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WIND  
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ACTIVITIES

# CLASS AND ACTIVITIES

Looking for STEM to do at home or in the classroom?

One Power's engineers provide a variety of activities to keep curious minds engaged.

Below you'll find a collection of STEM experiment and activity videos from our Science Shorts social media series.

## Science Shorts

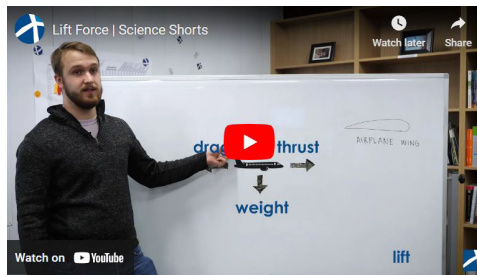
### Energy vs. Power



Power vs. energy – what's the difference?

Reporting from the North Findlay Wind Campus, Jessie will explain the difference between power and energy, with real-life examples and help from Senior Analyst Carly. Learn how these concepts differ, and how they relate to wind turbines and wind energy.

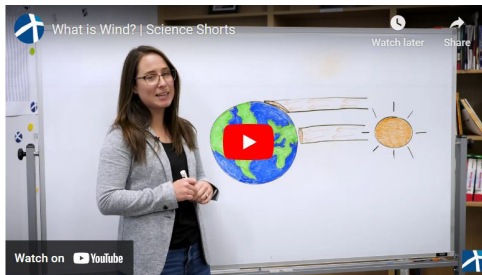
### Lift Force



Ever wonder what makes a wind turbine spin?

Learn what aerodynamic forces are, and how one force in particular – lift – enables both airplane travel and the movement of wind turbine blades. Hans and Josh, interns at One Power, will explain how blades are designed to “catch the wind,” and will share an up-close view of a wind turbine blade.

### What is Wind?



We all know what wind is... or do we?

Wind is what makes the leaves rustle, and the hat fly off your head – but what is it, really? Why does it happen? And most importantly, how can we get energy from it?

Jessie illustrates how wind is related to the sun, and how tiny air molecules can be powerful enough to move wind turbines and generate electricity – ultimately powering the facilities of One Power's customers!

### Concrete vs. Cement



Concrete and cement – what are they, how are they made, and why do we care?

Field Engineer Erica explains concrete vs. cement. She'll debunk the misconception that the two are interchangeable, explain how each is made, and reveal why it matters for wind energy construction.

What's the difference between concrete and cement? Watch this episode to find out. can be powerful enough to move wind turbines and generate electricity – ultimately powering the facilities of One Power's customers!

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## How Wind Instruments Work



One Power collects information about wind in order to properly build and operate wind energy projects – but just how is this information collected?

Jessica is focusing on instruments that allow One Power to measure the most important data we collect: wind speed data! Watch as Jessica explains cup anemometers and sonic anemometers.

Watch and learn about these instruments' functions, strengths, differences, and equations!

## LiDAR Units

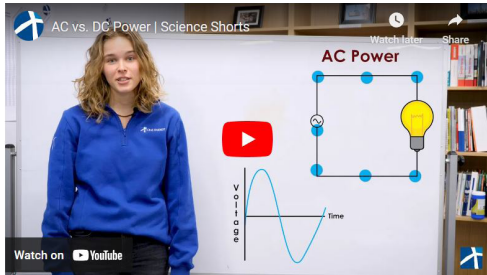


One Power has various ways of capturing weather and wind data. Follow along as Erica explains the LiDAR unit!

LiDAR stands for Light Detection and Ranging. LiDARs are relatively small, portable instruments, which come in handy when we need to measure wind data at a potential customer's site: instead of installing a tall MET pole, we can transport a smaller, more mobile LiDAR unit!

Watch as Erica explains how these units capture data using light beams and lasers along with atmospheric aerosols – and find out which instances One Power chooses to deploy a LiDAR unit over other ways of obtaining wind data.

## AC vs. DC Power



Prepare to be thunderstruck... with science!

Project Engineer Michelle explains the difference between AC and DC (or alternating current and direct current) power.

Watch to learn how electricity goes from a generation source (like a wind turbine) to an object (like a light bulb or your cell phone!). Michelle will cover everything involved in electric currents, from electrons, voltage, power, and direction of flow, to how it works with wind turbines, and more!

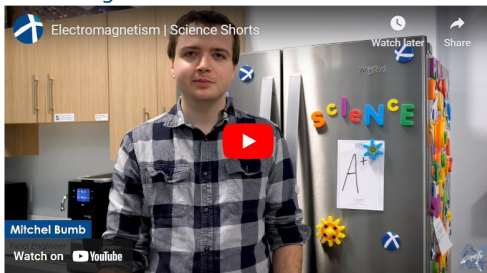
## Potential vs. Kinetic Energy



Let's catch up with Eathan, to explore two types of energy: potential and kinetic!

In this episode, we'll cover the First Law of Thermodynamics, which states that energy is always constant – it can't be created or destroyed. Then we'll dive into the concepts of potential and kinetic energy, with real-life examples to demonstrate each.

