

## MIDDLE SCHOOL LEVEL PROJECTS

### Experiments:

#### **Physical Science**

Which metal conduct heat best? \*

Measuring the calories in a peanut

Which material makes the best heat insulator?

The efficiency of airspace as an insulator \*

Which color of liquid absorbs the most heat?

Which color container absorbs the most heat?

Which color container cools off the quickest?

How temperature affects the height at which different balls bounce

How heat affects recording tape \*

Do black bottom pools keep the water warmer?

How constant is the temperature in my refrigerator?

How accurate is the temperature in my oven?

The effects of temperature on the strength of dry cells

The effect of light on dyed materials

Calculating liquid density using light refraction

Materials that absorb sound

String telephone: What materials work best in conducting sound?

Conductivity of various liquids

How temperature affects the amount of electricity given off by a solar cell

How increasing the number of batteries affects the speed of a motor

What is the voltage range of the GE-14 bulb?

The strength of a magnet vs. distance

Do magnetic fields affect the sound quality on a recording tape?

The effects of washing on dyed materials

Which fabrics are most fire-resistant?

Which toothpaste is most abrasive?

The amount of dissolved salt in drinking water

Can saltwater be desalted by freezing?

Popcorn: A graphical analysis of pops per second

Strength of different woods

Ink evaluation with paper chromatography

Splat: A study in droplet patters

Chlorine levels in our drinking water

The effects of swimming pool water (chlorine) on hair

Testing sugar in soft drinks

Comparison of vitamin A content in frozen, canned and fresh peas

Which foods have starch (or sugar, fat, protein, etc.)?

Testing various orange drinks for vitamin C

How fire affects roofing materials  
How well do various fabrics absorb dye?  
Who has greater body density, boys or girls?  
How strong is a spider web thread?  
Think up your own special project idea  
How does the tail affect the flight of a kite?  
What shutter speed is needed to photograph a moving fan?  
The velocity of water through different tubes (same size, different material)  
The velocity of water through different tubes (same material, different sizes)  
The velocity of different liquids through the same size tube  
Density of various liquids

## Engineering

Do oil additives reduce friction on engine parts? \*  
A frictionless magnetic bearing \*How many rotor blades give maximum lift for a helicopter? \*  
Paper airplane performance  
Robots \*  
Using electromagnets to power a car \*  
Battle of the bridges \*  
Computer projects \*  
Testing a car headlight as a satellite dish antenna \*  
Storing the sun's energy \*  
Power from the waves \*  
Testing different water turbine blades \*

## Earth Science

Charting the apparent motion of Polaris \*  
Composition of Hawaiian sand  
Water retention of different soils  
Using a computer for mineral identification  
How much dust falls on your lawn in a month?  
How clean is our air?  
How acid is our rain?  
Speed of clouds using photography  
The effect of wave action on different rocks (using a rock tumbler)  
Wave barriers  
Using feathers to clean up oil spills  
Terracing and how it affects erosion  
The effects of water on different types of wood

## Consumer

Which firewood gives the most heat per dollar?  
Which solar panel is most efficient?  
Can a roof overhang cut summer cooling costs?  
A comparative study of various packing materials  
How much money can a pool cover save?  
Which candle is the best buy?  
Which light bulb is most efficient?  
Are TV commercials louder than regular programming?  
Think up your own special project  
The frequency and length of TV commercials during a one-hour program  
Which battery is the best buy?  
How much does it really cost to run a refrigerator?  
Which stain remover works best?  
Which detergent removes grass stains best?  
Which detergent cuts grease best?  
Which detergent has the longest-lasting suds?

## More Consumer Projects

The effectiveness of pre-wash products  
Waterproofing agents: which is best?  
The effects of deodorants on clothes  
Which paint protects wood the best?  
The effectiveness of different wood preservatives  
Shampoo evaluation \*

Water solubility of suntan lotions	*
Meat, fat and moisture content of hot dogs	*
Do sausages vary in fat and water content?	*

Which popcorn pops the most?  
Up to bat: Wood or aluminum?  
Fishing lines take the strength test  
Sole traction: Which sole is best? \*

Skateboard wheels: Which are best?	*
------------------------------------	---

Leaky faucets: How much do they cost us?  
Which uses more water, a shower or a bath?  
Which container (or wrapping) preserves food best?  
Which paper towels are most absorbent?  
Which diaper is best?  
Which lighter has the most fuel?  
Comparison of locks: Which is best?

