

HOW
ABOUT
WATER

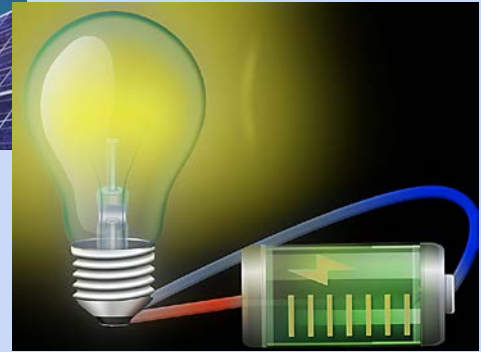


What is Energy?

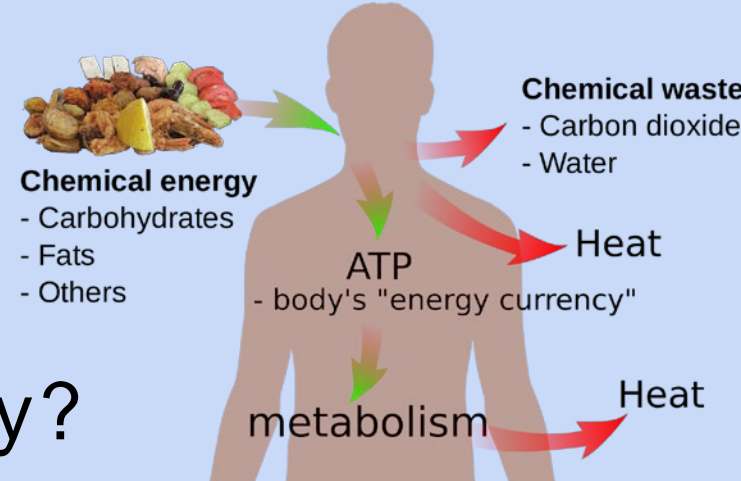
Energy is the ability to do work, cause things to happen and make changes.



[PBS NOVA Now - Energy](#)



Energy and human life



How do *we* use energy?

Examples of Potential and Kinetic Energy



When the ball is not moving it has potential energy.

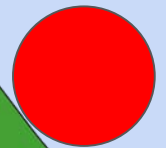
Potential Energy Examples:

- A yo-yo in your hand
- A spring that is compressed
- A bike at the top of a hill

Kinetic Energy Examples:

- The motion of the planets orbiting the sun
- Running, hopping, skipping
- A skydiver jumping out of a plane

As it rolls down the hill it loses potential energy and gains kinetic energy.





What is potential energy?

What is kinetic energy?

There are many forms of energy but they can all be put into two categories:

Potential Energy Potential Energy is stored energy and the energy of position.	Kinetic Energy Kinetic energy is the motion of waves, electrons, atoms, molecules, substances, and objects.
Chemical	Radiant
Mechanical	Thermal
Nuclear	Motion
Gravitational	Sound
	Electrical

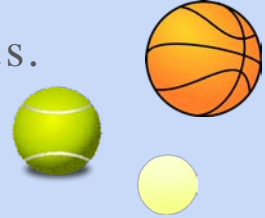
Energy Experiment

Potential vs. Kinetic Energy:

- If we hold a ball 20 cm above the floor does it have the same potential energy as a different ball?
- Try it!
 - Find your partner and choose two different types of balls
 - Try dropping a ball 20 cm off the floor
 - Next, try dropping another ball 20 cm off the floor
 - What happened?
 - Use a ruler to determine the height from which you are dropping the balls
 - Record the height of the bounce

Ball Bounce Experiment

Make a table on your paper to record your results.



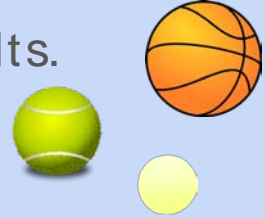
Height of Ball vs. Ball Bounce

<i>Type of Ball</i>	<i>Starting Height (20 cm)</i>	<i>Trial 1</i>	<i>Trial 2</i>	<i>Trial 3</i>	<i>Trial 4</i>	<i>Trial 5</i>
Ball #1	Bounce Height (cm)					
Ball #2	Bounce Height (cm)					

When you are done, transfer your information to a Google Slides presentation. You may make your own or share it with your partner. We will add to it next week.

Ball Bounce Experiment

Make a table on **Google Slides** to record your results.



