

Energy exists in two "states," or forms: potential and kinetic.

Potential energy is stored in an object, either in the object's position, in its structure, or in its condition. Another term for potential energy is **elastic energy**. To an observer, an object that is not moving appears to have no energy because it is doing nothing. However, the object has "potential" energy. It can move, fall, be thrown, and so forth. For example, a ball at rest on the top of a hill has the potential energy to roll down that hill.

Potential energy is stored in objects whose shape can be changed, like a rubber band or a spring. Changing the object's shape is **work** (transfer of energy from one object to another). When you stretch a rubber band, you give it potential energy. Energy is also stored in an object simply by being above the earth's surface. Lifting an object gives gravitational potential energy to that object because the object can fall. Lifting an object is work. The higher you lift an object, the more potential energy it gains. When a book is sitting on the

edge of a table, it has potential energy because it has been lifted and can fall. Heavier objects store more potential energy than lighter objects.

Kinetic energy is the energy of a moving object; it is the energy of motion. The faster an object is traveling, the more kinetic energy it has. The greater the mass of a moving object, the greater its kinetic energy. If a ball begins rolling down a hill, the energy in that motion is an example of kinetic energy.

The **mechanical energy** of an object is the total of its energy of position (potential energy) and its energy of motion (kinetic energy). Potential energy + kinetic energy = mechanical energy. When an acrobat juggles three balls, mechanical energy is visible. By moving his or her hands, the juggler works on the balls to give them kinetic energy. The kinetic energy of each ball sends it into the air, but before the ball reaches its thrown height, it begins to slow down. This means the kinetic energy is changing into potential energy. The kinetic energy decreases and causes the ball to slow down. When the ball stops moving upward, its kinetic energy has turned into potential energy.

Exercise:

1. What are the two states or forms of energy? What is the difference between the two? _____

2. What is potential energy? Give an example of potential energy. _____

3. What two forms of energy make up an object's mechanical energy? _____

4. What is an example of (a) potential energy and (b) kinetic energy? _____
