

Conservation of Energy

If you have ever observed the scene of a car collision, you may have noticed that parts of the car are crumpled or torn off, that glass is broken, and the fluids may be leaking from the engine. You might also smell strange odors, and you may also see and smell smoke. If you actually witnessed the collision, you would have heard the sounds of the two cars colliding. All these observations are examples of the Law of Conservation of Energy at work.

The **Law of Conservation of Energy** states that energy cannot be created or lost, but can only be converted from one form to another. For example, In a car collision, kinetic energy is converted into sound energy.

In addition to converting energy, energy may also be transferred from one object to another. For example, when a moving car strikes a stationary car, the moving car slows down and the stationary car begins to move. This is an example of transferring kinetic energy from one object to another.

There are many different forms that energy can take:

1. Kinetic Energy

- energy of motion
- based on mass and the square of velocity
 - more mass = more kinetic energy
 - higher speed = more kinetic energy

2. Gravitational Potential Energy

- energy that is stored and held in readiness
- based on height above Earth's surface
 - higher up = more potential energy

3. Electric Potential Energy

- energy that is stored and held in readiness
- based on the location of one charge relative to another charge
 - the closer the charges, the more potential energy

4. Heat Energy

- energy of molecules in motion
- based on the kinetic energy of the molecules
 - faster moving molecules = more kinetic energy

5. Sound Energy

- energy of a disturbance of molecules
- a vibrating object transfers kinetic energy to air molecules
- air molecules carry energy to a detector (e.g. your ear)

During a car crash, the kinetic energy of the car is reduced to zero. As the kinetic energy decreases, other forms of energy increase. This is dangerous for passengers, as they then become moving objects in the car with a great amount of kinetic energy. This is where safety belts and air bags become important.