

# SCIENCE FAIR CENTRAL

## SCIENCE PROJECT IDEAS

**Choose the topic you're interested in.** Then adopt one of these ideas or use the list as idea starters to come up with an investigation.

### Life Science

#### ♥ Plants

#### Easy Testable Questions (recommended for elementary level)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
What factors affect seed germination?	Factors (e.g. seeds in microwave, soaked seeds, etc.)	Amount of water, light and soil nutrients	Amount of growth over time
What amounts of light promote algae growth in a fish tank?	Hours of light in tank each day (e.g. 24 hours, 12 hrs, 6hrs, 2hrs, 0hrs.)	Set up fish tank (e.g. gravel, plants, fish)	Amount of algae visible on sides of tank
What medium is best for seeds to sprout?	Medium for planting (e.g. soil, cotton, rock wool, peat plugs, sand)	Amount of light, water, plant type	Growth of plant over time
How does temperature affect the water uptake of celery plants?	Temperature of water	Size of celery plant, amount of water	Water uptake over time
Which parts of a bean seed are needed to grow a healthy bean plant?	Seed parts (e.g. 1 cotyledon vs. 2 cotyledons, embryo, full seed)	Soil, amount of light, temperature, location	Growth and health of bean plant over time



### More Complex Testable Questions (recommended for middle school levels)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
How are transpiration rates affected by the measured area of a leaf?	Size area of leaves, type of leaf	Number of leaves in transpiration collection bag, environmental conditions	Amount of transpiration

### ♥ Animals

### Easy Testable Questions (recommended for elementary level)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
How does size affect the breathing rates of tropical fish?	Size of fish	Species of fish, time interval for observation	Average number of times different sized fish open and close their mouths over a given time period
How does temperature impact the activity of ants	Temperature (eg. room temperature, refrigerator for 8 minutes)	Number of ants in enclosed observatory	Pace and type of ant activity
How does time of day affect the problem solving ability of a hamster in a maze?	Time of day (e.g. morning, noon, night)	Maze, incentive	Time it takes to complete the maze
How does surface affect the travel rate of a caterpillar?	Surfaces (e.g. bumpy, smooth, shiny, scratchy)	Time, caterpillar	Distance traveled over time
What foods do worms prefer in a compost bin?	Type of food (e.g. watermelon rind, coffee grounds, bread, corncobs)	Number of and type of worm	Amount of food eaten over time
Which conditions attract the most insect pests (mosquitos, flies, gnats)?	Conditions (e.g. dark or light clothing, sweet smelling or fragrance free plants, lactic acid/sweat)	Time of day, length of time observed	Number of insect pests attracted to condition
What natural products are best at repelling insect pests (mosquitos, flies, gnats)?	Natural products (e.g. citronella oil, eucalyptus oil, castor oil, peppermint oil, olive oil or vegetable cooking oil)	Amount of oil, time of day, length of time observed	Number of insect pests attracted to product
What conditions affect the sleep of domesticated puppies?	Conditions (e.g. ticking alarm clock, classical music, large stuffed dog, etc.)	Species of puppy, age of puppy	Amount of time it takes puppy to fall asleep
How does temperature affect the development of a caterpillar?	Temperature	Age of caterpillar	Amount of time for metamorphosis



### More Complex Testable Questions (recommended for middle school levels)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
What type of food and feeder will attract the most cardinals?	Bird food and feeder type	Location, time of year	Number of cardinals attending each type of bird feeder with different foods at a specified time each day
How does moisture affect the tunneling ability of ants?	Sand (dry and moist), Soil (dry and moist), Clay (dry and moist)	Number of ants; type of closed observatory; temperature, light, food	Time it takes for ants to build a tunnel
How do laws/policies on deer affect deer populations?	Laws/deer policies in different areas or states	Time, data collection methods	Number of deer
How do the behaviors of domesticated cats compare to the behaviors of wild cats in zoo captivity?	Type of domesticated cat (e.g. calico, Siamese, etc.), type of wild cat (e.g. lion, tiger, bobcat, etc.)	Amount of time observed	Behaviors observed
Are natural sponges more absorbent than synthetic sponges?	Type of natural sponge, type of synthetic sponge	Amount of liquid absorbed, sponging method	Remaining liquid

