

# SAMPLE SCIENCE FAIR EXPERIMENTS

- To see if bats find food by hearing, seeing or smelling.
- To see if caffeine increases the heart rate of a rat
- To see if lady bugs will help control aphid populations
- To see if vitamin supplements will help rabbits increase in weight faster
- To see if light is energy or matter.
- To see if all objects fall at the same rate.
- Does the mass of an object affect inertia?
- Do projectiles fall at the same rate as dropped objects?
- Can the boiling point of water be lowered?
- Does a lever decrease the amount of force needed to lift an object?
- Do different colored lights affect plant growth?
- Does temperature affect volume of a gas? solid? liquid?
- Can an object more dense than water float?
- Is mass lost when wood is burned
- Can water be made from Hydrogen and Oxygen?
- Can the size of a molecule be calculated?
- Do acids or bases conduct electricity?
- Does the speed of electricity vary through different wires?
- Does the ground temperature affect seed germination?
- Does temperature affect the solubility of salt?
- Does Weed-B-Gone affect all plants equally?
- How is boiling point affected by the addition of a solute?
- Can we predict the amount of base needed to neutralize an acid?
- Does the speed of light change as it travels through different materials?
- Can rotation be predicted via the doppler effect?
- What colors have the highest frequency and energy?
- Can electromagnetism be used to propel a vehicle?
- Can wind be used to generate electricity?
- Can water be used to generate electricity?
- Does diet affect egg production in chickens?
- Would money be saved if incandescent bulbs were replaced by florescent?
- Does magnetism affect the electromagnetic spectrum?
- Does the fat content in meat affect bacteria growth?
- Does microwaving food reduce bacteria growth?
- Does the fat % in milk affect bacteria growth?
- Do different surfaces affect stopping time?

How does gravity affect the growth of roots? stems? germination?  
Can roots grow from different parts of plants? —  
Can plants grow using root systems from other plants?  
Do green leaves give off oxygen in sunlight?  
Can air enter a plant through leaves? —  
What gasses do seeds give off when they germinate?  
How effective are disinfectants at killing bacteria?  
What gasses does yeast give off when acting on sugar?  
Does air have weight?  
Does air have pressure and can we measure it?  
What are some of the chemical effects of air?  
How can water be decomposed?  
Can muddy water be purified?  
Can water be sterilized?  
How can soap be produced?  
Can a turbine be created with chemical reaction? —  
Can an elevator be made with hydraulics?  
Do simple machines make work easier?  
    lever, pulley, wedge, wheel & axle, screw, inclined plane  
How can an elevator be made using pulleys?  
How can movement become more efficient by reducing friction?  
Can a ripple tank be used to demonstrate sound travels in waves?  
Can the rate of expansion be measured?  
Which food source has fewer calories?  
Which materials conduct heat well? poor?  
Can steam make an engine work?  
Can gases be given off during electrolysis  
How can the magnifying power of a lens be measured?  
How can a film projector be made using common parts?  
What is the effect of exercise on pulse?  
How do the lungs work?  
Does temperature affect the growth of fungus?  
Can a computer help predict the lottery numbers?  
Can probability help predict safety?  
Does noise affect test performance?  
What temperature water do fish live best in?  
How much pollution can a goldfish tolerate?  
What insecticide works best?  
What is the best predictor of success in school?  
Can energy be stored?

Does the pH of coffee change with the strength of coffee?  
Does a sheep's wool coat change its feeding pattern?  
Does changing a grasshopper's color make it a more likely target for predators?  
Does temperature affect when leaves change color?  
Does temperature make flies easier to hit with a swatter?  
Can I get a higher yield from my corn crop using another hybrid?  
Will color paper affect typing speeds?  
Will color paper affect reading speeds?  
Does castration increase the rate of growth of bovine, (cattle)?  
Does the amount of salt in water change the boiling point?  
Does the amount of salt in water change the freezing point?  
Does loud music affect test scores?  
Does the quantity of commercial runs increase product sale rate?  
Does color affect the rate at which soil warms?  
Can a barometer really predict weather?  
Does soap decrease the amount of bacteria on hands?  
Does the amount of fat in hamburger relate to the bacteria growth?  
Are other brands of monofilament line better than the best seller?  
Does gravity affect plant growth direction?  
Does light direction affect plant growth direction?  
Which leaves give off more oxygen?  
Do plants produce CO<sub>2</sub> during respiration?  
Does a seed require air, warmth, and water to germinate?  
Do germinating seeds release CO<sub>2</sub>?  
Does the pH of chilies change with hotness?  
Does the amount of antacid change the acid content of stomach acid?  
Does the temperature of water reduce bacteria content?  
Do bacteria grow better in dark or light?  
Do bacteria grow better in warm temperatures?  
Where do bacteria grow?  
Does moisture affect bacteria growth?  
Do moulds need water for growth?  
Do moulds grow better in warm temperatures?  
Do moulds grow better in light?  
What gas is given off by yeast?  
Does temperature affect the heart rate of fish?  
Does caffeine affect heart rate of fish?  
Does temperature affect the life cycle of fruit flies?  
Which fruit has the most vitamin C?

