Work and Kinetic Energy

"Change in kinetic energy is equal to the mechanical work done by all forces"

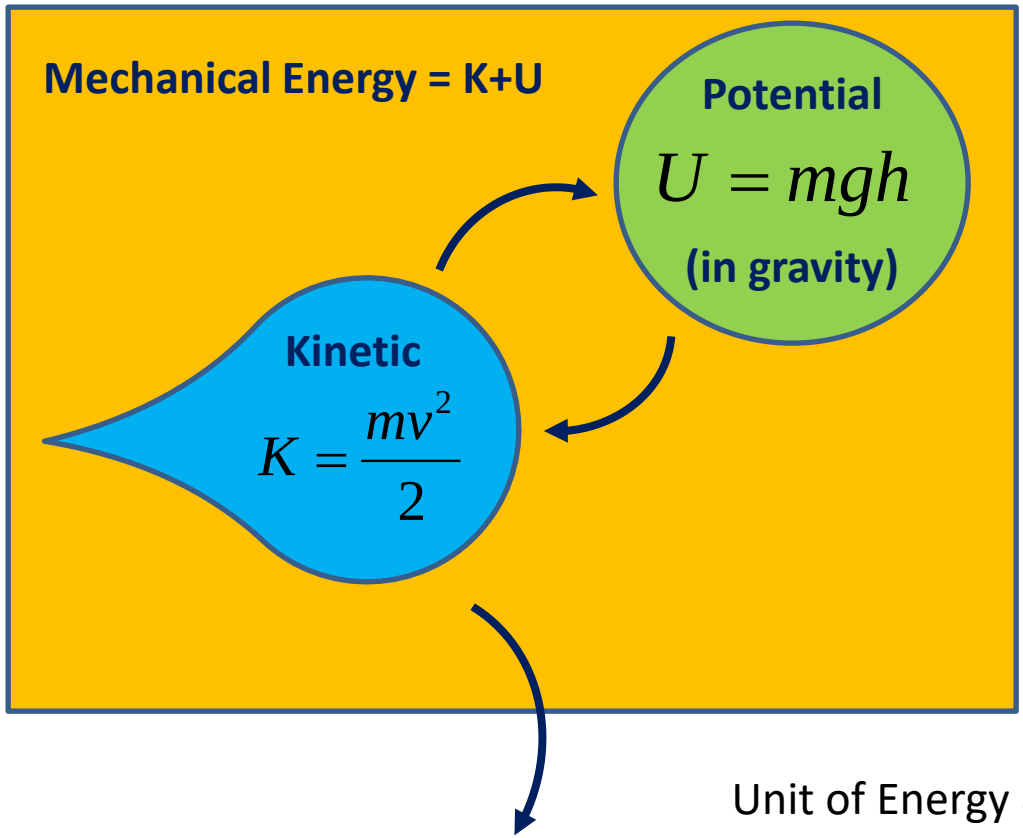
$$\Delta K = W$$

(Work = Force x Displacement)

$K = \frac{mv^2}{2}$, is called Kinetic Energy of an object

$W = F\Delta x$, is called Mechanical Work

Mechanical Energy and Work



Unit of Energy & Work is called Joule (J)

Change in Energy= Work done by all forces except gravity

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

$$W = F\Delta x$$

Homework 19

Problem 1.

A car is going down a mountainous road at a constant speed of 15 m/s. The engine is shut off, but the driver is constantly pushing the brake pedal to keep the car from being accelerated by gravity. In one minute the car descends 100 meters vertically. Find the friction force acting on the car. Mass of the car is 1800 kg. (*Hint: what happens to kinetic and potential energy of the car? What is the source of change in mechanical energy?*)

Problem 2.

Another car is going up the same road. After stopping at a viewpoint, it continues the ascent. In 2 minutes, the car goes 100 meters vertically up and has speed 10 m/s at the end of this ascent. Neglecting friction and air drag find what is the work done by the engine after the car started moving from a viewpoint. Mass of this car is 2000 kg.