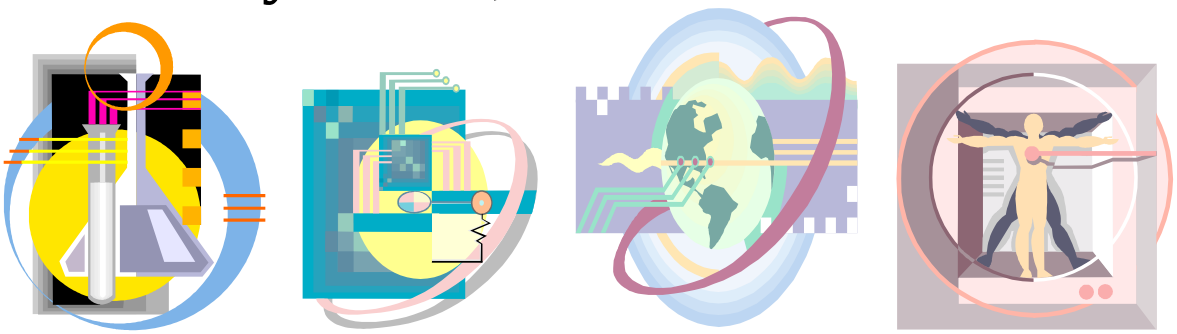
Joseph City Schools
19th Annual
District Science & Engineering Fair
February 23-25, 2016 at the AUDITORUM



Information Brochure

The Scientific Method

The scientific method is a five-step process that include purpose, hypothesis, research, experiment, and conclusion.

- **Purpose**: The problem or question which you are seeking a solution.
- **Hypothesis:** Your educated guess about the solution to the question.
- **Research:** The process by which you gather information. Consult the library, teachers, professionals or scientific organization.
- **Procedures or Experiment:** The process by which you develop your subject knowledge and research findings.
- **Conclusion:** The solution to your proposed question and proof or disproof of your hypothesis.

Suggested Timeline

Week 1 and 2 Identify your topic and establish a purpose.

Week 3 and 4 Use the Library, internet, etc. to research your topic.

Week 3 and 4 Plan your experiment and collect supplies.

Week 5 and 6 Conduct your experiment and collect data. (This could require more time.)

Week 7 Analyze results and establish a conclusion.

Week 8 Write abstract and research paper.

Week 9 Build Display and practice presentation. Review judge's worksheets.
Week 10 (Feb. 23-25, 2016) Bring project to Old Gym 02-23-16. Visit the science fair on 2-25-16.

Joseph City Schools Science & Engineering Fair

Science and Engineering Fairs are a motivating experience, which provided a vehicle for learning. They are an extension of the learning process, which takes place in the classroom. Science and engineering fair projects involve students in the process of investigation, (i.e. the statement of problems; the research for information; the formulation of a prediction or hypothesis or solution; the completion of a controlled experiment; and the interpretation and conclusion based on collected data). The project is the whole process, while the exhibit is only the means by which a student shows and explains what he/she has learned.

The **Joseph City Schools Science Fair** is planned for **the week of February 23-25, 2016.** All projects must be set up between 3:30 and 5:00 PM on Tuesday, February 23, 2016. Independent evaluators will judge projects on Wednesday, February 24, 2016. All projects will be on display during the public viewing to be held on Thursday, February 25, 2016 between 6:00 and 7:00 PM in the Old Gym Located between the District Office and the Cafeteria.

Science Projects:

1. Science projects can be done by individual students, a small group, or by a class.
2. Label the back of the project with the student's name, grade, teacher, and school.
3. **Don't do a Research Project**. (example "Dogs") **TEST** something! (Can Dogs understand a foreign language?)

Exhibit Size:

18 inches deep – front to back, 36 inches wide – side-to-side 48 inches high
Indicate if an electrical outlet is needed
Display board must be self-supporting. The district has display boards available for purchase at both school sites for a cost of $3.00/board. Boards can usually be purchased at stores, like Walmart.