### ♥ Health/Human Body

### Easy Testable Questions (recommended for elementary level)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
What conditions impact productivity while doing homework?	Conditions (e.g. tv, music, etc.)	Time, age/skill level of participants	Amount of work completed
How does smell affect taste?	Foods	Nose plugs, time	Ability to identify foods while blindfolded
How do different style pencils or grips affect writing fatigue?	Different style pencils or grips	Writing phrase, age/skill of participants	Amount of time writing before fatigue
Which brand of skin moisturizer lasts the longest?	Brand of body lotion	Location, amount of lotion	Skin dryness over time
Do reflexes change with age?	Age of participants	Reflex test	Participant success at completing reflex task
How does photo-editing affect perception?	Photo-editing techniques (e.g. lighting change, cropping, expanding a picture)	Original picture	Participants perceptions of how a picture makes them feel



### Easy Testable Questions (recommended for elementary level), continued...

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
How do different liquids affect the health of a simulated tooth?	Liquids (e.g. coffee, tea, juice, soda, vinegar, water, flavored water)	Simulated tooth (e.g. chicken bone), amount of liquid, amount of time submersed in liquid	Characteristics of simulated tooth (e.g. firmness, brittleness, color, etc.)

### More Complex Testable Questions (recommended for middle school levels)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
How do different types of movement activity affect human heart rate?	Activity (e.g. walking vs. running, etc.)	Same person or people in each trial, starting heart rate, exercise route, temperature)	Heart rate of the person(s)
What conditions improve short term memory?	Conditions (e.g. mnemonics, rehearsal, association, music)	Test, age and initial skill of participants	Achievement on memory test
How does air moisture affect healing time of a stuffy nose?	Type of moisture (e.g. cool mist, warm mist, no mist), hours of mist (e.g. 2 hrs., 8 hrs.)	Age of participants, time onset of stuffy nose	Cleansing of nasal passage over time

## 🐛 Microorganisms

### Easy Testable Questions (recommended for elementary level)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
What is the best way to reduce odor in shoes?	Odor reducing methods (e.g. open air, baking soda, etc.)	Type of shoe, initial odor of shoes	Odor of shoe over time
At what temperature does a yogurt culture grow best?	Temperature	Type and amount of milk, yogurt bacteria, container size	Time it takes for the milk to turn to yogurt
How does the location of water samples affect the number of micro-organisms observed?	Location	Amount of water	Number and type of micro-organisms



### More Complex Testable Questions (recommended for middle school levels)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
What conditions keep bread mold from growing on bread?	Conditions of containment, temperature, moisture	Bread mold, type of bread	Spread of bread mold over time
How does the bacteria in the mouth of a human, dog, cat, or hamster compare?	Animal (human, dog, cat, hamster)	Number of scrapes from tongue, time for bacteria to grow	Amount of bacteria in culture after specified time
What conditions improve bread yeast growth?	Water temperature, nutrient amount (sugar), nutrient type (type of sugar or other nutrient)	Container size and shape, amount of water, type of yeast, amount of yeast	Height of foam in container

### 🍷 Environment

#### Easy Testable Questions (recommended for elementary level)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
Does recycled paper decompose more quickly than non-recycled paper?	Type of paper	Time, location (e.g. depth buried in ground)	Condition of the paper
Which type of inside window covering is best for saving energy?	Type of window treatment	Amount of sunlight, outside temperature, time	Inside temperature
How does oil affect the growth of aquatic plants?	Concentration or amount of oil	Amount of water, number/type of aquatic plants	Condition of plant
How does acid rain affect plant growth?	Various concentrations of vinegar	Type of plant, amount of light, soil nutrients	Condition of the plant over time

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# Earth Science

## ♥ Weather

### Easy Testable Questions (recommended for elementary level)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
How does a surface affect the rate it is warmed?	Surfaces (e.g. soil, water, sand)	Amount and direction of heat, time observed	Temperature of surfaces at different time intervals
Does the sun heat saltwater and freshwater at the same rate?	Salinity of water (grams of salt per liter)	Container starting temperature	Temperature over time (1 hour)
How does topography affect wind speed?	Topography/location (e.g. open field, city, forested area)	Time tested	Wind speed
How does air temperature affect the rate of evaporation?	Temperature	Initial amount of water	Amount of water evaporated over time
How does weather affect mood?	Weather (e.g. rainy, sunny, cloudy, cool, hot)	Age of participants	Participants daily responses (3-4 weeks) to survey question: On a scale of 1-5 How do you feel today?(Participants should complete survey prior to being told that it is about weather.)

### More Complex Testable Questions (recommended for middle school levels)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
Which method is best for melting icy pavement?	Materials (e.g. types of salt, sand, kitty litter mixtures), methods: e.g amount of time material sits on ice, crushing ice before putting on ice melting material, etc.)	Thickness of ice, temperature of air and ice	Amount of ice after 10 min and 20 min.

