

# Newton's 3rd Law & Momentum Study Guide

---

Name \_\_\_\_\_

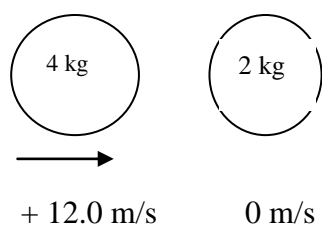
Period \_\_\_\_\_

1. Forces occur in ....
2. If I push on the wall with 80 N of force, the wall pushes back with \_\_\_\_\_.
3. What causes the horse to pull the cart?
4. Compared to the force of ball on bat, the amount of force on bat on ball is the.....
5. How do you calculate momentum?

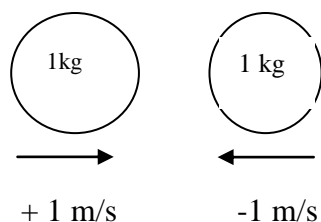
## Impulse?

6. If you double the mass of an object, the momentum would ....  
If you double the velocity of an object, the momentum would ....
7. A change in momentum is equal to ....
8. What do you have to do to change the momentum of an object?
9. What does moving your hand back in catching a fastball, landing with your knees bent or the use of airbags have in common?
10. What can you do to gain distance on a golf ball?
11. The dart from the long blow gun travels faster than the short blow gun because ....
12. Elastic collisions \_\_\_\_\_ while inelastic collisions \_\_\_\_\_.
13. When objects collide, what is conserved?
14. Explain the  $P_b = P_a$  in a rifle-bullet system. Include what happens to mass and velocity.

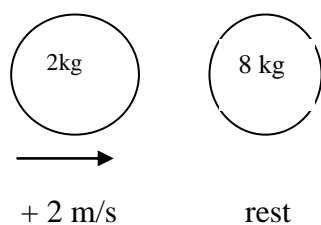
15. The objects below collide in an elastic collision. What will happen?



16. The objects below collide in an inelastic collision. What would the velocity be after the collision?



17. The objects below stick together and the two move with what velocity?



18. Ted the golfer hits a .050 kg golf ball with a force of 150.0 N for a period of .019 sec.

a) What impulse does Ted exert upon the golf ball?

b) What is the resulting velocity of the golf ball?

19. A bullet with a mass of .05 kg strikes a wooden block with a mass of 5 kg. The bullet becomes embedded in the block. The block with the bullet in it then flies off at 10 m/s. What is the original velocity of the bullet?