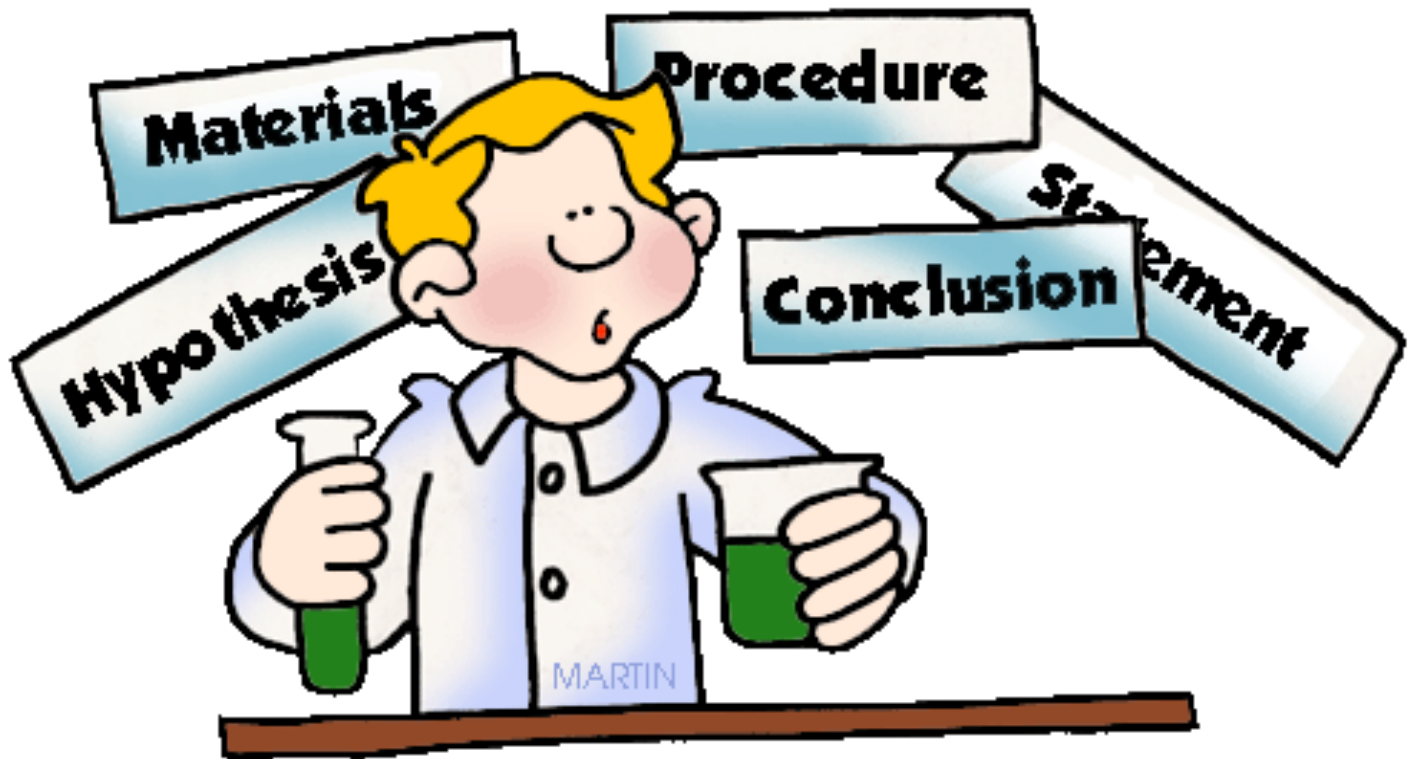


CSD SCIENCE FAIR HANDBOOK 5TH & 6TH GRADE



phillipmartin.info



“Too often we give children answers to remember, rather than problems to solve.”

-Roger Lewin

ORGANIZING YOUR SCHOOL FAIR & PARTICIPATING IN THE DISTRICT FAIR





RECOMMENDATIONS FOR SCHOOL SCIENCE FAIRS

1. Start Early. On average, it takes about 6 weeks for students to complete a science fair project. Make sure there is ample time provided.
2. Be explicit in your expectations from students and parents. Ensure that you've let the parents know that the work should only be done by the student.
3. Send home a packet for parents, which should include a letter explaining the process, rubric, timeline, safety guidelines, list of projects to avoid, and abstracts from quality projects.
4. Post a timeline in your classroom, or view the timeline often with the students.
5. Give the students a science fair notebook where they can organize all their work.
6. Have students fill out SLVSEF paperwork PRIOR to experimentation. (Pg. 6-8)
7. Have students present their project to the class, and use the provided scoring rubric. This eliminates the need for judges, and improves accuracy in the grading of projects. :)
8. Feedback is an important part of the learning process, so give the kids their scoring rubrics back with any positive feedback or improvement feedback.
9. There are many different options for how to arrange your fair. We recommend that it become a part of your school day, and that students set up their display boards in their classrooms. Parents, and other classes can be invited to come and view the work of your students. This is a great for students as it offers multiple opportunities to communicate their problem, procedures, and results. Fairs can be held in the evening, if there is a desire to involve more parents. (See standards-based science fair article pg. 9-13)
10. Give visitors "Stupendous Scientist" cards. When they like a project, they fill out the card and give it to the child.
11. Check with EBL to determine how many district science fair slots your school will have. Choose the projects that were top scorers according to the scoring rubric to participate in the district fair.

SUGGESTED TIMELINE

September:

- Determine the date(s) and time(s) of your school fair. **Remember that it needs to be completed by the first week in February in order for your students to participate in the district fair.**
- Determine how many students will be participating, and decide where the fair will be held, if not in classrooms.
 - Work with your custodian if you are having your fair after school hours, if having your fair in a non-classroom setting, and if you need extra tables, or other supplies.
 - Arrange for a location for an awards ceremony to congratulate all students, and to announce those who will advance to the district fair.
- Send home the parent information packet.
- Send a letter to local businesses to gather incentives for students who participate in the fair.
- Order any ribbons/trophies/or certificates that will be needed.
- Parent letter & media release form due

October:

- **Register your school science fair by visiting <http://tinyurl.com/elementaryscifairregistration> before the last week in October.**
- Project proposal forms due.
- Research and Bibliography due.
- SLVSEF Paperwork Due - Students must complete this paperwork PRIOR to experimentation as part of SLVSEF safety and rule guideline.

November:

- Hypothesis and Materials forms due.
- Experimental Design due.

December:

- Student experimentation and data collection begins.
- Send out invitations to the school science fair.

January:

- Observational data due
- Graphs/visual form of data due
- Analysis and Conclusion due
- Display board due
- Hold school science fair.

One week before Fair:

1. Copy grading rubrics
 2. Check with custodian on any set-up that needs to happen
- Copy participation certificates for each student
 - Ensure that ribbons, trophies, etc. are ready to go.

