



Provo City School District STEM Fair Information

The purpose of the Provo City School District STEM Fair is to provide students with the opportunity to apply the knowledge and skills they have acquired in class to real-world problems and/or needs and to share their knowledge with their peers and the community.

One of the most difficult aspects of a STEM fair is finding a problem or question for students to work on, but this need not be the case. We all have small problems every day that need to be solved in order for us to get through the day. These problems can be simple things from remembering to return homework each day to bigger issues that have a wide impact for many people. Students are encouraged to look at their own experiences and identify ways that they might be able to improve their lives or the lives of others. Finding a solution to these problems and helping to improve lives generates work that can be presented in many different categories at the STEM fair.

Another approach is to explore topics that interest the student. These topics do not need to be science, math, or engineering based. Encourage the students to ask questions related to these topics of interest and identify any questions that they do not know the answers to. Then determine if the answers to these questions could be found by experimentation. If so, then ask students to apply the process of experimentation to answer a question. The work they will generate can then be presented at the STEM fair.

STEM fair projects need not be complicated and expensive. Rather, they need to be relevant and meaningful to the student. The basic steps of a STEM fair project are:

1. Keeping a notebook or journal of the entire project
2. Identifying a problem or question to work on
3. Researching background information relating to the chosen topic
4. Designing an experiment to investigate the question or a solution to the problem
5. Carefully following the experimental design (scientific method) or proposed solution
6. Collecting data and information during testing
7. Analyzing the data that was collected
8. Drawing conclusions based on the data that was collected
9. Determining if the question has been definitively answered or if the solution is the best possible one to the problem
10. Revisiting the question or problem and determining if a different experimental design or solution would provide better results
11. Repeating this process until the best possible answer(s) or solution(s) have been found
12. Presenting the information gained in a manner that is understandable and neat
13. Answering questions from judges and practicing speaking and listening skills
14. Enjoying the process

The STEM fair is tremendous opportunity for students to explore the world around them and apply what they have learned. We are excited to see all of the tremendous creativity and ingenuity of the students in our district. We encourage you to work closely with your students' teachers to help them be successful.

Research Plan/Project Summary Instructions

A complete Research Plan/Project Summary is **required** for ALL projects and must accompany Student Checklist (1A).

1. **All projects must have a Research Plan/Project Summary**
 - a. Written prior to experimentation following the instructions below to detail the rationale, research question(s), methodology, and risk assessment of the proposed research.
 - b. If changes are made during the research, such changes can be added to the original research plan as an addendum, recognizing that some changes may require returning to the IRB or SRC for appropriate review and approvals. If no additional approvals are required, this addendum serves as a project summary to explain research that was conducted.
 - c. If no changes are made from the original research plan, no project summary is required.
2. Some studies, such as an engineering design or mathematics projects, will be less detailed in the initial project plan and will change through the course of research. If such changes occur, a project summary that explains what was done is required and can be appended to the original research plan.
3. **The Research Plan/Project Summary should include the following:**
 - a. **RATIONALE:** Include a brief synopsis of the background that supports your research problem and explain why this research is important and if applicable, explain any societal impact of your research.
 - b. **RESEARCH QUESTION(S), HYPOTHESIS(ES), ENGINEERING GOAL(S), EXPECTED OUTCOMES:** How is this based on the rationale described above?
 - c. Describe the following in detail:
 - **Procedures:** Detail all procedures and experimental design including methods for data collection. Describe only your project. Do not include work done by mentor or others.
 - **Risk and Safety:** Identify any potential risks and safety precautions needed.
 - **Data Analysis:** Describe the procedures you will use to analyze the data/results.
 - d. **BIBLIOGRAPHY:** List major references (e.g. science journal articles, books, internet sites) from your literature review. If you plan to use vertebrate animals, one of these references must be an animal care reference.

Items 1–4 below are subject-specific guidelines for additional items to be included in your research plan/project summary as applicable.

