

Law of Conservation of Momentum



Linear Momentum is a conserved quantity.

In a closed system, total linear momentum cannot change.

A closed system is a physical system which doesn't exchange any matter with its surroundings, and isn't subject to any force whose source is external to the system.

$$\text{Momentum} = \text{mass} \times \text{velocity}$$

$$M = m \times v$$

$$M = m \times u$$

$M = \text{Momentum}$ Momentum is a quantity expressing the motion of a body.

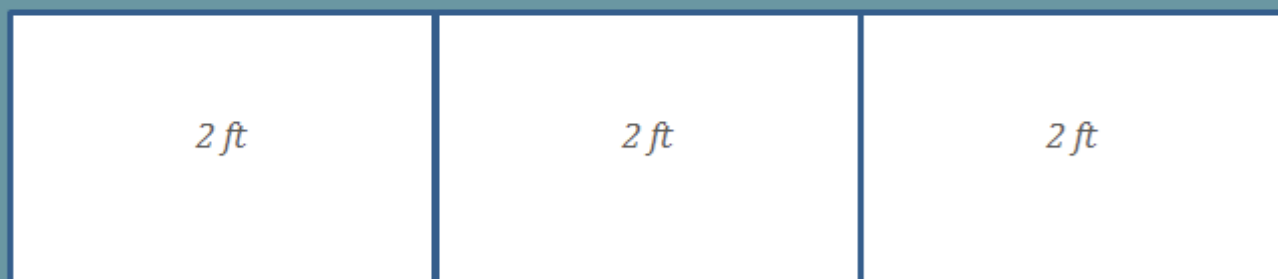
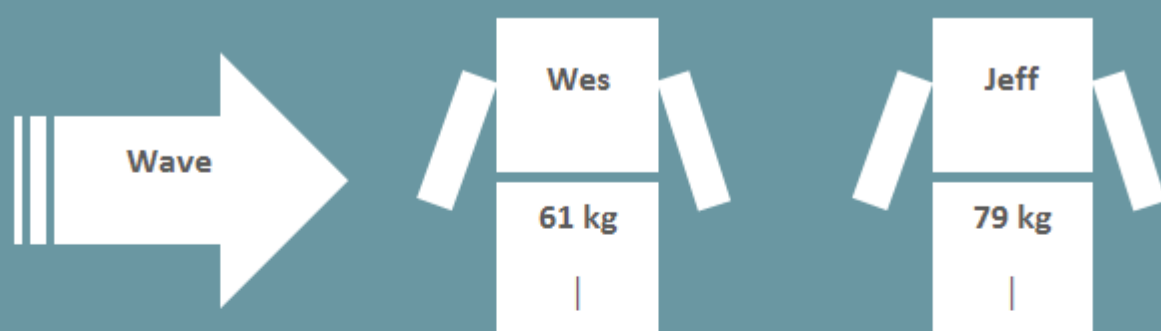
$m = \text{mass}$ Mass is the amount of matter that makes up an object.

In the International System of Units (SI), mass is measured in kilograms (kg) .

$v = \text{velocity} \left(\frac{ft}{sec} \right)$ This symbol represents the velocity before the collision .

$u = \text{velocity} \left(\frac{ft}{sec} \right)$ This symbol represents the velocity after the collision.

There is no standard SI unit for velocity. It its a derived unit.



$$m \times v = m \times u$$

It takes Wes 0.5 seconds to travel 2 feet across the raft.

How long did it take for Jeff fly off the boat?

$$61 \text{ kg} \times \frac{2 \text{ ft}}{0.5 \text{ sec}} = 79 \text{ kg} \times \frac{2 \text{ ft}}{x \text{ sec}}$$

Proper Mathematical Expression:

$$(m_w \times v_w) + (m_j \times v_j) = (m_w \times u_w) + (m_j \times u_j)$$

Then $v_j = 0$ and $u_w = 0$, so it reduces to

$$m_w \times v_w = m_j \times u_j$$