Which nails have the best holding power?  
The best air pressure for an A.T.C. (3-wheeler)  
How long are yellow lights at various intersections?  
Do parking meters give us the right time?

## Life Science

Does a magnetic field affect the growth of beans?  
Does electricity affect the growth of beans?  
Does temperature affect the growth of plants?  
How do plants react to different kinds of music?  
How detergents affect the growth of plants  
Do plants grow better with tap water or distilled water?  
The effects of root bounding on plant growth  
Do roots always grow down?  
Do mirrors affect the way plants grow?  
Does leaf surface area affect plant growth? \*

Leaf size vs. location  
Effects of artificial vs. natural light on plants  
Under which color cellophane do plants grow best?  
Can you give a plant too much fertilizer?  
Testing different potting soils.  
Which mulch covering works best?  
Does the phase of the moon affect the germination of seeds?  
Do seeds sprout better in hot or cold climates?  
Does acid rain affect the germination of seeds?  
How does gravity affect the growth of seeds? \*

Under which thickness of plastic do radishes grow best?  
Do avocados ripen more evenly with the stems left on?  
Which banana has the most sugar: green, yellow or brown? \*

Comparing the moisture content of five varieties of apples \*

Effects of the environment on popcorn (heat, cold, moisture, time, etc.)  
Does aspirin prolong the life of cut carnations?  
How detergents affect the growth of algae in pond water \*

A study of marine growth on various surfaces \*

How fast does a mealworm (or snail) travel?  
The speed of snails on different surfaces  
Horsepower of snails \*

The effect of different metals on snails  
Effects of household pesticides on earthworms  
Do earthworms help plants to grow?  
Can insects pull more than their own body weight? \*

Ant control: Natural vs. chemical repellents \*

Do goldfish grow larger in a larger tank?

Fish feeding: The effects of light  
 Can mice see colors? \*  
 Can mice distinguish shapes? (squares, circles, triangles – associate one with food)\*  
 Hamster activity and the phases of the moon \*  
 Can the color of unborn rabbits be predicted? \*  
 How many grams of food does a rabbit eat per day?  
 Chickens and colored corn: which will they eat?  
 Will a chicken lay more eggs with rock music playing? \*  
 Do pyramids preserve food?  
 How does our vision affect our taste? \*  
 Light vs. vision: Which color is best?  
 Night vision and the effects of colored objects  
 The effect of color on depth perception \*  
 Does a blindfolded person walk in a circle?  
 The relationship between age and response time  
 Can you recognize your own profile? \*  
 Left-hand, right-hand transference using a “mirror tracing”  
 Reading and remembering with different colored paper: Which works best?  
 Flexibility: Boys vs. Girls  
 Do adults know U.S. geography? (or math skills, science concepts, etc.)  
 How do people react when seeing a teenager shoplift?  
 How teeth react to different liquids \*  
 Do taste buds grow weaker as you get older? \*  
 Effects of coffee on a person’s steady hand \*  
 Effects of caffeine on blood pressure \*  
 Hot tubs and their effect on blood pressure  
 Effects of foul smells on blood pressure \*  
 Tar and nicotine in five brands of cigarettes \*  
 Smoking vs. lung capacity  
 Lung power of different age groups

- *Denotes more difficult projects*

## PROJECT TOPIC IDEAS

Can people identify flavors of Kool-Aid when blindfolded?  
 Which color liquid do hummingbirds prefer?  
 What is the best condition for the growth of mold?  
 Which bread molds most quickly?  
 In which soil do plants grow best?  
 Growing potatoes at different locations.  
 Testing different potting soils.