1. **Human participants research:**
 - a. **Participants:** Describe age range, gender, racial/ethnic composition of participants. Identify vulnerable populations (minors, pregnant women, prisoners, mentally disabled or economically disadvantaged).
 - b. **Recruitment:** Where will you find your participants? How will they be invited to participate?
 - c. **Methods:** What will participants be asked to do? Will you use any surveys, questionnaires or tests? If yes and not your own, how did you obtain? Did it require permissions? If so, explain. What is the frequency and length of time involved for each subject?
 - d. **Risk Assessment:** What are the risks or potential discomforts (physical, psychological, time involved, social, legal, etc.) to participants? How will you minimize risks? List any benefits to society or participants.
 - e. **Protection of Privacy:** Will identifiable information (e.g., names, telephone numbers, birth dates, email addresses) be collected? Will data be confidential/anonymous? If anonymous, describe how the data will be collected. If not anonymous, what procedures are in place for safeguarding confidentiality? Where will data be stored? Who will have access to the data? What will you do with the data after the study?
 - f. **Informed Consent Process:** Describe how you will inform participants about the purpose of the study, what they will be asked to do, that their participation is voluntary and they have the right to stop at any time.
2. **Vertebrate animal research:**
 - a. Discuss potential ALTERNATIVES to vertebrate animal use and present justification for use of vertebrates.
 - b. Explain potential impact or contribution of this research.
 - c. Detail all procedures to be used, including methods used to minimize potential discomfort, distress, pain and injury to the animals and detailed chemical concentrations and drug dosages.
 - d. Detail animal numbers, species, strain, sex, age, source, etc., include justification of the numbers planned.
 - e. Describe housing and oversight of daily care.
 - f. Discuss disposition of the animals at the end of the study.
3. **Potentially hazardous biological agents research:**
 - a. Give source of the organism and describe BSL assessment process and BSL determination.
 - b. Detail safety precautions and discuss methods of disposal.
4. **Hazardous chemicals, activities & devices:**
 - Describe Risk Assessment process, supervision, safety precautions and methods of disposal.
 - Material Safety Data Sheets are not necessary to submit with paperwork.

Attach your complete RESEARCH PLAN after this page.

Student Checklist (1A)

This form is **required** for ALL projects.

1. a. Student/Team Leader: _____ Grade: _____
Email: _____ Phone: _____
b. Team Member: _____ c. Team Member: _____
2. Title of Project: _____

3. School: _____ School Phone: _____
School Address: _____

4. Adult Sponsor: _____ Phone/Email: _____
5. Does this project need SRC/IRB/IACUC or other pre-approval? ☐ Yes ☐ No Tentative start date: _____
6. Is this a continuation/progression from a previous year? ☐ Yes ☐ No
If Yes:
a. Attach the previous year's ☐ Abstract and ☐ Research Plan/Project Summary
b. Explain how this project is new and different from previous years on
☐ Continuation/Research Progression Form (7)
7. This year's laboratory experiment/data collection:

Actual Start Date: (mm/dd/yy) _____ End Date: (mm/dd/yy) _____
8. Where will you conduct your experimentation? (check all that apply)
☐ Research Institution ☐ School ☐ Field ☐ Home ☐ Other: _____
9. List name and address of all non-home and non-school work site(s):
Name: _____
Address: _____
Phone/ email _____
10. Complete a Research Plan/Project Summary following the Research Plan/Project Summary instructions and attach to this form.
11. An abstract is required for all projects after experimentation.

Science Project Judging Criteria

Research Question	<ul style="list-style-type: none"> • Clear and focused purpose • Identifies contribution to field of study • Testable using scientific methods 	10
Design & Methodology	<ul style="list-style-type: none"> • Well designed plan and data collection methods • Variables and controls defined, appropriate and complete 	15
Execution: Data Collection, Analysis & Interpretation	<ul style="list-style-type: none"> • Systematic data collection and analysis • Reproducibility of results • Appropriate application of mathematical and statistical methods • Sufficient data collected to support interpretation and conclusions 	20
Creativity	<ul style="list-style-type: none"> • Project demonstrates significant creativity in one or more of the above criteria 	20
Presentation	Poster <ul style="list-style-type: none"> • Logical organization of material • Clarity of graphics and legends • Supporting documentation sited or displayed 	10
	Interview <ul style="list-style-type: none"> • Clear, concise, thoughtful responses to questions • Understanding of basic science relevant to project • Understanding interpretation and limitations of results and conclusions • Degree of independence in conducting project • Recognition of potential impact in science, society and/or economics • Quality of ideas for further research • For team projects, contributions to and understanding of project by all members 	25
		100

**Criteria updated Fall 2017 to align with the International Science & Engineering Fair judging criteria



Elementary Form (5-6 Grade)

One form required per project

All students completing a science fair project in grades 5-6 in the Alpine, Jordan, Nebo, Provo, or Wasatch District, or Charter/Private School within the listed district boundaries, must complete this form, complying with safety and experimentation rules.



