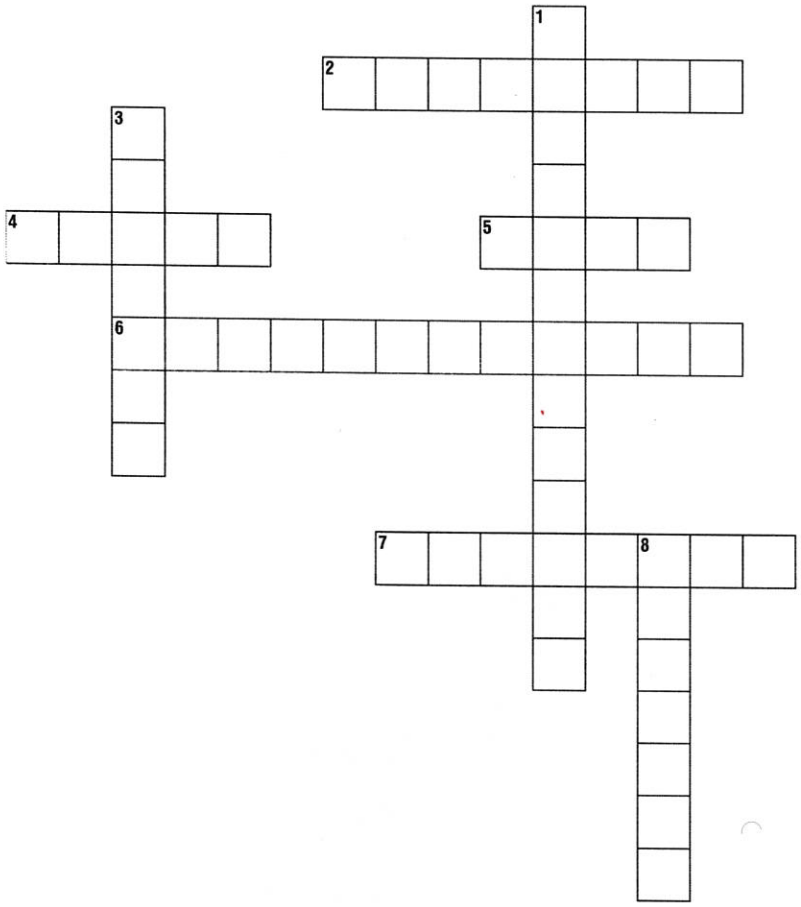
Name _____ Date _____ Class _____

Directed Reading for Content Mastery

Key Terms
Motion and Momentum

Directions: *Use the clues below to complete the crossword puzzle.*



Across

2. A measure of how hard it is to stop an object

4. Distance traveled divided by the time taken to travel the distance

5. Amount of matter in an object

6. Change in velocity divided by the time it takes for the change to occur

7. Speed and direction of motion of an object

Down

1. Speed of an object at one instant of time is the object's _____ speed

3. Total distance divided by the time taken is an object's _____ speed

8. Tendency of an object to resist change in its motion

Name _____ Date _____ Class _____

Section 3 ▪ Momentum

Directions: *Replace each italicized word in the statements below with the correct term.*

_____ **1.** The more *velocity* an object has the harder it is to slow it down, speed it up, or turn it.

_____ **2.** Objects with more mass have *less* inertia.

_____ **3.** The *weight* of an object is the amount of matter in an object.

_____ **4.** The SI unit for mass is the *gram.*

_____ **5.** The tendency of an object to resist change in its motion is called *speed.*

_____ **6.** The more mass an object has, the harder it is to change its *acceleration.*

_____ **7.** Velocity and *momentum* are defined the same for all objects, regardless of their mass.

_____ **8.** The *inertia* of an object is a measure of how hard it is to stop an object.

Directions: *Answer the following questions on the lines provided.*

9. State the law of the conservation of momentum.

_____

_____

_____

10. What can the law of conservation of momentum predict?

_____

_____

_____

Meeting Individual Needs

Name Date Class

SECTION 3 Reinforcement

Momentum

Directions: *In question 1, below, a code letter has been substituted for every letter of the alphabet. To find out what the sentence says, use the following key to decode it. In the key, the code letters are shown directly below the letters they stand for. Write the correct letter above each code letter, then read the sentence.*