Day of Fair:

- Set up
- Monitor
- Be sure that all students receive many project visitors
- Tabulate scores to determine finalists who will advance
- Hold awards ceremony - give District Fair information and registration packet to those advancing.
- Clean up.

After the Fair:

- Publicize winners
- Get a list of the finalists to the CSD Science Team.
- Reflect on changes for next year.
- **Finalists from school fairs will need to register at least 5 days in advance for the district fair at: <http://tinyurl.com/canyonssciencefairregistration>**
- **Arrange for a volunteer (teacher or parent) to chaperone any of your students who will advance to the regional SLVSEF fair.**



TIMELINE

Students are responsible for keeping a science fair notebook, where all information must be kept. The following forms will be given to each student to add to their notebooks. Each form must be presented to and approved by the teacher and the parent. Due dates for each of the forms are as follows:

_____ Project Proposal

Description of topic and question that will be investigated

_____ Research

Description of what needs to be investigated, list of all sources, and information found at each source

_____ Salt Lake Valley Science and Engineering Fair paperwork completed

_____ Hypothesis & Materials

Predict the outcome of the experiment based on the research, and provide a list of materials that will be used in experimentation.

_____ Experimental Design

List of step-by-step instructions for your experiment.

_____ Observations & Data Collection

All data that will be collected during experimentation.

_____ Graphing

A visual representation of the data collected.

_____ Analysis & Conclusion

Reviewing and analyzing data to determine an appropriate conclusion.

_____ Preparing Display Board

_____ School Science Fair

IMPORTANT DEADLINES

Register your school science fair by visiting <http://tinyurl.com/elementaryscifairregistration> by the **last week in October.**

You must have your school fair completed **by the first week in February.**

Finalists for your school fair must register for the district fair **at least 5 days in advance at <http://tinyurl.com/CanyonsScienceFairRegistration>.**





Salt Lake Valley Science & Engineering Fair Science Fair Form – Elementary & Junior Division

Form for the Salt Lake, Murray, Tooele, Park City, Granite, Canyons School Districts,
Charter and Salt Lake Catholic Diocese



Students in grades 5-8 in the Salt Lake, Murray, Tooele, Park City, Granite, and Canyons Districts, as well as Charter and students from the Salt Lake Catholic Diocese who would like to participate in the Salt Lake Valley Science and Engineering Fair (SLVSEF) must complete all three pages of this form to become eligible to compete. SLVSEF participants will also be **required** to register online at <http://slvsef.org> by **March 1, 2013**. Forms must be submitted to your district representative in order to advance to SLVSEF.

Student Information

Student's Name _____ Grade Level: (Check One) 5 6 7 8

Home Phone _____ Parent/Guardian Email _____

Is your project a team project? If so, **all members must be listed below.**

Student's Name _____ Grade Level: (Check One) 5 6 7 8

Home Phone _____ Parent/Guardian Email _____

Student's Name _____ Grade Level: (Check One) 5 6 7 8

Home Phone _____ Parent/Guardian Email _____

Project Information

Project Title _____

School _____ District _____

Teacher Name (first & last name) _____ Teacher's Email _____

Parent/Adult Supervisor's Name _____ Phone _____

My Question: _____

The main supplies I will need for my experiment are: _____

Procedure:

(Please write a detailed explanation about what you plan to do for your experiment. Attach extra paper, if needed):

SCIENCE FAIR PROJECT RULES

My Experiment will Involve the Following (check all that apply. *If none apply, please leave blank but still submit*):

Human Subjects

All human research projects must be **reviewed** and **approved** by a science teacher, or 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. cerevisiae*, 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 Biosafety 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.sciserv.org/isef/rules/isefrule.asp>

If your science fair project will include any of the subjects listed above, you must receive approval before you begin experimentation and obtain the signatures of those approving your project.

Science Teacher Approval

Date

Science Teacher Approval

Date

Other (doctor, biomedical scientist, etc)

Date



A Standards-Based Science Fair

A revamped fair places less emphasis on competition and more on communication

By Peter Rillero



Imagine a science fair with hundreds of smiles, no problems recruiting judges, parent involvement at appropriate levels, and children engaged in rich discussions of their full-inquiry projects. These are just some of the benefits of the standards-based science fair.

In standards-based science fairs, children learn more about what they are interested in. They deepen understandings of how science works and improve inquiry skills—including the ability to communicate and share research results. Parents learn more about science inquiry and their child's science abilities.

The standards-based science fair builds on the strengths of traditional science fairs, but by having students compete against standards rather than against other students, the projects become more student-centered. The classroom format of this science fair features many opportunities for students to communicate about their full inquiry projects.

Science Fair Challenges

I have observed science fairs as a former science research teacher (where I had a special class for students to do science fair projects), as an evaluator for three Intel International Science and Engineering Fairs (ISEF), as a parent assisting with science fair projects, as a judge at elementary school science fairs, and last, as a science fair book author (Rillero 2000). In these roles, I have also observed challenges in elementary school science fairs, such as an abundance of volcanoes and solar system models. It is not clear why so many students build models when inquiry is not stressed. Perhaps they are thinking about their projects as museum displays or maybe their parents built models for their own science fair projects and guide them in this direction.

Many researchers consider children describing their work and research results with others as essential parts of inquiry experiences (Jennings and Mills 2009). However, elementary school science fairs often lack opportunities for children to communicate their work. When the children put their boards in the multipurpose room, because of supervision and idleness issues, it is often not practical to have them wait by their board for a few hours while judges make their rounds. Thus, at your typical elementary school science fair, judges judge boards; they don't talk to children. Children lose out on an opportunity to describe their work, answer questions, and receive verbal feedback and praise.

In a typical science fair, the judges' scores are typically not shared with children. Perhaps organizers don't want children to receive blunt criticisms of their work or they have concerns about low reliability among judges. This is a lost opportunity for children to receive adult advice for their project's improvement and their inquiry skill development.

Judges cannot discern what the child did versus what the parent did because they never talk to the children.

Competition can help some students strive to higher levels of performance. At the elementary level, however, I believe student-against-student competition and declaring a few winners amplifies science fair problems and makes science seem elitist rather than an endeavor for all. There is a way to fix the problems with traditional science fairs, enhance the full inquiry benefits, and give students rich opportunities to discuss their work.

An Important Change

One fundamental change fixes many science fair problems and creates new possibilities to enhance the inquiry experience and community of sharing: Shifting from children's projects competing against other children's projects to children, with parental help, competing against benchmark standards.



PHOTOGRAPH COURTESY OF THE AUTHOR

A student measures his plants at home.

In norm-referenced assessments, students are compared to other students, providing information such as, "her science test score is better than 85% of the other U.S. students in fifth grade." Traditional science fairs are norm referenced; the few winners are selected because their scores are higher than other students.