Make Your Exhibit Interesting

Use some of these ideas: Imagination, neat printing, real experiments, graphs, dioramas, photos, color drawings, fancy lettering, charts. Using the computer is encouraged in preparing your display.

Your Project:

1. Choose a catchy title.
2. Mount copies of your purpose, method, and conclusion.
3. Show what you did.
4. Make sure your exhibit has a pleasing appearance.
5. **Be prepared to talk** with a judge about your project.
6. INCLUDE an Abstract with your project (250 words or less)

> The abstract is a brief overview of the project. It should not be more than one page and should include the project title, a statement of the purpose of the experiment, a hypothesis, a brief description of the procedure, data, and conclusions. There is no one way to write an abstract, but it should be brief.

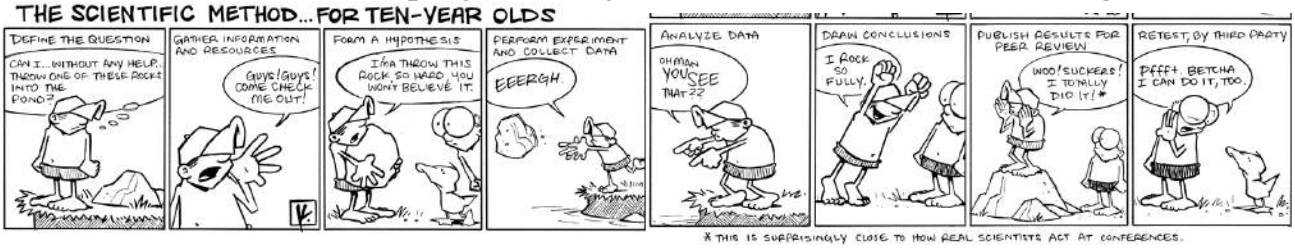
For an online template of an approved abstract form go to:
https://member.societyforscience.org/document.doc?id=24

OPTIONAL: **WRITTEN REPORT (**Good to have for State and National Science Fairs $$$$$)

> A report is the written record of the entire project from start to finish. When read by a person unfamiliar with a project, the report should be clear and detailed enough for the reader to know exactly what was done, why it was done, what the results were, whether or not the experimental evidence supported the hypothesis, and where the research information came from. This written document is your spokesperson when you are not present to explain your project, but more than that, it documents all your work. A project report should be typewritten, double-spaced, and bound in a folder or notebook. It should contain a title page, a table of contents, an abstract, an introduction, one or more experiments and data, a conclusion, a list of sources, and acknowledgments.
>
> (taken from Science Fair Central http://school.discoveryeducation.com/sciencefaircentral/

Judging: *Visual* and *written* presentations must demonstrate that students understand their research by providing all information in a logical, easily interpreted manner. *Oral* presentations must demonstrate that students are able to explain the project and the underlying science, and that students are comfortable discussing their projects and science in general.

1. Does the exhibit serve a purpose? Does Exhibit follow the **Scientific Method**? ….Answer a Question?
2. Are conclusions drawn? Are they justified by the data collected?
3. Interview/Classroom Presentation – How well is the student able to explain the exhibit? Is there a clear interest in the project? Does the student understand what is involved in the exhibit?
4. Are the important ideas emphasized?
5. Appearance: Is the exhibit attractive?
6. Examples of the Judge's Worksheets can be found on the school Web Site.
7. All projects will be judged by three different judges. All High school and junior high projects along with the top elementary projects will be interviewed by two judges. Scores will be averaged and then added together. 45 point maximum.
8. Awards are given to the top projects as Best of Show. 1st through 4th are also given to projects based on scores of judging.
9. Best of Show projects may be invited to the NEAZ Regional Fair.



Joseph City Science Fair Rules

The Science Fair rules are determined based upon the criteria developed for the International Science and Engineering Fair (ISEF). Projects that are not in compliance with the following rules will be disqualified and/or removed at the discretion of the Science Fair Director.

