

Momentum

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- not power, it is conserved
- the only way to change p (momentum) is by exhibiting a force on the object

$$p = \overset{\text{mass}}{m}v - \text{velocity}$$

★ impulse-momentum theorem

$$F \Delta t = p_f - p_i$$

force change in time final momentum initial momentum

★ Elastic collision

- when 2 objects are bouncing off of each other.

$$m_1 v_{1i} + m_2 v_{2i} = m_1 v_{1f} + m_2 v_{2f}$$

★ Inelastic collision (hit & stick)

$$m_1 v_{1i} + m_2 v_{2i} = (m_1 + m_2) v_f$$

★ explosion is opposite (2 things breaking apart)

calculate the following of each of the following objects.

a) a .50 kg ball thrown upward with a velocity of 30 m/s.

$$P = m \cdot v$$

$$P = .50 \cdot 30$$

$$P = 15 \text{ kg} \cdot \text{m/s}$$

b) a 2000 kg railway car moving south at 10 m/s.

$$P = m \cdot v$$

$$P = 2000 \cdot 10$$

$$P = 20,000 \text{ kg} \cdot \text{m/s}$$

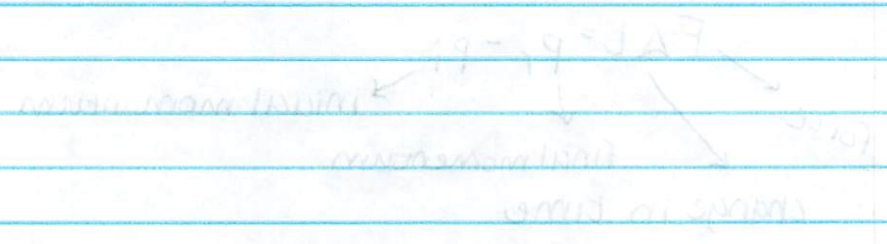
~~calculate the following of each of the following objects.~~
~~a) a .50 kg ball thrown upward with a velocity of 30 m/s.~~
~~b) a 2000 kg railway car moving south at 10 m/s.~~

Momentum

Not present, if it is conserved
 the only way to change p (momentum)
 is by exerting a force on the object

$$p = mv - \text{velocity}$$

* impulse = momentum



* Elastic Collision

when 2 objects are bouncing off each other

$$m_1 v_1 + m_2 v_2 = m_1 v_1' + m_2 v_2'$$

* Inelastic Collision (put a stick)

$$m_1 v_1 + m_2 v_2 = (m_1 + m_2) v'$$

objects are joined at each of the joined objects
 (they move together with a velocity)

Impulse = change in momentum
 $\Delta p = m \Delta v$

- 3000 kg moving at 10 m/s
- 2000 kg moving at 30 m/s
- 2000 kg moving at 10 m/s
- 2000 kg moving at 30 m/s
- 2000 kg moving at 10 m/s
- 2000 kg moving at 30 m/s