

## Friction and Gravity (pages 340–348)

### Friction (pages 341–343)

**Key Concept:** The strength of the force of friction depends on two factors: how hard the surfaces push together and the types of surfaces involved.

- **Friction** is a force caused by two objects rubbing together. Friction acts in the opposite direction of motion. Friction keeps you from slipping when you walk. Friction also makes a car's brakes work.
- The amount of friction depends on two things: how smooth the objects are and how hard they push together.
- There are four kinds of friction:
  1. **Static friction** is between two things that are not moving.
  2. **Sliding friction** happens when two objects slide past each other.
  3. **Rolling friction** occurs when one object rolls over another.
  4. **Fluid friction** happens when a solid moves through a fluid, like water or air.

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

1. A force caused by two objects rubbing together is \_\_\_\_\_.
2. Circle the letter of each sentence that is true about friction.
  - a. Friction acts in the same direction as motion.
  - b. There are four kinds of friction.
  - c. The amount of friction depends only on how smooth the objects are.

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3. Friction acts in the opposite direction of

\_\_\_\_\_.

4. Read the words in the box. Use the words to fill in the blanks in the table about friction.

Static friction

Fluid friction

Sliding friction

Friction	
Kind of Friction	Friction Occurs When...
Rolling friction	an object rolls over a surface
a. _____ _____	an object moves through air or water
b. _____ _____	one object slides over another
c. _____ _____	objects are not moving

**Forces** ▪ *Adapted Reading and Study***Gravity** (pages 344–345)

**Key Concept:** Two factors affect the gravitational attraction between objects: mass and distance.

- **Gravity** is a force that pulls objects toward each other.
- Gravity depends on mass. **Mass** is how much matter is in an object. Objects with a large mass have a greater force of gravity than objects with a small mass.
- Gravity depends on distance. As the distance between objects increases, the force of gravity decreases.
- **Weight** measures the force of gravity on an object. An object's weight can change if the force of gravity changes. An object's mass stays the same no matter where it is.

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

5. A force that pulls objects toward each other is

\_\_\_\_\_.

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

increases	decreases	stays the same
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- a. If two objects move farther apart, the force of gravity between them \_\_\_\_\_.
- b. An object's mass \_\_\_\_\_ if less gravity acts on the object.
7. What is weight? Circle the letter of the correct answer.
- a. a force that pulls objects toward each other
  - b. the amount of matter in an object
  - c. the force of gravity on an object

**Forces** ▪ *Adapted Reading and Study***Gravity and Motion** (pages 346–348)

**Key Concept:** In free fall, the force of gravity is an unbalanced force that causes an object to accelerate.

- Gravity is the force that pulls objects toward Earth.
- If gravity is the only force pulling on a falling object, the object is in **free fall**.
- Most objects move through air. Friction caused by air is called **air resistance**. Air resistance is a force that pushes upward on falling objects.
- As an object falls to Earth, its velocity increases. The greatest velocity it reaches is called its **terminal velocity**.

*Answer the following question. Use your textbook and the ideas above.*

8. Read the words in the box. Use the correct words to label the forces in the picture.

Gravity	Terminal velocity	Air resistance
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