1. Anything potentially dangerous to the public **is prohibited in the display**, including but not limited to the following:
    a. No flames, open or concealed, and any combustible solids, fluids or gases
    b. No living organisms, no plants (students can use photographs)
    c. No chemicals including caustics and acids (e.g. **Baking soda and vinegar**)
    d. No dry ice or other sublimating solids
    e. **No liquids**, except water, which must be securely sealed in non-glass leak-proof containers to avoid spills
    f. No sharp items, including syringes and needles
    g. No projects with unshielded belts, pulleys, chains and moving parts with tension or pinch points that pose potential hazard to observers
    h. No animal or human food (Some non-perishable foods such as cereal and some candies may be mounted on display boards. Such items should be in sealed plastic bags.)
2. No live animals or preserved vertebrate or invertebrate animals or parts may be exhibited. No human or animal parts. Teeth, hair, or nails may be exhibited in a completely sealed container. Dried animal bones and dry-mounted histological sections, and completely sealed wet-mounted tissue slides may be exhibited.
3. No cruel or inhumane experimentation will be permitted. Animal studies may not involve harmful substances such as alcohol or tobacco. Research involving the use of animals may display drawings, charts or graphs to illustrate the conditions, developments and results of the investigations. Photographs and other visual presentations of surgical techniques, dissection, autopsies or other laboratory techniques depicting vertebrate animals in other than normal conditions may not be displayed on the exhibit, but may be contained in an accompanying notebook to be shown only during judging.
4. No poisons, drugs, controlled substances, toxic or hazardous substances or devices may be used.
5. No batteries with open top cells are permitted. Other types of batteries may be used.
6. **Team projects are limited to no more than three students for K-3 only. Grades 4-12 must submit individual projects.
7. Student's NAME, SCHOOL, GRADE, and TEACHER are to be placed ON THE BACK of the project, not on the front.
8. Awards won at local fairs SHOULD NOT be displayed.
9. Photographs showing students must serve a purpose related to project implementation and are not for identifying or displaying who did the project. Do not use photos showing the student's face.
10. PROJECT SIZE – MAY NOT EXCEED: Grades K-8: 36" wide, 48" high, and 18" deep. Dimensions include support to hold project up. Oversized projects will be disqualified and will not be judged. Display board must be self-supporting. Poster board must be reinforced.
11. Project must reflect the work of the student and not that of the parents or teachers. Each entry form must include appropriate signatures to verify that the science fair rules were followed.
12. **For grades K-2, no computer graphics or use of computers are permitted – we want the student to print their project.

****To qualify for the NEAZ Regional STEM Fair** their rules must be followed. Full AZSEF rules **http://www.navajocountyaz.gov/Departments/Superintendent-of-Schools/Events/Northeast-Arizona-Regional-STEM-Fair**

**Prior approval required for certain projects, you are responsible for compliance.

How Do I Start?

Think: Visit **Getting Started at Science Fair Central** and http://school.discoveryeducation.com/sciencefaircentral/Getting-Started.html

What am I interested in? What can I learn and show others.

1. Choose a project of interest that you can prove by experimentation. Does the exhibit serve a purpose?
2. Study the project subject. Read. Learn about it. Talk to your parents, teachers, and librarian. Be able to explain your exhibit.
3. Make notes -- authors, title, pages used, and information. Emphasize the important ideas.
4. Write your purpose – What you want to do. Write your title.
5. Experiment. Make notes of what you do and what happens.
6. Conclusion. Write what you proved.

Helpful Hints for Your Display

a) *A Good Title*—The title is an extremely important attention grabber. A good title should simply and accurately present your research. The title should make the casual observer want to know more.

b) *Take Photographs*—Many projects involve elements that may not be safely exhibited at the fair, but are an important part of the project. You might want to take photographs of important parts/phases of your experiment to use in your display.

