

Forms of Energy

Energy

can be

Kinetic Energy

energy of movement

Potential Energy

stored energy

Thermal Energy

energy of moving particles (heat)

Chemical Energy

energy stored in food, fuel

Mechanical Energy

energy of objects in motion

Sound Energy

form of energy we can hear

Elastic Energy

energy stored in objects that are stretched

Electrical Energy

energy of particles moving through a wire

Light Energy

form of energy our eyes can detect

Nuclear Energy

energy stored in centre of particles

Magnetic Energy

energy causing push or pull

Gravitational Energy

energy stored in an object when it is above the earth's surface

energy comes from moving

energy is stored to be used later

we experience energy in different ways

What is Energy?

In science, **energy** is the ability to **do work**. Work is done when a force causes an object to move in the direction of the force.





Energy



- **Energy** is the ability to do work.

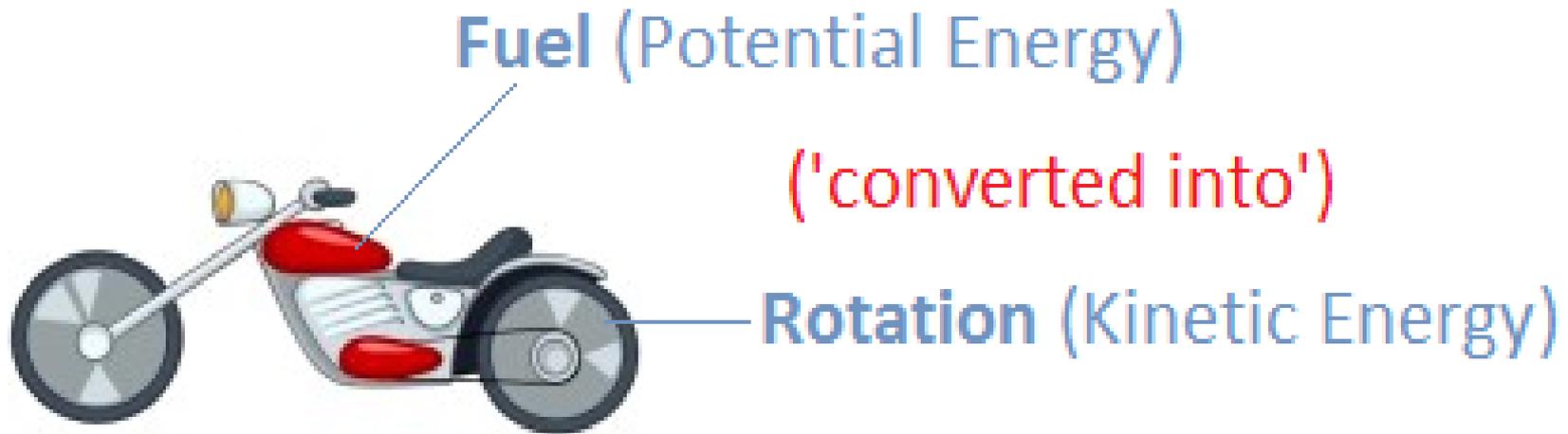
→ (reminder=What is work?.....)

Work- the transfer of **energy** from one object to another causing movement.

- SI Unit for Energy is the Joule (same as work)



The Law of Conservation of Energy



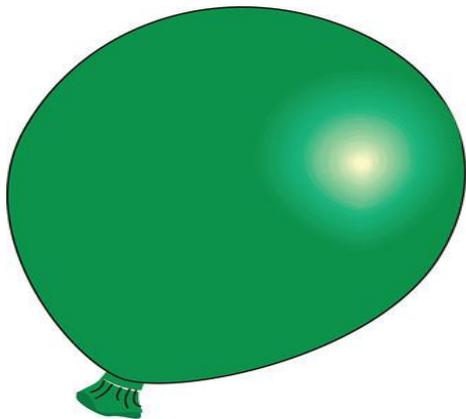
Conservation of Energy

Energy CANNOT be created or destroyed, but it CAN change forms.