Height of Ball vs. Ball Bounce

<i>Type of Ball</i>	<i>Starting Height (20 cm)</i>	<i>Trial 1</i>	<i>Trial 2</i>	<i>Trial 3</i>	<i>Trial 4</i>	<i>Trial 5</i>
Ball #1	Bounce Height (cm)					
Ball #2	Bounce Height (cm)					

After completing the table try this:

<http://freezeray.com/flashFiles/bouncingBall.htm>



Where does energy come from?

Experiment:

What will happen to the temperature of the water in the pan if we leave it in the sunlight for 45 minutes?

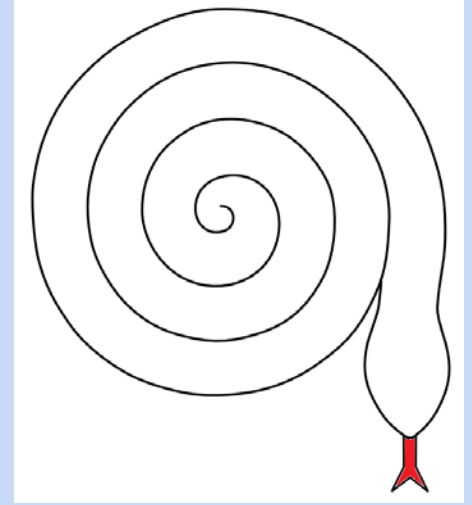


The Coiled Snake

- Hold the snake by the string over a candle or light bulb.
- As the light bulb heats up, the snake should spin.

Explanation: When the candle burns, two forms of energy are released, heat and light energy. The heat causes the air to rise up, which in turn makes the snake spin around. (The snake does not move up because the coiled shape of the snake allows the heat to rise through the middle and spin the snake.)

Class discussion: The energy we need comes from the food we eat. The energy required to turn the pedals of a bicycle comes from the person riding the bicycle. Cars and trucks get their energy from gasoline. Some homes are heated using oil or natural gas or firewood. When designing heating and cooling systems, engineers study thermal energy and how it creates air movement. They place heat vents and radiators low, near the floor because they know that hot air rises. As hot air rises it mixes with the existing room air, preventing "cold" spots and making the space more comfortable. The same is true for cool air vents that are placed high, near the ceiling. The cool air sinks, evenly mixing with the existing room air.





What are renewable energy resources?

What are nonrenewable energy resources?

Where does energy come from?

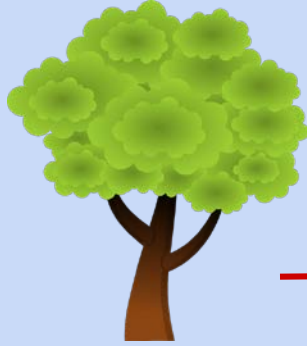
Natural energy sources: food, water, plants, trees, gravity, sun, fossil fuels, uranium, plutonium

Ways that humans have harnessed or converted natural energy sources: hydroelectric dams, coal/oil power plants, nuclear power plants, wind turbines, solar panels, etc.

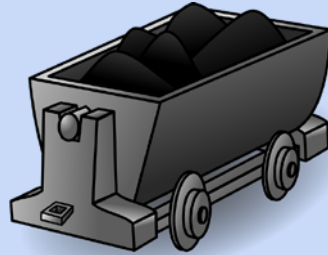
How do we get energy into our homes?



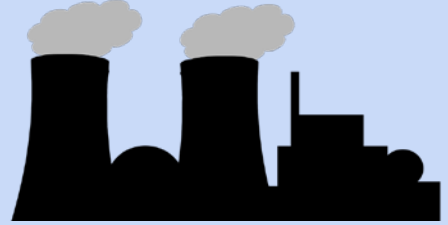
The sun produces light energy



Plants turn the light energy into chemical energy



Plants are fossilized and compressed into fossil fuels such as coal and oil



Fossil fuels are burned in power plants to produce electricity for our homes and businesses

What are sources of energy?