Do plants prefer tap water or distilled water?  
Do different kinds of apples have different amounts of seeds?  
Do large apples have more seeds than small ones?  
Does temperature affect the growth of plants?  
How do plants react to different kinds of music?  
How temperature affects plant growth  
How the amount of light affects the growth of marigolds  
How fast do kidney beans grow?  
What a plant needs to grow  
Do plants give off water?  
Do roots always grow down?  
Which materials dissolve in water?  
Do coins corrode more in salt or fresh water?  
Do parking meters give us our money's worth?  
How long are yellow lights at various intersections?  
Leaky faucets – how much do they cost us?  
Which popcorn pops the most?  
The frequency and length of TV commercials during a one-hour program.  
Which candle is the best buy?  
Which uses more water, a shower or a bath?  
Which paper towel absorbs the most water?  
Which brand of raisin bran has the most raisins?  
Testing a sundial with a clock.  
Measuring rainfall with a rain gauge.  
How a shadow changes throughout the day.  
Depth of snow at ten different locations  
Which materials conduct electricity best?  
Sounds from different rubber bands (or glasses of water)  
String telephones – what materials work best in conducting sounds.  
Splat! A study in droplet patterns.  
Which magnet is strongest?  
Which materials conduct heat best?  
How hot does it get inside a car with the windows rolled up?  
Will an ice cube melt faster when crushed up?  
Which toy car rolls furthest?  
Magnetic and nonmagnetic materials  
How accurate is the temperature knob on my oven?  
Which color of liquid absorbs the most heat?  
Which color container absorbs the most heat?  
Which color container cools off the quickest?  
What food does a hamster prefer?  
Can an earthworm detect light and darkness?  
How far does a mealworm (or snail) travel in one minute?  
Chickens and colors corn – which will they eat?  
The speed of snails on different surfaces.

Do earthworms help plants to grow?  
Do goldfish grow larger in a larger tank?  
What conditions do pill bugs prefer (light or dark, moist or dry)?

## **BOTANY**

Which mulch is best for conserving water while growing plants?  
How detergents affect the growth of plants.  
Does leaf surface area affect plant growth?  
How salt tolerant is ice plant?  
Effect of cigarette smoke on plants.  
Do lawns grow in a linear function?  
Comparing the moisture content of five varieties of apples. Leaf size vs. location.  
Does Instant Grow really work?  
The action of tendrils.  
Does Oxygen Plus affect plant growth?  
Does carbon dioxide concentration affect the growth rate of plants?  
Vegetation rebound following a brush fire.  
Effects of the environment on popcorn (heat, cold, moisture, time, etc.)  
Do mirrors affect the way plants grow?

## **CHEMISTRY/BIOCHEMISTRY**

The pH of soaps.  
What are the differences between butter and margarine?  
Corrosion – the effects of water on metal.  
Ink evaluation with paper chromatography.  
How do ultraviolet sterilizers affect the rubber straps on safety goggles?  
Can salt water be desalted by freezing?  
Epoxy and resins: their resistance to solvents.  
What is the (starch, sugar, fat or protein) content of various foods?  
Effects of permanent hair color on normal hair.  
How much oxygen does a candle use per minute?  
Measuring the calories in a peanut.  
How sucrose and yeast levels affect the rate of fermentation.  
Chlorine levels in our drinking water.  
The effects of swimming pool water (chlorine) on hair  
Testing sugar in soft drinks  
Comparison of vitamin A in frozen, canned and fresh peas  
Testing various orange drinks for vitamin C  
How teeth react to different liquids  
Smoking alternative: clove cigarettes  
The amount of dissolved salt in drinking water

## COMPUTERS

A homemade computer  
Prism simulation  
An inexpensive computer-controlled robot  
Writing an Applesoft BASIC program that plays checkers  
Can I create a unique historical adventure game?  
Zoom in! A computer map of my neighborhood  
Electron orbitals on a computer  
Hacker protections  
A computer program that teaches science facts  
Using a computer for mineral identification  
A computer program that tracks satellites  
A program that simulates model rocket trajectories  
Convert to or from metric instantly!  
A computer program that finds the planets

## CONSUMER

Liquid vs. bar soap  
Is there sugar in toothpaste?  
Which tent stake has the greatest holding power?  
Does temperature affect the output of a battery?  
Effect of detergents on commonly-used threads  
The effects of washing on dyed materials  
Hardest and softest woods  
Which battery is the best buy?  
Which detergent cuts grease the best?  
Which lubricant reduces friction the best?  
Which nails have the best holding power?  
Effect of some exterior wood protectants on cedar siding.  
The effects of deodorants on clothes.  
The best mix for concrete  
Which sleeping bag fabric retains heat the best?  
Endurance of roofing shingles and tiles  
Which hook and loop fastener works the best?  
The feathers of archery  
How effective are commercially –produced water filters?  
Which glue is the strongest?  
Which wood absorbs paint the best?  
Flexural strength of concrete Which fire alarm is best for the home?  
Which brand of lighter has the most fuel?  
Which container (or wrapping) preserves food the best?  
Are flame-retardant fabrics safe?  
The effectiveness of pre-wash products.