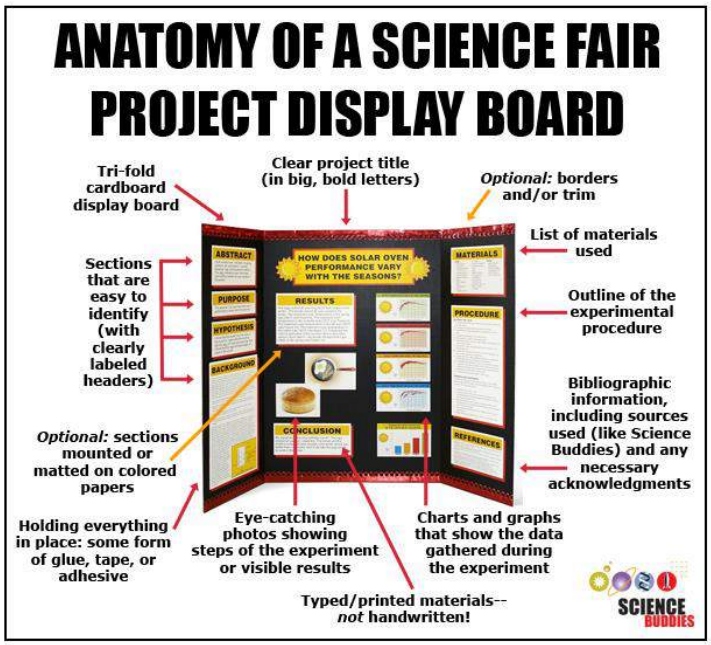
c) *Be Organized*—Make sure your display is logically presented and easy to read. A glance should permit anyone to quickly locate the title, experiments, results and conclusions. When you arrange your display, imagine that you are seeing it for the first time.

d) *Eye-Catching*—Make your display stand out. Use neat, colorful headings, charts, and graphs to present your project. Home-built equipment, construction paper, and colored markers are excellent for project displays. Pay attention to the labeling of graphs, charts, diagrams, and tables. Each item must have a descriptive title. Anyone should be able to understand the visuals without further explanation.

e) *Correctly Presented & Well Constructed*—Be sure to adhere to the size limitations and safety rules when preparing your display. Make sure your display is sturdy, as it will need to remain intact for quite a while. Do not hesitate to ask for advise from adults if you need it.

Project Display Board

(Not to exceed 48" in width, 108" in height and 30" in depth)



CHECK this site out!!!!

http://www.sciencebuddies.org/blog/2015/03/putting-together-a-project-display-board.php?from=Newsletter

Science Fair Categories

https:// student.societyforscience.org/intel-isef-categories-and-subcategories for a full description and definition of the Intel ISEF categories:

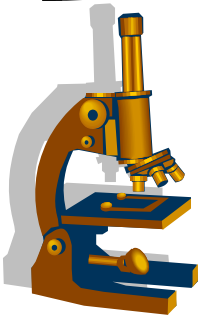
(01) Computer Science *Study and development of computer hardware, software engineering, internet networking and communications, graphics (including human interface), simulations/virtual reality or computational science (including data structures, encryption, coding and information theory).*

(02) Biological

Botany…*Study of plant life—agriculture, agronomy, horticulture, forestry, plant taxonomy, plant physiology, plant pathology, plant gene*

Biochemistry…*Chemistry of life processes—molecular biology, molecular genetics, enzymes, photosynthesis, blood chemistry, protein chemistry, food chemistry, hormones, etc.*

Zoology…*Study of animals—animal genetics, ornithology, ichthyology, herpetology, entomology, animal ecology, paleontology, cellular physiology, circadian rhythms, animal husbandry, cytology, histology, animal physiology, invertebrate neurophysiology, studies of invertebrates, etc.*



Microbiology *Biology of microorganisms—bacteriology, virology, protozoology, fungi, bacterial genetics, yeast, etc.*

Medicine and Health *Study of diseases and health of humans and animals—dentistry, pharmacology, pathology, ophthalmology, nutrition, sanitation, pediatrics, dermatology, allergies, speech and hearing, etc.*

