

Name: Key Date: _____ Period: _____

Calculating Momentum

$$p = m \times v$$

Using the formula, Momentum = mass x velocity, calculate the momentum of each of the following objects.

1. A 0.01 kg bullet moving at a velocity of 32 m/s.

$$0.32 \text{ kg} \cdot \text{m/s}$$

2. An 800 kg race car moving at a velocity of 50 m/s.

$$40,000 \text{ kg} \cdot \text{m/s}$$

3. A 0.3 kg baseball moving at a velocity of 5 m/s.

$$1.5 \text{ kg} \cdot \text{m/s}$$

4. A 400 kg speed boat traveling at 30 m/s.

$$12,000 \text{ kg} \cdot \text{m/s}$$

5. An 83 kg football player running with a velocity of 0.3 m/s.

$$24.9 \text{ kg} \cdot \text{m/s}$$

6. A 5 kg bowling ball rolling down the lane with a velocity of 0.5 m/s.

$$2.5 \text{ kg} \cdot \text{m/s}$$

7. A steel ball whose mass is 0.1 kg is rolling at a rate of 2.8 m/s.

$$0.28 \text{ kg} \cdot \text{m/s}$$

8. Find the mass of a marble rolling at a velocity of 100 cm/s with a momentum of 10,000 g-cm/sec.

$$p = m \times v \quad m = p/v = 10,000/100 = 100 \text{ g}$$

9. Find the velocity of a projectile whose mass is 3 kg and momentum is 1050 kg-m/s.

$$p = m \times v \quad v = p/m = 350 \text{ m/s}$$

Answer the following questions comparing the momenta of two objects.

10. Which has the greater momentum, a dump truck or a sports car traveling at the same speed?

$$p = m \times v \quad \text{Dump truck}$$

11. Which has the greater momentum, a car traveling at 8 m/s or an identical car traveling at 5 m/s?

$$8 \text{ m/s}$$

12. Car A collides with Car B which was stopped at a stoplight. Describe the changes in momentum of the two cars.

heavy car \rightarrow
fast car \rightarrow more momentum