



How to Prepare and Present a Science Fair Project

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Outline

- What is a science fair ?
- Why include a science fair project in your curriculum?
- Steps in creating a science fair project
- Resources





WHAT IS A SCIENCE FAIR?





What is a science fair?

- An opportunity for students to:
 - Identify a scientific problem
 - Develop a scientific approach to test solutions
 - Conduct an experiment
 - Analyze results
 - Present results to other people






Science Fairs differ in their style and scope

- From sharing results informally with friends and family

To...


- Following formal ISEF (International Science and Engineering Fair) rules in order to compete at regional, state, national and international levels






Common project topic categories

- BIOLOGICAL
- EARTH
- TECHNOLOGICAL
- PHYSICAL





Common age divisions

- ELEMENTARY DIVISION (GR. K-2)
- ELEMENTARY DIVISION (GR. 3-5)
- JUNIOR DIVISION (GR. 6-8)
- SENIOR DIVISION (GR. 9-12)



WHY INCLUDE A SCIENCE FAIR PROJECT IN YOUR CURRICULUM?

Science-related benefits for your student

- Allows an immersion into one topic with limited scope
- Teaches a structured approach to experimental science
 - Scientific method
- Provides hands-on experience with experimental design
 - Identifying/controlling variables
 - The importance of asking precise questions

General, non-science benefits for your student

- Encourages the student to ask questions
- Fosters logical thinking
- Importance of doing background research before tackling the problem
- Requires keeping good records
- Develops time management skills
 - External deadlines and expectations
- An opportunity to be an expert

Benefits for *all* high school students: Part 1

- Learning about themselves
 - Academic interests and disinterests
 - Their own strengths and weaknesses
 - Their growth in skill areas
- Building people skills
- Experiencing competition
 - They CAN compete effectively with peers
 - Learn to deal with judges' decisions
- Experience with rules and forms

Benefits for *all* high school students: Part 2

- Exposure to other students and experts with similar interests
 - Build mentoring relationships
- Write a research report that someone else will read
- Practice formal interview/presentation skills
- Scholarship, award opportunities
- Great addition to a transcript



STEPS IN CREATING A SCIENCE FAIR PROJECT

Brainstorm an idea

- Solve a problem that makes sense and is interesting to the student
 - Does putting glow sticks in the freezer make them glow longer?
 - Do different types of toilet paper plug the toilet easier?
 - How does the road surface affect safe car speeds?
 - What type of computer password is most secure?
- Don't use a "canned" science project – try for original work

Research the topic


- Understand the background of the problem
- Read
- Set up a field trip
- Talk to experts
- Do some preliminary experiments
- Write down what you've done and learned

Form a hypothesis

- Hypothesis:
 - A **statement** explaining an **observation or scientific problem** that can be tested by further **observation and/or experimentation**
- Examples:
 - Storing glow sticks in the freezer make them glow longer.
 - Luxury toilet paper disintegrates slower in water.
 - Concrete has a smaller co-efficient of friction than asphalt, making it less safe at higher speeds.

Design an experiment


- Key terms to keep in mind:
 - Independent variable
 - This is what you control or vary
 - Dependent variable
 - This is what you measure and is the result of your experiment
 - Replication
 - When possible, do the experiment more than once or have multiple measurements



Check the experimental design

- Discuss your design with an expert to make sure you are:
 - Making the appropriate measurements
 - Controlling all the important variables
- Double check all rules/regulations for the Science Fair you're entering
 - ISEF: Human Subjects, Vertebrates, Biological, Chemical or Physical Hazards

Gather materials and conduct the experiment




- Write down all specific materials
- Follow the experimental design exactly
 - If you have to alter it, record any deviations
- Write down data and be precise

<http://www.ck12.com/physics/airliftfamily>

Analyze the data and draw conclusions

- Statistics
- Charts
- Talk over results with an expert to make sure the conclusion matches the data
- Identify any uncontrolled variables
- Have some suggestions for future research or what to try next


Plan your display



- Check with rules on whether or not specific items can be displayed with the project
 - Examples:
 - Living plants and/or organisms
 - Water
 - Pulleys/movable objects

<http://www.ck12.com/physics/>

Prepare a display board




- Use a tri-fold science board to lay out the experiment
- Clearly label major steps in the scientific method
- Include photos
 - Photo credit line
 - Check on whether or not consent form is needed for anyone shown in the photos

Prepare written documentation

- Required documentation **may** include:
 - Project/data book
 - A log of all background research, data collection, etc.
 - Abstract
 - A one-page summary of the project
 - Research report
 - A full research report (more typical for older students)

Prepare for the interview



- Review background information
- Summarize your project in 2 minutes or less
 - "Elevator speech"
- Practice interview questions
- Review basic public speaking skills
 - Body language
 - Speaking clearly

How much time does this take?????

- Time depends on:
 - The age of student
 - The type of materials (plants, physical)
 - The complexity of the project
- Is it incorporated in your curriculum?
 - Treat it as a separate project
 - Or, work on it weekly for several months
- Start thinking about it now!

RESOURCES



Books

- Early elementary years – check your library for a resource!
 - Janice Van Cleave books
 - Many “how to do a science fair project” books

Websites

- Dayspring/Cary Homeschoolers Science Fair website
 - <http://caryareasciencefair.org>
- Greater Philadelphia Homeschool Science Fair website
 - <http://www.fair.science-resources.org/>
- NC State Science and Engineering Fair
 - <http://www.ncsta.org/sciencefair/>

WHAT NEXT?

