of Science Fair Handbook for related forms and other helpful information.)
- Monitoring the setting up and taking down of projects for your school, making sure parents and students know about the requirement to leave all projects in place from 9:15 a.m. to 12:15 p.m.
- Providing for supervision of projects and students during the fair.
- Working closely with the District Science Fair Committee.

Schools are encouraged to take advantage of this valuable opportunity for our students to interact with their peers and members of the community.



LOS ANGELES COUNTY & CALIFORNIA STATE SCIENCE FAIRS

The **Los Angeles County Science Fair** is held annually in the Los Angeles Convention Center in mid-April and is always an exciting and educational experience. Any school wishing to participate must **pre-register by the prior December** through the L.A. County Office of Education. The top



three projects in each category at the county science fair are invited to participate in the **California State Science Fair**, which is generally held during the third week in May. An average of six hundred projects in both the Junior (7th–9th grades) and Senior (10th–12th grades) divisions are on display at each fair. The categories chosen for the LBUSD Science Fair are identical to the categories selected for the county and state fairs. The creativity, dedication, and novel experimentation displayed are astounding. Teachers planning their first science fair would benefit from visiting the county science fair.

The Los Angeles County and California State Science Fairs display and judge the best projects produced by individual schools in the area. Projects developed under the guidance of a single teacher may be entered **directly** into the county science fair, even if their school has no formal science fair and regardless of whether they chose to enter the LBUSD science fair. A maximum of thirteen individual displays and one team display (consisting of two to four members) **per school** are allowed to participate each year.

For details, schedules, judging worksheets and much more, visit their official websites:

Los Angeles County Science Fair
www.lacoe.edu/sciencefair

California State Science Fair
www.usc.edu/CSSF/

SECONDARY SCIENCE FAIR



TEACHER FORMS LIST

FOR SCHOOL SITE SCIENCE FAIR

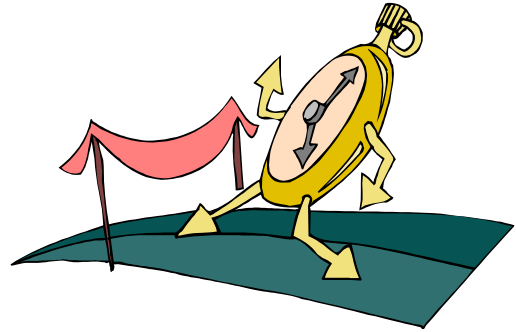


FORM	SUGGESTED PURPOSE & USE <i>Forms are listed in order of sequential use.</i>
Teacher Timeline for School Site Science Fair	To help you plan and organize the activities and essential responsibilities leading up to your school science fair
Introductory Letter to Students & Parents	To introduce the science fair to students and parents and stir up their enthusiasm for it This is the cover letter for <u>Project Selection Form</u> .
Project Selection Form	A preliminary form for students to submit their science question (or problem) and choose what type of project they wish to do to answer (solve) it Parent's or Guardian's signature is requested. When students turn these forms in to you, you will check to see if their question/problem is appropriate for (1) the science fair, and (2) the project type they selected. If not, you will be able to make adjustments at the beginning of the process.
Project Log	Log information from <u>Project Selection Forms</u> turned in to you and keep track of how students are doing.
Project Approval Form (half sheets – color suggested) <u>A</u> - With student packet attached <u>B</u> – Includes download instructions for student packet	This form gives the student approval to go forward with the project. Choose which form to use depending on your school and/or parent resources. Use <u>A</u> if you will be copying the student packets for your students. Attach this <u>Project Approval Form</u> to the front of the appropriate project type <u>Student Information Packet</u> , along with student's original <u>Project Selection Form</u> . Use <u>B</u> if you will be asking them to download the student packets themselves from our district Science Fair web page. Instructions and the link are on the form. Attach this <u>Project Approval Form</u> to the front student's original <u>Project Selection Form</u> .
Student Timeline for Science Fair Project	To keep students on target with the due dates you set up for your school science fair
Student Final Checklist for Project Completion	Send as you near the due date for projects to be turned in. This is a user friendly check-off list so nothing will be overlooked by the students.

