101+ AMAZING Science Project Ideas: PHYSICS

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- Recommends projects that are best for you

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A Magnifying Discovery
Have you ever looked through a magnifying lens? Why do things look bigger when you look at them through the magnifying lens? Even though the object appears to get larger, it really stays the same size. Each lens has its own unique power of magnification, which can be measured with a ruler. How powerful is your lens?
Difficulty = 1 – 3

A Battery That Makes Cents
Batteries are expensive, but you can make one for exactly 24 cents! In this experiment, you will make your own voltaic pile using pennies and nickels. How many coins in the pile will make the most electricity?
Difficulty = 1 – 2

Levitating Magnets: Floating Isn't Just for Magicians
Have you ever seen a magician float an object in the air? If so, you might think that levitation (making things float) is just a magic trick, but the truth is you can use an invisible physical force to levitate a magnet! Try this science project to find out how.
Difficulty = 1

Centripetal Force
What keeps you in your seat of a giant loop-de-loop roller coaster? Surprisingly, it is not the seatbelt but the seat! It works because of something called centripetal force and it does much more than make a great roller coaster. It keeps a satellite in orbit and you in your bicycle seat during a turn. How does it work?
Difficulty = 2

Magnets and Charge
Has anyone ever told you that you have a magnetic personality? Have you ever heard that opposites attract? These common phrases are both based on the properties of magnets and magnetic electricity. In this experiment learn how to make your own magnets out of nails and batteries. How does changing the wrapping of the wire change the strength and properties of the magnet?
Difficulty = 2

Slip Sliding Away: Experimenting with Friction
As you headed up the mountain to enjoy your last ski trip, you may have noticed a sign reading: Hazard! Icy Roads Ahead—Put On Your Chains. Putting chains on car tires increases the resistance between the tires and the road allowing the car to "grip" the road. This resistance to sliding is called friction. In this experiment, you will be investigating how to increase and decrease

the friction between two surfaces.
Difficulty = 2

Balancing the Load: The See-Saw as a Simple Machine
Have you ever tried to pull out a nail out of wood with your bare hands? Or have you tried to shove a staple through a stack of papers without a stapler? A hammer's claw, a stapler, a pair of pliers and a shovel are each examples of everyday tools that use levers to make our work easier.
Difficulty = 2

What Goes Up, Must Come Down: Conduct Galileo's Famous Falling Objects Experiment
Standing on a balcony near the top of the 179-foot tall Tower of Pisa, a young scientist dropped two iron balls into the crowd below. The scientist, young Galileo, was not trying to knock his fellow professors on the head, but was trying to prove his theory that all objects fall to earth at the same rate, regardless of their mass. In this experiment, you will repeat Galileo's experiment from the top of a ladder. Look out below!
Difficulty = 2

Swing Low: Investigate the Motion of a Pendulum
"Swing me higher, Mommy, higher!" Kids love to ride the swings at the playground. The back-and-forth motion of a swing demonstrates the physics of a pendulum. In this experiment, you will investigate the factors that affect the speed and duration of a pendulum's swing.
Difficulty = 2

Outer Space, The Silent Frontier: An Experiment on Sound Waves
In outer space there is utter silence. There are no sounds of traffic jams or thunderstorms or crashing waves. No buzzing bees or babies crying. Just silence. In this experiment, you will discover why empty space is void of sound.
Difficulty = 3

Give It a Lift with a Lever
Did you know that you can lift an object that's heavier than you are? Just use a lever! In this science project you'll build a tabletop lever and measure how much effort it takes to lift an object using it.
Difficulty = 4

Build a Motorboat Powered by Surface Tension
Have you ever wondered why a duck can float on the water without getting wet? Or how a water strider can walk on water? If you observe carefully, you could find dozens of similar interesting phenomena that are all linked to the surface tension of water. Here is a project that will help you understand and measure the properties of water surface tension.
Difficulty = 4

What's the Fastest Way to Cool a Soda?
So you've just finished mowing the lawn on a hot summer day, and you'd like a cold, refreshing drink as a reward. You look in the fridge, and oops! it's empty. The sodas are still sitting in the cupboard, at room temperature. What's the fastest way to get that soda down to a cold, drinkable temperature with materials readily at hand?
Difficulty = 5 – 6

Supercooling Water and Snap Freezing
Can water remain liquid below its normal freezing point? If it does, that water is *supercool*(-ed). This project shows you a method for supercooling water. You can test water from different sources to see whether or not it can be supercooled.
Difficulty = 5

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Pick This Project!
Here's a fun science project for anyone who plays an electric guitar. You'll learn about the physics of vibrating strings, and find out why the tone of your guitar changes when you switch between the different pickups.
Difficulty = 5 – 8