The effect of different fin shapes on surfboard performance  
Do swimming caps help you swim faster?  
Testing sunscreens' absorption of ultra-violet radiation  
How different fabric-care treatments affect the flammability of cloth  
Waterproofing agents – which is best?  
The spoilage rate of different types of baby food  
Which detergent has the longest-lasting suds?  
How well do various fabrics absorb dye?  
How much money can a pool cover save?  
Which light bulb is most efficient?  
Can a roof overhang cut summer cooling costs?  
Waterproof mascaras – are they really waterproof?  
Which firewood gives the most heat per dollar?  
Which stain remover works best?  
Are TV commercials louder than regular programming?  
How much does it really cost to run a refrigerator?  
Which solar panel is most efficient?  
Which paint protects wood the best?  
Thick or thin bicycle tires – which is best?  
Which fabrics are most fire resistant?  
How heat affects recording tape.  
Stability of color slide film.  
A comparative study of various packing materials  
Do oil additives reduce friction on engine parts?  
How fire affects roofing materials  
Which detergent removes grass stains best?  
Airplane noise analysis in my neighborhood  
The effectiveness of different wood preservatives  
Antifungals: how well do they work on athlete's foot?  
Meat, fat and moisture content of hot dogs  
Strength test for glues  
Water solubility of suntan lotions  
The power output of different model airplane fuels  
Shampoo evaluation  
Which diaper is best?  
Effects of different sizes and materials on tennis rackets  
Physical properties of various brands of diesel fuel  
Air pressure and tire wear  
Comparison of locks – which is best?  
Sole traction – which sole is best?  
Fishing lines take the strength test  
Up to bat – wood or aluminum?  
Do sausages vary in fat and water content?

## **EARTH/SPACE SCIENCE**

Mass loss in a rock tumbler  
How acid is our rain?  
Impact craters: size and shape  
Using feathers to clean up oil spills  
The greenhouse effect  
How clean is our air?  
How can mirrors increase a solar cell's voltage?  
Wave barriers  
Speed of clouds using photography  
The effects of water on different types of wood  
Terracing and how it affects erosion  
Testing various materials for cleaning up oil spills  
Charting the apparent motion of Polaris  
The effect of wave action on different rocks (using a rock tumbler)  
Composition of Hawaiian sand  
How much dust falls on your lawn in a month?  
Water retention of different soils  
Crepe paper: it doubles as a relative humidity gauge

## **ENGINEERING/ELECTRONICS**

Using electromagnets to power a car  
Different parachute designs and descent rates  
Battle of the bridges  
Paper airplane performance  
Can solar heat be used for a doghouse?  
Testing different water turbine blades  
Power from the waves  
Comparison of the hydrodynamics of keels  
Storing the sun's energy  
Testing a car headlight as a satellite dish antenna  
Best bridge structure for supporting weight  
Power from rising air  
How many rotor blades give maximum lift for a helicopter?  
A frictionless magnetic bearing  
Robots  
Moving objects with air Automatic fish feeder  
A 3-D adaptor for photography  
Which windmill blade is most efficient for producing electricity?  
Effect of lenses on a solar panel  
Do scales on the wings of aircraft increase lift?  
Sail performance  
How increasing the number of batteries affects the speed of a motor

What is the voltage range of the Ge-14 bulb?  
Analysis of rocket fins: stability and time of flight  
Flight of the boomerang  
Generation of electricity from wave energy  
Wind turbines and blade efficiency  
Aerobie or Frisbee: which design flies the farthest and longest?  
Strength of parabolas  
Which metals make the best batteries?  
Wind effects between tall buildings.

## HUMAN PSYCHOLOGY/SOCIAL SCIENCES

Do babies prefer a familiar or unfamiliar toy?  
Jellybean preference  
Does petting an animal affect your pulse rate?  
How people stand on a bus  
*Home sapiens* at the zoo  
Missing children: do pictures on milk cartons really help?  
School subject preference between boys and girls  
Colored cookie comparison  
A study on the usage of left turn signals at intersections  
Who knows the metric system best?  
Working vs. non-working parents: effects on kids' grades  
Effect of student seating on academic performance  
Does the level of noise affect eye-hand coordinator?  
Assertiveness: are there differences between junior high boys and girls?  
Synergy: do we hear colors?  
Does heart rate change while watching emotionally-charged movies?  
Does your pulse rate go up when you see money?  
Does color affect taste?  
Music and math – how do they mix?  
Tennis: which point wins?  
Reading and remembering with different colored paper – which works best?  
What type of people does graffiti?  
The space between two people when they meet  
Does a blindfolded person walk in a circle?  
The relationship between age and response time.  
Can you recognize your own profile?  
Left-hand, right-hand transference using a mirror tracing.  
How do people react when seeing a teenager shoplift?  
Are people biased towards types of vitamins?  
Does chewing gum affect students in a testing situation?  
Does age affect short-term memory?  
Student attitudes concerning an AIDS patient in school  
Racetrack accidents: does a jockey's fall affect his/her performance?

