

Directed Reading A

Section: Measuring Motion

1. Name something in motion that you cannot see moving.

OBSERVING MOTION BY USING A REFERENCE POINT

_____ 2. An object in motion is moving in relation to an object that appears to

a. stay in place.	c. maintain constant velocity.
b. keep moving.	d. maintain constant acceleration.

_____ 3. When an object changes position over time relative to a reference point, the object is

a. speeding.	c. decelerating.
b. accelerating.	d. moving.

4. For determining motion, the surface of Earth is a common _____.

5. Why are buildings, trees, and mountains all useful reference points?

6. Can a moving object be used as a reference point? Explain.

SPEED DEPENDS ON DISTANCE AND TIME

7. The speed of an object depends on the distance traveled and the _____ taken to travel that distance.

8. The SI unit for speed is _____.

9. Why is it useful to calculate average speed?

Directed Reading A *continued*

10. Explain how to calculate average speed.

11. When a person drives for several hours, how does the distance traveled in one hour usually compare with the distance traveled in other hours? Explain.

12. Suppose that, on a graph showing speed, there are two lines. One line represents speed per hour, and the other line represents average speed. Will both lines be exactly alike and in the same place on the graph? Explain.

VELOCITY: DIRECTION MATTERS

13. Why wouldn't birds end up at the same destination if they are flying exactly the same speed at all times?

14. What is the difference between velocity and speed?

Directed Reading A *continued*

15. How would you calculate the resultant velocity of two velocities in the same direction?

16. How would you calculate the resultant velocity of two velocities in opposite directions? What direction is the larger velocity?

ACCELERATION

17. If your speed is not changing but your direction is changing, are you accelerating? Explain your answer.

18. Another name for acceleration in which velocity increases is _____ acceleration.

19. What are the two common terms for decrease in velocity?

20. Write the mathematical formula for calculating average acceleration.

21. A speedometer shows that a cyclist is going 1 m/s the 1st second, 2 m/s the 2nd second, and 3 m/s the 3rd second, as the cyclist continues straight south. How do you know the cyclist is accelerating?

Directed Reading A *continued*

22. How would acceleration be shown on a graph?

23. A graph shows a roller coaster increasing in velocity for the first eight seconds as it goes down the hill. Will the graph have an upward slope representing a roller coaster traveling down the hill? Explain your answer.

24. As long as something travels in a circle, is it always accelerating? Explain your answer.

Skills Worksheet

Directed Reading A

Section: What Is a Force?

1. In science, a push or a pull is a(n) _____.
2. Any change in motion is caused by a(n) _____.
3. Force is expressed by a unit called the _____.

FORCES ACTING ON OBJECTS

4. Force always acts on a(n) _____.
5. Give two examples of objects on which you exert forces when you are doing your schoolwork.

6. Give one example of a force that does not cause an object to move.

7. What is one example of an unseen source exerting a force?

8. What is one example of an unseen receiver of a force?

DETERMINING NET FORCE

9. The combination of all forces acting on an object is _____.

10. How is net force determined if two students moving a piano exert force in the same direction?

Directed Reading A *continued*

11. Two dogs are pulling on a rope in opposite directions. The dog on the left pulls with a force of 10 N, while the dog on the right pulls with a force of 12 N. Which dog will win the tug-of-war? What is the net force?

BALANCED AND UNBALANCED FORCES

12. What will knowing the net force on an object tell you about the forces on the object?

13. When are the forces on an object *balanced*?

14. Forces are unbalanced when the net force is not equal to a certain number of newtons. What is that number?

15. What do you need to cause an object to start moving?

16. Give an example of an object that continues to move when an unbalanced force is removed.

Skills Worksheet

Directed Reading A

Section: Friction: A Force that Opposes Motion

1. What unbalanced force causes a ball to stop rolling?

2. The force that opposes motion between two surfaces that are in contact

is _____.

THE SOURCE OF FRICTION

3. What are two factors that affect the amount of friction between two surfaces?

4. What happens to friction if the force pushing surfaces together increases?

5. Why is more force needed to slide a large book across a table than to slide a small book across the same table?

6. Is the amount of friction greater between rough surfaces or smooth surfaces?
Why?

TYPES OF FRICTION

7. What is kinetic friction?

Directed Reading A *continued*

8. What are two types of kinetic friction?

9. Which type of kinetic friction is usually greater, sliding kinetic friction or rolling kinetic friction?

10. What is one example of the use of sliding kinetic friction?

11. What is one example of the use of rolling kinetic friction?

12. What is static friction?

13. As soon as an object starts moving, what replaces static friction?

FRICTION: HARMFUL AND HELPFUL

14. What is one helpful way friction affects a car?

15. What is one harmful way friction affects a car?

Directed Reading A *continued*

16. What is a substance applied to a surface to reduce friction called?

17. What are three ways friction can be reduced?

18. What are two ways friction can be increased?

Directed Reading A

Section: Gravity: A Force of Attraction

1. Why do astronauts on the moon bounce when they walk?

2. The force of attraction between two objects that is due to their masses is

THE EFFECTS OF GRAVITY ON MATTER

3. How can the force of gravity change the motion of an object?

4. Why is all matter affected by gravity?

5. The force that pulls you toward your pencil is the force

of _____.

6. Since all objects are attracted toward each other because of gravity, why can't you see the objects moving toward each other?

7. How are objects around you affected by the mass of Earth?

Directed Reading A *continued*

NEWTON AND THE STUDY OF GRAVITY

8. What were the two questions that Sir Isaac Newton realized were actually two parts of the same question?

9. What connection does legend say Newton made between the moon and a falling apple?

10. Newton summarized his ideas about gravity in a law now called

THE LAW OF UNIVERSAL GRAVITATION

11. What is stated by the law of universal gravitation?

12. How does the law of universal gravitation explain why gravity between an elephant and Earth is greater than gravity between a cat and Earth?

Directed Reading A *continued*

13. How does the law of universal gravitation explain why astronauts on the moon bounce when they walk?

14. How does the gravitational force between objects that have small masses compare to the gravitational force between large objects?

15. Why doesn't the sun's gravitational force affect you more than Earth's gravitational force does?

16. How does the gravitational force between two objects that are close together compare to the gravitational force between two objects as they move farther apart?

Directed Reading A *continued*

WEIGHT AS A MEASURE OF GRAVITATIONAL FORCE

- _____ **17.** The measure of the gravitational force on an object is its
a. mass.
b. force.
c. weight.
d. gravity.
- _____ **18.** A measure of the amount of matter in an object is
a. mass.
b. force.
c. weight.
d. gravity.
- _____ **19.** If an object is moved from Earth to a place with greater gravitational force,
a. its mass will stay the same.
b. its weight will stay the same.
c. its mass will increase.
d. its weight will decrease.
- 20.** On Earth, why are the words *mass* and *weight* often used to mean the same thing?

21. What is the SI unit of force?

22. Why is weight measured in newtons?

23. What is the main SI unit of mass?

24. Besides the kilogram, what are two units often used to measure mass?