## Electromagnetism

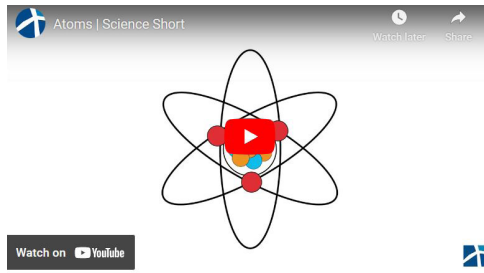


Opposites attract – at least when it comes to magnetic metals!

Mitchel explains one of science's mystifying concepts: magnets!

Watch to learn how the atoms and electrons within some objects create a force of attraction – and why your refrigerator magnets can only hold up so many A+ tests at a time.

## Atoms



Let's get back to basics... the basic building blocks of all things, that is! Atoms!

Spencer will explain how everything in the universe is made up of tiny particles called atoms.

He'll take us through what atoms are made of, how those "subatomic particles" behave, and why this all relates to electricity generation.

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## Atmospheric Pressure



We're conducting one of our favorite demonstrations at One Power: the pop can experiment!

We use this experiment to illustrate something called atmospheric pressure, also known as air pressure.

Nate demonstrates the effects of temperature on molecules and air pressure – using a few household items:

- a soda can
- a bowl of ice water
- a hot plate
- and plenty of safety gear!

## Momentum



This episode explains the concept of momentum. Learn the technical basics, view equations for measuring momentum, and watch as Field Engineer Darshan creates miniature collisions to illustrate how it all works!

## Buoyancy



If you're like us, you can't just enjoy a root beer float without wondering what the science behind it is.

Today's episode of Science Shorts can help! No – we can't explain why this dessert is so delicious. But we will cover what makes things (like a scoop of ice cream) float!

In this experiment, we use coins, a floatie, and a tub of water to demonstrate the concept of buoyancy. Buoyancy is described as the force that causes an object to float. Watch to learn how buoyancy is related to gravity, and the effects of volume and density on the buoyant force equation.

## Severe Weather Watch vs. Warning



Jessica, one of One Power's atmospheric scientists, uses tacos (yes, tacos!) to explain the difference between a severe weather WATCH and a severe weather WARNING, when issued by the U.S. National Weather Service.

Learn what each alert means, and what you should do when either one is issued in your area. And remember: when thunder roars, go indoors!

## Friction



Start your engines: it's time for a ramp race!

Wax or wood – which surface will win?

To demonstrate the concept of friction (which is described as a force that opposes motion) the experiment in this segment will involve blocks sliding down ramps, each with different surface roughness. Watch for an explanation of friction on each surface, and root for the ramp of your choice!

And stay tuned to find out what would happen if friction didn't exist (hint: you may have experienced this on an icy sidewalk in the winter!).

## Kinematics



Position, velocity, and acceleration – what do these terms really mean? (And perhaps more importantly, what do they have in common?)

These three properties are part of something called "kinematics" – the branch of physics that helps us describe the laws of motion.

We'll explain kinematics, as well as the properties of position, acceleration, and velocity. Our host Ramy breaks down each term, and provides helpful examples along the way!



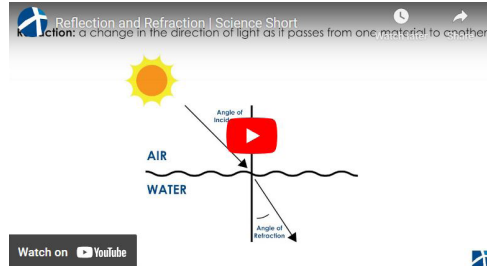
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## Reflection and Refraction



A mirror (and how light interacts with it) is an example of reflection in action. Reflection is a property of optics that has to do with how light bounces off a flat surface at a certain angle.

Learn about reflection, along with another property of optics: refraction! (Which Jerrod will demonstrate with an experiment using a glass of water and a wooden stick).

## Static Electricity



Electricity is all around us – and it powers many everyday items all over the world!

We'll explore the meaning of static electricity, explain how it works, and demonstrate it with a hair-raising balloon experiment!

## Composite Materials



Combining strengths is helpful in many instances – like the different positions on a soccer team, mixing several ingredients to bake a cake, and blending materials to manufacture a wind turbine blade!

Composite materials, like the fiberglass used to make the blades on One Power's wind turbines. Composite materials are substances made from combining two or more materials that have different properties on their own – in order to maximize desired properties (like strength or flexibility) in the resulting material.

Learn about composite materials and see if you can find more examples of these substances in your own home!

## Batteries



You might use batteries for small gadgets like remote control cars, a TV remote, or a flashlight. But did you know batteries can also be used to power big things? Think cars, trains, and planes!

At One Power, one way we use batteries is as a backup system to connect to our wind turbines via the internet, in case our routers go down. Batteries ensure we always know what's happening at each of our turbine sites.

We will explain just how batteries work – using graphic animations and a lightbulb demonstration.

## Introduction to Simple Machines



Let's get introduced to simple machines!

Watch as Carly explains how simple machines make our lives easier by allowing for changes in direction, distance, and amount of force acting on an object.

Some examples of everyday simple machines include garage doors, hammers, scissors, bicycles, wheelchair ramps, and bottle caps.

## Wheel and Axle



Sunny weather means it is bike season, but do you know how your bike works? One Power has you covered just in time for summer.

This is one of the simple machines we see everyday, the wheel and axle. Bower uses an equation to measure the mechanical advantage of a wheel and axle.

Watch what happens when we push the pedals of our bike and how much this technology helps!





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Pulleys



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