Many problems are eliminated when the science fair shifts to a criterion-referenced approach, in which student achievement is determined with reference to established criteria or standards. The criteria for levels of inquiry achievement are set, and if children have enough points, they earn recognition. The criteria come from national and state inquiry standards. The term *standards* in the standards-based science fair is a double entendre as it refers to (a) the standard or criteria used and (b) that the criteria comes from state and national standards.

The shift to the criterion-referenced approach is powerful because a child's success is no longer based on the quality of other projects. When children and parents know what to do because they are given clear rubrics (Figure 1, p. 34), the majority of children will do full-inquiry projects, communicate their work, earn recognition, and feel great about their work. The standards-based science fair establishes the idea that science isn't just for a few: It is for everyone.

In traditional science fairs the problem with parent-centered projects is that other deserving students, with child-centered projects, may not earn recognition as a result. With the standards-based science fair, it doesn't affect the other students if another parent does way too much because student projects are not being compared. These other students (and their parents) don't end up feeling that they were cheated. Science fairs, as a result, seem much fairer.

Child-Centered Projects

With the standards-based science fair the goal is to redirect parent involvement so it is more appropriate for

developing student inquiry abilities; projects should be child- not parent-centric. Ideally the project should come from the child's interests. Parents are still important to the process; they help to obtain needed materials and they ensure that the project is done safely. Children should not (a) work with hazardous, controlled, or regulated substances; (b) experiment on vertebrates; or (c) employ procedures that would place them in danger.



Teachers are also involved in making the projects child-centered. In-class full-inquiry activities give children an understanding of what they are going to be doing at home. Flannagan and McMillan (2009) have a useful four-question approach to facilitate inquiry. Students ask (a) Which

Figure 1.

Standards-based science fair rubric for grades 4–6.

Standards-Based Science Fair Grades 4–6

Full Inquiry Standards Rubric

Student Name _____ Teacher _____ Grade _____

Instructions to Scorer: For each item circle 0, 1, or 2. Do not leave any items unanswered.

0 = No 1 = Some Evidence 2 = Yes

1. Is the investigation guided by a question?	0	1	2
2. Is a hypothesis proposed that gives a possible answer to the guiding question?	0	1	2
3. Are the procedures described in sufficient detail to allow easy replication by another person?	0	1	2
4. Is there evidence that a well-planned experiment was conducted? (<i>Note:</i> Experiments have comparisons, such as how plants grow under different conditions or experiments comparing different commercial products.)	0	1	2
5. Was appropriate equipment used (e.g., rulers, scales, thermometers, stopwatches, or magnifiers) to help collect data?	0	1	2
6. Did the student(s) measure and present quantitative data?	0	1	2
7. Are the data displayed in an easy-to-read graph and/or table?	0	1	2
8. Are the data analyzed to seek an answer to the guiding question or to evaluate the hypothesis? (For this item it is okay for the student to conclude that the results are inconclusive.)	0	1	2
9. Is the project presented in a manner that makes the purpose, procedure, and results clear?	0	1	2
TOTAL POINTS			

Circle the score below:

0–9 Falls far below inquiry standards

10–13 Approaches inquiry standards

14–17 Meets inquiry standards (Honorable Mention)

18 Exceeds inquiry standards (Award for Exemplary Inquiry)

Additional Teacher Comments:

materials are available? (b) What does X do and how does it act? (c) How can I change the materials to affect the action? and (d) How can I measure or describe the response of X to the change? Going through these questions helps students develop an experiment where a variable is changed.

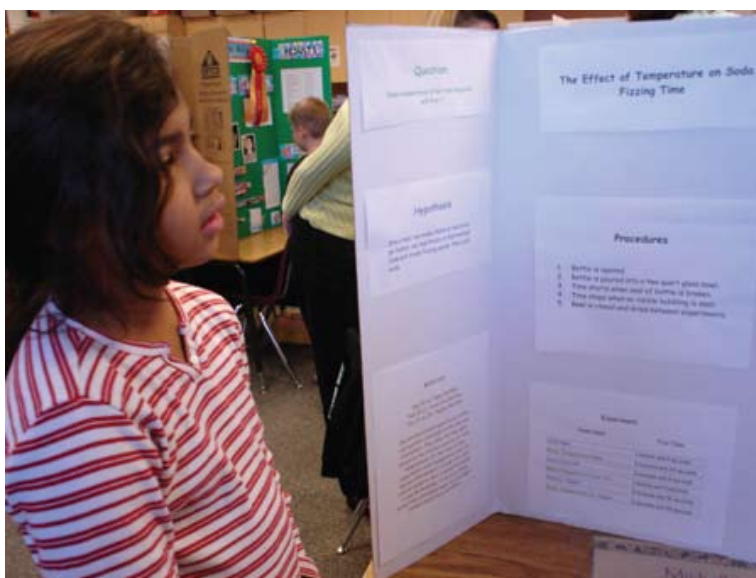
In all science research, choosing a problem that is important and can be solved is the biggest challenge. To assist their work, children may be given some structure, such as a fill-in-the-blanks problem statement, such as: "What is the effect of _____ on _____?" If children are interested in the growth of plants, they could investigate: "What is the effect of coffee grounds on radish growth?" If they are interested in sports, they might investigate: "What is the effect of temperature on the height of a bounce of a baseball?"

The fill-in-the-blanks problem supplies the structure for students to develop a student-centered, clear, and answerable problem statement.

When assigning the projects, teachers should also give children dates for the submission of key parts of the project, such as problem statements and procedures, to make sure the projects are appropriate and progress is being made for completion on the due date.

Emphasis on Student Communication

Because the projects are done at home, children have to communicate what they were trying to find out, what they did, and what they found out to school audiences. The science display board and possibly materials from the investigation become props to promote communication and discussion. In the standards-based science fair, there are multiple opportunities for students to share their work. They can do a whole-class presentation and one-on-one presentations, and they can present to teacher, student, and parent audiences. For example, at Gavilan Peak Elementary School (which my two sons attend) a few days before the science fair, children present their projects orally with their display boards to the entire class and teachers use the rubrics to evaluate the projects as they are presented. On science fair day, each class displays their science fair boards in their classroom, with the child who did the project at the board so he or she can talk with visitors. Visits for other classes and parents are pre-arranged, so that children get many experiences describing their work and their projects. Many variations on the communication plan are possi-



A student with her display board on science fair day.

PHOTOGRAPH COURTESY OF THE AUTHOR

ble. Larger schools might hold grade-level science fairs on different days. Some schools might hold their fairs in the evenings so more adults can attend.

Having a *classroom* science fair can help make the process more manageable. In traditional science fairs, students display their work in a large venue. Most schools have limited space, so projects have to be set up and taken down in a relatively short time to not affect other school functions. Instead, on science fair day children can set up their boards in the classroom and pre-arranged visits are conducted with other classrooms to learn about other projects and to communicate their work. These are designed to be like poster sessions at science conferences, where participants walk around, visit, and discuss the projects that they are most interested in. Children are given several blank "Kudos Cards" for the visits. When they like a project, they fill out the card and give it to the child as another way to say, "Way to go!" Parents are also invited to see the projects and this gives children another chance to communicate their problem, procedures, and results. On science fair day, the school community embraces the inquiry work of the children. There are hundreds of happy faces, and it is a celebration of science.