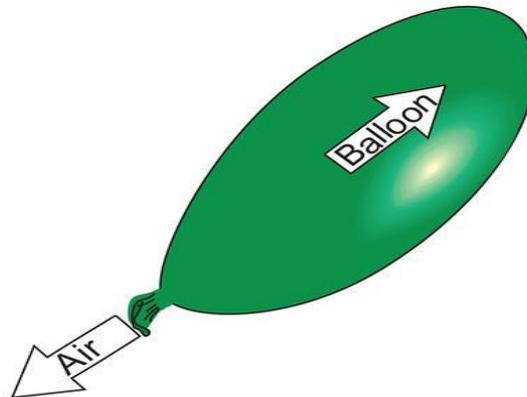
Types of Energy

There are **2** main types of energy:
Potential Energy and **Kinetic Energy**

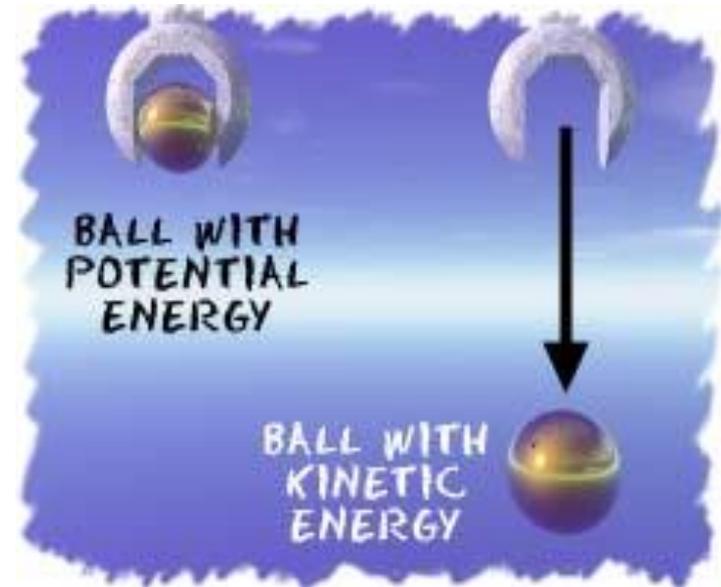
All forms of energy fall into one of these two categories.



Potential Energy



Kinetic Energy





Kinetic Energy



- Kinetic energy-the energy of an object that is due to the object's motion
 - all moving objects have KE
 - The greater the mass or velocity of a moving object, the more KE it has.
 - $KE = 0.5 \times mv^2$ (mass x velocity²). Your answer should be written in joules (J).



Potential energy

- Potential energy-the energy that an object has because of the position, shape, or condition of the object



- Gravitational potential energy= weight x height x mgh (mass, acceleration due to gravity, and height) and is written in joules (J).



Mechanical Energy



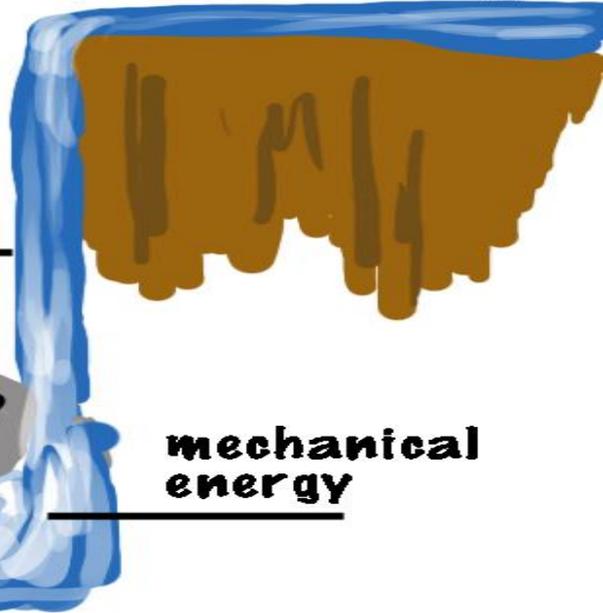
Mechanical energy is the potential energy and the kinetic energy added together (Both)



potential energy



kinetic energy



mechanical energy

Mechanical energy

- Mechanical energy-the amount of work an object can do because of the object's kinetic and potential energy **ME=PE+ KE**