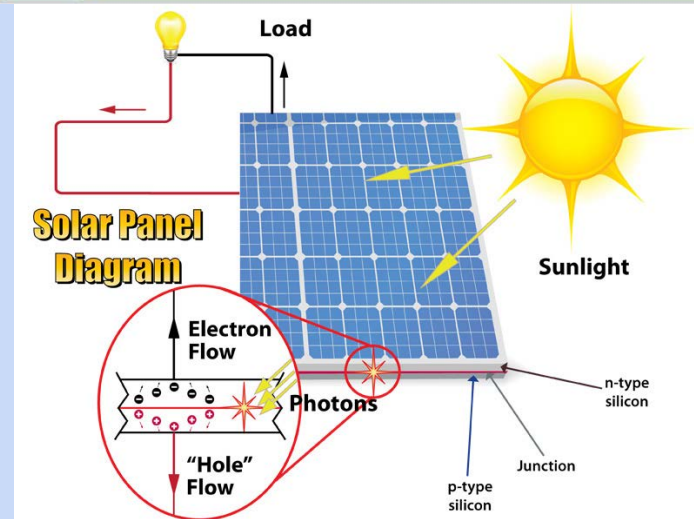
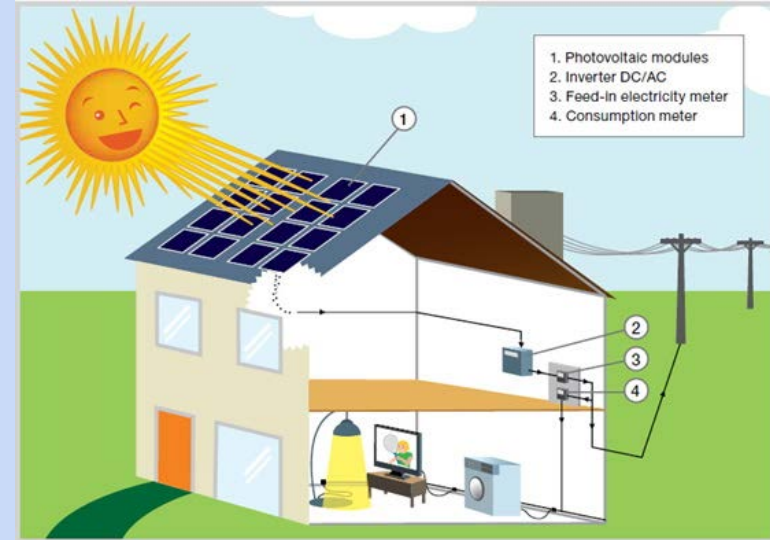
Renewable

Nonrenewable

How do Solar Panels Work?

Solar Panels are made up of photovoltaic cells or PV cells.

1. When sunlight hits the cells the photons cause the release electrons in the panel. This creates a current or flow of electrons travel down wires to an inverter where they are changed from DC current to AC current.





Vocabulary

- Energy
- Renewable
- Nonrenewable
- Solar
- Wind
- Fossil fuels
- Potential energy
- Kinetic energy





Slinky Experiment



*Draw this table on your notes page

Type of Wave	What does it look like?
Longitudinal	
Transverse	

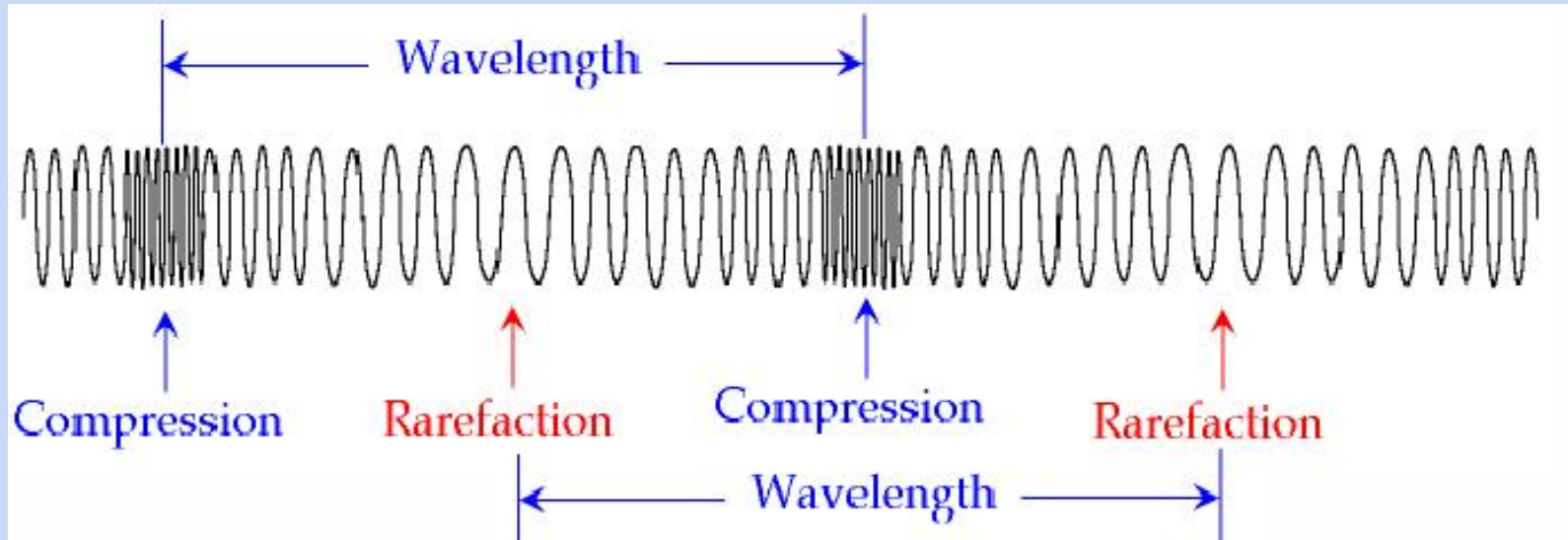
Slinky Waves -

Waves are created by vibrations. Vibrations are the sources of sounds.