TEACHER TIMELINE

for

SCHOOL SITE SCIENCE FAIR



BEFORE THE FAIR

Date
Due

1. Form a Science Fair Team. Be sure to select lead and back-up coordinators.	
2. Ask for parent, PTA, principal, and custodial support.	
3. Inform the school and public libraries and other resource people.	
4. Set a date and secure a location at your school for the fair.	
5. Develop due dates for the <i>Student Timeline for Science Fair Project</i> .	
6. Send <i>Introductory Letter to Parents</i> . (You can use the one in this handbook or create your own.) Attach a <i>Project Selection Form</i> .	
7. Download and use all or part of the <i>Student Information Packets</i> to fit your needs, or ask students to download their own. There are five separate packets based on project types – Career Shadow, Experiment, Invention, Rube Goldberg Device and Scientific Survey. You may also wish to download the <i>Science Fair Information Folder</i> .	
8. Monitor student progress.	
9. Determine how projects will be selected for the District Science Fair.	
10. Determine the type of recognition students will receive at school.	
11. Publicize the fair to your school's community. Invite parents, staff, district officials, and community to the school science fair	
12. Arrange for the set-up of projects at your school science fair.	
13. Allow classroom time for presentations.	
14. Schedule daytime viewing of projects by other grades / classrooms / schools. Provide student representatives to monitor and/or present projects.	
15. Determine how to get projects back to the students.	

AFTER THE FAIR

Date
Due

1. Send thank you notes to those who helped.	
2. Recognize student achievement.	
3. Evaluate the site science fair with your Science Fair Team.	
4. Begin preparations for the District Science Fair.	

SECONDARY SCIENCE FAIR

INTRODUCTORY LETTER TO STUDENTS & PARENTS

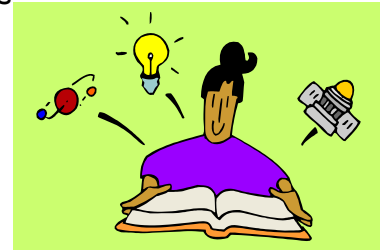
Dear Students and Parents,

The science fair project is a wonderful culminating activity for you to experience science as a scientist, not just a science student. This activity draws upon both basic and advanced science, math and writing skills you have learned over the years. This project will be graded primarily on your application of the Scientific Method or the Engineering Design Process (inventions) with neatness and creativity being considered secondarily.

The science fair project involves solving a problem/question for which you do not know the answer. To solve the problem you will use the Scientific Method (for experiments and other project types) or the Engineering Design Process (for inventions). The written report describes your steps in using one of these methods.

We are confident the following benefits will result from your participation in the Science Fair:

- ☆ Reinforcement of grade level science, literacy and math skills
- ☆ Fostering curiosity, awareness, and creativity
- ☆ Increased scientific knowledge
- ☆ Learning research techniques
- ☆ Growth in ability to work independently
- ☆ Having fun with science!



In addition to the opportunity to work on a project, the Science Fair provides students with an increased awareness of science and an opportunity for them to develop positive attitudes about themselves and their work. The science project allows students to use critical thinking and problem solving skills learned in science and in math.

Attached is a Science Fair Project Selection Form. Please sign the completed form which the student will turn in to me by the date listed at the top of the form.

For more details of how to complete a specific "project type" (i.e., career shadow, experiment, invention, Rube Goldberg device or scientific survey), the related student packets can be found at www.lbusd.k12.ca.us. Click on "S" in the A-Z index at the top, then click on "Science". Then click "Upcoming Events - Annual Science Information" and on the left side bar click "Parent Resources" or go to: http://www.lbusd.k12.ca.us/Main_Offices/Curriculum/Areas/Science/parent_resources.cfm

*"Science is not merely a collection of facts printed in an encyclopedia.
It is a living adventure of the human spirit." (Source unknown).*

Teacher's Name

Date

SECONDARY SCIENCE FAIR

PROJECT SELECTION FORM

Return this form to your teacher by _____

Student's first and last name (printed) _____

Grade _____ Room # _____ Teacher's name _____

★ Parent's/Guardian's signature _____ Date _____

MY ORIGINAL QUESTION I AM TRYING TO ANSWER, OR PROBLEM I AM TRYING TO SOLVE IS: _____

My project will be (please check one):

