

Chapter 02 - Motion

**Chapter 02**  
**Motion**

**True / False Questions**

1. Imagine an experiment in which a 8 lb bowling ball and a 10 lb bowling ball are dropped from the fifth floor at the same time. The heavier ball will reach the ground first.

**FALSE**

*Bloom's Level: 4. Analyze*

*Section: 2.04*

*Topic: Gravity*

2. When you roll a ball across the floor, it comes to a stop because you are no longer exerting a force on it.

**FALSE**

*Bloom's Level: 4. Analyze*

*Section: 2.03*

*Topic: Inertia*

3. An object accelerates when it slows or its direction of movement changes.

**TRUE**

*Bloom's Level: 2. Understand*

*Section: 2.02*

*Topic: Kinematics*

4. A car traveling at 20 mph on a curved exit ramp has a constant velocity.

**FALSE**

*Bloom's Level: 3. Apply*

*Section: 2.02*

*Topic: Kinematics*

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5. Newton's second law states that if an unbalanced force acts on an object, it will move at constant velocity.

**FALSE**

*Bloom's Level: 3. Apply*

*Section: 2.06*

*Topic: Newton's laws*

6. The reason a moving object slows down is that its force of motion gradually runs out.

**FALSE**

*Bloom's Level: 4. Analyze*

*Section: 2.03*

*Topic: Inertia*

7. The momentum of an object remains the same unless an unbalanced force acts on it.

**TRUE**

*Bloom's Level: 3. Apply*

*Section: 2.07*

*Topic: Momentum*

8. Astronauts experience a weightless condition when they are in orbit.

**FALSE**

*Bloom's Level: 4. Analyze*

*Section: 2.09*

*Topic: Gravity and Motion*

9. The force of gravity near the surface of Earth is  $9.8 \text{ m/s}^2$ .

**FALSE**

*Bloom's Level: 2. Understand*

*Section: 2.04*

*Topic: Gravity and Motion*

10. The attractive force a 70 kg person exerts on Earth is much, much smaller than the force Earth exerts on the person.

**FALSE**

*Bloom's Level: 4. Analyze*

*Section: 2.06*

*Topic: Newton's laws*

### Multiple Choice Questions

11. In the equation  $\bar{v} = \frac{d}{t}$ ,  $\bar{v}$  represents

- A.** average speed.
- B. instantaneous speed.
- C. final speed.
- D. constant speed.

*Bloom's Level: 3. Apply*

*Section: 2.02*

*Topic: Kinematics*

12. Ignoring air resistance, the velocity of a falling object

- A. is constant.
- B.** is constantly increasing.
- C. increases for a while, then becomes constant.
- D. depends on the mass of the object.

*Bloom's Level: 3. Apply*

*Section: 2.04*

*Topic: Gravity and Motion*

13. The tendency of a moving object to remain in unchanging motion in the absence of an unbalanced force is called

- A.** inertia.
- B. free fall.
- C. acceleration.
- D. impulse.

*Bloom's Level: 2. Understand*  
*Section: 2.03*  
*Topic: Inertia*

14. A heavy object and a light object are dropped from rest at the same time in a vacuum. The heavier object will reach the ground

- A. before the lighter object.
- B.** at the same time as the lighter object.
- C. after the lighter object.
- D. It depends on the shape of the object.

*Bloom's Level: 3. Apply*  
*Section: 2.04*  
*Topic: Gravity and Motion*

15. Gravity is an attractive force between

- A. all massive objects.
- B. Earth and objects on Earth.
- C. Earth and Moon, and objects on Earth.
- D.** all objects everywhere.

*Bloom's Level: 3. Apply*  
*Section: 2.09*  
*Topic: Newton's laws*

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16. The newton is a unit of

- A. motion.
- B. energy.
- C. power.
- D.** force.

*Bloom's Level: 2. Understand*

*Section: 2.06*

*Topic: Newton's laws*

17. The weight of a 50 kg box is closest to

- A. 5 N.
- B. 50 N.
- C.** 500 N.
- D. 5000 N.

