INFORMATION FOR ALL SCIENCE FAIR PROJECTS: GUIDELINES

Science Skills Learned and Practiced through Science Fair Participation

Observing - The learner will identify objects and their properties utilizing all five senses, identify changes in various systems, and make organized observations.

Classifying - The learner will sort objects by their properties, match objects by their likenesses and differences, and describe the sub-components of objects.

Measuring - The learner will compare two like quantities where one is used as a unit of measure.

Collecting and Organizing - The learner will gather, describe, and record data and then order, classify, and compare the data to identify patterns and similarities.

Predicting and Inferring - The learner will suggest explanations for a set of collected data and then form generalizations.

Identifying Variables - The learner will formulate a hypothesis from a set of observations and inferences, and devise a method to verify the hypothesis.

Synthesizing - The learner will integrate the lower process skills in the design, experimentation, and interpretation of an investigation of an observable phenomena.

The use of these processes will be continued throughout the secondary level science experience.

SCIENCE FAIR CATEGORIES

Botany: Subjects such as plants (mosses, seed plants), agriculture, conservation, and forestry. No live plants may be displayed.

Earth and Environmental Science: Projects illustrating principles of geology, geography, and related fields. Also, projects dealing with global change, issues related to spaceship Earth, world Earth Day topics, environmental concerns, extinctions and related fields.

Engineering: Technological devices which are useful to mankind. Also engineering-related fields, such as electricity, civil, mechanical, chemical, aeronautical, and geological.

Health and Behavioral Science: Emphasis on human health and behavior.

Mathematics and Computer Science: Showing any theory or principal of mathematics or demonstrating new ideas for computer software or computer systems.

Physical Science: Basic principles of physics, chemistry, astronomy, meteorology, and related fields.

Zoology: Observing the growth or behavior of animals (invertebrates, vertebrates), genetics, and paleontology. No live or preserved organisms may be displayed.

TYPES OF PROJECTS

1. ***INVESTIGATION:*** Observe nature (plants, animals, people) and report what you observe. Your purpose is to find out how your specimens behave or function. This type of project should follow the scientific method. Example: Watch prairie dogs; record their barks; photograph their movements; compare their movements at various times in the day or how their movement is affected by weather etc: chart or graph findings.

Comparative Surveys: These surveys are sometimes called natural experiments. Identify two or more groups or classes of subjects that are generally alike but which may show a difference in one or more important factors. Express the difference as a hypothesis. EXAMPLE: "Boys' hearts beat faster than girls' hearts do."

Controlled Experiment: This kind of experimenting involves more complex investigations. EXAMPLE: You might have a group of plants as an experimental subject and another group of the same type of plants as a control group. The independent variable in this experiment is the amount of chemical fertilizer added to the experimental plant group. The dependent variable is the difference observed in the growth of the plants.

Simple Experiment: In this kind of experiment your purpose is to change something. You will be observing what happens as a result of changes. EXAMPLES: Melt an ice cube; incubate an egg; inflate a balloon.

2. MODEL OR COLLECTION: Construct a kit or model, or exhibit a collection. The purpose is to provide an answer to a question or hypothesis you are presenting. You must be able to explain your model or collection. EXAMPLE: The purpose of a model of a solar home could be to determine the use of solar energy in lowering heating cots. Read; talk to experts; find answers.

3. BEHAVIORAL AND SOCIAL SCIENCE:- These projects usually involve surveys and/or human observation.

In the category of behavioral and social sciences:

All survey questions must have prior approval of the classroom teacher or school science fair committee and must be administered by the student;
All survey questions must be approved prior to administering them to students;
Students must notify interviewees of the purpose for the study;
Students must conduct the surveys;
There can be no deceptive use of the results; and
Prior permission must be obtained from parents to survey minors on questions pertaining to [insert board policy re: values, beliefs, etc.].
Failure to meet these criteria will be grounds for exclusion from the school science fair.

4. DEMONSTRATION OF A SCIENTIFIC PRINCIPLE: Find a scientific rule or law that is interesting to you. EXAMPLE: Measure lung capacity using several people. The purpose could be to find out if a large lung capacity is an advantage during exercise. Experiment and find the answers.

