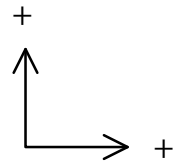


## P11 - 5.1 - Momentum



What is the momentum of a 20 kg object moving at 5 m/s?

What is the momentum of a 2000 kg object moving at 30 m/s?

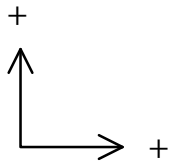
A 3 kg ball of glue with the velocity of 8 m/s is thrown directly at a wall where it comes to a complete stop. What is the ball's change in momentum?

A water balloon of 2 kg with a velocity of 3 m/s is thrown directly at a wall where it explodes. What is the ball's change in momentum?

A 1 kg soccer ball with the velocity of 8 m/s is kicked directly at a wall where it bounces off the wall at 4 m/s. What is the soccer ball's change in momentum?

A 40 kg football player with the velocity of 5 m/s tackles another football player who he bounces off of at 2 m/s. What is the football player's change in momentum?

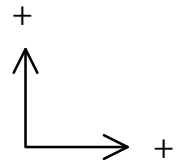
## P11 - 5.1 - Momentum Hmk



A 1 kg snow ball is thrown directly at a wall at 10 m/s where it hits the wall and smashes in 0.3 seconds. What is the net force exerted on the wall by the snowball?

A pitcher throws a 0.2 kg ball with the velocity of 25 m/s directly at a catcher who stops the ball exerting a force of 30 N on the ball. How long does it take for the ball to stop?

## P11 - 5.2 - Conservation of Momentum



A pool player shoots the cue ball with the momentum of 8 kg meters per second at the eight ball at rest. The cue ball comes to a complete stop, the eightball will continue with the momentum of 8 kg metres per second.

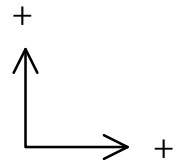
What is the change in momentum on the Cue ball?

What is the change in momentum of the eight ball?

A bullet is fired from a gun with the momentum of 60 kg metres per second. What is the recoil momentum of the gun?

An arrow is shot from a bow with the momentum of 20 kilograms metres per second. What is the recoil momentum of the bow?

## P11 - 5.2 - Conservation of Momentum



A football player with the momentum of 700 Ns south collides with another football player with the momentum of 500 Ns north. If they stick together what is their final momentum?

A hockey player Alina with the momentum of 550 Ns east collides with another hockey player Laura with the momentum of 800 Ns West. If they bounce off each other and Alina's final momentum is 200 Ns west. What is Laura's final momentum and direction signified by positive or negative?

## P12 - 5.3 - Momentum Trig HMK

*A Pool Player shoots the Cue Ball with a mass of 0.2 kg with a velocity of  $24 \frac{m}{s}$  at the Eight Ball with a mass of 0.15 kg at Rest. The Cue Ball deflects at a velocity of  $18 \frac{m}{s}$  at an angle of  $57^\circ$  above the horizontal and the Eight ball deflects at an angle below the horizontal. What is the velocity of the and angle of the Eight ball.*

*A Pool Player shoots the Cue Ball with a mass of 0.2 kg with a velocity of  $13 \frac{m}{s}$  at the Eight Ball with a mass of 0.15 kg at Rest. The Cue Ball deflects at a velocity of  $9 \frac{m}{s}$  at an angle of  $52^\circ$  above the horizontal and the Eight ball deflects at an angle below the horizontal. What is the velocity of the and angle of the Eight ball.*