*Bloom's Level: 4. Analyze*

*Section: 2.06*

*Topic: Weight and mass*

18. The pound is an English unit of measure; its SI counterpart is the

- A.** newton.
- B. kilogram.
- C. joule.
- D. momentum.

*Bloom's Level: 3. Apply*

*Section: 2.06*

*Topic: Weight and mass*

19. Suppose that a rock is swinging in a circle when some string is let out so that the length doubled as the same speed is maintained. The force now exerted on the string is
- A. the same as before.
  - B. doubled.
  - C. half as great.**
  - D. four times as great.

*Bloom's Level: 4. Analyze*  
*Section: 2.08*  
*Topic: Circular motion*

20. A boy on a skateboard pushes off the ground with his foot. He and the skateboard accelerate down the sidewalk due to the force
- A. he exerts against the ground.
  - B. between the skateboard wheels and the ground.
  - C. the ground exerts against his foot.**
  - D. of gravity acting on the skateboard.

*Bloom's Level: 4. Analyze*  
*Section: 2.06*  
*Topic: Newton's laws*

21. If an unbalanced force applied to an object doubles, then
- A. its velocity doubles.
  - B. its acceleration doubles.**
  - C. its acceleration is cut in half.
  - D. its acceleration increases by a factor of four.

*Bloom's Level: 4. Analyze*  
*Section: 2.06*  
*Topic: Newton's laws*

22. Everything that happens in the universe can be traced to interactions of
- A. matter and gravity.
  - B. light and matter.
  - C. four fundamental forces.**
  - D. gravity waves and light.

*Bloom's Level: 3. Apply*  
*Section: 2.02*  
*Topic: Forces*

23. The mass of a 100 N sack of seed is closest to
- A. 10 kg.**
  - B. 10 lb.
  - C. 98 kg.
  - D. 1,000 kg.

*Bloom's Level: 4. Analyze*  
*Section: 2.06*  
*Topic: Weight and mass*

24. A block of iron is transported to the Moon. Which of the following is true?
- A. both its mass and weight remain unchanged.
  - B. its mass decreases, but its weight remains the same.
  - C. its mass remains the same, but its weight decreases.**
  - D. both its mass and weight decrease.

*Bloom's Level: 4. Analyze*  
*Section: 2.06*  
*Topic: Weight and mass*

25. From the equation  $w = mg$ , it is apparent that weight is a(an)
- A. force.
  - B. mass.
  - C. acceleration.
  - D. None of the above.

*Bloom's Level: 4. Analyze*  
*Section: 2.06*  
*Topic: Weight and mass*

26. If you double the mass of an object while an unbalanced force remains constant,
- A. the object moves at half the speed.
  - B. the acceleration of the object is doubled.
  - C. the object will gradually slow down.
  - D. The acceleration of the object is halved.

*Bloom's Level: 4. Analyze*  
*Section: 2.06*  
*Topic: Newton's laws*

27. If you consider the total distance and total time for a trip, you are calculating a(an)
- A. instantaneous speed.
  - B. constant speed.
  - C. average speed.
  - D. non-uniform speed

*Bloom's Level: 4. Analyze*  
*Section: 2.02*  
*Topic: Kinematics*



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28. You should "follow through" when hitting a ball because

- A. this increases the force.
- B. momentum is conserved.
- C.** of the relationship  $\Delta p = Ft$ .
- D. momentum is  $mv$ .

*Bloom's Level: 4. Analyze*

*Section: 2.07*

*Topic: Momentum*

29. A cannon ball and a bowling ball were dropped at the same time from the top of a building. At the instant before the balls hit the sidewalk, the cannon ball has greater

- A. velocity.
- B. acceleration.
- C.** momentum.
- D. all of these are the same for the two balls.

*Bloom's Level: 4. Analyze*

*Section: 2.07*

*Topic: Momentum*

30. A 250 g ball travels at a velocity of 40 m/s. Its momentum is

- A. 4 kg·m/s.
- B.** 10 kg·m/s.
- C. 160 kg·m/s.
- D. 10,000 kg·m/s.

*Bloom's Level: 3. Apply*

*Section: 2.07*

*Topic: Momentum*