

# Science Fair Project Ideas and Resources

The greatest hurdle facing most students when starting a science fair research project is the selection of a topic. Though many books have been written describing projects, few of the projects described, especially in the older books, are true research projects.

This handout is designed as a quick resource when a student asks the familiar question 'What kind of project can I do? Each project title can be designed with one experimental variable. All other factors affecting the outcome of the student's research can be controlled. The methods book, Nuts and Bolts of Science Fair Projects, is perhaps the best, simple guide to basic student scientific research.

## Paper

- How does wetting paper affect its strength?
- How can you fold paper to make it support more weight?
- Which paper has the fastest capillary anion?
- Which paper plate will carry the most weight without buckling?
- Does the color of a paper towel affect the amount of water it will absorb?
- Does the color of a paper towel affect its strength?
- Do different types of paper change color when exposed to sunlight?
- Do different types of paper change color when exposed to heat?
- Do different types of paper change in strength with changes in humidity?
- Does the thickness of paper affect its strength?

## Evaporation

- How does temperature affect the rate of evaporation?
- Do additives affect the rate at which water evaporates?
- Does the size of its container affect the rate at which water evaporates?
- Does air movement affect the rate at which water evaporates?
- Does the viscosity (thickness) of a liquid affect its evaporation rate?

## Absorption

- Does the size of a sponge affect the amount of water absorbed?
- Do the size of the holes in a sponge change the amount of water it can absorb?
- Does the material from which a sponge is made affect the amount of water absorbed?
- Is the amount absorbed by a sponge affected by the type of fluid being absorbed?

## Fabrics

- Does the drying rate vary with different fabrics?
- Which kinds of fabrics are easiest to dye?
- Which fabrics are the best insulators?
- Which fabrics absorb the most moisture?
- Which fabrics absorb moisture fastest?

## Soft Drinks

- Which drinks are the most carbonated (have the most fizz)?
- Do drinks stay colder longer in cans or bottles?
- Can people distinguish between brands of soft drinks?
- What effect do different soft drinks have on various materials (for examples, meat, vegetables, pastry, paper, fabrics)?

## Ice

- What factors affect the rate at which ice melts (size, shape, additives)?
- Do additives affect the time required for water to freeze?
- What materials are the best insulators for ice?

## Sugar

- Does water temperature affect the rate at which sugar dissolves?
- Does water temperature affect the amount of sugar that can be dissolved in a given volume?
- Does the shape of a piece of candy affect the rate at which it melts?
- Does the size of a piece of candy affect the rate at which it melts?
- Do different kinds of candy melt at different rates?

## Music

- Does music affect the respiration rate of fish?
- Does music affect the activity of fish?
- How does the pitch of a bottle change when the volume of water in the bottle is changed?
- How do different kinds of string material affect the pitch of a guitar?
- Does the length of a pitch pipe affect its pitch?
- Does the speed of a passing vehicle affect the change in pitch demonstrated by the Doppler effect?

## Soap

- What kind or brand of soap makes the most bubbles?
- What kind or brand of soap bubbles last the longest?
- What kind or brand of soap or detergent cuts greases best?
- How do soap bubbles react to additives in the water?

- How does glycerin affect the size and/or strength of blown soap bubbles?
- Can soap bubbles be made in a variety of shapes?

## Bouncing Balls

- How does the drop-height of a ball affect the height of its bounce?
- How does the drop-height of a ball affect the number of times it will bounce?
- How is the bounce of a ball affected by the surface on which it bounces?
- How does the material from which it is made affect the bounce of a ball?
- How does the distance from a light change the size of an object's shadow?
- How is a shadow affected by the brightness of the light source?
- How is the size of a shadow affected by the size of the object casting the shadow?

## Light

- Does the area covered by a light beam change with the distance to a surface?
- Does the strength of a light beam change with the distance to a surface?
- Does the area covered by a light beam change with the angle between the beam and a surface?
- Does the amount of light on a given area of a surface change with the angle between the light beam and the surface?

