

Chapter 1 Linear Motion

Free-Fall: Going Up

Pre-Test - Post-Test

1. An object is thrown upwards and then caught when it comes back down. Neglecting air resistance, the speed with which it is caught is _____.
 - A) more than the speed it had when thrown upwards.
 - B) less than the speed it had when thrown upwards.
 - C) the same as the speed it had when thrown upwards.

2. As an object rises in the air, its acceleration is _____.
 - A) less than 9.8 m/s/s.
 - B) 9.8 m/s/s.
 - C) more than 9.8 m/s/s.
 - D) changing.

3. When a rock thrown upwards gets to the exact top of its path, its _____.
 - A) velocity is zero.
 - B) velocity is less than 10 m/s.
 - C) velocity is to 10 m/s.
 - D) velocity is greater than 10 m/s.
 - E) depends on how fast it was thrown.

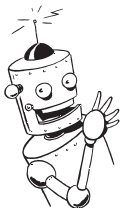
4. When a rock thrown upwards gets to the exact top of its path, its _____.
 - A) acceleration is zero.
 - B) acceleration is 9.8 m/s/s.
 - C) acceleration is greater than 10 m/s/s.
 - D) acceleration is less than 10 m/s/s.
 - E) none of these.

5. A ball is thrown upwards. Neglecting air resistance, what initial upward speed does the ball need to remain in the air for a total of 10 seconds?
 - A) 10 m/s.
 - B) 20 m/s.
 - C) 50 m/s.
 - D) 100 m/s.
 - E) 110 m/s.
 - F) none of these.

6. An object is thrown upwards and then caught when it comes back down. If air resistance is a factor, the speed with which it is caught is _____.
 - A) more than the speed it had when thrown upwards.
 - B) less than the speed it had when thrown upwards.
 - A) the same as the speed it had when thrown upwards.

7. A ball is thrown 125 meters upwards and then falls the same distance back to earth. Neglecting air resistance, its total time in the air is about _____.
 - A) 5 seconds.
 - B) 10 seconds.
 - C) 15 seconds.
 - D) more than 20 seconds.

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1. In the absence of air resistance, what rate do objects in free fall gain velocity?

2. How fast will an object dropped from rest be traveling after 3 s, 4 s, 5 s?

3. Write the formula for calculating the speed of an object dropped from rest.

4. In the image below, label the positive and negative directions.



5. What is the direction of an object's velocity as it moves away from the Earth (positive or negative)?

6. What is the direction of an object's velocity as it moves towards the Earth (positive or negative)?

7. A baseball is thrown upward away from the Earth at 10 m/s:
 - a) At what rate does the baseball change speed on the way up?

 - b) At what rate does the baseball change speed on the way down?

 - c) In what direction is the acceleration while the ball is going up?

 - d) In what direction is the acceleration while the ball is coming down?

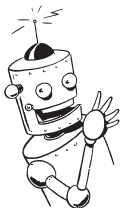
 - e) What is the speed of the ball at the tippy-top?

 - f) What is the acceleration of the ball at the tippy-top?

 - g) How fast is the ball going when it comes back to its starting point: faster, slower, the same?

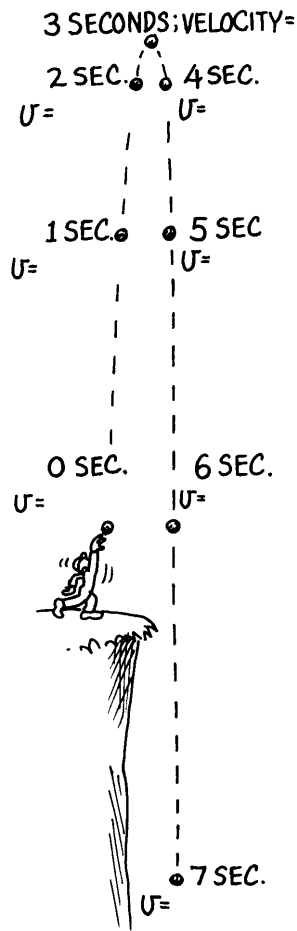
 - h) If there is no air resistance, how much time is required for going up compared to coming down: more, less, same?

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8. On the image below, label the ball's velocity every second of the object's motion.



9. How does the acceleration of a ball going up compare to the acceleration of a ball coming back down?

10. Why is it a bad idea to fire bullets into the air during a celebration?

11. How does the speed of a ball going up compare to the speed of a ball coming back down when air resistance is a factor?

12. When dropped from rest, how long does it take a falling object to reach a speed of 50 m/s?

13. If a rock is thrown straight upward at 50 m/s, how long does it take to reach a speed of 0 m/s?

14. If a rock is thrown straight upward at 50 m/s, How high will it travel?

15. If a rock is thrown straight upward at 50 m/s, how long will it be in the air?

16. What will the velocity of the ball be when it comes back to your hand?

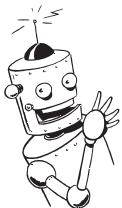
17. What is the velocity of an object when it reaches the top of its path?

- a) 0 m/s
- b) 9.8 m/s
- c) 9.8 m/s/s
- d) less than 9.8 m/s/s
- e) greater than 9.8 m/s/s

18. What is the acceleration of an object when it reaches the top of its path?

- a) 0 m/s
- b) 9.8 m/s
- c) 9.8 m/s/s
- d) less than 9.8 m/s/s
- e) greater than 9.8 m/s/s

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