

Name: _____

Date: _____



7.1 Potential and Kinetic Energy



This skill sheet reviews various forms of energy and introduces formulas for two kinds of mechanical energy—potential and kinetic. You will learn how to calculate the amount of kinetic or potential energy for an object.

Forms of energy

Forms of energy include radiant energy from the sun, chemical energy from the food you eat, and electrical energy from the outlets in your home. Mechanical energy refers to the energy an object has because of its motion. All these forms of energy may be used or stored. Energy that is stored is called *potential energy*. Energy that is being used for motion is called *kinetic energy*. All types of energy are measured in joules or newton-meters.

$$1 \text{ N} = 1 \text{ kg} \cdot \frac{\text{m}}{\text{s}^2}$$

$$1 \text{ joule} = 1 \text{ kg} \cdot \frac{\text{m}^2}{\text{s}^2} = 1 \text{ N} \cdot \text{m}$$

Potential energy

The word *potential* means that something is capable of becoming active. Potential energy sometimes is referred to as stored energy. This type of energy often comes from the position of an object relative to Earth. A diver on the high diving board has more energy than someone who dives into the pool from the low dive.

The formula to calculate the potential energy of an object is the mass of the object times the acceleration due to gravity (9.8 m/s^2) times the height of the object.

$$E_p = mgh$$

Did you notice that the mass of the object in kilograms times the acceleration of gravity (g) is the same as the weight of the object in newtons? Therefore you can think of an object's potential energy as equal to the object's weight multiplied by its height.

$$\text{mass of the object (kilograms)} \times \frac{9.8 \text{ m}}{\text{s}^2} = \text{weight of the object (newtons)}$$

So...

$$E_p = \text{weight of object} \times \text{height of object}$$

Kinetic energy

Kinetic energy is the energy of motion. Kinetic energy depends on the mass of the object as well as the speed of that object. Just think of a large object moving at a very high speed. You would say that the object has a lot of energy. Since the object is moving, it has kinetic energy. The formula for kinetic energy is:

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