## ♥ Geology

### Easy Testable Questions (recommended for elementary level)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
Which type of soil can hold the most water?	Type of soil	Amount of soil, amount of water, container	Amount of water loss



### Easy Testable Questions (recommended for elementary level), continued...

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
Which conditions stop erosion the best?	Conditions of soil (e.g. plant cover, trench or terrace, no cover)	Amount of water, slope, type of soil	Mass of filtered soil that eroded
How do different liquid solutions with varying pH levels affect rocks?	Type of solution (e.g. vinegar, water, or mixture)	Rocks tested (be sure to include chalk), amount of liquid	Effect on rock (e.g. bubbles or no bubbles)
What conditions are best for making the tallest sandcastle?	Construction methods	Amount of sand	Height of castle

### More Complex Testable Questions (recommended for middle school levels)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
What factors are best to grow sugar crystals?	Temperature OR saturation (how much was dissolved in the water)	Type of crystal, amount of water, temperature	Mass of crystals, number of crystals, length of time to form crystals
Do major earthquakes cause minor earthquakes nearby?	Location of major earthquakes (e.g. check national geological service data)	Distance from the major earthquake, time period, earthquake magnitude	Number of minor earthquakes that occur nearby during the time period
Which structure of model house is best at withstanding a model earthquake?	Size of house, type of construction of house	Amount/time shaken, shaking mechanism	Condition of shaken house
What is the best way to clean or remove deposits from a copper penny (or other precious metal)?	Cleaning methods	Initial color of penny, amount of copper in penny	Color of penny

## 🚀 Space

### Easy Testable Questions (recommended for elementary level)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
How do fins on a rocket affect its flight?	Size of fins	Shape and number of fins, fin placement, type and size of rocket, propulsion system (amount of push), air movement, temperature, launch site	Distance the rocket flies or trajectory (how straight the rocket flies)



### More Complex Testable Questions (recommended for middle school levels)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
How do fins on a straw rocket affect its flight?	Size, shape and number of fins	Type and size of rocket, propulsion system (amount of push), air movement, temperature, launch site	Distance the rocket flies, trajectory (how straight the rocket flies)
What conditions produce craters?	Type of surface (e.g. sand, gravel, clay, silt or flour, mass of falling sphere)	Height from which sphere is dropped	Pattern of crater

## Physical Science

### ♥ Chemistry

### Easy Testable Questions (recommended for elementary level)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
Which egg substitutes are best for different recipes?	Type of egg substitute	Recipe procedures except for egg	Taste, texture of food
How does temperature affect the rate of a simple reaction?	Temperature	Size of antacid tablet, amount of water	Amount of time for antacid tablet to dissolve
How does particle size affect the rate of a reaction?	Particle size (whole, half, and powder) of an antacid tablet	Amount of water, temperature of water	Amount of time for antacid tablet to dissolve
How does temperature affect the brewing of tea?	Temperature	Amount of water, type/size tea bag	Brew strength over time

### More Complex Testable Questions (recommended for middle school levels)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
Which detergent is best for removing stains?	Detergent	Size, type, and age of stain, fabric or carpet, physical process of stain removal	Color of fabric (e.g. stained, faded, completely disappeared)
What conditions are best to prevent soda from losing carbonation?	Conditions [e.g. temperature- (refrigerated/ room temp) and containers-glass, thermos, open cup, closed cup]]	Brand of soda	Carbonation bubbles observed over time





## ♥ Energy/Force

### Easy Testable Questions (recommended for elementary level)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
What type of paper makes the best paper airplane?	Type of paper	Design of plane, size of paper, thrust, air currents	Distance plane travels using the same amount of thrust
How does mass affect a pendulum swing?	Mass (Number of washers/ weights)	Length of string, time tested	Number of swing periods
What is the best shock absorber for dropping an egg?	Shock observers (e.g. feathers, foam, towels, etc.)	Height of drop, size of egg	Wholeness of the egg (How much did the egg crack?)
How does the angle of impact affect patterns observed in falling water balloons?	Angle (e.g. straight 90 degree vs. angled 45 degree)	Size of water and procedures for making water balloon, force, height of drop	Pattern observed at impact site
What type of ball bounces the highest?	Type of ball	Size of ball, height from which ball is dropped	Bounce height
How does changing the height from which a ball is dropped impact its bounce?	Drop height	ball	Bounce height
How does mass affect the distance of a catapulted object?	Mass of object	Design of catapult	Distance object travels
What is the best shape for a parachute?	shape of the parachute	Drop height, wind, area of parachute	Time for parachute to complete descent
What is the best material to use for a parachute?	Different materials	Drop height, size and shape of parachute, wind	Time for parachute to complete descent
How does temperature affect a magnet's strength?	Temperature of magnet	Type, shape, and size of magnet, type of thermometer, placement of thermometer on the magnet	Magnet's ability to hold an object
What is the best insulator to keep ice from melting?	Type of insulation in a container	Amount of ice, starting temperature	Time for ice to completely melt
How does the size of a vibrating surface affect pitch?	Size of object (e.g. length of a ruler)	Method for vibrating the object	Pitch (e.g. high, medium, and low)
What materials conduct heat the best?	Spoons made of different materials	Amount of water, temperature of the water and air, amount of butter attaching a bead indicator to each spoon	Time it takes for heat to rise up the spoon causing the butter to melt and the bead indicator to detach from the spoon



