

KINETIC ENERGY

One of the most basic types of energy is Kinetic Energy, and it is the energy of MOTION. It is defined as:

$$KE = \frac{1}{2}mv^2$$

↪ People often just use "K" instead of "KE"!

Like all energy types, the units of Kinetic Energy are Joules (J). Notice that kinetic energy only depends on the mass and speed of an object. Also notice that KE has to be a positive number. There is no such thing as "negative mass" and v^2 will always have a positive result.

Kinetic Energy is a SCALAR - it has a magnitude, but it doesn't matter the direction an object is going at all. If you go to the left with a certain speed and then to the right with the same speed, your kinetic energy would be the same in both cases (But your MOMENTUM would be opposite, because momentum is a vector!)

Looking at the equation, you should see that speeding up always increases your kinetic energy and that slowing down always decreases your kinetic energy. As long as you have a constant speed (even if turning) you would have a constant kinetic energy.

POTENTIAL ENERGY

Actually, there are many kinds of Potential Energy. All of them refer to a "stored" energy because of the position of something, and each of them refers to the force that is causing the energy to be stored.

The only equation we will use is The Potential Energy from Gravity:

$$PE = mgh$$

height means how high off the ground - not how tall you are! ;)

In this case, the "position" is the height "h" of the object. Notice how the rest of the equation is the force of gravity - "mg". Even though we won't use the equations, other kinds of potential energy are

Elastic Potential Energy - The energy stored in a stretched spring or rubber band. It depends on the force of the spring and how much the spring is stretched.

Electric Potential Energy - The energy stored by electric charges being close together

Magnetic Potential Energy - energy stored by how close magnets are

Chemical Potential Energy - energy stored in molecules and how the atoms / electrons are arranged.