Do any rocks around Fort Lupton have limestone in them?  
Can cement mixtures make a difference in its strength?  
Are different types of soil more prone to erosion?  
Does air pressure affect different density liquids differently?  
What happens to liquid when air pressure is reduced?  
Does the time between breaths change the amount of CO<sub>2</sub> in exhaled air?  
Does the shape of a wing change it's ability to lift?  
Does bouyancy change with the type of fluid?  
Does gravity affect vertical and horizontal moving objects the same?  
Does the length of a vibrating string change it's sound?  
Does the thickness of a vibrating string change it's sound?  
Does heat cause metals to expand?  
Does heat cause some metals to expand more than others?  
Is the expansion rate of a gas proportional to it's temperature?  
Does temperature affect air pressure?  
What gases are discharged during electrolysis?  
Do different treatments reduce the rate of rust?  
Do different paints prevent weathering of wood?  
Does pH change the rate at which rust forms?  
Does the shape of a sail affect how well a sail boat uses wind?  
Does the shape of a boat allow it to carry more cargo?  
Does the surface change stopping distance of moving objects?  
Does the shape of a boat make it faster?  
Does the shape of a car make it faster?  
  
Does the mass of a bullet change it's trajectory?

# SCIENCE FAIR PROJECTS

Outstanding science projects are the result of creative thought. Creative thinking means contributing a new idea, a new approach or a new solution to a problem. Choose a topic that is interesting to you and something that you would like to know more about. These topics are only suggestions that might give you an idea.

## SCIENCE FAIR TOPICS

- Does air take up space?
- How do thermometers work?
- Why does the wind blow?
- Causes of thunder and lightning
- Comparison of different eggs
- Camouflage in nature
- Compare melting rates and shapes.
- How many ways to measure?
- What is a water ecosystem?
- Original hand shadows
- How is light measured?
- Why does the sun shine?
- Differences of plants and animals
- What is decomposition?
- Compare fruits and vegetables
- Why are some leaves green?
- Difference between seeds and eggs
- How do submarines work?
- Compare sinking and floating.
- What is air pressure?
- Weather vs. Climate
- Cloud patterns.
- Butterfly life cycles
- What is insulation?
- Is the earth round?
- What is a food chain?
- Producer-Consumer
- Predator-Prey
- How to purify water
- What are stars?
- What is a flower?
- Larvae are what?
- Precious minerals
- How does mold grow?
- Best boat shapes?
- Do fruitflies see color?
- Why soap floats?

Choose a topic and narrow it to a specific question or problem that allows for experimentation.

## A sample of some middle level student ideas for Science Fair Projects

1. Who is in better physical shape--the top U.S. biker or runner? (Use top 2 athletes in school rather than U.S.)
2. Test different brands of bikes for better performance.
3. What shape boomerang flies best?
4. What household substances repel insects?
5. Test different types of clothing to reduce wind resistance for bike racers.
6. Devise and test different ways of wind transportation.
7. Test air flow patterns in a home to improve energy use.
8. Do different cleat positions on athletic shoes affect performance?
9. Test different materials on tennis racquets for improved grip.
10. Compare body fat of hibernating animals and of humans.
11. What shape of house offers least wind resistance?
12. Compare average temperature in two American cities in different latitudes for a month.
13. Which brand running shoe is best for ninth graders?
14. Build models of different frames for eye glasses and test for comfort.
15. Design a more aerodynamic bike.
16. Graph temperature data to predict temperature changes.
17. Compare different kinds of hieroglyphics.
18. Design and test a new fire escape.
19. Compare physical data from athletes to see if certain traits can predict performance.
20. Test aerodynamics of different auto shapes.
21. Test different window shapes to compare air patterns in a house.
22. Test kite designs for lifting ability.
23. Test kite fabrics for lifting ability.
24. What chair design is most comfortable for students?
25. Test different household solutions to preserve cut flowers.
26. Build a model to predict run off patterns of rain for your school, town, etc.
27. Graph earthquake dates to look for a pattern of prediction.
28. Does music affect student test results?
29. Can different colors be used to attract and capture insects?
30. How is the weight of the rider related to speed in bike racing?
31. Graph tornado locations and dates to be used for prediction.
32. Is there a relationship between solar flares and airplane crashes?
33. Can a sail be used for land transportation?
34. Test temperature patterns in a model of a body of water. Ex. Grand Lake in Colorado.
35. Design and test a better oil pump (model).
36. Test different colors of hot air balloons for efficiency.
37. Devise and test an easier to understand method of telling time.
38. Does the color of a kite improve its performance?
39. Test ways to dissipate clouds using models.
40. Test how well sound travels through different substances.