Project Information:

School Name: _____ School District: _____

Teacher Name: _____

Project Type: ☐ Individual ☐ Team | Number of Team Members ☐ 2 ☐ 3

Student 1: Grade ☐ 5 ☐ 6

Team Member 2: Grade ☐ 5 ☐ 6

Team Member 3: Grade ☐ 5 ☐ 6

First Name: _____

First Name: _____

First Name: _____

Last Name: _____

Last Name: _____

Last Name: _____

Required Project Approval:

Please respond to each question and obtain the correct **approvals and signatures needed BEFORE experimentation**. Project must be reviewed and approved before each individual may sign. **Check all boxes that apply.**

☐ I completed a project. (**required for all projects)

By signing below I certify that I have reviewed and approved this student's research plan **AND** project details listed on page 2, prior to experimentation and certify that the experimental rules of the Central Utah STEM Fair and project approvals below, are being followed in compliance with the affiliation with the International Science & Engineering Fair and BYU-Public School Association and Governing Board.

Supervising Teacher Signature _____ Date _____

☐ My project used human test subjects (examples: survey, taste test, play a game, etc)

A copy of the surveys or tests you intend to use must be attached. Additional project review required. During the review, if it is determined 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, signature pages **MUST** be included with registration form. If it is determined that there are unacceptable risks involved the student must revise his or her project.

Psychologist, Medical Doctor or Registered Nurse Signature _____
Name _____ Email/Phone _____ Date _____

☐ My project used non-human vertebrate animals (examples: fish, rabbits, dogs, etc)

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. 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.

Veterinarian or other Biomedical/Biological Scientist Signature _____
Name _____ Email/Phone _____ Date _____

☐ My project used bacteria, mold, fungi, viruses/parasites, human or animal fresh tissues, blood or bodily fluids (Potentially Hazardous Biological Agents)

Determine the level of biological containment available to the student researcher. Biosafety Level 1 projects can be performed in a school BSL-1 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. ****Bacteria, mold, fungi or other hazardous agent CANNOT be cultured at home, doing so is an automatic disqualification.** For lab space or questions, please contact the Central Utah STEM Fair via email: admin@cusef.byu.edu

Biomedical/Biological Scientist Signature _____
Name _____ Email/Phone _____ Date _____

☐ My project used prescription or over the counter drugs, alcohol, and/or tobacco

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.

Biomedical/Biological Scientist Signature _____
Name _____ Email/Phone _____ Date _____

☐ My project used hazardous chemicals, weapons/firearms, lasers, radiation, etc.

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

School Administrator Signature _____
Name _____ Email/Phone _____ Date _____

Project Category: Please select the category that best fits your project

- | | | |
|---|--|---|
| <input type="checkbox"/> Chemistry | <input type="checkbox"/> Earth & Environmental Science | <input type="checkbox"/> Life Science |
| <input type="checkbox"/> Computer Science | <input type="checkbox"/> Engineering | <input type="checkbox"/> Physics, Astronomy, & Mathematics |
| | | <input type="checkbox"/> Product Testing & Consumer Science |

Project Details: Please be complete in your answers

State your question or computer/engineering problem: _____

How did you come up with your project idea?: _____

List one resource for your background research: _____

Walk through your thought process for your project: _____

Materials you needed: _____

Where did you complete your project? (example: home, school, university, etc): _____

Adult Supervisor's Name: _____ Email/Phone: _____

Summary of project including detailed explanation about any **safety precautions** that will be in place for you and/or your test subjects: _____

Display & Safety Rules:

Display boards can be no larger than 30" deep, 48" side to side, and 108" tall.

Do NOT bring items from your experiment to display -- take pictures and include them on your board or project notebook. A 1 minute video is also permitted with fair personnel preview and approval.

As an affiliated fair with the International Science & Engineering Fair the following are NOT permitted when creating or displaying your board:

- | | |
|--|--|
| 1. Living organisms, including plant material | 9. Sharp items - pipettes, glass, syringes, needles |
| 2. Taxidermy specimens or parts | 10. Highly flammable display materials (NO matches) |
| 3. Preserved animals - including embryos | 11. Empty tanks that previously contained combustible liquids or gases |
| 4. Food (empty containers may be secured to the display) | 12. Batteries with open top cells |
| 5. Human or animal parts or body fluids | 13. Photographs of people other than yourself or your family without their written permission (must have signatures) |
| 6. Soil, sand or waste samples | 14. Photographs or visual representations depicting vertebrate animals in surgical techniques, dissections, necropsies, other lab techniques, improper handling methods, improper housing conditions, etc. |
| 7. Laboratory/household chemicals - including water | |
| 8. Poisons, drugs, hazardous substances, or devices | |

I certify that my science project complies with all of the experimental rules of the Central Utah STEM Fair. I understand that if I have not complied with these rules that my project could fail to qualify for competition. I have also read and I understand the display and safety rules. If I display any of the objects listed above I am aware that they will be removed and returned at the conclusion of the fair.

