

Name: _____ Date: _____ Period: _____

Impulse and Momentum Study Guide

Review Notes:

Define the following terms:

- Momentum
- Impulse
- Conservation of Momentum
- Elastic Collisions
- Inelastic Collision

True or False?

- _____ 1.) Momentum is not equal to the mass of an object divided by its velocity.
- _____ 2.) The momentum of an object can change.
- _____ 3.) Two objects with the same mass will always have the same momentum.
- _____ 4.) All moving objects don't have momentum.
- _____ 5.) When an object speeds up, it gains momentum.
- _____ 6.) Objects with different masses can't have the same momentum.
- _____ 7.) Direction does not matter when you are measuring momentum

A steel ball whose mass is 2.0 kg is rolling at a rate of 2.8 m/s. What is its momentum?

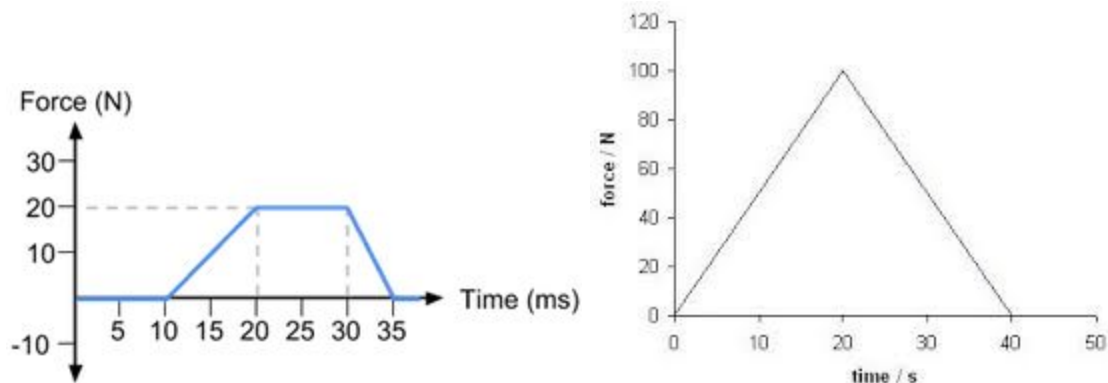
A marble is rolling at a velocity of 1.5 m/s with a momentum of 0.10 kgm/s. What is its mass?

A force of 4 N is applied to a ball for 0.75 s. What is the impulse?

What are the different methods for calculating impulse?

What are two safety features in a car, and describe how they relate to impulse and momentum.

Calculate the impulse from the following graphs.



Which of the following objects have the most momentum

- A 3kg ball rolling at 4 m/s
- A 3kg ball rolling at 6 m/s
- A 3kg ball rolling at 10 m/s

Which of the following objects have the most momentum

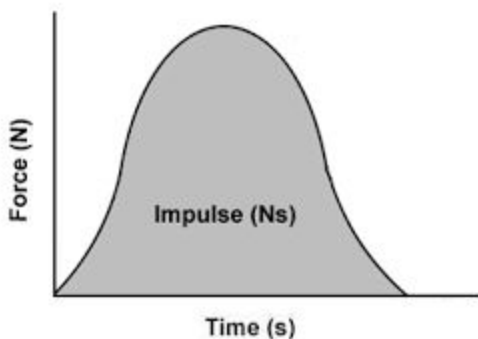
- A 1 kg ball rolling at 4 m/s
- A 10 kg ball rolling at 4 m/s
- A 8 kg ball rolling at 4 m/s

Which of the following has the greatest impulse.

- A bike coming to a stop from 14 m/s to 0 m/s
- A bike speeding up from 40 m/s to 50 m/s

Circle the correct choice to complete the sentence.

- As the mass of an object increases the momentum of the object (increases or decreases)
- As the velocity of the object decreases, the momentum of the object (increases or decreases)
- During a collision the time of impact is increased to help keep the (force or mass) at a minimum.



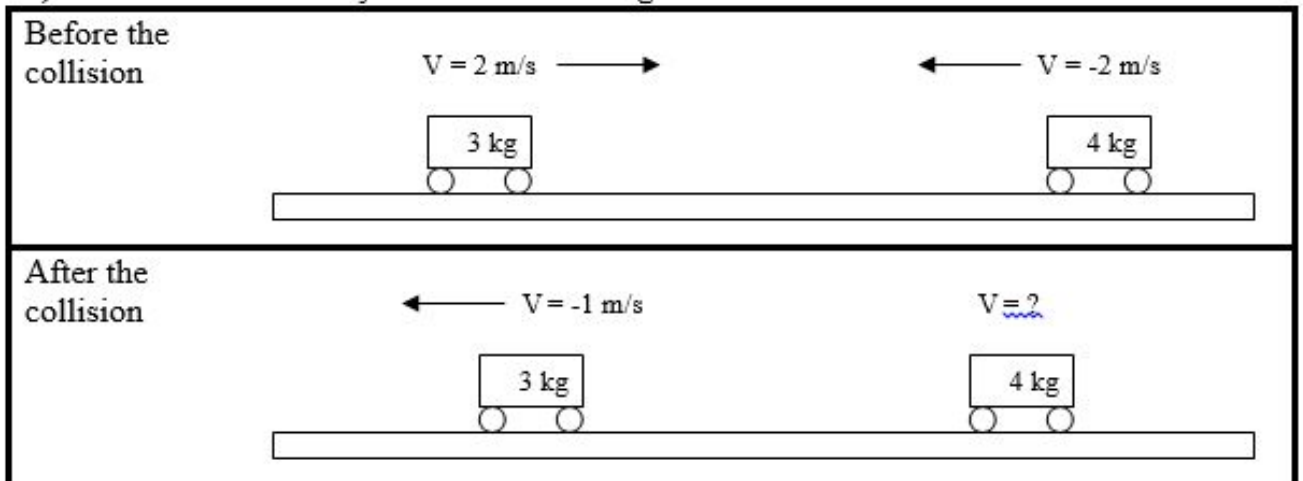
The Force time graph is shown below for a ball being thrown. The ball has a mass of 3 kg and starts from rest. If the integral of the graph is 15Ns, how fast will the ball be going when thrown?

A 0.08 kg ball is moving at a velocity of 15 m/s, hits a wall and starts moving in the opposite direction at a velocity of 10m/s. What is the impulse of the ball.

A 0.08 kg ball is moving at a velocity of 20 m/s, hits a wall and starts moving in the opposite direction at a velocity of 7m/s. What is the impulse of the ball.

Assume that the sum of any external forces acting on the system is zero. *Note: The arrows are just supposed to show the direction of the car's movement. They do not represent the magnitude of the velocity.*

1) Find the final velocity of the car on the right hand side.



- What is your momentum of car one before the collision?
- What is your momentum of car two before the collision?
- What is your total momentum before the collision?
- What is your total momentum after the collision?
- What is your momentum of car one after the collision?
- What is your momentum of car two after the collision?
- What is your velocity of car two after the collision?