

Physics Year 11 Week 8

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

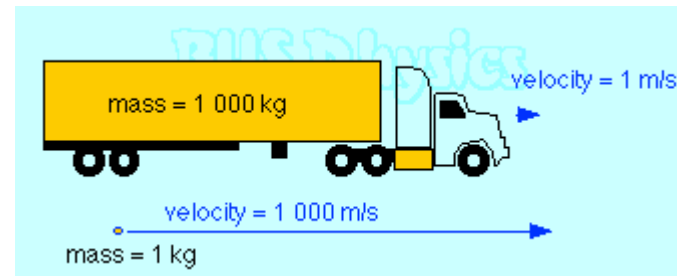
Dependence on Velocity

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