

Directed Reading A

Section Gravity and motion

1. Suppose a baseball and a marble are dropped at the same time from the same height. which ball would land first according to Aristotle? Explain.

GRAVITY AND FALLING OBJECTS

2. What Italian scientist argued that the mass of an object does not affect the time the object takes to fall to the ground?

3. Why do objects fall to the ground at the same rate?

4. On what two factors does acceleration depend?

5. Does a heavier object or a lighter object experience a greater gravitational force?

6. Why is a heavier object harder to accelerate than a lighter object?

7. Why does a heavier object fall with the same acceleration as a lighter object?

8. The rate at which velocity changes over time is called

_____.

9. How is acceleration calculated?

10. At what rate do all objects accelerate toward Earth?

11. What equation is used to calculate the velocity (Δv) of a falling object?

Directed Reading A *continued*

AIR RESISTANCE AND FALLING OBJECTS

- _____ 12. The force that opposes the motion of objects through air is
- a. gravity.
 - b. net force.
 - c. velocity.
 - d. air resistance.

13. What three factors affect the amount of air resistance acting on an object?

14. What do you get when you subtract the force of air resistance from the force of gravity?

15. When a falling object stops accelerating, it has reached _____ velocity.

16. If there were no air resistance, what would be the velocities of hailstones during a hailstorm?

17. The motion of a body when only the force of gravity is acting on the body is called _____.

18. Why can free fall occur only where there is no air?

19. What are two places that have no air resistance?

ORBITING OBJECTS ARE IN FREE FALL

20. Is it true that an astronaut is weightless in space? Explain your answer.

Directed Reading A *continued*

21. A space shuttle follows the curve of the Earth's surface as it moves at a constant speed, and so is said to be _____ Earth.
22. Why don't space shuttle astronauts in orbit hit their heads on the ceiling of the falling shuttle?

23. What is centripetal force?

PROJECTILE MOTION AND GRAVITY

- _____ 24. The curved path that an object follows when thrown, launched, or otherwise projected near the surface of Earth is called
- a. terminal velocity.
 - b. projectile motion.
 - c. terminal motion.
 - d. projectile velocity.
- _____ 25. The two independent components of projectile motion that combine to form a curved path are
- a. horizontal motion and vertical motion.
 - b. parallel motion and vertical motion.
 - c. horizontal motion and perpendicular motion.
 - d. horizontal force and vertical force.
- _____ 26. Motion parallel to the ground is called
- a. vertical motion.
 - b. horizontal motion.
 - c. parallel motion.
 - d. horizontal force.

Directed Reading A *continued*

- _____ 27. Everything on Earth is pulled downward toward the center by
- a. acceleration.
 - b. projectile motion.
 - c. gravity.
 - d. vertical motion.
- _____ 28. Motion perpendicular to the ground is called
- a. vertical motion.
 - b. horizontal motion.
 - c. perpendicular motion.
 - d. perpendicular force.
- _____ 29. Objects in projectile motion are pulled down by
- a. acceleration.
 - b. horizontal motion.
 - c. vertical motion.
 - d. gravity.
- _____ 30. Compared to a falling object, the downward acceleration of a thrown object is
- a. the same.
 - b. faster.
 - c. slower.
 - d. constant.
- _____ 31. If you want to hit a target with a thrown or propelled object, you must
- a. aim directly at the target.
 - b. aim below the target.
 - c. aim above the target.
 - d. stand very close to the target.