Gerontology *Study of the aging process in living organisms*

(03) Behavioral & Social *Human and animal behavior, social and community relationships—psychology, sociology, anthropology, archaeology, ethology, ethnology, linguistics, learning, perception, urban problems, reading problems, public opinion surveys, educational testing, etc.*

(04) Earth & Space Science *Geology, mineralogy, physiography, oceanography, meteorology, Climatology, astronomy, speleology, seismology, geography, etc.*

Environmental Science—*Study of pollution (air, water, and land) sources and their control; ecology.*

(05) Engineering *Technology; projects that directly apply scientific principles to manufacturing and practical uses—civil, mechanical, aeronautical, chemical, electrical, photographic, sound, automotive, marine, heating and refrigerating, transportation, environmental engineering, etc.*

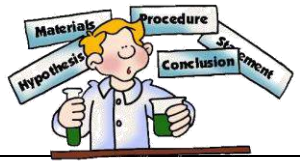
(06) Chemistry *Study of nature and composition of matter and laws governing it—physical chemistry, organic chemistry (other than biochemistry), inorganic chemistry, materials, plastics, fuels, pesticides, metallurgy, soil chemistry, etc.*

(07) Physics *Theories, principles, and laws governing energy and the effect of energy on matter—solid state, optics, acoustics, particle, nuclear, atomic, plasma, superconductivity, fluid and gas dynamics, thermodynamics, semiconductors, magnetism, quantum mechanics, biophysics, etc*

(08) Mathematics *Development of formal logical systems or various numerical and algebraic computations, and the application of these principles—calculus, geometry, abstract algebra, number theory, statistics, complex analysis, probability.*

Science Fair Project Ideas…

Choose one or think up your own.



- Are homemade weather instruments reliable?
- When will water evaporate faster?
- Why does an electric fan cool?
- Why is ice lighter than water?
- When does a body float?
- How do you measure air pressure?
- How can you locate the North Star?
- How can you tell time by the sun?
- How does sound reach your ears?
- How is an echo produced?
- How can you store electricity?
- How does magnetism make electricity?
- How does light bend?
- How can a pulley increase your strength?
- How do plants make their food?
- How does the blind spot of your eye affect your vision?
- Can your taste buds be cooled?
- Are there germs on things around us?
- How can levers make work easier?
- Is a homemade compass reliable?
- What effect does loud music have on hearing?
- Under what color lights do plants grow best?
- Do two or more elements always form a compound?
- How do electric charges react?
- What things are biodegradable?
- What does yeast do to sugar or starch?
- How does rainfall cause erosion?
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- How can you get many colors out of white light?
- What type of packaging will keep food cold?
- What will make an electromagnet stronger?
- What do hot air balloons rise?
- What forces determine how high playing cards can be stacked?
- Which materials are magnetic?

- Will foods mold under damp conditions?
- Do foods contain the same among of water?
- Which materials conduct electricity best?
- Which brand of paper towel absorbs water the best?
- Which materials make good heat insulators?
- How much heat does it take to heat cooking oil and an equal amount of water?
- What effect does adding salt or sugars have on the freezing point of water?
- Does ice float the same way in different liquids?
- Do liquids freeze at the same temperature?
- Which household materials are acid s or bases?
- Will a loud noise blow our a candle?
- Why is ground water clear?
- How do different activities affect body temperature?
- Can evaporation of water be controlled?
- What effect does sight have on balance?
- How does birth weight compare to adult weight?
- How can a shadow be used to tell time?
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The Internet is a great source for finding ideas for science fair projects. Try these sites or do a SEARCH.