Teacher as Evaluator

Competing against standards as opposed to competing against other children means that only one person needs to judge each project. The most suitable person is the classroom teacher, who judges the project during the whole-class presentation prior to science fair day,

using the rubric. As the teacher evaluates the projects, she or he gets firsthand data about the inquiry abilities of the students. Later, the completed rubric is given to the child, and the child's project is given a ribbon with the color representing the level of inquiry achieved. The child can then seek to improve his or her project for another science fair, or use what is learned to do a different project.

Unlike with external judges, the teacher-evaluator can use the score as part of the student's science grade. The teacher-as-evaluator eliminates the traditional science fair challenge of recruiting enough judges, and training the judges, which results in scores that are reliable and consistent.

Clear Rubrics

The assessment of inquiry is different than traditional assessments that focus on science content knowledge; inquiry assessment focuses "on examining the *processes* of engaging in scientific knowing and learning" (Duschl 2003). Rubrics can make expectations clear, which guide the children's work and the teachers' evaluation (Brookhart, Moss, and Long 2008). Clear and simple rubrics show the standards of inquiry that are expected in the standards-based science fair. Figure 1 is a sample rubric that can be modified to fit state and district standards and goals (see NSTA Connection for rubrics for grades 1 to 3 and other materials).

Depending on the criteria, children are evaluated with a 0, 1, or 2 for each item on the rubric. The rubric is constructed from the national, state, or district standards. In this way the science fair is not only viewed as a tool for helping to achieve agreed-upon outcomes but it also provides a means for evaluating progress toward those outcomes. The rubrics help children, parents, and teachers know what must be done to achieve a high score. Plus, there is less confusion as to what a science fair project should be, because inquiry is the focus.

A Day of Celebration

Science fair projects can be a powerful tool to give children full-inquiry experiences fueled by explorations of their unique interests. The standards-based science fair has many improvements over the traditional science fair. Children discuss their work and answer questions, and ask questions about other children's work, turning science fair day into one of sharing and celebration of the accomplishments of all the children. ■

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Acknowledgments

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Connecting to the Standards

This article relates to the following *National Science Education Standards* (NRC 1996):

Teaching Standards

Standard A:

Teachers of science plan an inquiry-based program for their students.

Content Standards

Grades K–8

Standard A: Science as Inquiry

- Abilities necessary to do science inquiry
- Understanding about science inquiry

National Research Council (NRC). 1996. *National science education standards*. Washington, DC: National Academies Press.

NSTA Connection

For rubrics for grades 1 to 3 and other materials, visit www.nsta.org/SC1104.



Science Fair Awards



_____ is awarded this certificate for

School _____

Signed _____

Date _____

Science Fair Awards



_____ is awarded this certificate for

School _____

Signed _____

Date _____

SCIENCE FAIR: PARENT INFORMATION PACKET



SAMPLE PARENT LETTER

Dear Students and Parents:

It's time to start work on our school's Science Fair! Enclosed is a schedule outlining due dates and important information regarding your child's project. Ample time has been scheduled and work has been spread out, so students can complete the work at a comfortable pace.

This is a **major** project and will represent a **significant portion** of your child's grade for the next grading period(s). The primary objective of this project is to have students approach a problem scientifically. This includes:

1. Asking questions and forming hypotheses
2. Creating experiments to test those hypotheses
3. Organizing data and drawing conclusions
4. Writing about scientific research

The project must be **experimental** in nature as opposed to research oriented. In other words, students must do a test, survey, or experiment to determine the answer to their question instead of just looking it up in a book. We encourage students to pick topics that they are genuinely interested in, since they will be working on these projects for the next several months. Topics must also be "**original**" - something students do not already know.

Project guidelines state that all work must be done by the students; however, assistance may be provided by teachers, parents, etc. It is very difficult to work alone without the exchange of ideas, so we encourage you to brainstorm with your child on different ideas and possible topics your child may want to pursue. Students have been given lists of Science Fair Guidelines, a project timeline, lists of projects often done by students, and abstracts of projects from former regional science fair participants.

Please keep in mind that our school's Science Fair is the first step to participating in the District Science Fair. Students who are finalists in the school Science Fair will be participate in the Canyons School District Science Fair in February.

I am looking forward to working with you to make this a valuable learning experience for your child. I appreciate your support on this important project. As acknowledgement and part of your child's homework, please sign, date, and return the bottom portion of this letter by _____.

***Due:** _____

I have reviewed the Science Fair information and timeline with my child, _____,
(Printed Name of Child) and we understand the requirements for a successful Science Fair Project.

Parent Signature

Student Signature

In the event that my child is a finalist in our school science fair, I give permission for my my child's name to appear on the school website and in local newspapers.

Parent Signature

Date

PROJECTS OFTEN DONE BY STUDENTS

Projects should be experiments, NOT demonstrations and should reflect the student's own work and ideas. As an experiment the project is a collection and analysis of data. The following list outlines topics that are commonly seen at science fairs and ARE NOT necessarily unique ideas or projects. If your student does a similar project, make sure it is well thought out with a lot of data and multiple trials and has a creative twist.

- ✓ Effect of music/talking on plants
- ✓ Effect of light/dark/colored lights on plants
- ✓ Effects of different liquids on plants
- ✓ Effect of soda/coffee/etc. on teeth
- ✓ Effect of running/jumping/music/video games on blood pressure, etc.
- ✓ Strength/absorbency of paper towels
- ✓ Which is better? Brand wars (popcorn, soaps, fertilizers, batters, etc.)
- ✓ Basic maze running
- ✓ Effect of color on memory/emotion/mood/etc.
- ✓ Effect of color on food taste
- ✓ Optical illusions
- ✓ How music effects learning
- ✓ Color choices of gold fish
- ✓ Fingerprints and Heredity
- ✓ Hovercraft design
- ✓ Colonizing bacteria from doorknobs, hands, places around school
- ✓ Mentos and Coke