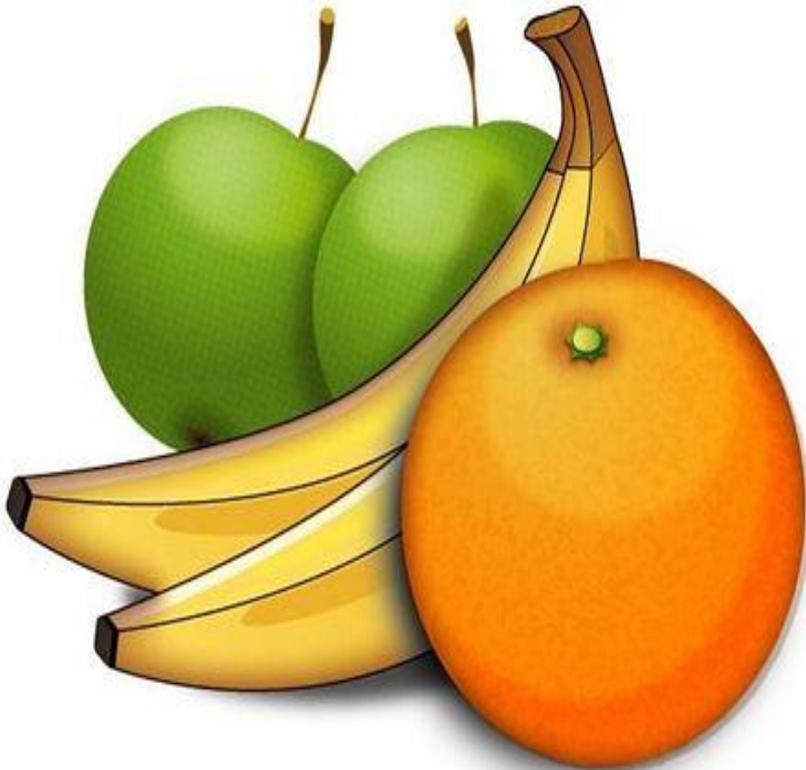
Sound Energy-Kinetic

Sound energy is caused by an object's vibrations. When an object vibrates, its vibrations transmit through the air so that we can hear it from another location.



Chemical Energy-Potential

Chemical energy is the energy of a compound that changes as its atoms are rearranged (Potential).



Electrical Energy (Kinetic)