THE SCIENTIFIC METHOD

When doing an investigation you will want to follow a research method used by scientists when they do experiments.

PURPOSE: A question or statement stating what you will try to find out with your experiment

HYPOTHESIS: Your prediction of the experiment outcome

PROCEDURE: Experimenting and observing

DATA GATHERING: Collecting information and results

RESULTS: Finding out what the experiment proves

CONCLUSION: A summary of what your experiment shows and how your work can be used for more research.

Exhibit Guidelines

Keep the exhibit neat, uncluttered and to the point. All posters, charts, etc. must be attached to the exhibit. No part of an exhibit may be attached to walls or tables. Build your exhibit compactly. It must be self-supporting (FREE STANDING). Be sure to make everything sturdy so it can be safely transported. Fasten everything well.
The exhibit displays your project. Use attractive lettering. Make cut-out letters since stencil letters can be hard to read. Use one-color printing to avoid confusion. Spell correctly. Main points should be large and simple. Details must be clear and legible from three feet away.

EXHIBIT SPACE: Maximum size is:
Width: (side to side) 122 cm (4 feet)
Depth: (front to back) 76 cm (2 1/2 feet)
Height: Table Exhibit 122 cm (4 feet)

Roles and Responsibilities

In order to maximize your student's experience, please follow these guidelines and responsibilities.

Student's Role is to:
Select a topic for the project following school district science fair guidelines and gain approval for the project;
Complete an investigation, model, collection or demonstration of a scientific principle;
Construct an exhibit and, when the grade level is appropriate, write a report which illustrates and explains the project;
Use scientific terms in the display and explanation of the project to other students and community members; and Follow district science fair safety guidelines.

Teacher's Role is to:
Motivate students;
Serve as an advisor;
Support student ideas and promote creativity;
Be generous with praise and enthusiasm;
Contact resource people to serve as mentors;
Arrange for special equipment if needed;
Determine appropriateness of projects submitted; and Maintain a safe environment.

Parent's Role is to:
Provide information on the topic as a resource person;
Furnish supplies and help locate needed equipment;
Transport students to library or resource people;
Provide space such as a garage or room in the home for student to work on the project;
Provide encouragement to the student who is the primary scientist completing the project;
Ensure student safety and follow district safety guidelines.

ELEMENTARY SAFETY DISPLAY GUIDELINES

Anything which could be hazardous to the public, the exhibitor, or other exhibitors is PROHIBITED.

Organisms**: No organisms may be displayed. For example:**
Vertebrates- No owl pellets
No mice, live or dead
No skeletons
No fish, live or dead

Microbial cultures- No fungi, live or dead
No bread molds, bacteria, viruses, viroids, prions, rickettsia, live or dead
No parasites, human or other, live or dead

Invertebrates- No worms, live or dead
No insects, live or dead

Plants- No plants in soil

Chemicals: No chemicals may be displayed. For example:
No acids, dilute or strong
No bases, dilute or strong
No salt solutions
No insecticides
No repellents
No mercury

Flammable substances: No flammable substances may be displayed.
No gases
No solid rocket fuel
No flammable liquids
No fumes

An alternative solution to displaying the above items: Take photographs of the substances that were used or use a digital camera and create large pictures with a computer printer for display on your board. No identifiable humans or their parts may be displayed in photos.

Electricity: **Projects in the electricity category require the following:**
Electrical connections using voltage over 12 volts must be soldered or fixed with approved connectors, and all connecting wires must be properly insulated. Nails, tacks, or un-insulated staples must not be used to fasten wire. All switches and metal parts must be located out of reach of observers and be designed with adequate overload protection. Bare wiring and exposed knife switches may be used on circuits of 12 volts or less only.

If the project requires an electrical outlet: Only one 110 volt, 60 cycle, single phase AC connection will be provided for exhibits (if ordered in advance). Exhibitors who require electricity must furnish a 25 foot, three-pronged (grounded) extension cord, maximum amperage = 5 amps, maximum wattage = 500 watts.