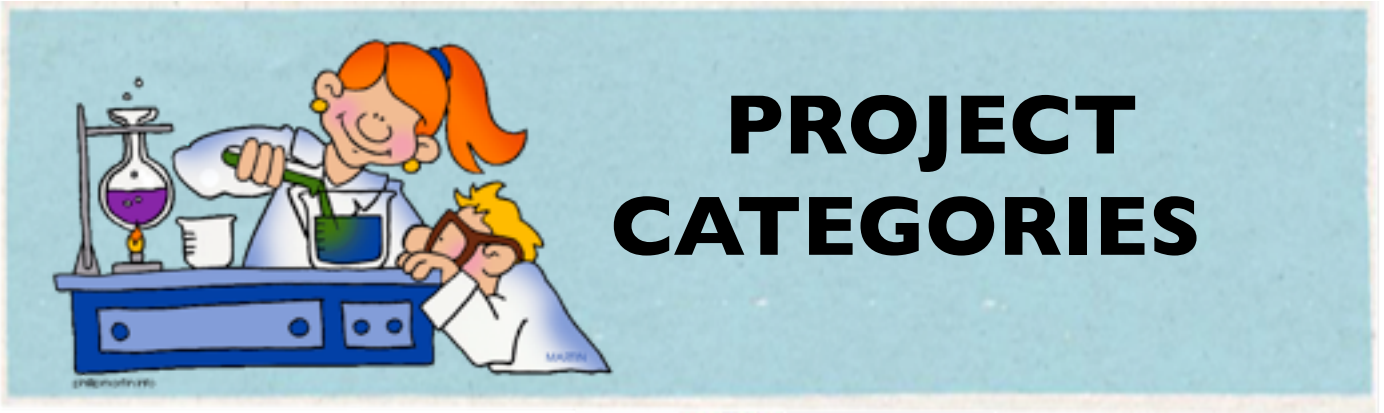


GUIDELINES & SAFETY

*Failure to abide by the guidelines will result in disqualification.



1. Individual projects must be the work of a single student.
2. Team projects must consist of no more than 3 participants.
3. All work presented must be the student's work.
4. Parents can be guides. Adults can supervise the investigation, but not take part except in cases of safety.
5. Parents should not participate in the preparation of the presentation, except to help with materials and act as an audience for practice.
6. Students must cite research, using the rules that the teacher provides.
7. Students must keep dated, step-by-step notebook recordings of the project including all references, procedures, dates, and other relevant materials.
8. Students may have procedures performed by a scientist or other person(s) that he/she did not perform. Credit must be given to the scientist or any other person performing any part of the student's research, collection of data, experimentation, analysis of data, etc.
9. Students should not work with hazardous, controlled, or regulated substances.
10. Students should not experiment on vertebrates (animals with backbones).
11. Students should never grow bacteria at home. All bacteria should be contained in a laboratory, where colonies can be properly disposed of.
12. Students should not employ any procedures that would place them in danger.



PROJECT CATEGORIES

- 1 Behavioral & Social Sciences
- 2 Biology & Biochemistry
- 3 Chemistry
- 4 Energy & Transportation
- 5 Engineering & Computer Science
- 6 Environmental Sciences
- 7 Medicine & Health Sciences
- 8 Physics, Astronomy & Math
- 9 Plant & Earth Sciences



TIMELINE

Students are responsible for keeping a science fair notebook, where all information must be kept. The following forms will be given to each student to add to their notebooks. Each form must be presented to and approved by the teacher and the parent. Due dates for each of the forms are as follows:

_____ Project Proposal

Description of topic and question that will be investigated

_____ Research

Description of what needs to be investigated, list of all sources, and information found at each source

_____ Salt Lake Valley Science and Engineering Fair paperwork completed

_____ Hypothesis & Materials

Predict the outcome of the experiment based on the research, and provide a list of materials that will be used in experimentation.

_____ Experimental Design

List of step-by-step instructions for your experiment.

_____ Observations & Data Collection

All data that will be collected during experimentation.

_____ Graphing

A visual representation of the data collected.

_____ Analysis & Conclusion

Reviewing and analyzing data to determine an appropriate conclusion.

_____ Preparing Display Board

_____ School Science Fair

PROJECT ABSTRACTS

[Behavioral & Social Sciences] Driving And Cell Phones

My project studied the effects of driving without distractions and compared this to driving with distractions such as talking or texting on a cell phone. I used the video game Mario Kart to help me with this test. Each "driver" would drive the course w/o distractions, then again while talking on a cell phone, then a third time while texting on a cell phone. My prediction was that drivers would be at their worst while texting and driving. I was correct.

[Behavioral & Social Sciences] Does Age Or Gender Affect Vocal Range?

This project is to determine whether vocal range is affected by a person's age or gender. Twenty volunteers were to sing notes they hear played on a piano to determine their vocal range. Then the results were compared with those of other gender or age groups. There were four groups: men over age 21, boys under age 9, women over age 21 and girls under age 9. The conclusion was that there is a difference in vocal range of gender groups and age groups

[Biology & Biochemistry] Evert Fresh Bags, Do They Really Work?

The purpose of this experiment was to test if the Evert Fresh Bags really work. The Evert Fresh Bags will be challenging the Paper bag, Plastic bag, and the plate. Each will be sitting out on the counter top for 2 1/2 weeks. Every other day they will be recorded and measured. At the end we will see who is in the best shape.

[Biology & Biochemistry] How The Effects Of Water's Salinity Effects The Growth Of Sea Monkeys.

This scientific experiment was used to see how the effects of the water's salinity would effect the growth cycle of Artemia aka Sea Monkeys. By using one group of Sea Monkeys as a control in their required salinity and then adjusting two other groups of Sea Monkeys by adding additional salt and adding additional water to dilute the salinity. This adjustment did effect their growth cycle.

[Engineering & Computer Science] Shoe Traction On A Gym Floor

The purpose of my project is, which type of shoe has the best traction on a gym floor? My procedure is, 1. gather the materials, a running shoe, a basketball shoe, a dress shoe, a hiking shoe, rope, gym floor, weight scale in pounds, and two three pound weights. 2. go to a gym floor for the test. 3. put the weights in the shoe and tie the rope between the shoe at the laces and the weight scale. 4. pull the shoe with the weight scale on the floor until it slips on the floor. 5. record the pounds of force it took to pull the shoe until it slipped. My hypothesis is that the running shoe will have the best traction on the gym floor. I think that because a running shoe has a medium sized tread which will create more friction.

[Medicine & Health Sciences] What Distracts You From Pain The Best?

What distracts you from pain the best? In this experiment, I had my subjects put their foot into a bucket of ice-cold water. While in the water, they would do different distracting things. When they couldn't stand it anymore, they would take their foot out. I timed them for each distraction, and the distraction that they had lasted in the water for longest was the best distraction for them. The distractions were at first, no distraction, then reading, watching television, playing video games, and listening to music. My hypothesis was that the best would be video games and the worst would be listening to music. The overall conclusion was that the best was video games, however the worst was reading. I think this is because you have to really focus on playing video games, while with reading, not so much focus is required.

[Medicine & Health Sciences] Taste Buds, Do They Affect Your Bmi

I counted my subjects taste buds and weighed and measured their height to determine if there was a relationship between the amount of taste buds they had and their BMI.

[Physics, Astronomy & Math] Does Hockey Stick Flex Affect The Speed And Accuracy Of A Slap Shot?

This science project explores the idea of whether hockey stick flex affects the speed and accuracy of a slap shot.

[Plant & Earth Sciences] The Grass Is Always Greener...

