

M.6.1 Momentum

If an object is moving with some speed, then to change its speed or direction a force must be applied, even then the object will be reluctant to change. This reluctance of a body to change its velocity is known as momentum.

The momentum of a body is defined by:

Momentum = mass of body \times velocity of body

$$\vec{p} = m \vec{v}$$

Momentum is a vector and should be treated as any vector would. The units of momentum are Kg ms^{-1} .

M.6.1.1 Conservation of Momentum

In a closed system (of two or more objects) the momentum of the system remains the same before and after the collision.

$$\Sigma \vec{p}_i = \Sigma \vec{p}_f$$

Example

A railway truck, of mass 80 g, on a model train track is moving with a speed of 15 cms^{-1} and collides with a stationary truck of mass 90 g. The two trucks become coupled together. What is their common speed?

Example

A mass of 5 kg moving at 2 ms^{-1} collides with a mass of 3 kg travelling at 3 ms^{-1} in the opposite direction. If the 5 kg mass rebounds with a velocity of 1 ms^{-1} , find the velocity of the 3 kg mass.

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