New Bridge School

Science & Engineering Fair

2019

Congratulations on your decision to participate in this year's STEM Fair! Please read the following information packet carefully with a family member. It has the project guidelines and lots of helpful hints for you.
We look forward to your project!

Project Timeline

Task	Description	Target Date
Topic Selection	Choose project type and topic	December 9, 2018
Define Question or Problem	Specifically define the question or problem you will be working on	December 12, 2018
Plan	Research, plan, and gather materials for your project	December 14, 2018
Project	Conduct the steps in your project as outlined in your plan	January 11, 2019
Project Display	Construct all display to include all research, data, and conclusions from your project	January 26, 2019
STEM Fair Set -Up	ALL PROJECTS DUE-bring to school	January 28, 2019
STEM Fair Judging & School Viewing	You will present your project for judging and viewing by peers	January 29, 2019
Science & Engineering Fair Family Night	Families are invited to view projects	January 29, 2019, 6:00-7:30 pm
Junior District Science Fair	The top 5 sixth grade projects from New Bridge fair will be competing at the Junior District Science Fair.	February 13, 2019
Ritchey Science Fair	Any 6th graders that place at the District Science Fair will complete in the Ritchey Science Fair at Weber State.	March 21, 2019

Project Selection

Use the table below to select the type of project you would like to do.
Students in grades ***Kindergarten-4th grade*** may work with one partner in the same grade to submit a project (Maximum 2 students per project). ***5th-6th grade*** students complete individual projects.

Grade Level	Type	Description
K or 1	Collection	Collect and organize something of interest, answering questions related to observations made while exploring your world.
K-3	Research	A research science project is one where you will learn all about a science topic or concept that you are personal interested in by reading books and magazines, going to libraries or other institutions, talking to an expert in the field, and more.
K-6	Science Project	This type of project involves answering a question about nature using the Scientific Inquiry Process. This includes asking a question, predicting results, researching and investigating, observing and gathering data, and explaining your conclusions with reasoning.
K-6	Engineering Project	This type of project involves designing, analyzing and improving a device, material or technology. An engineering project involves building a prototype or developing a simulation to test the effectiveness of design changes or differing materials.

Science Fair Topic Wizard: http://www.sciencebuddies.org/science-fair-projects/recommender_register.php

Selecting a Topic:

- Must be something interesting to you. – Award winning projects involve many hours of work.
- Must be reasonable for your skills.
- Must be something for which you have the equipment and/or resources. (Mentors)
- Don't be too specific/narrow at first.
    - Be flexible, assume that your idea will evolve.
    - Expect the project will change.
    - Follow interesting new ideas.

Project Categories:

Botany - Study of plant life—Agriculture, agronomy, horticulture, forestry, plant taxonomy, plant physiology, plant pathology, plant genetics, hydroponics, algae, etc.

Chemistry - Study of the composition of matter and laws governing it—Physical chemistry, organic chemistry, inorganic chemistry, materials, plastics, fuels, metallurgy, soil chemistry, etc.

Earth/Space - Study of the universe—Geology, mineralogy, physiography, oceanography, meteorology, astronomy, seismology, geography, geophysics, etc.

Energy/Transportation - Study of the energy and transportation—Aerospace and Aeronautical Engineering, Aerodynamics, Alternative Fuels, Fossil Fuel Energy, Vehicle Development, Renewable Energies, etc.

Engineering/Computer Science - Technology projects that directly apply scientific principles practical uses—Civil, mechanical, manufacturing, aeronautical, chemical, electrical, sound, automotive, heating and refrigerating, transportation, environmental engineering, etc.

Environmental - Study of pollution sources and their control—Ecology, recycling, acid rain etc.

Math/Physics - Development and application of numerical computations, theories, principles and laws governing energy also includes computer sciences—Calculus, geometry, abstract algebra, number theory, statistics, complex analysis and probability. Solid state, optics, acoustics, superconductivity, fluid and gas dynamics, thermodynamics, magnetism, quantum mechanics, biophysics and states of matter, computer programming, computers in general etc.

