Physics Year 11 Week 6

Momentum is not Energy

Kinetic energy and momentum are **NOT THE SAME**!

- **Scalar Versus Vector**
- - momentum is a vector quantity
- - KE is a scalar quantity

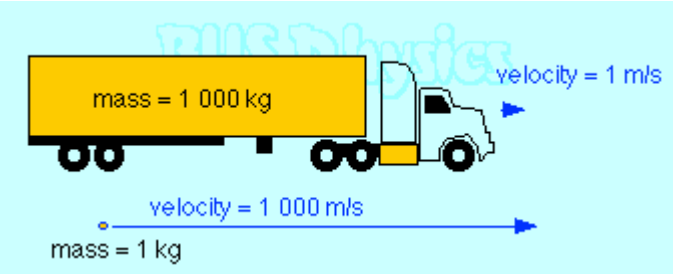
Dependence on Velocity

- The momentum of an object is proportional to the object's velocity - if you double its velocity, you double its momentum.
- The ke energy of an object is proportional to the **square** of the object's velocity - if you double its velocity, you quadruple its ke.

Have a Think….

Hobsons Choice or Not?

- Stand in front of a 1000 kg truck moving at 1 m/s, or



- Stand in front of a 1 kg spongeball moving at 1000 m/s.

Momentum and KE of the truck and the spongeball:

- Truck:
- Truck's momentum = mv = (1000 kg)(1 m/s) = 1000 kg m/s
- Truck's kinetic energy = 0.5 mv^2 = (0.5)(1000 kg)(1 m/s)^2 = 500 Joules
- Spongeball:
- Spongeball's momentum = mv = (1 kg)(1000 m/s) = 1000 kg m/s
- Spongeballs's kinetic energy = 0.5 mv^2 = (0.5)(1 kg)(1000 m/s)^2 = 500 000 Joules