

Physics 10-20 Impulse and Momentum Formative Worksheet

**Learning Target**

1. I can apply the concepts of Impulse and Momentum to the motion of objects in a system.
- a. I can define the terms impulse and momentum.
  - b. I can state that the change in momentum is equal to the impulse applied to the object.
  - c. I can apply the Impulse-Momentum Theorem to solve for a given unknown
  - d. I can apply the Law of Conservation of Momentum to analyze

Name: Key Period: \_\_\_\_\_

1. The momentum of an object depends upon the object's A, D. Pick two quantities.
- a. mass - how much stuff it has
  - b. acceleration - the rate at which the stuff changes its velocity
  - c. weight - the force by which gravity attracts the stuff to Earth
  - d. velocity - how fast and in what direction it's stuff is moving
  - e. position - where the stuff is at

2. The two quantities needed to calculate an object's momentum are mass and velocity.

3. Calculate the momentum value of ... (Include appropriate units on your answers.)

- a. ... a 2.0-kg brick moving through the air at 12 m/s.

$$P = mv = 2\text{kg} \cdot 12\text{m/s} = 24\text{ kg} \cdot \text{m/s}$$

- b. ... a 3.5-kg wagon moving along the sidewalk at 1.2 m/s.

$$3.5\text{kg} \cdot 1.2\text{m/s} = 4.2\text{ kg} \cdot \text{m/s}$$

4. With what velocity must a 0.53-kg softball be moving to equal the momentum of a 0.31-kg baseball moving at 21 m/s?

$$P = mv \rightarrow v = \frac{P}{m} = 0.31 \cdot 21\text{ m/s} = 6.51\text{ kg} \cdot \text{m/s}$$

$$v_{\text{ball}} = \frac{6.51}{0.53\text{kg}} = 12.2\text{ m/s}$$