



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

## Watch Your Velocity!

(Lexile 820L)

- 1 Motion of an object can be described by its speed, velocity, and/or acceleration. The distance an object travels over a certain period of time is its speed. An object's speed and the specific direction it is traveling is its velocity. A change in an object's velocity over a specific period of time is called acceleration.
- 2 In order to measure velocity, you must know the speed and direction of a given object. Imagine riding in the car with your family. You are taking a trip to the mall. As you head down the street, your mother pushes the gas pedal to move the car forward. The car had been moving at 25 miles per hour. It is now going forward at 45 miles per hour. Pushing the gas pedal causes the car to accelerate, or speed up. The constant rate of speed or the velocity of the car increases. Therefore, your family will get to the mall much faster. In this case, the velocity and the acceleration of the car are in the same direction.
- 3 Velocity can be constant, or it can change. Once your family reaches the main highway, your car is stuck in weekend traffic. Your mother now applies pressure to the brake pedal. The car will slow down, or decelerate. The car slows back down from 45 miles per hour to 25 miles per hour. In this case, the velocity of the car and its acceleration are in opposite directions. When you accelerate or decelerate, you change your velocity by a specific amount over a specific amount of time.
- 4 For motion to be described accurately, you need to use a point of reference. A point of reference is just an object or position near the object in motion. During your trip to the mall, there are several ways to describe your motion. Assume that you are inside the car. It is moving at a speed of 25 miles per hour. Here, the ground is your point of reference. Both you and the car are moving 25 miles per hour relative to the ground. If the car is the point of reference, then you are not moving relative to the car. What if you pass a car that is driving 20 miles per hour? In that case, you are moving 5 miles per hour relative to the other car. Three different points of reference result in three different descriptions of your motion. For this reason, it is important to indicate your point of reference when measuring velocity. Most often, speed is determined with respect to the ground. However, there are times when speed may be determined with respect to an object or an observer.
- 5 Remember, you need to know two things in order to truly describe how fast an object is going. You need to know its velocity and the point of reference. How else can the officer tell if your mother is speeding?





# Reading Science

**1** The term **acceleration** was used in paragraphs 1-3. Which of the following could be a definition of acceleration?

- A** a change in an object's speed
  - B** an object at rest
  - C** a change in an object's direction
  - D** both A and C
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**2** In which of these three situations is the object accelerating?

1. A trash truck takes off from the curb.
2. A book rests on a shelf.
3. An airplane banks to circle around the airport.

- A** only 1
  - B** only 2
  - C** both 1 and 3
  - D** 1, 2, and 3
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**3** When a police officer is trying to decide if a driver is speeding, what is his point of reference?

- A** The ground
- B** His car
- C** The speed limit
- D** All of these



## Reading Science

- 4 Which words help you to determine the meaning of the word **decelerate** in paragraph 3?
- A “Velocity can be constant, or it can change”
  - B “Applies pressure to the brake pedal”
  - C “The car will slow down”
  - D “Stuck in weekend traffic”
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- 5 A bowling ball moves 18 meters every 2 seconds down the lane at a bowling alley. What is the speed of the bowling ball?
- A 18 meters per second
  - B 9 meters per second
  - C 2 meters per second
  - D 36 meters per second