

Science Fair

Teacher's Guide

This is a supplementary guide for the use of educators in instructional circumstances.

Previous to watching the Student Toolbox module entitled 'Science Fair,' teachers are encouraged to begin with a class discussion on the topic. Invite students to contribute their thoughts and questions on the subject matter.

This information will reveal what the students already know about the topic. Teachers can affirm correct responses and prepare students for the reception of new information.

Create a list of ideas and concepts under a heading such as "What We Know Already." Invite further comment as this list is assembled. List student suggestions of what they expect or hope to learn from the video they are about to view.

Tell the students that this list will be revisited after viewing the video. Encourage students to view the video closely so as to determine which of their ideas or questions were adequately addressed or not presented within the module.

After watching the module, initiate a brief discussion. Ask your class to confirm whether the content of the module covered the items on the "What We Know Already" list. Ask the students for a new list of new things they learned and ask questions from the question list and initiate activity from the suggestions provided.

Urge students to do follow-up research using the suggested Internet links and by choosing to read from the titles offered.

Program Summary

Creating a science fair project is a great way for students to demonstrate and expand upon classroom learning. There is often an element of competition as adjudication of individual projects can lead to the awarding of ribbons or prizes.

A successful project relies on the student or students having a thorough understanding of the assignment. Students should be encouraged to ask questions. They should be acutely aware of the assigned deadlines toward the completion of the project, and of course, the exact date of the science fair.

Choosing a topic from an area of interest to a student will make the project more appealing. Since elements of science exist within almost any topic that can be suggested, creativity can be instrumental.

A good approach is to have students ask themselves "How can I *make* a something that will *do* something?" or "How does the thing I'm thinking about *work*?" Simple topics that are easy to complete, analyze and understand are best. Students should have topics approved by the teacher so as to ensure appropriateness.

Although the Internet would appear to be the most ready source for research materials, students should be encouraged to take advantage of the local reference librarian. The reference librarian exists for the purpose of assisting in research.

Learning everything about a topic will instill confidence at the science fair. An experiment to prove a 'hypothesis' can be an integral part of a science fair display and presentation. The experiment should be accompanied by a suggested outcome as well as a checklist of procedures to execute the experiment. Procedures should be documented in a 'log book.'

Notes should be taken on the results of each experiment including pictures or sketches for a report and to include in the display. Notes should be organized along with a summary of the results. Charts or graphs can add to the presentation.

After sketching out ideas, the display can be assembled from hinged pieces of plywood, cardboard, foam-core or plastic. Large letters will make the display easy to spot from several feet away. Photographs, prints, diagrams and a general statement on the objective of the project can all be part of the display. Equipment and procedures should also be on display.

The Student who creates the display is the most important element of the presentation. Ample time should be invested in rehearsing responses and explanations. Presenters should, themselves, be presentable dressed in nice clothes and with a warm and ready smile. The science project should provide an excellent forum to demonstrate depth of topic knowledge and understanding.

Vocabulary

- **Science Fair** - A science fair is a competition where contestants, usually school students, create a project to explain or demonstrate scientific phenomenon or a chosen topic from a scientific perspective. An exhibit is a display of images and images demonstrating or in support of a specific theme or topic.
- **Exhibit** - An exhibit is a display of information and images in support of or to demonstrate a specific theme or topic.
- **Learning Environment** - A learning environment is an area established and supplied so as to be conducive to learning.
- **Hypothesis** - A Hypothesis is a proposal intended to explain certain facts or observations.
- **Experiment** - An experiment is the act of conducting a controlled test or investigation.
- **Rehearse** - To rehearse is to practice in preparation for a public performance.
- **Log Book** - A Log Book is a notebook used by inventors, scientists and engineers to record their ideas, invention process, experimental tests and results and observations.
- **Backboard** - A backboard is a raised vertical board, often hinged and capable of standing alone, to which titles, labels, photos, charts and diagrams are attached for display purposes.
- **Foam-core** - Foam core is a light sheet material made of polystyrene sandwiched between layers of white cardboard and used as a backing board for displays.

Pre-viewing Discussion

Before the class assemble their list of “What We Know Already” about Science Fair activities, stimulate and focus their thinking by outlining the following questions designed to ready them for learning:

- What are Science Fairs?
- Why are Science Fairs held?
- What types of elements should a Science Fair exhibit include?
- How would you choose a good Science Fair topic?

After the class has assembled their list of “What We Know Already” ask for suggestions of what they expect or hope to learn from the video they are about to view. Tell the students that this list will be revisited after viewing the video. Encourage students to view the video closely so as to determine which of their ideas or questions were adequately addressed or not presented within the module.

Focus Questions

1. What kinds of careers benefit from a knowledge of science?
2. What do the judges do at a science fair?
3. What type of topic should you choose for your Science Fair exhibit?
4. How will you know if your topic is appropriate?
5. What questions should you ask yourself when choosing a topic?
6. What are some good sources of research material?
7. What does a reference librarian do?
8. What is a Hypothesis?
9. Why should you make notes about everything you do?
10. How should charts and graphs be used in your display?
11. What is a log book?
12. What steps should you take to design your display?
13. What elements should be included in your display?
14. What is the most important part of a Science Fair Display?
15. What types of things will judges look for from you and your exhibit?

Follow-up Discussion

Following the viewing it is important to review the beliefs of the class versus the facts revealed by the presentation. Research has concluded that students will maintain their previous ideas and concepts until they specifically recognize and adjust their own mistakes. As such, it is important to guide students toward the correct answers and facts to the questions and issues that they contributed to the “What We Know Already” list.

An effective approach is to pose thought-provoking questions and concepts that lead to fresh thinking. A couple of examples are:

- Why is it important to demonstrate your basic knowledge of science?
- Why do you think an understanding of science is important?
- If you were going to use science to make the Earth a better place how might you do that?

Follow-up Activities

Have students suggest possible science fair topics. Have the students consider the questions “How can I make a something that will do something?” or “How does the thing I’m thinking about work?” Follow up their suggestions with an open forum on what sorts of things should be included in an exhibit. Have the students suggest items for a checklist.

Have students meet in small groups to discuss a group science fair exhibit. Have a member of each group explain the suggestions that were offered and some of the ideas that each group generated.

Suggest a class science fair. Invite students in other grades to participate. Involve the students in planning the date and details. Determine if there are local or regional science fairs in which students can participate or to which you could attend as a class.

Suggested Internet Resources

[Cyber Fair: Steps to Prepare a Science Fair Project](http://www.isd77.k12.mn.us/resources/cf/steps.html)

<http://www.isd77.k12.mn.us/resources/cf/steps.html>

This site has one-sentence explanations of each part of a science fair.

[Discovery Channel School: Science Fair Central](http://school.discovery.com/sciencefaircentral/)

<http://school.discovery.com/sciencefaircentral/>

This site provides a complete guide to science fair projects.

[The Ultimate Science Fair Resource](http://www.scifair.org/)

<http://www.scifair.org/>

A variety of resources and advice.

Suggested Print Resources

Levine, Shar & Johnstone, Leslie Quick-But-Great Science Fair Projects
Sterling Publishing Company, Inc. Dec 31, 2001

Vecchione, Glen 100 Amazing Make-it-yourself Science Fair Projects
Sterling Publishing Company, Inc, New York, NY Dec 31, 2001

Rhatigan, Joe & Newcomb, Rain Prize-Winning Science Fair Projects for Curious Kids,
Lark Books, Asheville, N.C. August 1, 2004