Kinetic Energy

Work done on an object changes kinetic energy

KE = ½ m v^2

Work done changes KE

- W = F x D x cos(angle)
- If F is constant, then
- W = m x A x D

- Recall Vf^2 = Vi^2 + 2 x A x D
- ½ x m x Vf^2 = ½ x m x Vi^2 + m x A x D
- 1/2mVf^2 – 1/2mVx^2 = mAD = Work
- Change 1/2mV^2 = change in KE = Work

KE = 1/2mV^2

Example: A 10 kg object is subjected to a 20 N force. The initial speed was 2 m/s; when the force is removed the speed was 6 m/s. Calculate the KE, Work, and D.

KE(i) = ½ mv^2 = ½ 10 2^2 = 20 J

KE(f) = ½ mv^2 = ½ 10 6^2 = 180 J

Work = 180 J – 20 J = 160 J

Work = F x D so D = Work/F = 160/20 = 8 m

Group Activity for Kinetic Energy

- 1. If the velocity of a car is doubled, how does its KE change?
- 2. If the velocity of a car is tripled, how does its KE change?
- 3. The KE of a 10 kg mass moving at a speed of 5 m/s is how much?
- 4. Compare the KE of an object that has fallen freely 2 m versus the KE of the object after falling 1 m.