## OUTDOOR SCIENCE PROJECT IDEAS

- I. Snowflake projects
  - A. photograph and categorize
  - B. measure sizes
  - C. measure falling rate
  - D. measure moisture content (by weighing)
  - E. flakes/area/time
  - F. measure pressure and temperature, relative humidity, and wind; compare flakes regarding these conditions (see I)
  - G. collect, melt and analyze for pollutants
  - H. collect flakes at various altitudes, compare after they have preserved
  
- II. Rock and Mineral Kit and tests
  - A. Kit
    1. glass slide
    2. penny
    3. pocket knife
    4. streak plate
    5. pocket magnifier
    6. small dropper bottle of HCl
    7. piece of steel file
    8. 15 inch ruler
    9. note book, pencil, sample bags
    10. mineral key
    11. rock key
    12. small magnet
  
  - B. Tests and Projects
    1. test minerals for identification
    2. test rocks for identification
    3. describe physical geology where samples are found
    4. photograph landforms and relate local geology
    5. make maps
    6. design project relative to specific area, e. g. sand dunes; photos, and sand samples, mineral composition, wind analysis, etc.
  
- III. Weather
  - A. weather patterns of a given area, i. e., sand dunes, Long's Peak, etc.
  - B. weather's effect on ecosystems, plants, animals, etc.
  - C. build instruments and record weather data
  - D. use item C in specific situations, i. e. dunes, Long's Peak
  - E. weather effects on pollution control
  - F. collect historical weather data from specific areas (Rocky Mountain National Park) and relate to sun spot data
  - G. do wind chill experiments on pieces of meat or vegetables
  - H. calculate melting rates of snow fields

#### IV. Water and Air

- A. see snowflake G
- B. collect and analyze water samples from:
  1. streams and rivers
  2. lakes and ponds
  3. rain and snow melt or snow fields
  4. glaciers
- C. photographs of pollution and ecosystems
- D. raindrop project: nylon hose (panty hose) stretched over embroidery hoop--sprinkle with flour

#### V. Soil

- A. take samples and analyze as to composition of minerals and chemicals, pH, pollutants
- B. study the layering of soil in ditches, road cuts etc.
- C. types of plants able to grow in given soils
- D. compare soils with rock and mineral samples from "uphill"
- E. construct solar still, sand area, etc. measure how much water it collected

#### Chemistry

1. see snowflake G
2. see astronomy (6)
3. see water and air item B
4. see soil item A
5. make chromatographs of plants and flowers, water, and soil samples
6. study chemical reactions with various minerals

#### Math

Study natural patterns in nature

1. shells
2. snowflakes
3. crystals
4. honeycombs
5. genetics

#### Astronomy

1. photograph stars and constellations
2. measure diameters of sun and moon
3. measure period of rotation of sun (sun spots)
4. photograph sun and moon and larger planets
5. measure periods of Jupiter's moons
6. use spectroscope to analyze elements in sun, planets, stars, etc.
7. design project to relate to current events--comets, meteor showers, solar flares, etc.
8. use stars for navigation
9. photograph circumpolar constellations in time exposure (1/2 hour)

Physics

1. how does gravity affect soil layering
  - a. in dry soils?
  - b. in sand dunes?
  - c. in fast moving streams?
  - d. in slow moving streams?
2. find various types of simple machines in nature, e.g. levers, insect legs; wedge, birds' bills
3. calculate flow rates of streams and rivers, relate this to seasons

Biology

1. collect and catagorize plants and flowers
2. collect and catagorize insects
3. photograph flowers blooming
4. photograph insects in "action"
5. photograph birds and wildlife
6. record food habits of birds and small animals
7. photograph, collect, and catagorize lichen samples
8. photograph, collect, and catagorize fungus samples
9. collect water samples from various places and observe microscopic plants and animals
10. catch fish and dissect to study:
  - a. foods eaten (relate to season)
  - b. anatomy
11. study symbiosis in insects, plants, and animals of a given area

