Kinetic Energy : The energy of a moving object.

Kinetic energy depends on mass and speed.

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

Where:

E_k = kinetic energy Joules(J)

m = mass (kilograms, kg)

v = speed (m/s)

*Note that E_k is directly proportional to mass (double mass, double E_k)

and

it is proportional to the square of the velocity (double velocity, quadruple E_k).

Ex 1: An 8.0 g bullet is moving at 3.00 x 10 m/s.

a) What is the kinetic energy of the bullet?

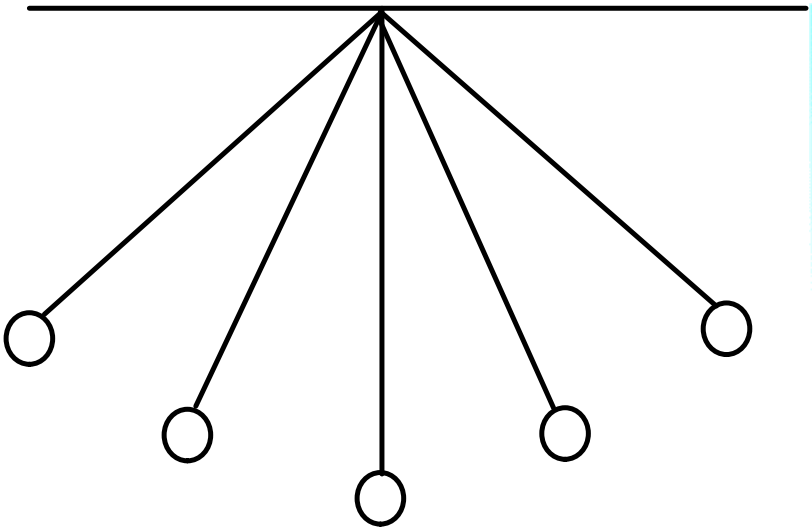
b) What would be the kinetic energy if the speed were tripled to 900 m/s?

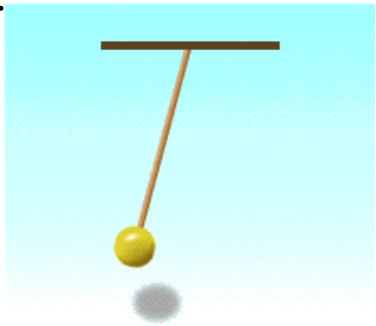
c) What if the mass were doubled but the speed remained constant?

2. What is the speed of a 2.0kg object that has 120 J of kinetic energy?

3. A car travelling at 27m/s has 438 KJ of kinetic energy. What is the mass of the car?

A pendulum has both potential and kinetic energy.





Work - Energy Theorem:

A change in E_k is caused by work done on the system.

$W = \Delta E_k$ Where $W = F\Delta d$

$\Delta E_k = E_{k2} - E_{k1}$

(when work is done horizontally)

Example 1: A 60.0 kg cyclist is moving at 4.0 m/s.

a) What is the kinetic energy of the cyclist?

b) How much work must be done to increase the cyclist's velocity to 6.0 m/s?

c) What average force must be applied to accomplish this change in velocity over a distance of 2.0 m?

Ex 2: A 250 g object is moving at 42 km/hr

a) What is the kinetic energy of the object?

b) How much work must be done by friction to slow the object to 15 km/hr?

b) How much work must be done by friction to slow the object to 15 km/hr?

Work done vertically.. $\text{Work} = \triangle \text{Eg}$

A 10.0kg box sits on the floor. How much work must be done to lift it to a tabletop 1.5m above the floor?

Read p. 335
p. 336 #1 - 4
p. 371 #47 - 57, 60 - 62

Assmt here.
Quiz?