

## Chapter 16

Use with Section 3

## ENRICHMENT

## ● How do things move?

**Newton and His Forces**

Sir Isaac Newton was born on Christmas day in 1642. In that same year, another famous scientist, Galileo, died. Together, Galileo and Newton's scientific ideas changed all of science. They ended traditions that dated back more than a thousand years, to the Greek philosopher Aristotle.

Aristotle believed that the natural state of any object was to be at rest. In addition, he said that an object would constantly work toward reaching that state. Both Galileo and Newton disagreed. Galileo developed idea that any object resisted any change in its motion. He called this phenomenon inertia. Newton went even further, saying that an object's motion would not change unless a force acted on it.

**Newton's Three Laws**

1. An object at rest will remain at rest, or an object moving in a straight line at constant speed will continue to do so until a force acts on it.
2. An object that has a force acting on it will accelerate in the direction of the force.
3. Forces always occur in equal but opposite pairs.

**Apply what you've learned.**

1. You are rolling a marble on the carpeting. Every time it comes to a stop you give it another push. Describe how Aristotle, Galileo, and Newton might explain what is happening to the marble as it slows and then stops.

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2. You are a passenger in a car on a stormy and windy night. It is difficult to see because of the heavy rain. Suddenly the driver sees a fallen branch on the road and swerves to avoid it, and you are thrown against the car door so hard that it hurts. Later you discover a bruise on your arm. Why were you thrown against the door?

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3. A meteor is headed directly from Mars to the sun. It approaches the moon, and slowly but surely its course changes, and it hits the moon's surface.

- a. In what direction was inertia carrying the meteor? \_\_\_\_\_
- b. What force changed the course of the meteor? \_\_\_\_\_