POTENTIAL AND KINETIC ENERGY

Name _____

Potential energy is stored energy due to position. Kinetic energy is energy that depends on mass and velocity (movement).

Potential Energy = Weight x Height (P.E. = w x h)
Kinetic Energy = $^1/_2$ Mass x Velocity^2 (K.E. = $^1/_2mv^2$)
The units used are: Energy = joules
Weight = newtons
Height = meters
Mass = kilograms
Velocity = m/s

For a closed system, the sum of the potential energy and the kinetic energy is a constant. As the potential energy decreases, the kinetic energy increases.

Solve the following problems.

1. What is the potential energy of a rock that weighs 100 newtons that is sitting on top of a hill 300 meters high?

   Answer: _____

2. What is the kinetic energy of a bicycle with a mass of 14 kg traveling at a velocity of 3 m/s?

   Answer: _____

3. A flower pot weighing 3 newtons is sitting on a windowsill 30 meters from the ground. Is the energy of the flower pot potential or kinetic? How many joules is this?

   Answers: _____ _____

4. When the flower pot in Problem 3 is only 10 meters from the ground, what is its potential energy?

   Answer: _____

5. How much of the total energy in Problems 3 and 4 has been transformed to kinetic energy?

   Answer: _____

6. A 1200 kg automobile is traveling at a velocity of 100 m/s. Is its energy potential or kinetic? How much energy does it possess?

   Answers: _____ _____

CALCULATING WORK

Name _____

Work has a special meaning in science. It is the product of the force applied to an object and the distance the object moves. The unit of work is the joule (J).

W = Force x Distance
W = F x d
Force = newtons
Distance = meters

Solve the following problems.

1. A book weighing 1.0 newton is lifted 2 meters. How much work was done?

   Answer: _____

2. A force of 15 newtons is used to push a box along the floor a distance of 3 meters. How much work was done?

   Answer: _____

3. It took 50 joules to push a chair 5 meters across the floor. With what force was the chair pushed?

   Answer: _____

4. A force of 100 newtons was necessary to lift a rock. A total of 150 joules of work was done. How far was the rock lifted?

   Answer: _____

5. It took 500 newtons of force to push a car 4 meters. How much work was done?

   Answer: _____

6. A young man exerted a force of 9,000 newtons on a stalled car but was unable to move it. How much work was done?

   Answer: _____