Are there similarities between an owner and his/her pet?  
Can the use of a computer game increase memory?  
Audio memory vs. visual memory  
Are fads cyclical?  
Should stop signs be red and white?  
Is there a relationship between cost and perceived print quality?  
Dumb blonds: rumor or reality?  
Comic books – are they becoming more corrupt and violent?  
How does our vision affect our taste?  
Do adults know U.S. geography?

## **MATHEMATICS**

When it's raining, do you get more wet walking or running?  
How accurately can we measure the height of a building with a quadrant?  
How common is the perfect histogram?  
Is there a sophomore jinx in baseball?  
A statistical analysis of the length diversity of kidney beans  
Is high school harder? A comparative grade analysis  
Weather patterns: a study in probability  
World population statistics: what's ahead for the year 3000  
Popcorn: a graphical analysis of pops per second  
Estimating the volume of garbage generated in my town  
How tough is the teacher? A test score analysis  
Should you bet on the gray horse?

## **MEDICAL SCIENCES**

Do cigarette filters work?  
How does exercise affect the blood sugars in a diabetic?  
Effects of smoking on skin temperature. Age and the ability to estimate distance  
Cornflakes or candy? Testing glycemic responses  
Effects of caffeine on blood pressure  
Which method of cooking is better for retaining vitamin C in foods?  
Correlations between vision acuity and grade-point average  
Pupil size and reaction to light – age and sex differences  
Lights vs. vision – which color is best?  
Night vision and the effects of colored objects  
The effect of color on depth perception  
Smoking vs. lung capacity  
Resolving power of the eye  
Lung power of different age groups  
Does eating breakfast affect short-term memory?  
Flexibility: males vs. females  
Effects of coffee on a person's steady hand

How tubs and their effect on blood pressure  
Effects of foul smells on blood pressure  
Tar and nicotine in five brands of cigarettes  
Do taste buds grow weaker as you get older?

## PHYSICS

How temperature affects electricity generated by a solar cell  
Which material makes the best heat insulator  
How propeller pitch affects the power of an outboard motor  
Materials that absorb sound  
How much energy is generated by humans at the health spa?  
Calculating liquid density using light refraction  
How temperature affects the height at which different balls bounce  
How accurately can we measure the height of a building with a barometer?  
What properties of a ball will cause it to roll more rapidly?  
How does the tail affect the flight of a kite?  
What shutter speed is needed to photograph a moving fan blade?  
Who has greater body density, boys or girls?  
How do different surfaces effect friction?  
Which wavelength of light best penetrates through smoke (or fog)?  
Thermal expansion of different metals  
How strong is a spider web thread?  
The strength of a magnet vs. distance  
Ball rebound speed: Astroturf vs. grass  
The velocity of water through different tubes (same size, different material)  
The velocity of water through different size tubes (same material)  
The velocity of different liquid through the same size tube  
Density of various cooking oils  
Microwaves: are U.S. standards safe?  
How air pressure effects the performance of a basketball  
Strength of different woods  
Are brown eggshells stronger than white?  
Patterns of energy loss experienced by a bouncing ball  
Conductivity of various liquids  
Which metals conduct heat best?  
The effect of light on dyed materials  
The effect of temperature on the strength of dry cells  
The efficiency of air space as an insulator  
How much force is required to break an eggshell?  
Do black bottom pools keep the water warmer?  
How constant is the temperature in my refrigerator?

## ZOOLOGY

Ant control – natural vs. chemical repellants

Can insect pull more than their own body weight?

Can mice see colors?

Effects of household pesticides on earthworms

The effect of different metals on snails

Determining the dimensions of butterfly scales

Horsepower of snails

Fish feeding – the effects of light

Can the color of unborn rabbits be predicted?

Shell selection of hermit crabs

Distribution of earthworms in an open lot

Environmental effects on the heartbeat of *Daphnia*

Density distribution of mussels on a pier piling

Humidity preference of flour beetles

Can mice distinguish shapes (squares, circles, etc.)?

How many grams of food does a rabbit eat per day?

Hamster activity and the phases of the moon

What color light are moths most attracted to?