How the Strength of a Magnet Varies with Temperature
Physicists sometimes study matter under extreme conditions. For example, think of the emptiness of interstellar space vs. the unimaginable crush of pressure at the center of a neutron star, or an object dipped in liquid nitrogen vs. the tiles on the space shuttle during re-entry. Here's an experiment on permanent magnets in "extreme kitchen" conditions that you can try at home.
Difficulty = 5

Solid Motor Rocket Propulsion
What does it take to launch a satellite to explore Mars, or a mission to the moon? This project has several possible variations for exploring the physics of rockets. This *is* rocket science!
Difficulty = 5 – 9

Blowing Bottletops: Making Music with Glass Bottles
This is a musical project about the resonance of closed-end air columns. Organ pipes, flutes, and brass instruments are examples of musical instruments of this type. In this project, you'll learn how the pitch of the note produced depends on the length of the column. All you need are some bottles, water, a ruler, and a chromatic tuner.
Difficulty = 5 – 7

Singing Wine Glasses
The American holiday of Thanksgiving is a favorite of many. Friends and family getting together, a big feast, fancy china and glassware on the table. Who can resist the temptation to make the wine glasses sing? Find out more about how this works with this project!
Difficulty = 5 – 7

The Joly Photometer: Measuring Light Intensity Using the Inverse Square Law
You've probably heard that compact fluorescent light bulbs are more efficient than incandescent bulbs. More of the electricity they use goes into producing light, and less into producing heat than with incandescent bulbs. How much more efficient are compact fluorescent bulbs? You can find out for yourself by making a simple photometer to compare the light output from different bulbs. This project shows you how.
Difficulty = 6

Roller Coaster Marbles: How Much Height to Loop the Loop?
This is a really fun project even if you don't like going on roller coasters yourself. You'll build a roller coaster track for marbles using foam pipe insulation and masking tape, and see how much of an initial drop is required to get the marble to "loop the loop." It's a great way to learn about how stored energy (potential energy) is converted into the energy of motion (kinetic energy).
Difficulty = 6

Spare-Change Circus: Walking Coins on a (Vertical!) 'High Wire'
Here is a project that is almost like a magic trick: with a strong magnet and a simple apparatus you can build yourself, you can make a coin "walk" up and down a wire coat hanger! This project is an interesting way to learn about the distance over which magnetic forces act on magnetic materials.
Difficulty = 6 – 7

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Extreme Sounds: Lessons in a Noisy World
Can you hear me now . . . ? Just how loud does a sound have to be for us to hear it? And how loud is too loud for our ears? Learn to measure levels of sound in this project, and discover the amazing auditory range your ears can detect in the noisy world around you.
Difficulty = 6 – 8

Technicolor Shadows: Lessons in Light and Color
Is that right side of your brain yearning to express its artistic side? This is a project that beautifully blends art with science. Learn about light and colorful shadows in these experiments where you mix and match various colors of light to create a mini light show and shadow wall. You might be surprised at the colorful hues you'll find lurking in the shadows.
Difficulty = 6 – 10

How Does Color Affect Heating by Absorption of Light?
Why is it more comfortable to wear light-colored clothes on a hot summer day? Why wear a dark-colored jacket for early-morning fishing on a cold lake? How much difference can it make? Here's a project where you can quantify how much difference color makes for absorbing heat.
Difficulty = 6 – 8

Measuring the Surface Tension of Water
Did you know that when you dip your finger in water and pull it out, the water is actually pulling back on you? Here's a way you can measure how much.
Difficulty = 6 – 7

Going the Distance: Launch Angles & Projectile Trajectory
If you're into building things and making small objects fly, this project is for you. You'll use materials you can find at your local hardware store to make a launcher to send ball bearings flying through the air. What launch angle will give you the maximum distance for your projectiles?
Difficulty = 6 – 8

Distance and Constant Acceleration
This project is an experiment in classical physics. You'll be following in Galileo's footsteps, and investigating Newton's laws of motion, using a metronome as your timing device. Sure, it's been done before, but if you do it yourself, you can get a firm understanding of these important concepts.
Difficulty = 6

Forensics: How does it matter? Measure the spatter!
Every criminal leaves behind evidence at the crime scene. The trick to catching the criminal is collecting all of the evidence and making sense of it. This is what the forensic expert does. In this science project you will be correlating the size of blood stains to the distance from which a body fell, but don't get too grossed out. You'll be doing it with water-filled balloons. If you like figuring out mysteries, this is the science project for you!
Difficulty = 7

Simple Harmonic Motion in a Spring-Mass System
Many things in nature are periodic: the seasons of the year, the phases of the moon, the vibration of a violin string, and the beating of the human heart. In each of these cases, the events occur in repeated cycles, or periods. In this project you will investigate the periodic motion of a spring, using a mini Slinky®. Basic physics will then allow you to determine the Hooke's Law spring constant. Your analysis will also yield the effective mass of the spring, a factor that is important in real-world engineering applications.
Difficulty = 7 – 9

