

Chapter 12 Forces and Motion

Section 12.1 Forces**(pages 356–362)**

This section describes what forces are and explains how forces affect the motion of various objects.

Reading Strategy (page 356)

Relating Text and Visuals As you read about forces, look carefully at Figures 2, 3, and 5 in your textbook. Then complete the table by describing the forces and motion shown in each figure. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Forces and Motion		
Figure	Is Net Force 0?	Effect on Motion
2A	Yes	None
2B	Yes	None
3	Yes	None
5A	Yes	None
5B	No	Potted plant accelerates

What Is a Force? (pages 356–357)

- A force is defined as a(n) push or a(n) pull that acts on an object.
- Is the following sentence true or false? A force can act to cause an object at rest to move or it can accelerate an object that is already moving.
true
- Circle the letter of the best answer. What force causes a 1-kg mass to accelerate at a rate of 1 meter per second each second?
 - $1 \text{ kg/m} \cdot \text{s}^2$
 - 1 kg/s
 - 1 newton

Combining Forces (pages 357–358)

- The combination of all the forces acting on an object is the net force.
- Circle the letter of the correct answer. How do unbalanced forces affect the motion of an object?
 - no change because the net force is zero
 - no change because the net force is negative
 - acceleration because the net force is not zero

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Friction (pages 359–360)

6. Is the following sentence true or false? Friction is a force that helps objects that are touching move past each other more easily.

_____ **false** _____

7. Circle the letters that identify types of friction.

- a. rolling
- b. gravity
- c. sliding

8. The friction force that acts on objects that are at rest is _____ **static friction** _____.

9. Use the terms in the box to complete the table below about friction forces.

In-line skates
Sliding
Walking

Types of Friction Forces	
Friction Force	Example
Static	Walking
Sliding	Pushing a book along your desk
Rolling	In-line skates

10. Is the following sentence true or false? Fluid friction is a force that opposes the motion of an object through a fluid such as water.

_____ **true** _____

Gravity (page 361)

11. Gravity is a(n) _____ **attractive** _____ force that pulls objects together.

12. Is the following sentence true or false? Earth’s gravity acts downward toward the center of Earth. _____ **true** _____

13. Is the following sentence true or false? Terminal velocity is the constant velocity of a falling object when the force of air resistance equals the force of gravity. _____ **true** _____

Projectile Motion (page 362)

14. The curved path caused by the combination of an initial forward velocity and the downward force of gravity is known as _____ **projectile** _____ motion.