We live in a desert climate and I see people watering their lawns every day. I wanted to know if watering our lawns every day is the best use of our water resources. If not, what is.

[Plant & Earth Sciences] Apples To Acid

Do different fruit juices affect the preservation of apple slices?

We dipped sliced apples into four liquids: Fresca soda, lemon, lime, and orange juices. We also left a sliced apple plain. We thought the Fresca soda would preserve the apple the best because it was carbonated and it has real fruit juices. We conducted this experiment three times.

After the apples started to turn brown we observed them by taking photos. During the procedure we looked at the pictures to collect the data. Our hypothesis was not correct.



SCORING RUBRIC

Name _____ Partner _____ Class _____

Full Inquiry Standards Rubric

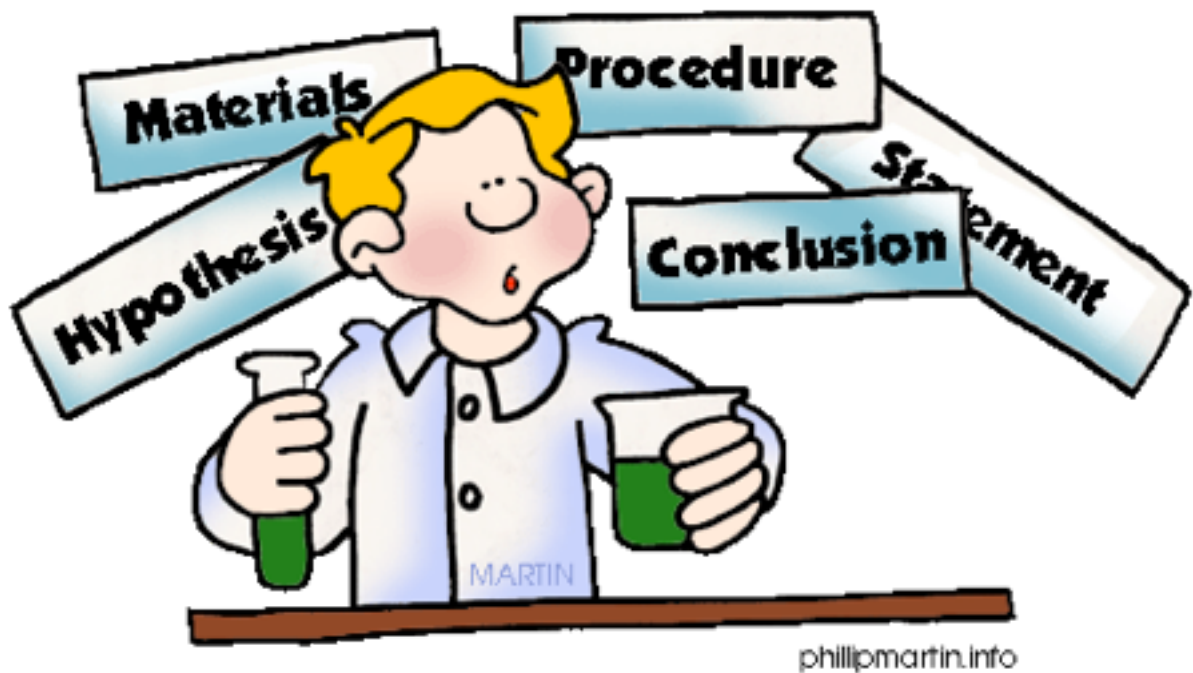
Grades 5 & 6

0 = No 1 = Some Evidence 2 = Yes

INQUIRY STANDARD	SCORE
Is the project guided by a question?	
Is there enough research present for the student to propose an acceptable hypothesis?	
Is a hypothesis proposed that gives a possible answer to the guiding question?	
Are the procedures described in sufficient detail to allow easy replication by another person?	
Is there evidence that a well-planned experiment was conducted? (Note: experiments have comparisons, such as how plants grow under different conditions)	
Was appropriate equipment used (e.g. rulers, scales, thermometers, stopwatches, or magnifiers) to help collect data?	
Did the student(s) measure and present quantitative or qualitative data?	
Was experiment repeated? Were there 2 or more trials, to ensure accuracy of data?	
Are the data displayed in an easy-to-read graph and/or table?	
Are the data analyzed to seek an answer to the guiding question or to evaluate the hypothesis? (Note: It is okay for the students to say the results were inconclusive, or that they did not match their predicted outcome.)	
Is the project presented in a manner that makes the purpose, procedure, and results clear?	
Total Points: 0-10 Falls far below inquiry standard 11-19 Approached inquiry standard 20-23 Meets inquiry standards (honorable mention) 24 Exceeds inquiry standards (Award for exemplary inquiry)	

Feedback:

MY SCIENCE FAIR NOTEBOOK



Name: _____

Partner: _____

Class: _____

Project Title: _____



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_____ School Science Fair



Salt Lake Valley Science & Engineering Fair Science Fair Form – Elementary & Junior Division

Form for the Salt Lake, Murray, Tooele, Park City, Granite, Canyons School Districts,
Charter and Salt Lake Catholic Diocese



Students in grades 5-8 in the Salt Lake, Murray, Tooele, Park City, Granite, and Canyons Districts, as well as Charter and students from the Salt Lake Catholic Diocese who would like to participate in the Salt Lake Valley Science and Engineering Fair (SLVSEF) must complete all three pages of this form to become eligible to compete. SLVSEF participants will also be **required** to register online at <http://slvsef.org> by **March 1, 2013**. Forms must be submitted to your district representative in order to advance to SLVSEF.

Student Information

Student's Name _____ Grade Level: (Check One) 5 6 7 8

Home Phone _____ Parent/Guardian Email _____

Is your project a team project? If so, **all members must be listed below.**

Student's Name _____ Grade Level: (Check One) 5 6 7 8

Home Phone _____ Parent/Guardian Email _____

Student's Name _____ Grade Level: (Check One) 5 6 7 8

Home Phone _____ Parent/Guardian Email _____

Project Information

Project Title _____

School _____ District _____

Teacher Name (first & last name) _____ Teacher's Email _____

Parent/Adult Supervisor's Name _____ Phone _____

My Question: _____

The main supplies I will need for my experiment are: _____

Procedure:

(Please write a detailed explanation about what you plan to do for your experiment. Attach extra paper, if needed):

SCIENCE FAIR PROJECT RULES

My Experiment will Involve the Following (check all that apply. *If none apply, please leave blank but still submit*):

Human Subjects

All human research projects must be **reviewed** and **approved** by a science teacher, or 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. cerevisiae*, 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 Biosafety 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.sciserv.org/isef/rules/isefrule.asp>

If your science fair project will include any of the subjects listed above, you must receive approval before you begin experimentation and obtain the signatures of those approving your project.