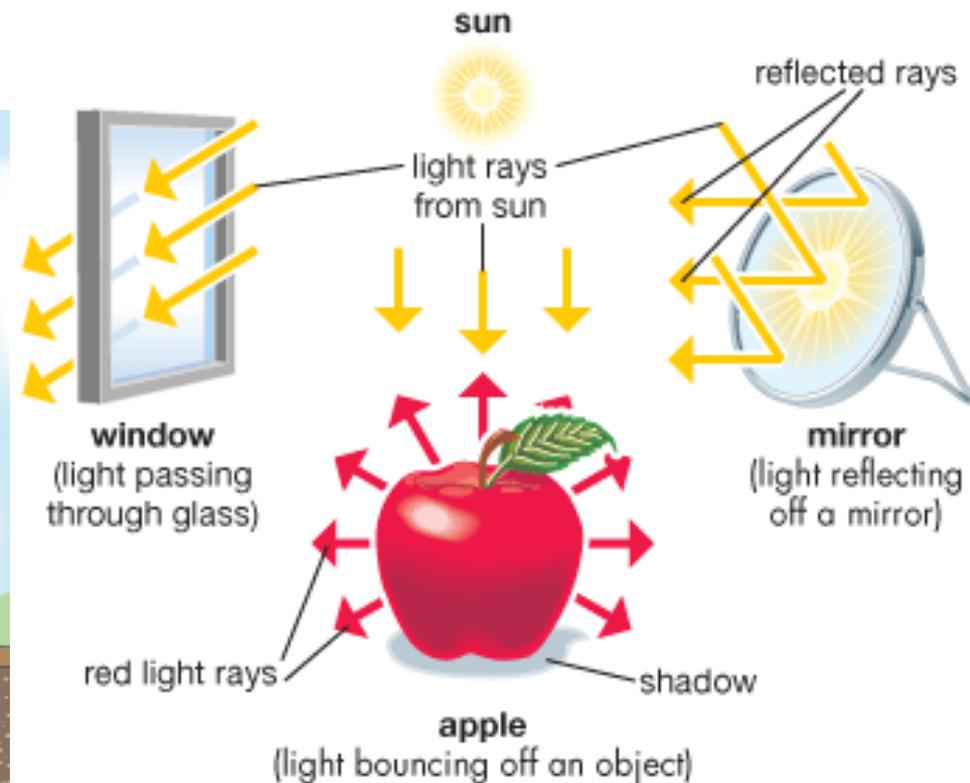
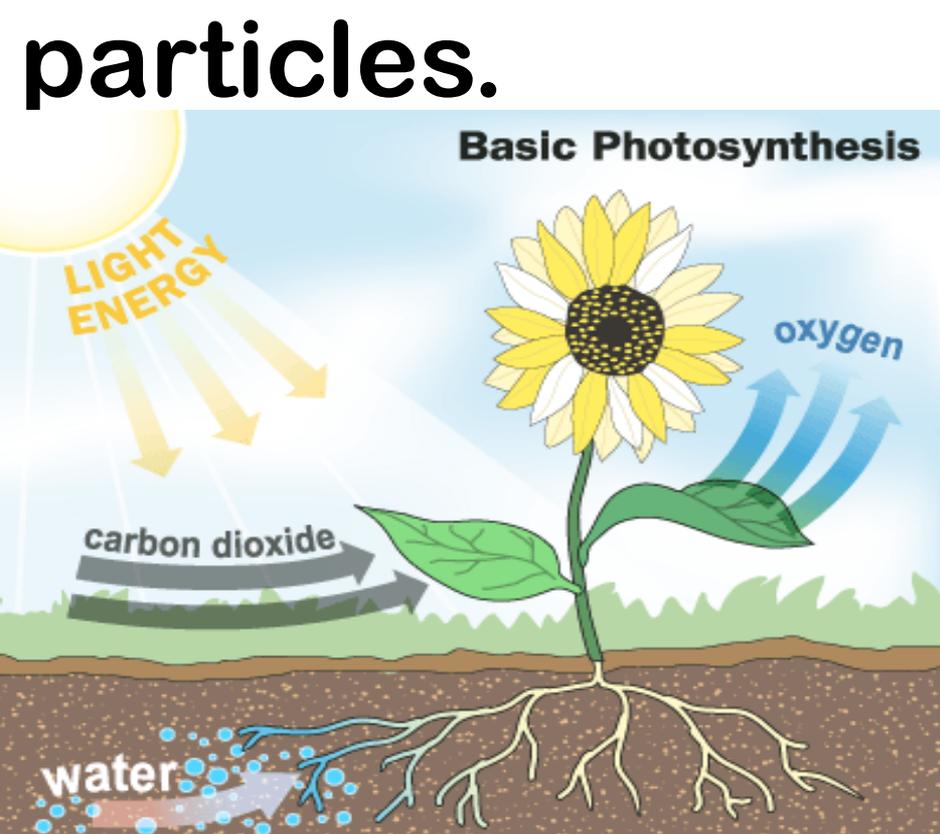


Electrical energy is the energy of moving electrons.



Light Energy (Kinetic)

Light energy is produced by the vibrations of electrically charged particles.



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Like sound vibrations, light vibrations cause energy to be transmitted.

