

Kinetic Energy

- **Energy** is defined as the capacity to do work or produce heat.
- **Kinetic energy** is energy transferred when work is done on an object, causing the object to move at a new constant speed.
- The **SI unit for kinetic energy is the Joule**, which is equivalent to $(\text{kg} \times \text{m}^2) / \text{s}^2$
- Kinetic energy differs from **potential energy**, the energy that an object possesses due to its position relative to other objects, internal tensions, electric charge, etc.

Formula

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

KE = kinetic energy (J)

m = the body's mass (kg)

v = the body's velocity (m/s^2)

Example

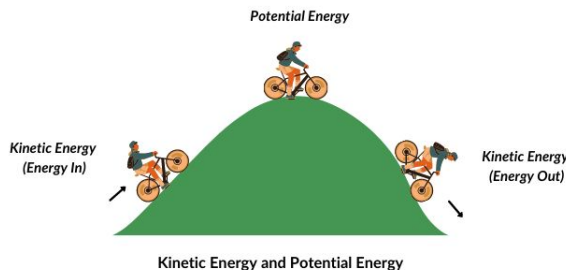
What is the kinetic energy of a 125 kg object moving at a constant speed of 15 m/s^2 ?

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

$$KE = \frac{1}{2}(125 \text{ kg})(15 \text{ m/s}^2)$$

$$KE = 1125 \text{ J}$$

Visualize



The biker has kinetic energy as he applies work to the bike to pedal uphill. He stores potential energy while doing so, which will be released on his way back down as kinetic energy.