## Acceleration

- Does the speed of a cart rolling down a ramp change with the angle of the ramp?
- Does the speed of a cart rolling down a ramp change with the mass of the cart?
- Does the speed of a cart rolling down a ramp change with the size of the wheels?
- Does the speed of a cart rolling down a ramp change with the placement of mass in the cart?
- How does the speed of a car rolling down a ramp, compare to the distance it can roll on a flat surface?
- Does the speed of a ball rolling down a ramp change with the kind of material from which the ball is made?
- Does the speed of a ball rolling down a ramp change with the kind of surface on which the ball is rolling?

### **Solution**

- Does Alka-Seltzer dissolve at different rates in different substances?
- Does temperature affect the rate at which Alka-Seltzer dissolves?
- Do different brands of antacid dissolve at different rates?
- Do different brands of antacid neutralize different amounts of acid?
- Which antacid neutralizes acid fastest?

### **Fruits**

- Does temperature affect the rate at which a banana ripens?
- Does the size of a fruit affect the number of seeds it contains?
- Does the size of a fruit affect the amount of juice it contains?
- Does the kind of fruit affect the amount of juice it contains?

### **Rubber Bands**

- Are thicker rubber bands stronger?
- Does the strength of a rubber band vary with temperature?
- Does using a rubber band affect its strength?
- Does exposing a rubber band to sunlight change its strength?
- Does exposing a rubber band to chemicals change its strength?
- Does exposing a rubber band to heat change its strength?
- Does exposing a rubber band to radiation change its strength?

### **Popcorn**

- Does the method of popping affect the volume of popcorn?
- Does the method of popping affect the ratio of popped to unpopped kernels?
- Does the brand of popcorn affect the ratio of popped to unpopped kernels?
- Does the amount of moisture affect the ratio of popped to unpopped kernels?
- Does the storage temperature of popcorn affect the ratio of popped to unpopped kernels?
- Does the type of oil used affect the ratio of popped to unpopped kernels?
- Does the temperature of popping affect the ratio of popped to unpopped kernels?
- Does popping time affect the ratio of popped to unpopped kernels?

### **Bag Strength**

- Is the cost of a plastic garbage bag related to its strength?
- Is the strength of a plastic garbage bag affected by its thickness?
- Is the strength of a plastic garbage bag affected by exposure to sunlight?
- Is the strength of a plastic garbage bag affected by exposure to radiation?
- Is the strength of a plastic garbage bag affected by freezing?
- Which brand of plastic garbage bag is strongest?
- Does moisture affect the strength of paper grocery bag?

### **The Outer Banks**

- Do different plants grow in different areas of a barrier island?
- What factors affect the type of plants that can grow in different areas of a barrier island?
- How do the size and shape of sand grains vary across a barrier island?
- Does the salt content of shallow wells vary across a barrier island?
- Does the character of sand grains vary from one barrier island to another?

### **Pollution**

- What kinds of particles are found in our air?
- How does particulate air pollution vary from one area to another?
- Does particulate air pollution vary depending on the way people use an area?
- Does the amount of precipitation affect the amount of particulate air pollution?

### **Precipitation**

- Does precipitation vary from place to place within a storm?
- Does precipitation contain solid particles?
- Does the acidity of precipitation vary with the amount that falls?
- Does the acidity of precipitation vary with the seasons?
- What is the average speed of the wind in (city)?
- Does the speed of the wind vary with the direction from which it blows?
- What direction does the wind blow from in (city)?
- Is the direction from which the wind blows related to weather systems?

### **Temperature**

- Does temperature vary with height above the ground?
- Does the kind of vegetation in an area affect the temperature near the ground?
- Is the temperature variation different on different sides of a building?
- Does the kind of surface (concrete, asphalt, grass, dirt & water, etc) affect the way temperature varies near ground level?
- Does the drying time of paint vary with temperature?

### **Environment**

- What impact does automobile traffic have on animal life and death in (city or county)?