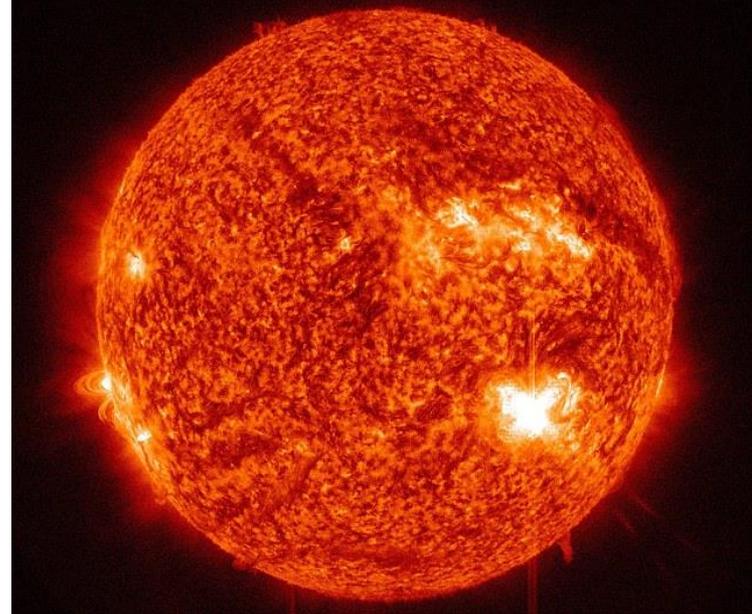
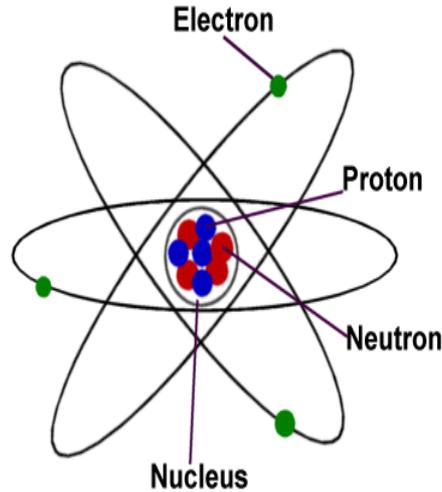
Thermal Energy (Kinetic)

Thermal energy is all of the kinetic energy due to random motion of the particles that make up an object. **Heat** is thermal energy.

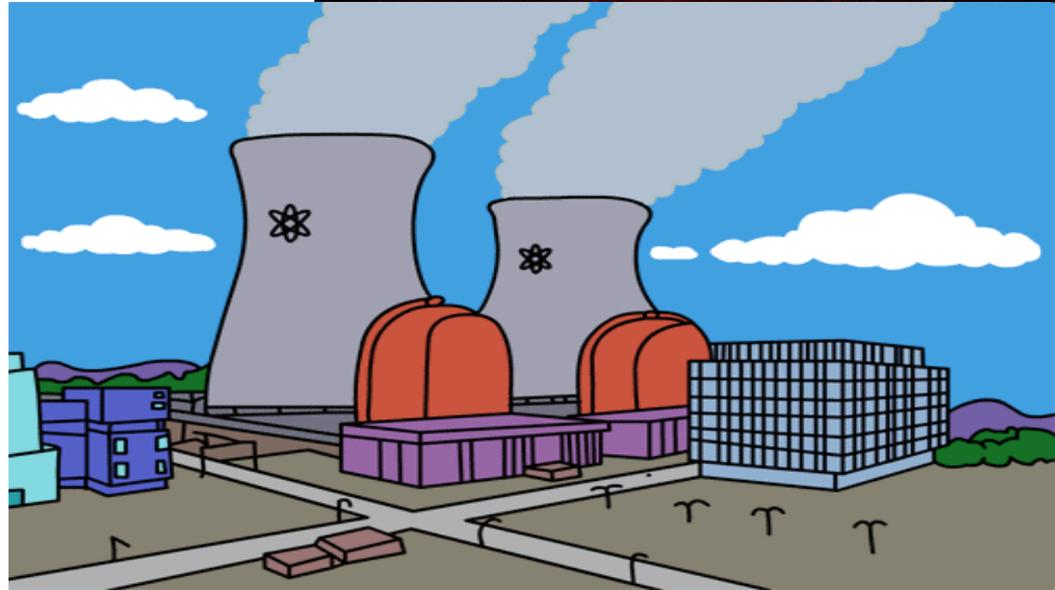


Nuclear Energy (Both)

Nuclear energy, the energy that comes from changes in the nucleus of an atom.



