

Chapter Review

USING VOCABULARY

To complete the following sentences, choose the correct term from each pair of terms listed below:

1. An object in motion tends to stay in motion because it has _____. (*inertia* or *terminal velocity*)
2. Falling objects stop accelerating at _____. (*free fall* or *terminal velocity*)
3. _____ is the path that a thrown object follows. (*Free fall* or *Projectile motion*)
4. A property of moving objects that depends on mass and velocity is _____. (*inertia* or *momentum*)
5. _____ only occurs when there is no air resistance. (*Momentum* or *Free fall*)

UNDERSTANDING CONCEPTS

Multiple Choice

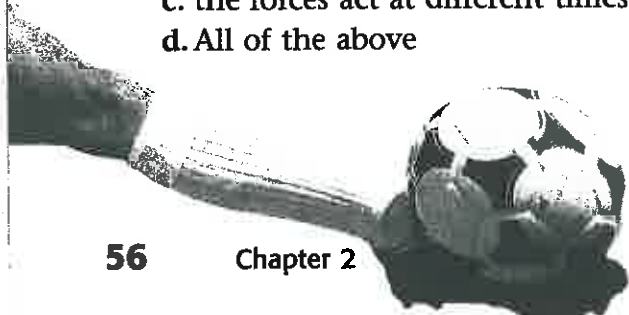
6. A feather and a rock dropped at the same time from the same height would land at the same time when dropped by
 - a. Galileo in Italy.
 - b. Newton in England.
 - c. an astronaut on the moon.
 - d. an astronaut on the space shuttle.
7. When a soccer ball is kicked, the action and reaction forces do not cancel each other out because
 - a. the force of the foot on the ball is bigger than the force of the ball on the foot.
 - b. the forces act on two different objects.
 - c. the forces act at different times.
 - d. All of the above



8. An object is in projectile motion if
 - a. it is thrown with a horizontal push.
 - b. it is accelerated downward by gravity.
 - c. it does not accelerate horizontally.
 - d. All of the above
9. Newton's first law of motion applies
 - a. to moving objects.
 - b. to objects that are not moving.
 - c. to objects that are accelerating.
 - d. Both (a) and (b)
10. Acceleration of an object
 - a. decreases as the mass of the object increases.
 - b. increases as the force on the object increases.
 - c. is in the same direction as the force on the object.
 - d. All of the above
11. A golf ball and a bowling ball are moving at the same velocity. Which has more momentum?
 - a. the golf ball, because it has less mass
 - b. the bowling ball, because it has more mass
 - c. They both have the same momentum because they have the same velocity.
 - d. There is no way to know without additional information.

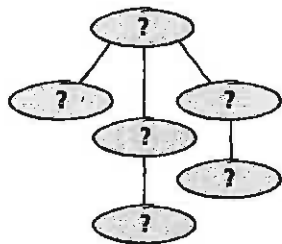
Short Answer

12. Explain how an orbit is formed.
13. Describe how gravity and air resistance combine when an object reaches terminal velocity.
14. Explain why friction can make observing Newton's first law of motion difficult.



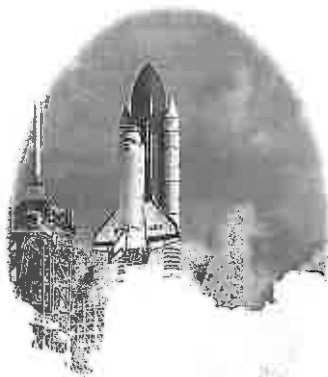
Concept Mapping

15. Use the following terms to create a concept map: gravity, free fall, terminal velocity, projectile motion, air resistance.



CRITICAL THINKING AND PROBLEM SOLVING

16. During a shuttle launch, about 830,000 kg of fuel is burned in 8 minutes. The fuel provides the shuttle with a constant thrust, or push off the ground. How does Newton's second law of motion explain why the shuttle's acceleration increases during takeoff?



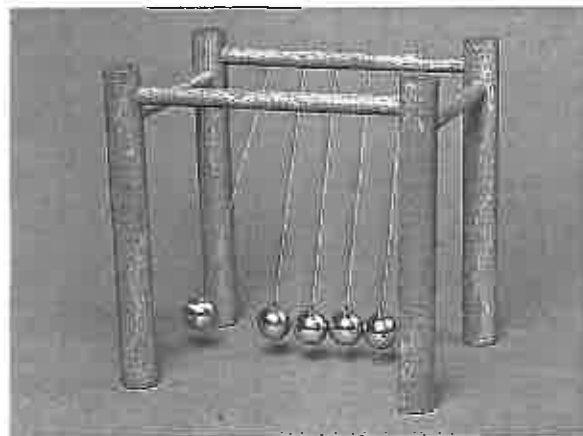
17. When using a hammer to drive a nail into wood, you have to swing the hammer through the air with a certain velocity. Because the hammer has both mass and velocity, it has momentum. Describe what happens to the hammer's momentum after the hammer hits the nail.
18. Suppose you are standing on a skateboard or on in-line skates and you toss a backpack full of heavy books toward your friend. What do you think will happen to you and why? Explain your answer in terms of Newton's third law of motion.

MATH IN SCIENCE

19. A 12 kg rock falls from rest off a cliff and hits the ground in 1.5 seconds.
- Ignoring air resistance, what is the rock's velocity just before it hits the ground?
 - What is the rock's weight after it hits the ground? (Hint: Weight is a measure of the gravitational force on an object.)

INTERPRETING GRAPHICS

20. The picture below shows a common desk toy. If you pull one ball up and release it, it hits the balls at the bottom and comes to a stop. In the same instant, the ball on the other side swings up and repeats the cycle. How does conservation of momentum explain how this toy works?



Reading Check-up

Take a minute to review your answers to the Pre-Reading Questions found at the bottom of page 34. Have your answers changed? If necessary, revise your answers based on what you have learned since you began this chapter.