

Name: \_\_\_\_\_ Block: \_\_\_\_\_

## Impulse

1. A teacher on corridor patrol duty is run into by a student rushing to class. The teacher has a mass of 100. kg, and the student has a mass of 50. kg and a velocity of  $2.0 \frac{\text{m}}{\text{s}}$ . What is the velocity of the entangled teacher and student after they collide?

$$0.67 \frac{\text{m}}{\text{s}}$$

2. If the collision in problem #1 lasted for 0.020 s, calculate the impulse and the force applied to the teacher.

$$67 \text{ N} \cdot \text{s}$$

$$+3333 \text{ N}$$

3. An 800 kg car travelling at  $10 \frac{\text{m}}{\text{s}}$  comes to a stop in 0.50 s in an accident.

(a) What was the impulse applied to the car?

$$-8000 \text{ N} \cdot \text{s}$$

(b) What was the average net force on the car as it came to a stop?

$$-16000 \text{ N}$$

4. A 0.80 kg ball is dropped from a height of 2.0 m above the ground. It rebounds to a height of 1.6 m. The contact between the ball and the ground lasted for 0.045 s.

(a) What was the impulse applied to the ball?

9.49 N · s

(b) What was the average net force on the ball?

210.9 N ↑