

Chapter 12 Forces and Motion

## Section 12.2 Newton’s First and Second Laws of Motion

(pages 363–369)

*This section discusses how force and mass affect acceleration. It also defines acceleration due to gravity and compares mass and weight.*

### Reading Strategy (page 363)

**Building Vocabulary** As you read this section, write a definition in the table for each vocabulary word you encounter. Use your own words in the definitions. 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.

Matter and Motion	
Vocabulary	Definition
Inertia	Inertia is the tendency of an object to resist a change in its motion.
Mass	Mass is the amount of matter an object contains as measured by its inertia.
Weight	Weight is the force of gravity acting on an object.

### Aristotle, Galileo, and Newton (pages 363–364)

Match each scientist with his accomplishment.

Accomplishment	Scientist
<u>  b  </u> 1. Italian scientist who experimented with force and motion	a. Aristotle
<u>  c  </u> 2. Scientist who introduced laws describing force and motion	b. Galileo
<u>  a  </u> 3. An ancient Greek philosopher who made many scientific discoveries through observation and logical reasoning	c. Newton

### Newton’s First Law of Motion (pages 364–365)

- Is the following sentence true or false? According to Newton’s first law of motion, an object’s state of motion does not change as long as the net force acting on it is zero.           true
- What is inertia? Inertia is the tendency of an object to resist changes in its motion.

## Chapter 12 Forces and Motion

**Newton's Second Law of Motion** (pages 365–368)

6. According to Newton's second law of motion, acceleration of an object depends upon the \_\_\_\_\_ of the object and the \_\_\_\_\_ acting on it. Circle the best answers.

inertia       mass       net force

Match each term with its description.

- | Description   | Term            |
|---|-----------------|
| <u>  a  </u> 7. A measure of the inertia of an object | a. mass         |
| <u>  c  </u> 8. Net force/Mass                        | b. net force    |
| <u>  b  </u> 9. Causes an object's velocity to change | c. acceleration |
10. Is the following sentence true or false? The acceleration of an object is always in the same direction as the net force acting on the object.           true
11. Is the following sentence true or false? If the same force acts upon two objects with different masses, the acceleration will be greater for the object with greater mass.           false

**Weight and Mass** (pages 368–369)

12. What is weight? Weight is the force of gravity acting on an object.
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13. Circle the letter of the formula used to calculate the weight of an object.
- a. weight = mass  $\times$  velocity of an object
- b. weight = mass  $\times$  acceleration of an object
- c. weight = mass  $\times$  acceleration due to gravity
14. Is the following sentence true or false? Because the weight formula shows that mass and weight are proportional, doubling the mass of an object will not affect its weight.           false
15. On the moon, the acceleration due to gravity is only about one sixth that on Earth. Will an object weigh more or less on the moon than it weighs on Earth?           less