### **Magnets**

- Does adding coils of wire to an electromagnet increase its strength?
- Does the material from which an electromagnet core is made affect its strength?
- Does the voltage applied to an electromagnet affect its strength?
- Does changing the current flowing through an electromagnet change its strength?
- How does the force between a piece of metal and a magnet vary with distance?

### **Seeds**

- Does the position in which a seed is planted affect the way its seedling sprouts?
- Does the sprouting time for a seed change with planting depth?
- Does the sprouting time for a seed vary with its size?
- Does sprouting time vary with soil temperature?
- Can a plant's response to gravity be changed?

### **Heat and Light**

- Does the color of a surface affect the rate at which it absorbs or releases heat?
- Does the texture of a colored surface affect the rate at which it absorbs or releases heat?
- Does the color of light affect the rate at which it is absorbed by a surface?
- Can infrared energy be detected in a spectrum?
- Does boiling an egg change its mass?

### **Facial Tissue**

- How does the resistance of Kleenex to blowing (compressed air) vary from brand to brand?
- How does the resistance of Kleenex to blowing (waft) vary from brand to brand?
- How does moisture affect the strength of Kleenex?

### **Oil/Friction**

- How does the viscosity of oil vary with temperature?
- How does the slipperiness of oil vary with temperature?
- Do different oil weights behave differently (viscosity, slipperiness) with changes in temperature?

### **Fabrics**

- Does exposure to sunlight cause nylon to deteriorate?
- Do changes in temperature and/or humidity affect the strength of nylon?
- Does exposure to sunlight cause rayon to deteriorate?
- Do changes in temperature and/or humidity affect the strength of rayon?
- Do woven mixtures of nylon, rayon, etc withstand sunlight and weather better than pure nylon or rayon?

### **Humidity**

- Can human hair be used to indicate changes in humidity?
- Do different colors of human hair react differently to changes in humidity?
- Do straight and curly hair react differently to changes in humidity?
- Does treating hair with chemicals change its reaction to changes in humidity?
- Does the drying time of paint vary with humidity?

### **Mechanics**

- Does the spacing of dominoes affect the rate at which they fall?

### **Human Physiology**

- Does human weight change with time of day?
- How does exercise affect blood pressure?
- How does exercise affect body temperature?
- How does exercise affect respiration?
- Do males and females grow at different rates?

### **Epidemiology**

- Can the life span of individuals buried in cemeteries be related to medical discoveries?
- Do the life spans of individuals buried in cemeteries reflect epidemics?
- Do the death rates of individuals buried in cemeteries reflect epidemics?

### **Physical Geology**

- How is the distance a rock rolls in a stream related to rounding of its edges?
- How does the surface area of a rock change as it is broken?
- Does the composition of a rock affect its resistance to abrasion?

## **BIBLIOGRAPHY**

### **WEBSITES**

#### **Intel International Science and Engineering Fair:**

<http://www.sciserv.org>

Science Service administers the Intel International Science and Engineering Fair. We have developed our website to help interested persons find information about the fair, rules and guidelines, affiliated fairs, and all other pertinent information that we can think to put up on the site. Also available are all of the Intel ISEF forms available for pdf downloading.

#### **The World-Wide-Web Virtual Library: Science Fairs**

<http://physics1.usc.edu/~gould/ScienceFairs/>

The WWW Virtual Library has a comprehensive list that attempts to provide "every science fair accessible through the World Wide Web", whether of global or local scope. Many of the sites have resource pages that provide additional links. Visit other fair sites to get ideas for your own site and/or let the Virtual Library know about your site if you are not already linked.

#### **NASA Life Sciences Support Contract Science Project Guidelines:**

<http://atlas.ksc.nasa.gov/education/general/scifair.html>

This is a site that provides a comprehensive set of guidelines on the fundamentals of putting together a science fair project. The Guide has been written from the experience of judges from the Life Sciences Support Contract at the Kennedy Space Center who have judged at their local science fairs.

#### **The EDUZONE Science Links:**

[http://www.eduzone.com/l\\_links/science.htm](http://www.eduzone.com/l_links/science.htm)

The education site has a good resource link page that has rated the links it provides. The page gives a variety of research options from a more specific Science Fair Research page providing links to all types of science related sites to the National Student Research Center that contains a large collection of research projects from student researchers across the country.

