

**Forces** ▪ Reading/Notetaking Guide

**Friction, Gravity, and Elastic Forces** (pp. 380–388)

*This section describes the effects of friction on surfaces that rub on each other. It also describes how gravity acts between objects in the universe.*

**Use Target Reading Skills**

*Friction and gravity are both forces that affect motion. As you read the section, compare and contrast friction and gravity by completing the graphic organizer.*

	Friction	Gravity
Effect on motion	Opposes motion	
Depends on		
Measured in		

**Friction** (pp. 381–383)

- Is the following sentence true or false? When two surfaces rub, the irregularities of one surface get caught on those of the other surface.  
\_\_\_\_\_
- What is friction?  
\_\_\_\_\_  
\_\_\_\_\_
- Friction acts in a direction \_\_\_\_\_ to the object's direction of motion.
- The strength of the force of friction depends on what two factors?  
\_\_\_\_\_  
\_\_\_\_\_

**Forces** ▪ Reading/Notetaking Guide

**Friction, Gravity, and Elastic Forces** (continued)

- How is friction involved in sledding and skiing?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Why does some friction occur with seemingly smooth surfaces?  
\_\_\_\_\_  
\_\_\_\_\_
- Complete the following table about the different kinds of friction.

Friction	
Kind of Friction	Friction Occurs When . . .
	An object moves through a liquid or gas
	Solid surfaces slide over each other
	An object rolls over a surface
	Objects are not moving

- Which kind of friction requires more force to overcome, rolling friction or sliding friction? \_\_\_\_\_
- What kind of friction occurs when moving parts have ball bearings?  
\_\_\_\_\_
- How does oil between machine parts reduce friction?  
\_\_\_\_\_  
\_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_ Class \_\_\_\_\_

**Forces** ▪ *Reading/Notetaking Guide*

**Gravity** (pp. 384–385)

11. A force that pulls objects toward each other is called \_\_\_\_\_.
12. Is the following sentence true or false? The force that makes an apple fall to the ground is the same force that keeps Earth orbiting the sun.  
\_\_\_\_\_
13. What does the law of universal gravitation state?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
14. The force of attraction between two objects varies with what two factors?  
\_\_\_\_\_  
\_\_\_\_\_
15. What is weight?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
16. How is weight different from mass?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
17. Weight is usually measured in \_\_\_\_\_.

**Gravity and Motion** (pp. 386–387)

18. Is the following sentence true or false? On the moon, your mass would be less than it is on Earth, but your weight would be the same.  
\_\_\_\_\_
19. When is an object said to be in free fall?  
\_\_\_\_\_  
\_\_\_\_\_
20. Near the surface of Earth, what is the acceleration of an object due to the force of gravity? \_\_\_\_\_
21. Objects falling through air experience a type of fluid friction called \_\_\_\_\_.

Name \_\_\_\_\_ Date \_\_\_\_\_ Class \_\_\_\_\_

**Forces** ▪ *Reading/Notetaking Guide*

**Friction, Gravity, and Elastic Forces** (*continued*)

22. Is the following sentence true or false? The greater the surface area of an object, the greater the air resistance. \_\_\_\_\_
23. An object that is thrown is called a(n) \_\_\_\_\_.
24. Is the following sentence true or false? An object that is dropped will hit the ground before an object that is thrown horizontally from the same height. \_\_\_\_\_
25. On the diagram below, draw arrows that show the forces acting on the falling acorn. Label each arrow with the name of the force.



**Elastic Forces** (p. 388)

26. Matter is considered \_\_\_\_\_ if it returns to its original shape after it is squeezed or stretched.
27. Is the following sentence true or false? Squeezing and stretching matter involves elastic forces. \_\_\_\_\_
28. What is compression?  
\_\_\_\_\_  
\_\_\_\_\_
29. What is the elastic force that stretches or pulls matter?  
\_\_\_\_\_  
\_\_\_\_\_