Momentum notes & practice

Name:
Period: Date: #

Today's agenda: Short videos, then reading and problem-solving.

Answer the following questions as you watch the video. Ask your teacher to pause the video if there is a time where complex answers are provided.

Important note: *Momentum and kinetic energy may at first seem like the same thing, but energy stored in motion (kinetic energy) can be converted into elastic, gravitational, or other energy types, momentum is always momentum.*

Video 1

1. The video presenter talks about "oomph" of objects. What are the two things needed to have 'oomph?"

2. What does it mean when scientists say something is conserved?

3. In the image of the car driving down the road, was the car it collided with a part of its system? Explain.

4. Newton's third lab states what?

Video 2 (Bozeman Science)

5. If you want to change the momentum of a toy car and you can't change its mass, what do you have to do to change its velocity?

6. What are the units for momentum?

7. Explain how a net force can decrease the momentum of an object.

Reading: Pages 374-377 in the textbook.

8. What is the formula for calculating the momentum of a system? What units do you need to measure both variables with?

9. A blowing ball ***can*** have less momentum than a ping-pong ball. Describe a situation where this would be true.

10. Describe what is happening in the three train situations shown on page 376.

A	B	C

Practice problems:

Momentum equation

$$p = m \times v$$

Rearrange the equatoni in two ways

v=

m=

11. Sample: Calculate the momentum of a 60 kg person walking at 1.5 m/s.
    a. List variables and values provided: $m = 60\ kg, v = 1.5\ m/s$
    b. Plug numbers into equation: $p = 60\ kg \times 1.5\ m/s$
    c. Write answer with units: $p = 90\ kg \cdot m/s$
12. Calculate the momentum of a 0.184 kg softball that is pitched with a velocity of 27 m/s.
    a. List
    b. Plug
    c. Answer with units
13. Calculate the momentum of a 0.142 kg baseball that is pitched with a velocity of 39 m/s.
    a. List
    b. Plug
    c. Answer with units
14. Calculate the momentum of two cars: (a) a 965 Scion iQ moving at 11.2 m/s (that's about 25 MPH), and (b) a 2,762 kg moving at 15.6 m/s (about 35 MPH).
    a. List
    b. Plug
    c. Answer with units
15. Calculate the mass of a ball that is moving at 10 m/s and has a momentum of 5.4 kg·m/s.
    a. List
    b. Plug
    c. Answer with units
16. Calculate the speed of a 3 kg ball that has a momentum of 13 kg·m/s.
    a. List
    b. Plug
    c. Answer with units
17. Calculate the speed of a 70 kg ball that has a momentum of 13 kg·m/s.
    a. List
    b. Plug
    c. Answer with units
18. Usain Bolt set the record for the 100 m dash with a momentum of 9,840 kg·m/s. Calculate his mass.
    a. List
    b. Plug
    c. Answer with units