#### **Internet Scout Project:**

<http://www.scout.cs.wisc.edu>

The Internet Scout Project is designed to help you find the resources you need on the Internet. Funded in part by NSF, the project is devoted to finding online resources most valuable to the education community.

#### **California State Science Fair:**

<http://www.usc.edu/CMSI/CalifSF/Resources/>

The California State Science Fair has an excellent resources page of Science Fair links to help get started with projects including other fairs and school district resource pages.

#### **Science Hobbyist/Science Club Science Fair Idea Exchange:**

<http://www.halcyon.com/sciclub/cgi/vt/scifair/questbook.html>

This page includes an archive of ideas and other websites for "Science Fair Stuff". You can add "an old and unused (but cool) idea for a science fair project" or the archive for an idea.

## **BOOKS**

### **Science Fair and Projects Grades 7-12**

Published by the National Science Teachers Association  
1840 Wilson Blvd., Arlington, VA 22201  
(703) 243-7100 \$9.50

Suggestions involving students in science projects, guiding parents in their child's investigation. Includes sections on Planning Ahead, The What, Why, and How of Projects, A Fair Evaluation, and Beyond the Science Fair.

### **How to Prepare a Science Fair Project**

Published by United Learning  
(800) 424-0362

Videotape (\$ 9.50 - 25 minutes) Blackline Masters Provides teachers and student guides, which include sample forms, sample long-range schedule, ideas for science fair projects, judges score sheet, and certificate of accomplishment.

### **1001 Ideas for Science Projects**

Published by Prentice Hall General Reference  
Columbus Circle, New York, NY 10023  
(800) 288-4745

Hundreds of stimulating, project ideas for students, from middle school to college, and their teachers. Informative and easy to follow, covers every area of science.

### **Science For Kids: 39 Easy Animal Biology Experiment**

Published by TAB books  
Blue Ridge Summit, PA 17294-0850

Learn about a wide assortment of animals while studying such topics as anatomy, life cycle, hibernation, and sensory perception.

### **Science Fair: Developing a Successful and Fun Project**

Published by TAB Books  
Blue Ridge Summit, PA 17294-0850

An Excellent guide for students with minimal adult supervision. which provides easy-to-follow instructions on step-by-step of project preparation instructions to include from choosing a topic. defining the problem, setting up and conducting the experiment. drawing conclusions to setting up the display.

*Nuts and Bolts: A Matter of Fact Guide to Science Fair Projects:* 1980, Van Deman, Barry, A and McDonald, Ed., The Science Man Press, Harwood Heights, Illinois, 62p.

*INQUIRE: Suggested Activities to Motivate the Teaching of Intermediate Science:* 1976, Youngpeter, John, M. Ed., Educational Service Inc, Setvensville, Michigan, 221p.

*Science Experiments for the Primary Grades:* 1962, Reid, Robert, W., Pitman Learning Inc, Belmont, California, 40p

*Science Activity Book From the Smithsonian Institution:* 1987, Galison Books, New York, New York, 90p.

*More Science Activities From the Smithsonian Institution:* 1988, Galison Books' NewYork, New York, 90p

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*Our Wonderful World - Environmental Studies Project Aims - Grades 5-9:* 1987, Wiebe, Arthur, Ecklund, Larry, and Mercier, Sheryl Eds., AIMS Education Foundation, Fresno, California, 36p.

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*Tim's Science Notebook:* 1985, DeCloux, Tina and Werges, Rosanne, American Teaching Aids, Covina, California, 45p.

*School Ground Science Activities for Elementary and Middle Schools:* 1988, Roth, Charles, E., Cleti, Cervoni, Wellnitz, Thomas, and Arms, Elizabeth, Massachusetts Audubon Society, Lincoln, Massachusetts, 64p.

*Creative, Hands-on Science Experiences:* 1986, DeBruin, Jerry, Good Apple Inc., Carthage, Illinois, 247p.