Medical/Health - Study of disease and health of humans and animals—Dentistry, pharmacology, pathology, ophthalmology, nutrition, sanitation, dermatology, allergies, speech and hearing, etc.

Microbiology - Biology of microorganisms—Bacteriology, virology, fungi, bacteria, yeast, etc.

Social/Behavioral - Study of human & animal behavior and relationships—Psychology, sociology, anthropology, archaeology, linguistics, learning, perception, public opinion surveys, effects of stress, conditioned responses, etc.

Zoology - Study of animals—Animal genetics, ornithology, entomology, animal ecology, paleontology, cytology, histology, animal physiology, invertebrates, etc.

Important!

Science Fair Project Guidelines

These guidelines are designed to ensure the safety of our science fair participants and the viewing public. Science fair project proposals will be reviewed for compliance with these guidelines.

1. Science fair projects may not include inhumane treatment of people or animals. In fact, we recommend that no projects at this level use people or animals as subjects.

2. No living organisms except plants may be exhibited at the fair. Display of spoiled foods, molds, bacteria, microorganisms or any other type of cultured growth is not permitted.

3. Anything that is normally prohibited on school property or that could be harmful to the public cannot be exhibited at the fair. It includes, but is not limited to harmful chemicals, caustics, acids, poisons, explosives, open flames, combustible materials, and any sharp items (knives, pins, hypodermic needles).

4. Models or photographs can be used instead of things that are restricted from display.

5. There will be space for each exhibitor to have a display board and a small amount of table space in front of the display board. No running water or electricity will be available. If you are interested in developing a project involving electricity, you may choose to use batteries.

6. Projects should be developed, carried out, and exhibited by students with minimal help from adults. *Adults may help with display boards/data presentation. Students are responsible for coming up with project, collecting data and forming their conclusions.

New Bridge STEM Fair Judging Criteria	
Science Project (K-6)	Engineering Project (K-6)
I. Research Question (10 pts) • Clear and focused purpose • Identifies contribution to field of study • Testable using scientific methods	I. Research Problem (10 pts) • Description of a practical need or problem to be solved • Definition of criteria for proposed solution • Explanation of constraints
II. Design and Methodology (15 pts) • Well--designed plan and data collection methods • Variables and controls defined, appropriate and complete	II. Design and Methodology (15 pts) • exploration of alternatives to answer need or problem • identification of a solution • development of a prototype/model
III. Execution: Data Collection, Analysis and Interpretation (20 pts) • Systematic data collection and analysis • Reproducibility of results • Appropriate application of mathematical and statistical methods • Sufficient data collected to support interpretation and conclusions	III. Execution: Data Collection, Analysis and Interpretation (20 pts) • prototype demonstrates intended design • prototype has been tested in multiple conditions/trials • prototype demonstrates engineering skill and completeness
IV. Scientific Creativity (20 pts) • Project demonstrates significant creativity in one or more of the above criteria	IV. Engineering Creativity (20 pts) • Project demonstrates significant creativity in one or more of the above criteria
V. Presentation, Poster (10 pts) • Logical organization of material • Clarity of graphics and legends • Supporting documentation displayed	V. Presentation, Poster (10 pts) • Logical organization of material • Clarity of graphics and legends • Supporting documentation displayed
VI. Student's Knowledge, Interview (25 pts) • 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	V. Student's Knowledge, Interview (25 pts) • 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

STEM Fair Collections Rubric (K and 1st grade)

