

Kinetic vs. Potential

Energy

Quick Review: Energy causes things to happen.

- ❖ During the day, the sun gives off light and heat energy.
- ❖ At night, street lamps convert electrical energy to light energy.
- ❖ A car converts the chemical energy of gasoline into mechanical and kinetic energy.
- ❖ Our bodies convert the chemical energy found in the foods we eat into the kinetic energy we need to play and study.

Energy can be divided into two main types: **Potential Energy** and **Kinetic Energy**.

Potential Energy: energy that is stored (energy of position or height). Where does it come from??????

- ❖ Potential energy is the **energy gained as work is being done to an object.**
- ❖ If you stretch a rubber band, you will give it potential energy. As the rubber band is released, potential energy is changed to motion or kinetic energy. (The same concept applies to a bow and arrow.)

- ❖ The chemical energy in a can of gasoline, the energy in a rubber ball before it is dropped, and the energy in water behind a dam are all **examples** of potential energy.
- ❖ Rollercoasters operate on the basis of potential and kinetic energy.
- ❖ Gravitational potential energy is **the energy stored in an object as the result of its height. The higher the object is, the greater its potential energy.**
- ❖ There is a relationship between the mass of an object and its gravitational potential energy. **The more massive an object is, the greater its potential energy.**

Kinetic Energy: energy that is moving or energy of motion. Where does it come from???????

- ❖ Kinetic energy is the **energy released by an object as it is doing work.**
- ❖ A rubber band flying through the air has kinetic energy.
- ❖ A bouncing ball has kinetic energy.
- ❖ You have kinetic energy as you are walking to class.
- ❖ Kinetic energy is related to both mass and speed. **The greater the mass or speed of an object, the greater the kinetic energy.**



examples: A waterfall has both potential and kinetic energy. The water at the top of the waterfall has potential energy. When the water begins to fall, its potential energy is changed into kinetic energy.

It does not take much effort to lift a ball off the ground. However work is being done as it is being lifted, giving it energy. When the ball is dropped, the ball begins to move. The potential energy is converted into kinetic energy.

Think about the match used to light the fireworks. The match has the potential to produce light energy and heat energy. **The potential energy of the match is in the form of chemical energy.**

Chemical Energy: the energy of the electrons that form the bonds between atoms in molecules.

EX: fuel burned in a car, furnace, or power plant

Different types of fuels have different kinds of molecules so some fuels produce more energy than others based upon their molecular composition.

The chemical fuel for the human body is food. Some foods give your body more energy than others. When people refer to the number of calories in food, they are really referring to the amount of energy in the food. (See the chart on page 453.)

Nuclear Energy: energy related to the structure of atoms.

Whereas electrons are on the outside of an atom's nucleus, the nucleus is made up of protons and neutrons. The nucleus of an atom contains a huge amount of potential energy.

Protons all have the same charge and tend to push away from each other. Nuclear energy holds the protons together inside the nucleus. Some things can break that hold and release a proton. When that happens, the nuclear energy that was holding the proton in place is released.

In nuclear plants, released nuclear energy heats water until it changes into steam. The steam turns a turbine that generates electrical energy.