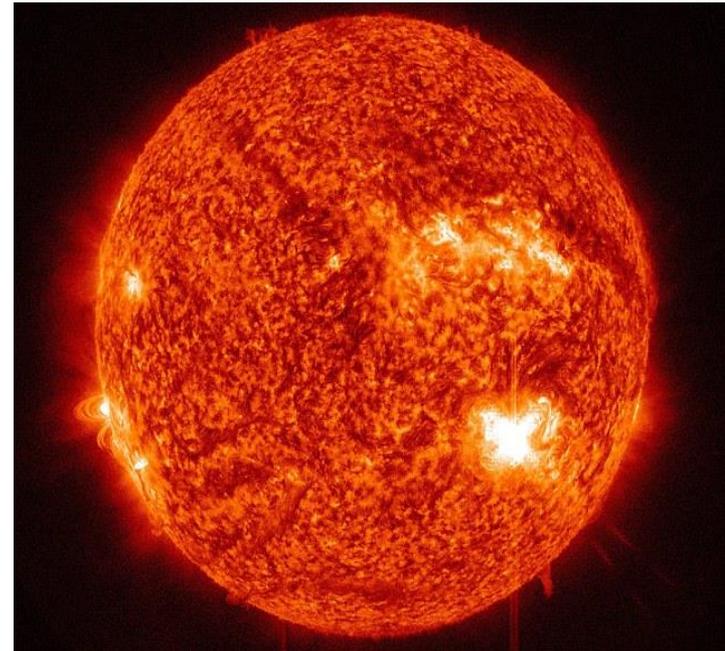
Fission is when the nucleus of an atom is split apart. **Fusion** is when the nucleus of two atoms are joined or “fused” together.



Solar Energy (Kinetic)

Solar energy is radiant light and heat from the sun harnessed using a range of ever-evolving technologies such as solar heating, solar thermal energy, and energy from the sun can be changed into electrical energy by solar cells. A solar cell is a device that changes solar energy into electrical energy (solar panels).

The sun is the source of most energy on Earth.



1. A car stopped at the top of a ramp has _____ energy.
2. Water stored behind a dam is an example of what type of energy?
 - a. Kinetic
 - b. Gravitational Potential
 - c. Solar
3. Which is not a form of energy?
 - a. electrical
 - b. light
 - c. friction
 - d. heat
4. What is mechanical energy?
5. Lightning is what form of energy?
6. When a hair dryer is being used, one of the energy transformations that takes place is _____ to _____.

Wind Energy (Kinetic)

WIND ENERGY

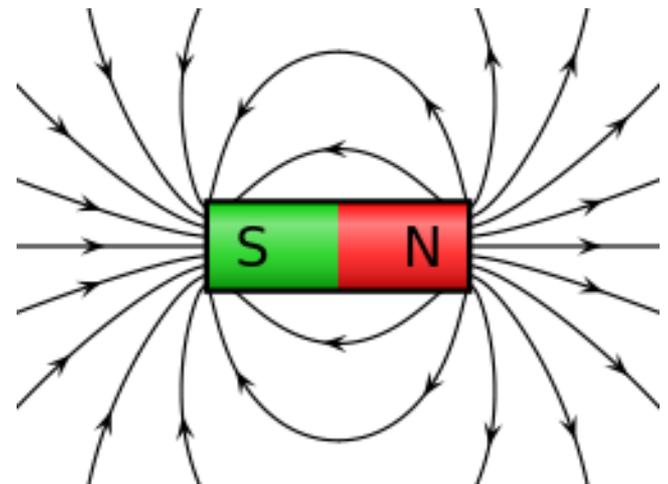
Because the sun does not heat Earth's surface the same in all places, wind is created.

The kinetic energy of wind can turn the blades of a windmill. Wind turbines change this kinetic energy into electrical energy by turning a generator.



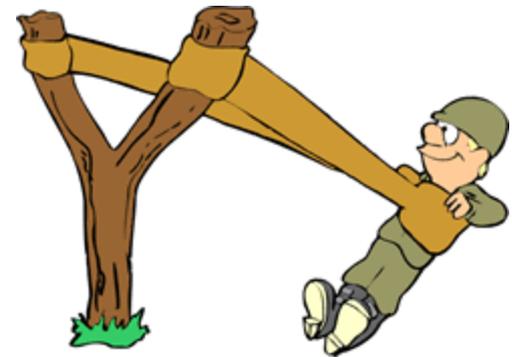
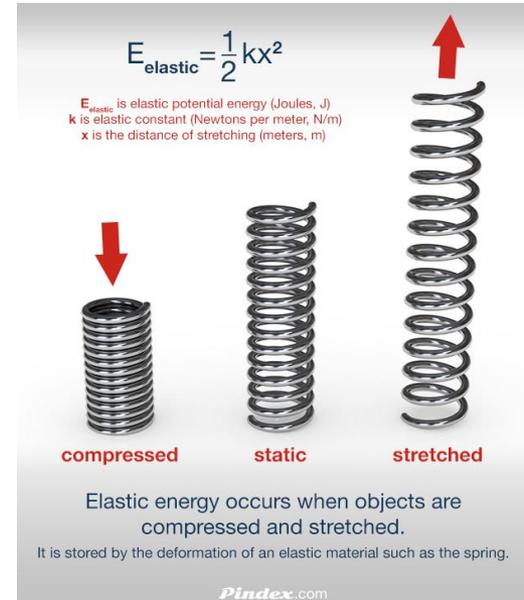
Magnetic Energy (Kinetic)