- CAREER SHADOW** (6th, 7th & 8th grades ONLY) - You will learn about a science related career by shadowing one or two mentors currently working in a field of science of your choice. Before you begin this type of project, you will need to prepare by reading thoroughly the Career Shadow Rubric and the Career Shadow guidelines. These can be found in the Secondary Student Information Packet - Career Shadow.
- EXPERIMENT** (6th through 12th grades) - You will conduct an experiment to find the answer to your question/problem. Using The Scientific Method will take you through the correct process of asking a question, doing some preliminary research, making a hypothesis (your best guess at how it will turn out), planning and conducting your experiment, and analyzing your results.
- INVENTION** (6th through 12th grades) - Everyone is an engineer! You will use science, math, and creativity to dream up and design an object or a process to solve a real life problem. Using The Engineering Design Process will take you through all the necessary steps: asking a question about an everyday problem, brainstorming solutions, planning, and creating and testing your invention.
- RUBE GOLDBERG DEVICE** (6th, 7th & 8th grades ONLY) - You will design and build a device with at least 8 energy transfers per person that uses at least 4 different types of energy to accomplish a realistic task. To accomplish this project, you will need to refer to the Rube Goldberg Device Rubric and the Rube Goldberg Device guidelines. These can be found in the Secondary Student Information Packet - Rube Goldberg Device.
- SCIENTIFIC SURVEY** (7th grade ONLY) - You will design a science and/or health project using carefully constructed Scientific Surveys for gathering data related to consumer products or opinions as part of the experimental procedure. Other special elements that will need to be included in this project type can be found in the Secondary Student Information Packet - Scientific Survey.

TO:

Student's Name

SECONDARY SCIENCE FAIR
PROJECT APPROVAL FORM

Student Information Packet attached

Excellent!

Your Science Project has been approved! It looks you are on the right track to answer your question or solve your problem!

The type of project you have chosen is:

<input type="checkbox"/> CAREER SHADOW (6 th , 7 th and 8 th grades ONLY)	<input type="checkbox"/> EXPERIMENT (6th through 12 th grades)	<input type="checkbox"/> INVENTION (6th through 12 th grades)	<input type="checkbox"/> RUBE GOLDBERG DEVICE (6 th , 7 th and 8 th grades ONLY)	<input type="checkbox"/> SCIENTIFIC SURVEY (7 th grade ONLY)
--	---	--	---	---

Please read the attached Science Fair Student Information Packet for your project type. It contains written instructions for you to be able to complete your written report and your display board.

Reminder: Your completed project is due on _____.

TO:

Student's Name

SECONDARY SCIENCE FAIR
PROJECT APPROVAL FORM

Student Information Packet attached

Excellent!

Your Science Project has been approved! It looks you are on the right track to answer your question or solve your problem!

The type of project you have chosen is:

<input type="checkbox"/> CAREER SHADOW (6 th , 7 th and 8 th grades ONLY)	<input type="checkbox"/> EXPERIMENT (6th through 12 th grades)	<input type="checkbox"/> INVENTION (6th through 12 th grades)	<input type="checkbox"/> RUBE GOLDBERG DEVICE (6 th , 7 th and 8 th grades ONLY)	<input type="checkbox"/> SCIENTIFIC SURVEY (7 th grade ONLY)
--	---	--	---	---

Please read the attached Science Fair Student Information Packet for your project type. It contains written instructions for you to be able to complete your written report and your display board.

Reminder: Your completed project is due on _____.

TO:

 Student's Name

SECONDARY SCIENCE FAIR
PROJECT APPROVAL FORM

Please download your Student Information Packet.

Excellent!

Your Science Project has been approved! It looks you are on the right track to answer your question or solve your problem!

The type of project you have chosen is:

<input type="checkbox"/> CAREER SHADOW (6 th , 7 th and 8 th grades ONLY)	<input type="checkbox"/> EXPERIMENT (6 th through 12 th grades)	<input type="checkbox"/> INVENTION (6 th through 12 th grades)	<input type="checkbox"/> RUBE GOLDBERG DEVICE (6 th , 7 th and 8 th grades ONLY)	<input type="checkbox"/> SCIENTIFIC SURVEY (7 th grade ONLY)
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Please download and read the Science Fair Student Information Packet for your project type. It contains written instructions for you to be able to complete your written report and your display board. Go to:

http://www.lbusd.k12.ca.us/Main_Offices/Curriculum/Areas/Science/parent_resources.cfm

Reminder: Your completed project is due on _____.

TO:

 Student's Name

ELEMENTARY SCIENCE FAIR
PROJECT APPROVAL FORM

Please download your Student Information Packet.

Excellent!

Your Science Project has been approved! It looks you are on the right track to answer your question or solve your problem!

