Name _____ Class _____ Date _____

Skills Worksheet

Directed Reading A

Section: What Is a Force?

1. In science, a push or a pull is a _____.

2. Any change in motion is caused by a _____.

3. Force is expressed by a unit called _____.

FORCES ACTING ON OBJECTS

4. Force always acts on a(n) _____.

5. Name three examples of objects on which you exert forces when you are doing your schoolwork.

_____

_____

_____

6. Name three examples of forces that do not cause an object to move.

_____

_____

_____

Identify which of the following is exerting a force. Do so by writing *force* or *no force* in the space provided.

_____ **7.** A woman pushes the elevator button.

_____ **8.** A pile of soil sits on the ground.

_____ **9.** A balloon is rubbed on the fur of a cat.

_____ **10.** Magnets stick to the refrigerator.

DETERMINING NET FORCE

11. When all forces acting on an object are combined together, the result is known as the _____.

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Directed Reading A *continued*

12. How does net force apply to two students moving a piano when both students are exerting force in the same direction?

13. Two dogs are pulling on a rope in a tug-of-war. The dog on the left pulls with a force of 13 N, while the dog on the right pulls with a force of 12 N. Which dog will win the tug-of-war? Explain your answer.

BALANCED AND UNBALANCED FORCES

14. Why is it useful to know the net force?

15. Forces are balanced when the net force is equal to a certain number of newtons. What is that number?

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

17. To start or change the motion of an object, which do you need, a balanced or an unbalanced force? Explain your answer.

18. Can an object continue to move when an unbalanced force is removed? Give an example.

Answer Key

Directed Reading A

SECTION: MEASURING MOTION

1. Answers will vary. Sample answer: I cannot see Earth moving. Yet, I know it moves (revolves) around the sun.
2. A
3. D
4. reference point
5. They make useful reference points because they do not move.
6. Answers will vary. Sample answer: Yes; a moving object can be used as a reference point because it can be observed in relation to another moving object.
7. time
8. m/s, or meters per second
9. Answers will vary. Sample answer: Objects don't often travel at a constant speed.
10. Average speed is the total distance traveled divided by the total time taken to travel that distance.
11. The distances vary, because the speed is not constant.
12. The line representing actual speed per hour will usually not be straight, because speed usually changes. The line representing average speed over the entire time will be straight, as it represents average speed as if it were the same speed all the time.
13. B
14. They are travelling in different directions.
15. Velocity includes direction; speed does not include direction.
16. same, opposite
17. Yes, a change in direction is acceleration, just as a change in speed is acceleration.
18. positive
19. deceleration
20. average acceleration = (final velocity – beginning velocity)/time for velocity change
21. A change in velocity means acceleration. The cyclist's velocity increased from 1 m/s south to 3 m/s south. So, the cyclist is accelerating.
22. The graph shows velocity changing as time passes.
23. Answers will vary. Sample answer: The graph's upward (positive) slope represents increasing velocity, which is what the roller coaster has as it travels downward.
24. Yes, it is always accelerating while it remains in a circle, because it is always changing direction.

SECTION: WHAT IS A FORCE?

1. force
2. force
3. newton
4. object
5. Answers will vary. Sample answer: I exert a force on a book when I open it; I exert a force on the keys of a keyboard when I type; and I exert a force on a chair when I sit on it.
6. Answers will vary. Sample answer: An SUV sits in the parking lot; a computer sits on a desk; a desk sits on the floor.
7. force
8. force
9. force
10. force
11. net force
12. When both students apply force in the same direction, their forces are added together to produce a net force.
13. The dog on the left will win the tug-of-war, because the net force will be 1 N to the left.
14. It will help you determine the effect of the force on the motion of an object.
15. zero
16. zero
17. You need an unbalanced force. An unbalanced force causes motion in the direction of the greatest force.
18. Yes. Answers will vary. Sample answer: A soccer ball that has been kicked continues to roll on the ground long after the ball is kicked.