http://school.discoveryeducation.com/sciencefaircentral All About Science Fairs
http://www.youngscientistchallenge.com Young Scientist Challenge 1st place **$25,000.00…Awesome**
http://mathforum.org/teachers/mathproject.html Math Ideas for Science Fair Projects...or BING it.
http://www.math.ca/Education/mpsf/ more Math Ideas for Science Fair Projects…or BING Math ideas
BING …science fair projects, look at the images for examples of displays and project ideas.
http://www.scsdsciencefair.org/ A student Fair Handbook.
http://www.sciencebuddies.org/ BEST SITE!..... BEST SITE!..... BEST SITE!.....BEST SITE!!!!
http://www.homeworkspot.com/sciencefair/
http://www.all-science-fair-projects.com
http://www.sciencefair-projects.org
https://www.youtube.com/watch?v=2rXOXACmC_U Youtube examples of the Project board
http://www.navajocountyaz.gov/Departments/Superintendent-of-Schools/Events/Northeast-Arizona-Regional-STEM-Fair Navajo County Science Fair…

These are examples of **Bad** science fair project **topics.**

You should **Avoid** these topics:

Science Project Topics to Avoid	**Why**
Any topic that boils down to a simple preference or taste comparison. For example, "Which tastes better: Coke or Pepsi?"	Such experiments don't involve the kinds of numerical measurements we want in a science fair project. They are more of a survey than an experiment.
Most consumer product testing of the "Which is best?" type. This includes comparisons of popcorn, bubblegum, make-up, detergents, cleaning products, and paper towels.	These projects only have scientific validity if the Investigator fully understands the science behind why the product works and applies that understanding to the experiment. While many consumer products are easy to use, the science behind them is often at the level of a graduate student in college.
Any topic that requires people to recall things they did in the past.	The data tends to be unreliable.
Effect of colored light on plants	Several people do this project at almost every science fair. You can be more creative!
Effect of music or talking on plants	Difficult to measure.
Effect of running, music, video games, or almost anything on blood pressure	The result is either obvious (the heart beats faster when you run) or difficult to measure with proper controls (the effect of music).
Effect of color on memory, emotion, mood, taste, strength, etc.	Highly subjective and difficult to measure.
Any topic that requires measurements that will be extremely difficult to make or repeat, given your equipment.	Without measurement, you can't do science.
Graphology or handwriting analysis	Questionable scientific validity.
Astrology or ESP	No scientific validity.
Any topic that requires dangerous, hard to find, expensive, or illegal materials.	Violates the rules of virtually any science fair.
Any topic that requires drugging, pain, or injury to a live vertebrate animal.	Violates the rules of virtually any science fair.
Any topic that creates unacceptable risk (physical or psychological) to a human subject.	Violates the rules of virtually any science fair.
Any topic that involves collection of tissue samples from living humans or vertebrate animals.	Violates the rules of virtually any science fair.

XIX Annual Joseph City Unified School District

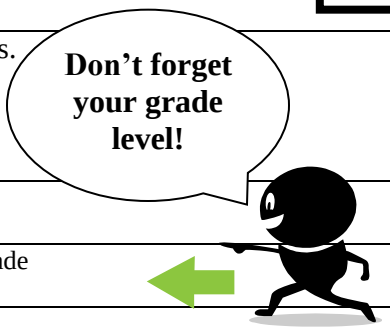
Science and Engineering Fair
2016 Entry Form

PROJECT #
To be assigned

Please print first and last name **clearly**.

Student Name (1)

Individual or Team use additional lines to list other team members.
Example for class project: *Mrs. Imasyncfare's 7th Grade Class*



Student Name (2)

Student Name (3)

School | Grade

Joseph City, AZ 86032

Science Teacher Sponsoring Project

Project Title

Please Circle appropriate Class and project type

Class: K-3 4-6 7-8 9-12

Project: Individual Team Class

Category:

(Please write which category your project represents.)

Categories

01-Computer Science	**05-Engineering**
02-Biological	**06-Chemistry**
03-Behavioral & Social	**07-Physics**
04-Earth and Space Science	**08-Mathematics**

Signatures verify that science fair rules were complied with.
Parents or a teacher may sponsor Projects.

Parent Signature | Phone

Teacher Signature | Phone

Names should **not** be displayed on the front of projects. Put Name, Class, and Category on the back, bottom-middle panel of your display board. Fasten entry form with a paper clip to project. **DO NOT TAPE.**