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
L V Y Q G Z M O B P F S R J D T E N I H X C K M A U

1. _____ _____ _____ _____ _____ _____
HOG HDHLS RDRGJHXR DZ DVPGYHI HOLH

_____ _____ _____ _____ _____ _____ _____
YDSSBQG KBHO GLYO DHOGN QDGI JDH YOLJMG

2. What is the law that is stated above?

_____

Directions: *Correctly complete each sentence by underlining the best of the three choices in parentheses.*

3. A feather floating in the air has (more, less, the same) momentum as a bowling ball on a shelf.
4. The momentum of an object depends on its mass and (velocity, acceleration, inertia).
5. The tendency for an object to resist change in its motion, is its (momentum, inertia, weight).
6. We say that momentum is conserved, yet objects slow down after collisions. This is because of (inertia, friction, mass).

Directions: *Answer the following questions on the lines provided.*

7. A 500 g model train car traveling at 0.8 m/s collides with a 300 g stationary car. The cars hook up and move off down the track together. How fast are they going?

_____

_____

8. Which has a greater momentum, a car or a bike moving at the same speed?

_____

9. What happens when two objects with the same mass collide?

_____

_____

Meeting Individual Needs

PROBLEM SET
MOMENTUM

ANSWER ALL QUESTIONS AND SHOW YOUR WORK

1. What is the momentum of s 10-kg rock moving at 3 m/s?
2. What is the momentum of a 0.5-kg ball moving at 12 m/s?
3. A 2-kg toy truck is rolling along a level sidewalk at 3.5 m/s. What is the momentum of the toy truck?
4. A 1.4-kg bird is flying at 15.6 m/s. What is the momentum of the bird
5. A 1.5-kg bowling ball is traveling at 24.8 m/s. What is its momentum?
6. A baseball travels at 7 m/s, while a basketball moves at 3 m/s. The mass of the baseball is 0.14 kg and the mass of the basketball is 0.5 kg. Which has the greater momentum?
7. A 45,000 kg locomotive is moving at 15 m/sec. What is the locomotive's momentum?
8. A soccer player kicks a 0.1 kg ball that is initially at rest so that it moves with a velocity of 20 m/s. What is the impulse the player imparts to the ball?
9. Compare the momentum of a 6,160 kg truck (vehicle 1) moving at 3.0 m/s to the momentum of a 1540 kg car (vehicle 2) moving at 12 m/s.
10. What is the momentum of a 6-kg railroad cart (coming in from the right) moving at 4 m/s? Another cart on the same line is moving at 4 m/s towards the first cart (coming in from the left) from the opposite direction and has a mass 2-kg.
    A) What is the momentum of the 6-kg cart?
    B) What is the momentum of the 2kg cart?
    C) What is the total momentum of the system?
    D) If the two carts collide and stick together, what will be the direction of their motion?
    E) What is the total momentum after the two carts collide?
    F) What is the velocity of the two carts after they collide and stick together?
11. A 95 kilogram motorcycle is moving at a speed of 45 m/s. What is the momentum of the cycle?
12. An object with a mass of 7.93 kg experiences a change in velocity of 5.39 m/s. What is its change in momentum?
13. An object with a mass of 32.94 kg experiences a change in momentum of 77.20 kg-m/s. What is its change in velocity?
14. An object changes its velocity by an amount of 3.02 m/s while changing its momentum by an amount of 7.86 kg-m/s. What is its mass?
15. Determine the momentum of the following:

    a. 60-kg halfback moving eastward at 9 m/s.
    b. 1000-kg car moving northward at 20 m/s