



The Value of a Student Research (*Science Fair*) Project

With the jam-packed schedules of today's families, why would either a student or a parent want to add one more major activity? Clearly, any school project assigned to a student should meet a stringent test for usefulness. Surprising to some, a science fair project is one of the best learning experiences a student can undertake. And, if it is taken seriously, it can be an excellent way to earn significant prizes, qualify for scholarships, and distinguish a college application.

Conceptually, a science fair project is very straightforward. A student chooses a scientific question he or she would like to answer. Then, library and Internet research on the question give the student the background information he or she needs to formulate a hypothesis and design an experiment. After writing a report to summarize this research, the student performs the experiment, draws his or her conclusions, and presents the results to teachers and classmates using a display board. Most students do their projects for a school science fair, but in many cases, students can enter that same project in fairs at the city or county level. This is the first step in competitions that lead up to the international level, where prizes total over \$3,000,000 and the top winners take home \$50,000 scholarships.

What makes a science fair project such a great learning experience is that it involves so much more than science. If the student is in middle school, the research report will most likely be the longest paper the student has ever written. Indeed, California curriculum standards call for papers of only 1-2 pages in length through the 8th grade, and any decent research report will be at least that long. The bibliography for the report will also be the first ever for some students. And, while library research is still important, these reports are a great way to hone computer research skills, as well as to learn the ins and outs of common office programs, such as word processors and spreadsheets. Most projects also involve a good deal of math, and all students get an opportunity to enhance their presentation skills when they prepare their display boards and discuss their projects with the judges.

A science fair project will also have a longer duration than any other assignment a student has done. In contrast to the typical school homework due the next day or perhaps a week hence, a science fair project requires a student to learn to plan over two or three months, a skill of immense importance in adulthood. Procrastination is definitely not rewarded.

Savvy students, especially those who work their way up to higher levels of competition, learn even more about communications skills. They learn the importance of selecting topics and fine-tuning their presentations in ways that will make them most likely to impress science fair judges. While some may bemoan this lack of purity in the pursuit of science, the fact is that even a professional scientist must compete for funds to continue his or her research. When better to learn how to persuade others than before your livelihood depends on it?

A science fair project even provides an opportunity for the discussion of ethical issues, such as plagiarism and falsification of data. Indeed, such a discussion is highly recommended. The ease of copying information from the Internet is hard to resist, and many students are far ahead of their teachers in understanding what is possible. Of course, learning about science is at the heart of a science fair project. Our society relies more on science every day, and science fairs are a great way for students to become more knowledgeable about how the world around them works. Every citizen needs sufficient science literacy to make educated decisions about what he or she reads in the media, about health care, and about other every-day problems.

Preparing a science fair project is an excellent example of what education experts call *active learning* or *inquiry* (also "hands-on" learning). It is a very effective instructional method; indeed, it is recommended as a cornerstone of successful science teaching. Yet, according to the National Research Council, active learning is not employed often enough in the classroom and its absence is seen as one of the key factors behind kids losing interest in science and not performing to their potential. Colleges want to see what students have done with the opportunities they had available to them, and science competitions are a fantastic opportunity. Typically, 2–4 percent of science fair entrants at the high school level move on to the top level of science fair competition, the Intel International Science and Engineering Fair (ISEF). While the competition is stiff, those odds are a lot better than the lottery. And clearly the state of New York is on to something. Students from Long Island came home from the 2003 International Science and Engineering Fair with prizes and scholarships totaling \$114,500.