Medicine

1. measure heart or pulse rates of hikers carrying heavy loads
2. measure blood pressure of campers at various altitudes and in various work conditions; compare this to pulse rates
3. take camper's temperatures under conditions similar to #1 and #2
4. Harvard Step Test

Environment (Ecology)

Reference: U. S. Forest service, Department of Agriculture flow charts for field studies of:

1. Mountain Streams (use water test kit and butterfly nets)
2. soils (use soil test kit)
3. forest (use tree ring bore)  
(natural pigment and charcoal pictures)

4. Can plants grow submerged and in wood ash?
5. Is it true that one eye is stronger than the other or is clearer than the other?
6. How does a manster use its senses and are they always accurate?
7. How can different types of exercise affect your pulse?
8. How much more food does it take feeding a sports person than a non-sports person?
9. What are different crystals made of?
10. How much money do you save using insulation?
11. Does rock music affect your test grades?
12. How durable is latex paint on aspen, pine, birch, and fir wood?
13. Is the body temperature of a 13-year-old the same as in a tent and a trailer at night when they are asleep?
14. Does a plant really grow faster, neater and grow up to be healthier by use of plant food?
15. How does the density of a rock in Lafayette compare to a rock in California?
16. What shampoo helps stop the greasier?
17. Can the different fronts of cars affect their miles per gallon and wind resistance?
18. When water runs down a sandy riverbed, why does it make different shapes - delta, sandbar, etc.
19. Does your heart rate differ at different altitudes?
20. Which motorcycle has the best price and quality?
21. How much heat is given off by a solar panel?
22. Does the way you walk effect on how tired you get?
23. Does the clothing you wear effect your performance as you're dancing?
24. Which type of model rockets will go higher using the same size engine?
25. How do boys minds differ from girls?
26. Does the surroundings of a room effect peoples' test results?
27. Which bread stays fresh longer?
28. How can different ways of waking up effect your pulse rate?
29. What kind of music will help you sleep?
30. How much energy do solar panels save?
31. What effect does a glacier have on erosion of the earth?
32. What house arrangement gives better air flow?
33. What kind of gloves keep you warmest?
34. What sort of wires are good conductors of electricity?
35. What kind of grass grows the best in Lafayette?
36. Which shoe is better on a football field - cleets or non cleeted shoes?
37. Does age effect your blood pressure?
38. What is the effect of 3 different brands of weed killer on a flower?
39. Which chapstick helps you the most?
40. What does cola do to your teeth?
41. How does the density of soil in the mountains compare with the density

## SCIENCE FAIR PROJECT IDEAS

Mrs. Cito

### BOTANY

- ✓ Which species of tree seeds can survive a fire?
- ✓ Effects of sulfuric acid and ammonium hydroxide on the growth of algae
- ✓ Algae as a water quality indicator
- ✓ Does adding bleach to water affect fungus growth
- ✓ What are the effects of overgrazing a flood plain?
- ✓ Healing effects of aloe vera juice
- How do antibiotics affect plants
- Ethylene gas: its effects on seed germination and fruit ripening
- ✓ The effects of microwave radiation on seed germination
- Why do our digestive systems respond to beans the way they do?
- Does bean seed mass have an affect on germination?
- How do calcium, cinnamon oil, and lemon juice affect ripening in apples?
- What are the effects of an acid presoak on the germination of seeds?
- What are the effects of varying nitrogen levels on corn?
- How does temperature affect bean germination?
- What are the effects of chlorine on plant growth?
- What are the effects of contaminants in soil on wheat germination?
- What are the effects of ethylene of pear ripening?

### ZOOLOGY

- ✓ Effects of copper on regeneration of planarians
- ✓ Mealworms reaction to a light stimulus
- Behavior of ants: coffee grounds, peppermint plants
- What kind of seeds do different species of birds prefer?
- Fruit Flies and Radiation: What mutations occur?
- The effect of frog water on the regeneration of planarians
- Which characteristic is most influential in attracting bees to a flower: fragrance, color, or flavor?
- What chemicals attract corn root worms?
- What are the effects of calcium on the regeneration of planaria?
- What are the effects of UV light on the regeneration of earthworms?
- What are the effects of nicotine on daphnia?
- Canabolism in planarians: can it make the recipient smarter?
- Which bait will lure and catch the most bugs?
- Does the color of the shell affect a hermit crab's choice for a home?
- Can crickets associate a commercial smell with food preference?

## PHYSICAL SCIENCES AND ENGINEERING

Acid Rain: Effects on different materials or insects

pH studies of rain, snow

High fiber construction with peanut shells

Dominoes: Does the way you set them up change the way they come tumbling down?

What colored dyes are found in powdered drink mix and colored markers?