If I am selected to participate at the Central Utah STEM 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 designated time for project tear down. I understand that I must be present for judging during the designated competition date and time to be eligible to receive an award.

I understand that the completion of this form, and submission to my school or district, does not guarantee advancement to the Central Utah STEM Fair. I understand that if selected as a district finalist I am required to register **online** for the Central Utah STEM Fair. I understand the district will provide the registration information to me, including the username and password, and that I **must register online** no later than February 27, 2020 or for a \$25 late fee February 28 - March 1. I understand that I will receive an email confirmation as verification that I have registered, if I do not I should email admin@cusef.byu.edu **BEFORE** March 2. I understand that no registrations for the Central Utah STEM Fair will be accepted after March 1.

Signature of Student 1 _____ Signature of Parent/Guardian _____ Date _____

Signature of Team Member 2 _____ Signature of Parent/Guardian _____ Date _____

Signature of Team Member 3 _____ Signature of Parent/Guardian _____ Date _____

Approval Form (1B)

A completed form is required for each student, including all team members.

1. To Be Completed by Student and Parent

a. Student Acknowledgment:

- I understand the risks and possible dangers to me of the proposed research plan.
- I have read the ISEF Rules and Guidelines and will adhere to all International Rules when conducting this research.
- I have read and will abide by the following Ethics statement

Student researchers are expected to maintain the highest standards of honesty and integrity. Scientific fraud and misconduct are not condoned at any level of research or competition. Such practices include but are not limited to plagiarism, forgery, use or presentation of other researcher's work as one's own, and fabrication of data. Fraudulent projects will fail to qualify for competition in affiliated fairs and ISEF.

Student's Printed Name

Signature

Date Acknowledged (mm/dd/yy)
(Must be prior to experimentation.)

- b. **Parent/Guardian Approval:** I have read and understand the risks and possible dangers involved in the Research Plan/Project Summary. I consent to my child participating in this research.

Parent/Guardian's Printed Name

Signature

Date Acknowledged (mm/dd/yy)
(Must be prior to experimentation.)

2. To be completed by the local or affiliated Fair SRC

(Required for projects requiring prior SRC/IRB APPROVAL. Sign 2a or 2b as appropriate.)

- a. Required for projects that need prior SRC/IRB approval BEFORE experimentation (humans, vertebrates or potentially hazardous biological agents).

The SRC/IRB has carefully studied this project's Research Plan/Project Summary and all the required forms are included. My signature indicates approval of the Research Plan/Project Summary before the student begins experimentation.

SRC/IRB Chair's Printed Name

Signature

Date of Approval (mm/dd/yy)
(Must be prior to experimentation.)

OR

- b. Required for research conducted at all Regulated Research Institutions with no prior fair SRC/IRB approval.

This project was conducted at a regulated research institution (not home or high school, etc.), was reviewed and approved by the proper institutional board before experimentation and complies with the ISEF Rules. Attach (1C) and any required institutional approvals (e.g. IACUC, IRB).

SRC Chair's Printed Name

Signature

Date of Signature (mm/dd/yy)
(May be after experimentation)

3. Final ISEF Affiliated Fair SRC Approval (Required for ALL Projects)

SRC Approval After Experimentation and Before Competition at Regional/State/National Fair

I certify that this project adheres to the approved Research Plan/Project Summary and complies with all ISEF Rules.

Regional SRC Chair's Printed Name

Signature

Date of Approval (mm/dd/yy)

State/National SRC Chair's Printed Name
(where applicable)

Signature

Date of Approval (mm/dd/yy)

Attach any additional required forms here.

Additional forms can be found on the CUSF or ISEF website.

If you are unsure what additional forms you may need please review the previous form you completed: 'Checklist for Adult Sponsor'
OR complete the Rules Wizard on the ISEF website: <https://ruleswizard.societyforscience.org/>