

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

# Momentum Worksheet

## CHAPTER 8: MOMENTUM

**Directions:** Answer the following questions based on reading from Chapter 9 (pgs. 199-216) and/or from notes in class.

Equations:  $p = mv$        $F\Delta t = m\Delta v$        $F\Delta t = p_2 - p_1$        $p_{A2} + p_{B2} = p_{A1} + p_{B1}$

1. Is the momentum of a car traveling south different from that of the same car when it travels north at the same speed? Draw the momentum vectors to support your answer.
2. Which has more momentum, a supertanker tied to a dock or a raindrop falling? Use the equation for momentum to support your answer ( $p = mv$ )
3. If you jump off a table, you let your legs bend at the knees as you feet hit the floor. Explain why you do this in terms of the physics concept of impulse. ( $Ft = m\Delta v$ )
4. Two soccer players come from opposite directions and collide when trying to head the ball. They come to rest in midair and fall to the ground. What can you say about their **initial momenta**?
5. Your brother's mass is **40.0 kg**, and he has a **1.30 kg** skateboard. What is the combined **momentum** of your brother and his skateboard if they are going **8.50 m/s**?
6. A hockey player makes a slap shot, exerting a constant force of **25.0 N** on the puck for **0.16 seconds**. What is the **magnitude** of the **impulse** given to the puck?

7. A hockey puck has a mass of **0.115 kg** and is at rest. A hockey player makes a shot, exerting a constant force of **25.0 N** on the puck for **0.16 s**. With what **speed** does it head toward the goal?

8. A constant force of **5.00 N** acts on a **2.50 kg** object for **10.0 s**. What are the changes in the object's **momentum** and **velocity**?

9. A **95 kg** fullback, running at **7.4 m/s**, collides in midair with a **125 kg** defensive tackle moving in the **opposite** direction. Both players end up with **zero** speed.

a. Identify “before” and “after” and make a **diagram** of the situation.

b. What was the **fullback's momentum** before the collision?

c. What was the change in the **fullback's momentum**?

d. What was the change in the **tackle's momentum**?

e. What was the tackle's **original momentum**?

f. How **fast** was the tackle moving originally?