Electric and magnetic (electromagnetic) forces can be attractive or repulsive. Their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved, and on the distances between the interacting objects. Magnets move things due to repelling poles. Opposites attract!



Elastic Energy (Potential)

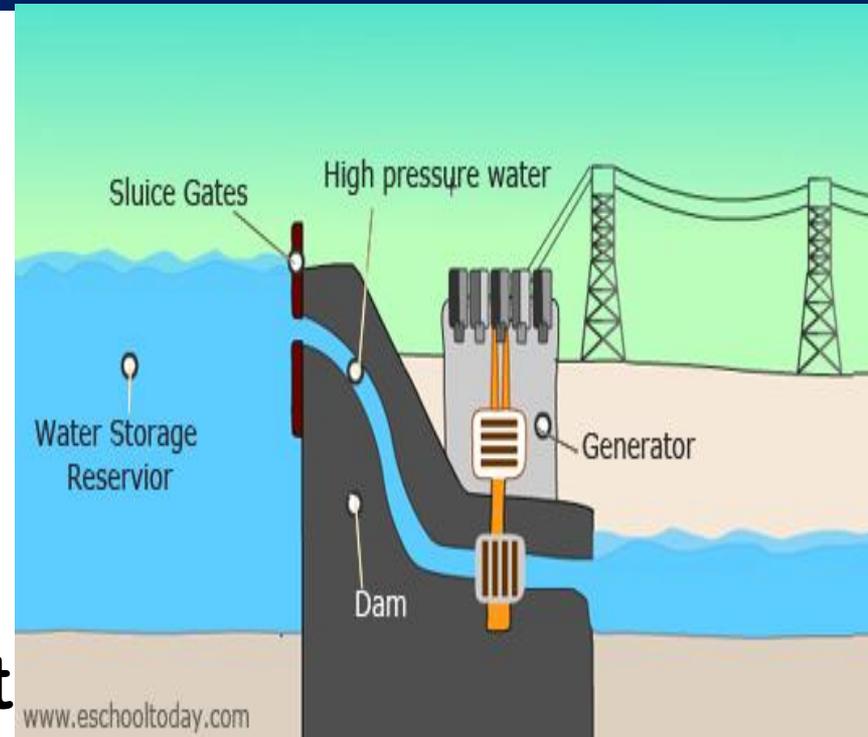
Elastic energy is potential energy stored as a result of deformation of an elastic object, such as the stretching of a spring. It is equal to the work done to stretch the spring as well as the distance stretched.



Gravitational Potential Energy

When you lift an object, you do work on it. You move it in an opposite direction from the force of gravity. As you lift the object, you transfer energy to the object and give it gravitational potential energy. The amount of gravitational potential energy of an object depends on the object's weight and its distance from the ground.

- An example of this is water stored behind a dam.



Gravitational Potential Energy



Energy Transformations

1. The Law of Conservation of Energy states...
2. _____ energy depends on height of the object.
3. _____ energy results from producing friction like rubbing hands together.
4. If you turn on a lamp, what type of energy transfer did you just make? _____ to _____

Law of Conservation

Reinforcement Practice and Comic Strips

1. Complete p. 451 #1-2 (all) and p. 459 #1-3 (all).
Complete these in complete sentences. You do not have to write the question. This assignment must be completed first!
2. Create an Energy Transformation Comic Strip using your notes and reference the textbook beginning on page 447.
 - The Comic Strip must include at least 6 energy transformations (at least 6 blocks for your strip).
 - The comic strip must be accompanied by a written description of the transformations that are represented on the comic strip.
 - You must use color with your drawings.
 - The comic strip will be due 9/15.

Energy Transformations