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Measuring Sugar Content of a Liquid with a Laser Pointer
Here's a project that shows you how to use a laser pointer and some knowledge of physics to figure out the concentration of sugar dissolved in a liquid.
Difficulty = 7 – 9

Using a Laser to Measure the Speed of Light in Jello
Think it takes expensive, sophisticated equipment to measure the speed of light? Think again! Outfit yourself with a simple handheld laser pointer, a protractor, and Jello, and you're ready to get started.
Difficulty = 7 – 8

Light Energy & Frequency
This is a cool project that combines simple electronics and physics to investigate some basic properties of light energy. It's based on a project that won the Science Buddies Clever Scientist Award at the 2007 California State Science Fair. It uses an interesting method for measuring the energy of light from different parts of the visible spectrum. You'll measure the evaporation rate for drops of rubbing alcohol when it is illuminated with light from LEDs of different colors.
Difficulty = 7

Using a Laser Pointer to Measure the Data Track Spacing on CDs and DVDs
You've probably noticed the colorful patterns "reflecting" from the shiny surface of a CD disk. What you are seeing is actually diffraction of white light, and the rainbows of color are *diffraction* patterns. In this project you'll learn about how diffraction patterns are generated, and you'll find out how you can use a laser pointer and a protractor to measure the microscopic spacing of data tracks on a CD.
Difficulty = 7 – 8

Investigating the 'Mpemba Effect': Can Hot Water Freeze Faster than Cold Water?
This physics project seems like it should have an easy answer. Instead, it turns out to be a great illustration of why it is important to base scientific conclusions on the outcome of controlled experiments. Things don't always turn out as we expect!
Difficulty = 7 – 9

Rainbow Fire
Astronomers can determine the atomic composition of distant stars by measuring the spectrum of light emitted by the star. In this project you can do something similar by observing the color of flames when various chemicals are burned in an alcohol solution.
Difficulty = 7 – 8

What is the Maximum Intermediate Height for a Siphon?
A siphon is a handy device for emptying out a liquid reservoir that has no drain. For example, they're great for cleaning fish tanks. An interesting aspect of a siphon in action is that the liquid flows "uphill" for a portion of its journey through the tube. This project asks the question, is there a maximum height for that uphill part of the siphon?
Difficulty = 7

Distance and Speed of Rolling Objects Measured from Video Recordings
This project is an experiment in classical physics. You'll be following in Galileo's footsteps, and investigating Newton's laws of motion, but you'll be taking advantage of modern video recording technology to make your measurements. Sure, it's been done before, but if you do it yourself, you can get a firm understanding of these important concepts.
Difficulty = 7

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Don't You Fret! Standing Waves on a Guitar
In this project, you'll investigate the physics of standing waves on guitar strings. You'll learn about the different *modes* (i.e., patterns) of vibration that can be produced on a string, and you'll figure out how to produce the various modes by lightly touching the string at just the right place while you pick the string. This technique is called playing *harmonics* on the string. By the way, we chose a guitar for this project, but you can do the experiments using any stringed instrument, with or without frets.
Difficulty = 7

Guitar Fundamentals: Wavelength, Frequency, & Speed
This is a rockin' project for guitarists with an interest in the physics behind the music. Have you ever wondered why the pitch of the note changes when you fret the string? You can find out for yourself with this project on the fundamental physics of stringed instruments.
Difficulty = 7

How to Make a Guitar Sing
This is a great project for a musician who is interested in the physics of stringed instruments. If you've every played an acoustic guitar, you may have noticed that picking a single string can make one or more of the other (unpicked) strings vibrate. When this happens, it's called *sympathetic* vibration. What intervals lead to the strongest sympathetic vibrations? Find out for yourself with this project.
Difficulty = 7

How to Make a Piano Sing
The renowned pianist Vladimir Horowitz once said, "The most important thing is to transform the piano from a percussive instrument into a singing instrument." Check out this project to learn about sympathetic vibrations, one way to make piano strings sing.
Difficulty = 7

Frequency-Dependent Sound Absorption
Want to start a garage band, but Mom or Dad won't let you because it will make too much noise? This is a good project for someone who is interested in acoustics and likes to build things. Who knows, it might help you figure out how to make everyone happy.
Difficulty = 7

Measuring the Speed of 'Light' with a Microwave Oven
Did you know that you can measure the speed of light using a microwave oven, some egg white, and a ruler? Find out how with this cool kitchen science project thanks to Mr. Nick Hood, a science teacher in Fife, Scotland.
Difficulty = 8

Roller Coaster Marbles: Converting Potential Energy to Kinetic Energy
If you'd like to investigate the physics of amusement park rides, then this project is for you. You'll build a roller coaster track for marbles using foam pipe insulation and masking tape, and see how much the marble's potential energy at the beginning of the track is converted to kinetic energy at various points along the track.
Difficulty = 8