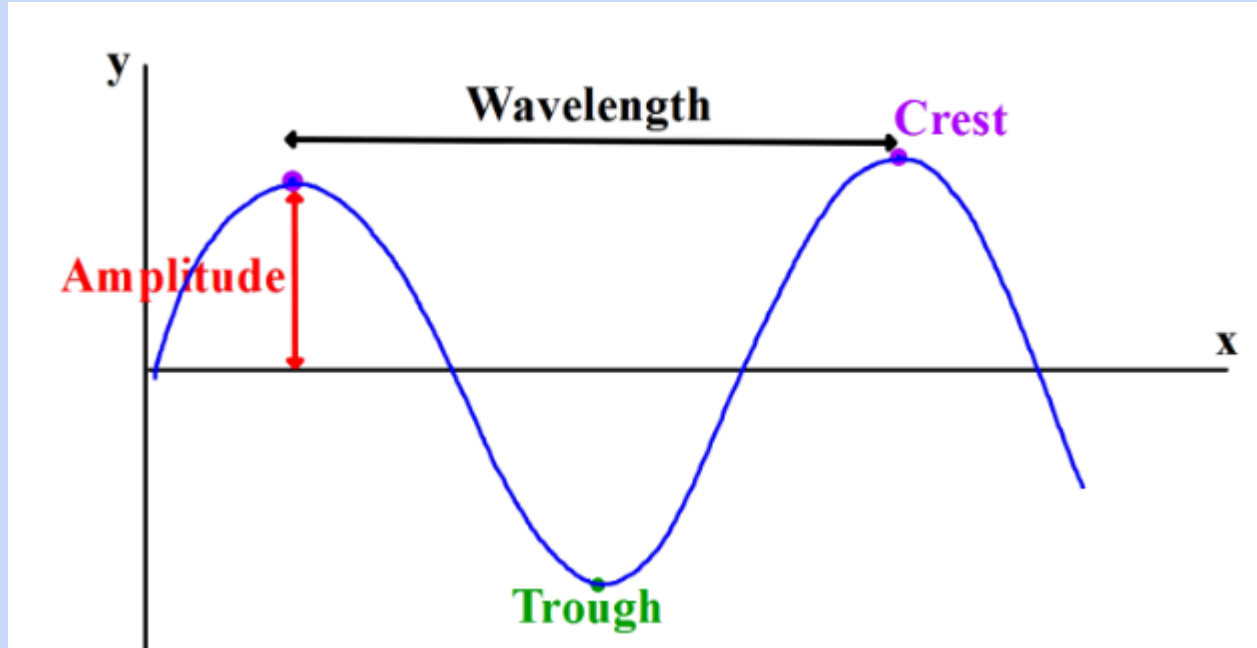
- On your sketch note, draw pictures of what you see happening with each type of wave.
- Which way do the waves move?
- What happens when the “wave” hits the end of the slinky?
- Can you think of other places where you see waves?



Slinky Waves - Longitudinal Waves - *Sound Waves*



Slinky Waves - Transverse Waves - *Water Waves*



I Used to Think...

But Now I Know...

What is energy?

The ability to do work or cause change.

Work is the application of a force through a distance. (Ask the students for examples, such as moving a box across the room, sweeping, etc.)

- Force can put matter into motion or stop it if it is already moving.
- Motion is a change in position of an object with time.

To do work, energy is needed.

From where does energy come?

Natural energy sources: food, water, plants, trees, gravity, sun, fossil fuels, uranium, plutonium

Ways that humans have harnessed or converted natural energy sources: hydroelectric dams, coal/oil power plants, nuclear power plants, wind turbines, solar panels, etc.

What are different types of energy? (See the Vocabulary / Definitions section.)

Kinetic energy: electrical, light, thermal, solar, sound, wind, hydro

Potential energy: chemical, mechanical, nuclear, gravitational

How do we use energy?

To break down and digest food (in our bodies)

To heat houses and other buildings

To illuminate lights