Definition	Category	Attempted 1	Proficient 3	Advanced 5
Ask a real question where you don't know the answer.	**Problem** **(Double Points) (x2)**	Problem does not relate to the purpose or the objects collected.	Problem is written as a question and relates to the purpose.	Problem is a well-written question that directly relates to the objects collected.
Answer your question with your best guess.	**Hypothesis** **(Double Points) (x2)**	Hypothesis is vague or not in student's own words. Or, it may be non testable, or does not address the problem.	Hypothesis is written in the student's own words, is testable, and relates to the problem.	Hypothesis is clear and written in the student's own words. It is testable, completely addresses the problem and includes some evidence to support it.
Find a way to organize the things you collected. Organize your collected things in another way too.	**Collection** **(Double Points) (x2)**	Collection is displayed one way, without apparent organization other than appearance.	Collection is organized in one way to show relationships between the items collected in a way that allows the student to answer the hypothesis.	Collection is organized in more than one way to show relationships between the items collected in a way that allows the student to completely answer the hypothesis.
Use your data to answer your original question. Explain why your guess was right or wrong.	**Conclusions** **(Double Points) (x2)**	Conclusion does not answer the problem, or does not refer back to the hypothesis, or contradicts the evidence collected.	Conclusion answers the problem and states if the hypothesis was supported or rejected.	Conclusion answers the problem, states if the hypothesis was supported or rejected and explains why.
Make your project fun to look at with pictures and colors. Use large, clear letter. Check grammar and spelling.	**Visual Quality of Display**	Project has limited eye appeal or is not easily readable at approximately two foot distance. The project has limited organization, or contains confusing visuals, or contains language or spelling errors.	Project is appealing and is readable at approximately 2 foot distance. It is organized and clear, uses understandable visuals and/or models, and has correct language and spelling.	Project is appealing and neat, and is readable at approximately 2 foot distance. It is well organized and clear, makes striking use of inventive or amusing visuals and/or models, and uses language and spelling flawlessly.

STEM Fair RESEARCH Rubric (K - 3rd grade)

Definition	Category	Attempted 1	Proficient 3	Advanced 5
Ask a question where you don't know know the answer.	**Problem** **(Double Points) (x2)**	The Problem is vague, or has no apparent connection to the student's interest or experience, or address an issue to which the student already knows the answer	States the Problem clearly. Appears to represent a genuine learning opportunity for the student.	States the Problem clearly, addressing a valid scientific or mathematical concept. Represents a genuine learning opportunity for the student.
Try to answer your question.	**Hypothesis** **(Double Points) (x2)**	Hypothesis is incomplete, not testable, or does not connect to the stated problem	Hypothesis is complete (in one sentence), testable, and addresses the stated problem without reflecting prior knowledge.	Hypothesis is complete (in one sentence), testable, directly addressing the stated problem, and reflects prior knowledge.
Research thoroughly from many sources. Connect the research to your question.	**Research** **(Double Points) (x2)**	Cites only one source. The description of the research is incomplete, or has little or no connection to the problem or hypothesis, or is not written in the student's own words.	Cites two or more sources from one or more types of resources (e.g., text, magazines, internet, or interviews). The student adequately connects the research to their problem and hypothesis in their own words.	Cites two or more sources. There are at least two different types of resources. The student makes clear, in-depth connections between the research and their problem and hypothesis in their own words.
Use your research to answer your original question. Explain how you know if your hypothesis was right or wrong.	**Conclusions** **(Double Points) (x2)**	Conclusion does not answer the problem, or does not refer back to the hypothesis, or contradicts the evidence found in the research.	Conclusion answers the problem, states if the hypothesis was supported or rejected and attempts to explain why.	Conclusion completely answers all aspects of the problem, states if the hypothesis was supported or rejected and clearly cites evidence to explain why.
Make your project fun to look at with pictures and colors. Use large, clear letters. Check grammar and spelling.	**Visual Quality of Display**	Project has limited eye appeal or is not easily readable at approximately a two foot distance. The project has limited organization, or contains confusing visuals, or contains language or spelling errors.	Project is appealing and is readable at approximately a 2 foot distance. It is organized and clear, uses understandable visuals and/or models, and has correct language and spelling.	Project is appealing and neat, and is readable at approximately a 2 foot distance. It is well organized and clear, makes striking use of inventive or amusing visuals and/or models, and uses language and spelling flawlessly.