### Easy Testable Questions (recommended for elementary level), continued...

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
How does the position of a fulcrum affect the ability of a lever to do work?	Position of fulcrum	Mass of load	effort
Which conditions produce the best echo?	Locations	Sound making instrument	Loudness of echo
How do pulleys affect the amount of mass that can be lifted?	Types of pulleys	mass	Ease of lifting mass
How does the surface area of a drum affect its pitch?	Surface area of drum	Material and construction of drum, shape of drum, drumstick, and force for hitting drum	pitch
What materials are best for conducting electricity?	Materials	Battery, circuit arrangement	Ability of light bulb to light up

### More Complex Testable Questions (recommended for middle school levels)

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
What conditions make for the fastest sailboat?	Area of sail, material of sail, shape of boat, mass of boat	Wind speed on fan	Distance traveled over time
What conditions make a top that spins the longest?	Mass of the top, length of the axle	Procedures for constructing the top	Spinning time
How do different surfaces affect friction?	Different surfaces	Slope of ramp, mass/shape/ material of object slid on ramp	Time it takes object to slide down the ramp
How does the diameter of the hose affect the speed of water in a siphon?	Diameter of water hose	Siphoning procedure	Speed of water



**Easy Testable Questions (recommended for elementary level)**

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
Which paper towel absorbs the fastest?	Brand of paper towel	Amount of paper towel, amount of water	Time it takes for water to flow from one end of the paper towel to the other
How does temperature affect air pressure in a tire?	Temperature	Brand and type of tire	Air pressure
How does a container's size and shape affect evaporation rates?	Containers of varying size and shape (e.g. tall, short and wide, etc.)	Initial amount of water, heat source	Amount of evaporation over time
How does exposure to sunlight affect the strength of a plastic bag?	Plastic bags exposed to varying amounts of sunlight (e.g. 2 weeks, 1 week, 1 day, 1 hour etc.)	Type of plastic bag, size of plastic bag	Amount of mass the bag can hold without breaking
Which types of paper have the least amount of fading in sunlight?	Types of paper (e.g. construction paper, newspaper, advertisements, etc.)	Area and thickness of paper	Fading over time
Which is the best liquid solvent for separating a marker stain?	Solvents	Marker stain, amount of solvent, time, filter paper	Number /colors observed on filter paper
Which type of microwave popcorn pops the best?	Brand of microwave popcorn	Time in microwave, microwave power level, container, position in microwave	Percentage of popcorn popped (number of popped kernels compared to number of unpopped kernels.)
How does the type of liquid impact the time it takes for the liquid to freeze?	Liquid type (e.g. water, syrup, detergent)	Size of container, temperature	Time it takes to freeze
How does salinity affect the freezing point of liquids?	Water with varying amounts of salt	Temperature, size of container	Time it takes to freeze

**More Complex Testable Questions (recommended for middle school levels)**

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
What is the best way to remove wrinkles from fabric?	Varying moisture amounts	Type of fabric, amount of heat	Number of wrinkles observed
How does density affect the buoyancy of objects?	Objects of different mass and sizes	Objects tested, liquid	Level at which the object floats, is suspended or sinks.



More Complex Testable Questions (recommended for middle school levels), continued...

Testable Questions	What is Tested?	What Stays the Same?	Data Collected
Which brand of paper towels is the strongest when wet?	Brand of paper towel	Amount of weight tested on each towel, size and position of paper towel	Amount of weights it takes for the paper towel to break
How does temperature affect the drying time of paint?	Varying temperatures, type of paint	Amount and surface of paint	Dryness over time



Once your student has identified a design question, have him [validate the question](#).