Science Teacher Approval

Date

Science Teacher Approval

Date

Other (doctor, biomedical scientist, etc)

Date

Display and Safety Rules – Items that Cannot be Displayed at the Science Fair*

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Living Organisms 2. Plant materials (living, dead or preserved) 3. Taxidermy specimens or parts 4. Preserved animals – includes embryos 5. Human or animal food 6. Human or animal parts or body fluids 7. Soil, sand or waste samples 8. Laboratory/household chemicals – including water 9. Poisons, drugs, hazardous substances or devices | <ol style="list-style-type: none"> 10. Sharp items – pipettes, glass, syringes, needles 11. Dry ice or other sublimating solids 12. Flames or highly flammable display materials 13. Empty tanks that previously contained combustible liquids or gases 14. Batteries with open top cells 15. Awards, medals, business cards, flags, logos, brochures, booklets, or any other type of endorsements. 16. Photographs or other visual presentations depicting vertebrate animals in surgical techniques, dissection, necropsies, other lab techniques, improper handling methods, improper housing conditions etc. |
|--|---|

*For a complete list and more details, please see the SLVSEF website at slvsef.org.

SLVSEF and the participating school districts reserve the right to remove anything displayed with your science fair project that may be deemed hazardous or inappropriate for public display.

I certify that my science project complies with all of the experimental rules of the Salt Lake Valley Science and Engineering Fair. I have also read and I understand the display and safety rules. If I display any of the items listed above, I am aware that they will be removed and returned at the conclusion of the science fair. I agree to set up my project on the appointed day prior to my competition and I will leave my project on display until the conclusion of the awards ceremony.

Signature of Student _____ Date _____

If this is a team project, each additional team member must sign below.

Signature of Student _____ Date _____

Signature of Student _____ Date _____

I give my permission to allow appropriate information about my child to be used for publicity purposes. This includes photographs submitted by me or my child as well as any photographs, videos or likenesses that by be used by the Salt Lake Valley Science & Engineering Fair, or the sponsors of awards for the purposes of illustration, advertising or publication in any manner. I also consent to the use of my child's name in connection therewith.

Signature of Parent/Guardian _____ Date _____

If this is a team project, each additional team member's Parent/Guardian must sign below.

Signature of Parent/Guardian _____ Date _____

Signature of Parent/Guardian _____ Date _____

Teacher Signature

I have reviewed and approved this student's research plan prior to experimentation and certify that they will comply with all of the experimental rules of the Salt Lake Valley Science & Engineering Fair.

Teacher Signature Date

SLVSEF Approval for Competition

Regional SRC Approval

Date

Every effort will be made to protect exhibits from loss or damage. However, since the exhibition of projects is open to the public, the SLVSEF Committee and University of Utah cannot and will not accept any liability or responsibility of any nature for any theft, loss or damage to any exhibit or any other property of any SLVSEF participant. Accordingly, it is recommended that each participant secure and guard his/her project and take all prudent precautions to prevent any theft, loss or damage to their project.

For more information please visit our website <http://slvsef.org>

The Salt Lake Valley Science & Engineering Fair is presented by the Center for Science and Mathematics Education and the University of Utah.



PROJECT PROPOSAL

Name: _____ Partner: _____ Class: _____

***Project Proposal Due:** _____ ***Final Project Due:** _____

Directions: Brainstorm five possible topics that you are interested in, and come up with two investigation questions per topic. Investigation questions should be in the following format: What is the effect of _____ on _____?

Example:

Topic: Skateboarding

Question 1: What is the effect of different brands of grip tape on a skateboard?

Question 2: What is the effect of additional wheels on a skateboard?

Topic 1: _____

Question 1: _____

Question 2: _____

Topic 2: _____

Question 1: _____

Question 2: _____

Topic 3: _____

Question 1: _____

Question 2: _____

Topic 4: _____

Question 1: _____

Question 2: _____

Topic 5: _____

Question 1: _____

Question 2: _____

*Circle the topic and question that you will investigate for your science fair project. You will submit this proposal to your science teacher, and you will also present this proposal to your classmates.

Teacher Approval

Parent Approval



RESEARCH

Name: _____ Partner: _____ Class: _____

***Research Due:** _____ ***Final Project Due:** _____

You will need to find as much information as you can about your topic and your question.

Example

Topic: Skateboarding

Question: What is the effect of more wheels on a skateboard?

What to Research? Newton's laws of motion and the laws of friction.

Topic: _____

Question: _____

What to Research? _____

You will need to use the research and bibliography worksheets to help organizer all pertinent information for your project.

Teacher Approval

Parent Approval



HYPOTHESIS & MATERIALS

Name: _____ Partner: _____ Class: _____

*Hypothesis & Materials Due: _____ *Final Project Due: _____

Creating a Hypothesis

Now that you have a science fair question and have done some research, it's time to create a hypothesis for your science fair project. Remember that a hypothesis is a possible answer to the question you're investigating.

Topic: _____

Question: _____

Hypothesis: _____

Materials

List all the materials that you will need in order to perform your science fair experiment. Remember that it is your responsibility to collect all of these items. Make sure you talk to you parents about the items and get their okay!

Teacher Approval

Parent Approval



EXPERIMENTAL DESIGN

Name: _____ Partner: _____ Class: _____

*Experimental Design Due: _____ *Final Project Due: _____

You will need to create a procedure for your experiment. This procedure needs to be a detailed list of step-by-step instructions, so that someone else could repeat your experiment exactly the same as you. Before you begin, determine your variables.

INDEPENDENT VARIABLE (what you will be changing in the experiment. Note: there should only be one item listed here.)	DEPENDENT VARIABLE (What you will be measuring or observing.)	CONTROLLED VARIABLES (What you will be keeping the same during the experiment.)

Procedure: Add paper as needed.

Teacher Approval

Parent Approval



OBSERVATIONS & DATA COLLECTION

Name: _____ Partner: _____ Class: _____

*Observations & Data Collection Due: _____ *Final Project Due: _____

Types of Data: data can take two different forms: data can be quantitative or qualitative. Some projects may combine both forms of data.

- **Quantitative Data:** Numbers or quantities that you can measure. Examples of quantitative data are the number of bird chirps that you hear on a cold day or the width of a layer of rock in a cliff wall.
- **Qualitative Data:** Descriptions of observations with adjectives instead of numbers. Examples of qualitative data are descriptions of the color and shape of the rock in each layer of a cliff wall. Drawings and photographs are also qualitative data.

Remember that you need to replicate your experiment at least 3 times. (Run a skateboard with extra wheels down the same hill 3 times and determine how long it takes, and then run a regular skateboard down the same hill 3 times and determine how long it takes. Calculate the averages.)

Example:

	CONTROL SKATEBOARD	TEST SKATEBOARD (MORE WHEELS)
Trial 1		
Trial 2		
Trial 3		
Average		

Create a data table for your project, and get started collecting data. Make sure you write clearly. If needed, take pictures as well.

