

Momentum 1

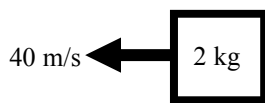
1) Find the velocity of a 35 kg object that has 450 kg m/s of momentum.

2) Which has more momentum? Explain why.

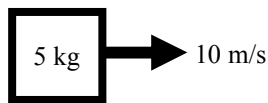
A. A car when its going fast or slow?

B. A heavy or light object going 10 m/s?

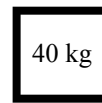
3) Find the momentum of each of the following objects:



A. _____



B. _____



C. _____

4) Which of the objects in #3 has the momentum with the greatest **magnitude** (*disregarding direction*)?

5) Which of the objects in #3 has the most **inertia**?

6) What is the difference between momentum and inertia?

7) A 2 kg ball at 4 m/s to the right is kicked and later has a velocity of 8 m/s to the left. Find the change in momentum of the ball.

8) A 3 kg object going 6 m/s to the right ends up going 3 m/s to the left. Find the change of momentum of the object.

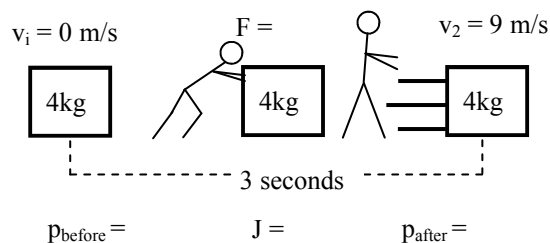
9) A brand new racquet ball and a dog's tennis ball are thrown against a wall with an initial velocity of 10 m/s. The racquet ball ($m=.08$ kg) bounces off of the wall with a velocity of 10 m/s while the half eaten tennis ball ($m=.08$ kg) only bounces off with a velocity of 2 m/s.

a. Find the change in momentum for each ball.

b. Which ball delivered more force to the wall?

c. Find the force that each ball exerted on the wall if the time of impact was .06 s.

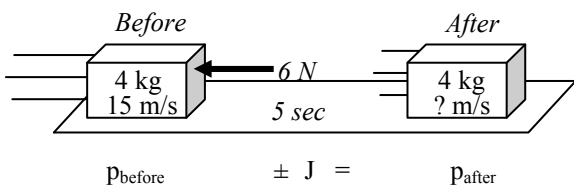
- 10) A man pushes on a 4 kg box for 3 seconds.
 A. Under the diagram, calculate the initial and final momentum of the box.



- B. Calculate the impulse that the man gave the box. Write it under the diagram.

- C. What is the average force that the man applies to the box? Write it under the diagram.

- D. Calculate the average force again, this time using mass and acceleration (you will have to find the acceleration with one of the kinematic equations). Does your answer agree with (C)?



- 11) A 4 kg object is moving 15 m/s. A force is applied to the left.
 A. Is the impulse positive or negative?

- B. Will the object gain or lose momentum?

- C. Fill in the information under the diagram and solve for the final velocity.

- 12) A 1000 N force acts for 1s on a 50 kg object which was initially at rest. What is the object's change in velocity?

- a. 10 m/s
- b. 20 m/s
- c. 30 m/s
- d. 40 m/s
- e. 50 m/s

- 13) A baseball of mass 0.15 kg is thrown with a speed of 20 m/s to a batter who hits a line drive straight back at the pitcher with a speed of 60 m/s. The ball is in contact with the bat for 0.025 s. What average force is exerted on the ball by the bat?

- a. 100 N
- b. 150 N
- c. 220 N
- d. 360 N
- e. 480 N