What pH level is most conducive to corrosion in iron and copper?

Can you extend a soap bubble's life span by changing the air temperature or other conditions?

What chemicals melt ice the best?

What paper airplane wing design flies the farthest?

Boiling water: which boils the fastest: colored water or non-colored water?

What are the effects of air resistance on different rocket fin types?

Comparing surface tensions of super cleaning surfactants.

What conditions can you change to get more popcorn kernels to pop?

Which type of water evaporates the quickest: salt, tap, or fresh?

What kind (shape) of sail will make a boat go the fastest?

Does the brightness of a light have an effect on the amount of heat the light produces?

Which dish soap makes the longest lasting suds?

What brand of sock makes the best insulator?

How does skateboard wheel diameter affect speed?

## HEALTH AND BEHAVIORAL SCIENCES

Does Renu really kill bacteria?

Can early education make a difference?

An infant's color preference

Are food-borne microorganisms affected by microwaves?

Bacterial growth at water dispensers

Which antiseptic works best?

Memory Testing: male vs. female, sibling, twins

What type of breath freshener has the most antibacterial effects?

Which mouthwash kills the most bacteria?

How is lactose intolerance affected by genetics?

What is the effect of \_\_\_\_\_ on blood pressure?

How does temperature and/or light affect milk spoilage?

Is your humidifier making you sick?

Which commercial rabbit food contains the highest protein percentage?

What soaps kill the most bacteria?

Does the time of day affect your body's temperature?

Whose mouth is the dirtiest?

How is bacterial growth affected by cutting board surface?

## 30 IDEAS FOR SCIENCE FAIR INVESTIGATIONS

1. Do metals rust at different rates?
2. Does the color of the shell affect a hermit crab's choice for a home?
3. Does the temperature of the air affect the air pressure?
4. Which type of water evaporates the quickest: salt, tap, or fresh?
5. Do the different colors in the spectrum have different temperatures?
6. Do crystals grow at the same rate?
7. Does the time of day affect your body's temperature?
8. How much salt will a plant be able to tolerate and still grow?
9. Does the size of the vibration affect the loudness of the sound?
10. Which fruits contain a large quantity of acid?
11. Does color have an effect on a person's food choice? How?
12. How quickly can a mouse learn to run a maze?
13. What effect does loud noise have on growing plants?
14. Over what kind of surface can an animal carry the most weight?
15. On which road surface is the breaking surface the least?
16. Does magnetism affect an animal's behavior? How?
17. Does magnetism affect plant growth? How?
18. How do mice communicate with each other?
19. What detergent is the most biodegradable?
20. Which packaging method best reduces the growth of mold or fungus?
21. Through what surfaces does sound travel best?
22. At what time during the day does the sun give the most energy?
23. What effect does the amount of sunlight have on the color of a leaf?
24. What kind (shape) of sail will make a boat go the fastest?
25. Does gravity affect the direction that a seed grows?
26. Does the brightness of a light have an effect on the amount of heat the light produces?
27. Does a thin liquid boil faster than a thick liquid?
28. Does caffeine affect plant growth? How?
29. What surfaces reflect light best?
30. What is the highest temperature at which milk may be stored and not spoil?

## SOME MIDDLE LEVEL SCIENCE PROJECT IDEAS

1. Which bandaids hold better in water
2. Would different types of fertilizers affect plant growth
3. How would you photograph an eclipse
4. Can plants grow submerged and in wood ash
5. Is it true that one eye is stronger than the other or is clearer than the other
6. How does a hamster use its senses and are they always accurate
7. How can different types of exercise affect your pulse
8. How much more food does it take feeding a sports person than a non-sports person
9. What are different crystals made of
10. How much money do you save using insulation
11. Does rock music affect your test grades
12. How durable is latex paint on aspen, pine, birch, and fir wood
13. Is the body temperature of a 13-year-old the same as in a tent and a trailer at night when they are asleep
14. Does a plant really grow faster, neater and grow up to be a healthier plant by the use of plant food
15. How does the density of a rock in Broomfield compare to a rock in Michigan
16. What shampoo helps stop the greasies
17. Can the different fronts of cars affect their miles per gallon and wind resistance
18. When water runs down a sandy riverbed, why does it make different shapes--delta, sandbar, etc.
19. Does your heart rate differ at different altitudes
20. Which motorcycle has the best price and quality
21. How much heat is given off by a solar panel
22. Does the way you walk effect on how tired you get
23. Does the clothing you wear effect your performance as you're dancing
24. Which type of model rockets will go higher using the same size engine
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31. What effect does a glacier have on erosion of the earth
32. What house arrangement gives better air flow