Teacher Approval

Parent Approval



GRAPHING

Name: _____ Partner: _____ Class: _____

***Graphs Due:** _____ ***Final Project Due:** _____

As you are collecting data, keep in mind that you will be required to display your results. You can make it easy for people to understand the relationships between your variables by displaying your data in a graph. Make sure your graph includes a title, and labels. Create a rough draft of your graph below. Once approved, transfer your graph onto graphing paper or create a graph on the computer.

Teacher Approval

Parent Approval



ANALYSIS & CONCLUSIONS

Name: _____ Partner: _____ Class: _____

*Analysis & Conclusion Due: _____ *Final Project Due: _____

Think about it! After you have gathered all of your data, you'll need to analyze it. In the analysis, ask yourself, "What is the data telling me? What trends do I see in the graphs? What does this all mean?"

At this point you need to write a conclusion for your project. A good conclusion needs the following . . .

- Restate your hypothesis
- Tell whether your hypothesis is correct or incorrect
- Use your data to explain
- Tell what you learned from the experiment
- Explain what you would do differently next time

Write your conclusion below.

Teacher Approval

Parent Approval



SCORING RUBRIC

Name _____ Partner _____ Class _____

Full Inquiry Standards Rubric

Grades 5 & 6

0 = No 1 = Some Evidence 2 = Yes

INQUIRY STANDARD	SCORE
Is the project guided by a question?	
Is there enough research present for the student to propose an acceptable hypothesis?	
Is a hypothesis proposed that gives a possible answer to the guiding question?	
Are the procedures described in sufficient detail to allow easy replication by another person?	
Is there evidence that a well-planned experiment was conducted? (Note: experiments have comparisons, such as how plants grow under different conditions)	
Was appropriate equipment used (e.g. rulers, scales, thermometers, stopwatches, or magnifiers) to help collect data?	
Did the student(s) measure and present quantitative or qualitative data?	
Was experiment repeated? Were there 2 or more trials, to ensure accuracy of data?	
Are the data displayed in an easy-to-read graph and/or table?	
Are the data analyzed to seek an answer to the guiding question or to evaluate the hypothesis? (Note: It is okay for the students to say the results were inconclusive, or that they did not match their predicted outcome.)	
Is the project presented in a manner that makes the purpose, procedure, and results clear?	
Total Points: 0-10 Falls far below inquiry standard 11-19 Approached inquiry standard 20-23 Meets inquiry standards (honorable mention) 24 Exceeds inquiry standards (Award for exemplary inquiry)	

Feedback:



NOTEBOOK & DISPLAY BOARD

*Due: _____

Notebook:

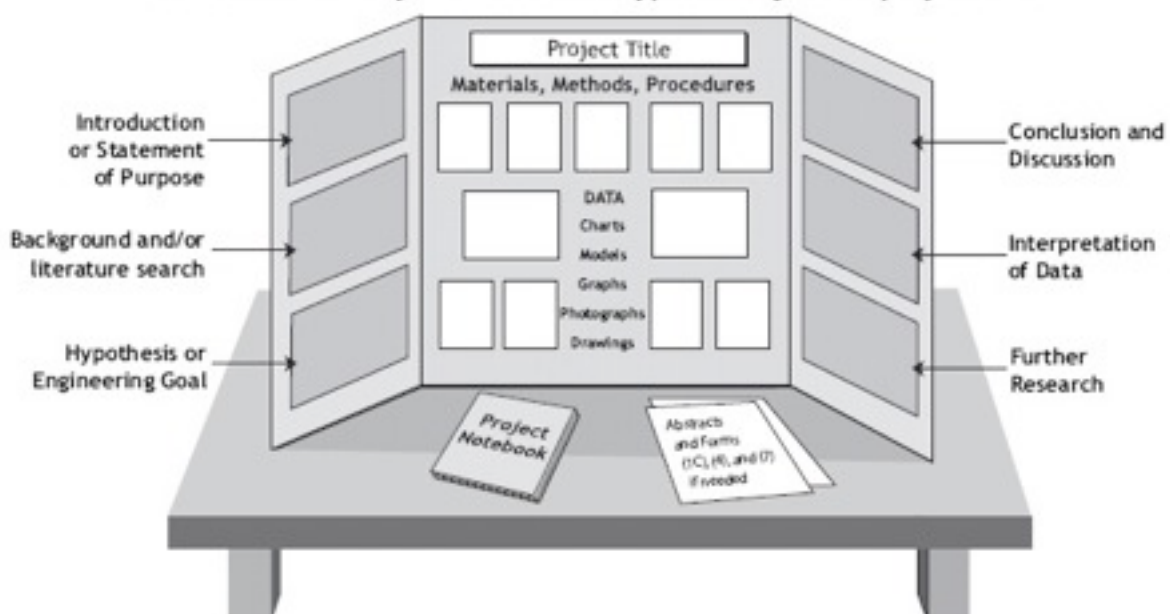
Your notebook should be printed, hole punched, and placed in a folder to display in front of your project. You obviously won't be able to fit all the information from your project onto your display board, which makes the notebook so important!

Display Board:

Your display board is important. It's not nearly as important as your judging interviews and the content on the board, but it's important. First impressions matter, and the first impression judges get about your project is what they see on your display board, read in your abstract, and find in your lab notebook.

1. Make your text readable. Font sizes larger than 100 for your title, 32-48 for headers, 16-18 for body text, and 12-14 for captions. Larger font sizes limit the amount of text on your board. Putting too much information on the display board is a common mistake.
2. Figures are great. Use graphs, flow charts, diagrams, and pictures whenever possible. Make sure they are large enough to be read from a distance, and be sure that your figures have captions.
3. Use a paper cutter for nice, straight edges.
4. Use matte photo for your photos, as it makes them easier to view.
5. Bacteria, plants, or anything else living or dead may not be displayed with your project. Please use photos if you'd like to include them somehow in your display.

Material Normally Included on a Typical Project Display Board





DISPLAY BOARD TIPS

Projects having displays that include any of the following items will be disqualified:

- ✓ Living organisms, including plants
- ✓ Soil, sand, rock, and or waste samples even if permanently encased in plastic
- ✓ Taxidermy specimens or parts
- ✓ Preserved vertebrate or invertebrate animals
- ✓ Human or animal food
- ✓ Human/animal part or body fluids (e.g. blood, urine, etc.)
- ✓ Plant materials (living, dead, or preserved).
- ✓ All chemicals including water
- ✓ All hazardous substances or devices (e.g. firearms, weapons, ammunitions, lasers, etc.)
- ✓ Dry ice or other sublimating solids
- ✓ Sharp items (e.g. syringes, needles, pipettes, knives)
- ✓ Flames or highly flammable materials
- ✓ Batteries with open-top cells
- ✓ Photographs or other visual presentations depicting vertebrate animals in surgical techniques, dissections, necropsies, or other lab procedures
- ✓ Glass or glass objects
- ✓ Any apparatus with unshielded belts, pulleys, chains, or moving parts