Describing and Measuring Motion (pages 6–15)

Describing Motion (pages 7–9)

Key Concept: **An object is in motion if it changes position relative to a reference point.**

- **Motion** means moving. To find out if an object is in motion, you must compare it to another object or place. An object is in motion if its distance from another object or place is changing.

- A **reference point** is an object or place that you can use to tell if an object is in motion. A tree, a sign, or a building make good reference points.

- Motion is measured as distance. A **meter** is a unit of length. Meters are used to measure distance.

Answer the following questions. Use your textbook and the ideas above.

1. Read each word in the box. In each sentence below, fill in the correct word or words.

reference point	meter	motion

   a. A unit used to measure length is the

      _____ .

   b. To see if an object is moving, you must compare

      it to a _____ .

2. Is the following sentence true or false? An object is in motion if its distance from another object is changing.

   _____

Calculating Speed (pages 10–11)

***Key Concept:* If you know the distance an object travels in a certain amount of time, you can calculate the speed of the object.**

- **Speed** is a rate. It tells how far something moves in a certain amount of time. For example, *1 meter per second* is a speed.

- To find speed, use the formula:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

- On a bike ride, you slow down and speed up. **Average speed** tells the total distance you rode divided by the total time it took. **Instantaneous speed** is the speed you were moving at an instant in time during the bike ride.

Answer the following questions. Use your textbook and the ideas above.

3. Read the words in the box. Use the correct words to fill in the blanks in the formula for speed.

Distance	Rate	Time

$$\text{Speed} = \frac{\text{a. _____}}{\text{b. _____}}$$

4. How would you find the speed of a person who walked 10 meters in 8 seconds? Circle the letter of the correct answer.

a. Speed = 10 meters ÷ 8 seconds

b. Speed = 8 seconds × 10 meters

c. Speed = 8 seconds ÷ 10 meters

Describing Velocity (pages 12–13)

Key Concept: **When you know both the speed and direction of an object's motion, you know the velocity of the object.**

- **Velocity** is speed in a given direction.

- For example, the velocity of a person walking is 3 kilometers per hour, west. This tells the speed the person is walking. It also tells you the direction the person is walking.

Answer the following questions. Use your textbook and the ideas above.

5. Speed in a given direction is _____.

6. What do you need to know to describe the velocity of an object? Circle the letter of each thing you need to know.
   a. distance
   b. direction
   c. speed

7. A velocity tells speed and direction. Circle the letter of each velocity.
   a. 2 meters per second east
   b. 5 kilometers per hour
   c. 10 meters per second west

Graphing Motion (pages 14–15)

Key Concept: **You can show the motion of an object on a line graph in which you plot distance versus time.**

- Motion can be shown on a line graph. A motion graph shows time along the bottom, or *x*-axis. A motion graph shows distance along the side, or *y*-axis.

- The steepness of the line on the graph is called **slope**. A line that rises steeply shows that an object is moving quickly. A line that rises less steeply shows that an object is moving more slowly. A line that is flat shows that an object is not moving at all.

Answer the following questions. Use your textbook and the ideas above.

8. The steepness of the line on a graph is called

_____.

9. Look at the graph. Which part of the line shows a time when the object was not moving?

   a. A

   b. B

   c. C