The type of project you have chosen is:

<input type="checkbox"/> CAREER SHADOW (6 th , 7 th and 8 th grades ONLY)	<input type="checkbox"/> EXPERIMENT (6 th through 12 th grades)	<input type="checkbox"/> INVENTION (6 th through 12 th grades)	<input type="checkbox"/> RUBE GOLDBERG DEVICE (6 th , 7 th and 8 th grades ONLY)	<input type="checkbox"/> SCIENTIFIC SURVEY (7 th grade ONLY)
--	---	--	---	---

Please download and read the Science Fair Student Information Packet for your project type. It contains written instructions for you to be able to complete your written report and your display board. Go to:

http://www.lbusd.k12.ca.us/Main_Offices/Curriculum/Areas/Science/parent_resources.cfm

Reminder: Your completed project is due on _____.

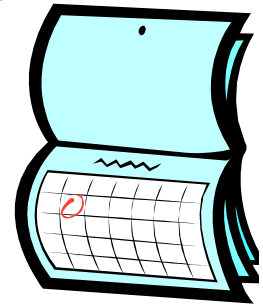


SECONDARY SCIENCE FAIR

STUDENT TIMELINE

for

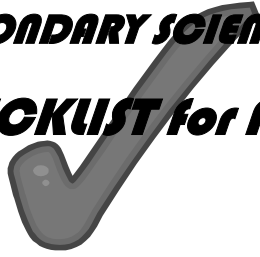
SCIENCE FAIR PROJECT



TASK	Teacher's Date Due	Teacher's Initials	Parent's Initials
1. Choose, and submit for teacher approval, a topic question/problem to investigate			
2. Do preliminary research. Collect and read books and other resources for your topic.			
3. Develop a hypothesis (your best guess) based on your preliminary research.			
4. Decide on the procedure that you will use to test your hypothesis.			
5. Make a list of your materials. Gather your materials.			
6. Conduct your experiment or scientific survey, build and test your invention or Rube Goldberg Device, or shadow your science career mentor. Record data.			
7. Organize your data and results.			
8. Write your conclusion based on your results. Write a "real world" application of what you learned.			
9. Write a draft of your science fair report.			
10. Proofread your draft or have someone else proofread it. Type or write a final copy of your report.			
11. Plan the layout of your display board. Be sure you include all the mandatory subtitles for <u>your project type</u> . Assemble your science fair display board and display items.			
12. Turn in your science fair project (report, display board and display items).			
13. Take your science fair project home.			

SECONDARY SCIENCE FAIR

STUDENT FINAL CHECKLIST for PROJECT COMPLETION



Date _____

Dear Students and Parents,

The purpose of this letter is to provide a checklist of procedures that need to be followed when turning in and taking home your science project. If any questions remain after reading this, call me at _____ before or after school.

Before bringing the science project to school, the student must check to see that:

- The project display board and display items are sturdy. The display board “wings” are prepared as discussed in class. The display board does not lean or bend.
- Paper, labels, and letters on the display board are flat and firmly in place. There are no tacks, pins, tape, or staples on the display board--- only strong glue.
- Student’s name, grade level, period, teacher’s name, school name, and date (including year) are on the *back of the display board in the upper right hand corner.*
- The report is in a report cover with 3-hole fasteners.
- The report is in a “pocket” on the front of the display board.
- Student’s name, grade level, period, teacher’s name, school name, and date (including year) are *in the upper right hand corner on the outside of the cover.*
- Student has the original report inside the report cover and a *copy* at home or on the computer.
- Any display items other than the display board and the report are in a paper bag with the student’s *name and other required information* on the outside of the bag.
- Bring a UL approved extension cord for displays requiring electricity.
- Display items with many pieces (i.e. crystals) are not loose. They are in a display case or other “holder.”
- NO harmful materials or substances, fire, living animals or animal remains are part of the project display. (Use drawings and/or photographs to represent those items instead.)
- The project is completed **before** bringing it to school.

The project must be brought to school on the morning it is due. The project must be in class before school begins, unless other arrangements have been made. Students not coming to school that day must arrange for the project to be delivered. Students with expensive or very fragile display items may make arrangements with me to bring those items later. Put a reminder note to me on your paper bag.

Students must **take projects home by** _____ . After this date, the projects will be recycled unless other arrangements have been made.

The **project is due the morning of** _____ , for exhibit at our school Science Fair on _____.

The staff, students, and I are looking forward to seeing you at our school SCIENCE FAIR!

Teacher: _____ Room _____