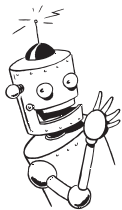


Chapter 3 Projectile Motion

Projectile Motion**Pre-Test - Post-Test**

1. A bullet fired from a gun begins to fall
 - a. as soon as it leaves the barrel
 - b. only after it slows
 - c. it never falls
 - d. depends on how fast it is going
2. Roll a ball off the edge of a table. As it falls its horizontal component of its motion
 - a. decreases
 - b. remains constant
 - c. increases
 - d. will vary.
3. A stone is thrown horizontally from the top of a cliff. One second after it has left your hand its vertical distance below the cliff is
 - a. 5 m
 - b. 10 m
 - c. 15 m.
 - d. depends on horizontal speed
4. Circle the letter that best describes the path followed by a ball that rolls off the edge of a desk
 - a. straight
 - b. horizontal
 - c. circular
 - d. curved
 - e. vertical
5. A bullet fired horizontally hits the ground in 0.5 seconds. If it had been fired with a much higher speed in the same direction, it would have hit the ground in
 - a. less than 0.5 sec.
 - b. more than 0.5 sec.
 - c. 0.5 sec.
6. What prevents satellites such as the space shuttle from falling?
 - a. they are outside Earth's gravity.
 - b. there is no air drag.
 - c. nothing, they are falling all the way around the Earth.
7. What prevents satellites such as the space shuttle from falling?
 - a. they are outside Earth's gravity.
 - b. there is no air drag.
 - c. nothing, they are falling all the way around the Earth.
8. Earth satellites are typically more than 150 km high so as to be above the earth's
 - a. atmosphere
 - b. gravitational field
 - c. both a and b
 - d. neither a or b



Chapter 3 Projectile Motion

Projectile Motion

Leap of Faith (The set-up)

Doc Fizzix dorm room was on the 32nd floor of his dormitory. There was a pool at the bottom of Doc Fizzix's dormitory but the pool was located several meters away from the edge of the building.

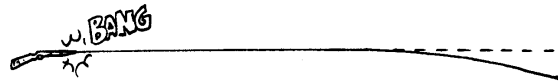
1. If Doc Fizzix dropped a tennis ball from the balcony it would take 4-seconds to hit the ground. How high up was Doc Fizzix?
2. If Doc Fizzix wanted to land in the pool he would have to jump away from the building, how would this change the time of fall?
7. Describe the components of projectile motion.
8. What happens to the horizontal component of an object's motion as it is projected off a cliff?
9. What happens to the vertical component of an object's motion as it is projected off a cliff?
10. What path does an object travel that is projected horizontal off a cliff?

2.1 Projectile Motion

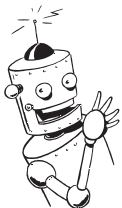
3. In which direction does gravity work? Vertical, horizontal, or both?
4. Explain how the motion of an object traveling horizontal is affected by gravity.
5. How does the velocity of an object moving horizontally compare along it's journey? Explain
6. How does the velocity of an object moving vertically compare along it's journey? Explain

2.2 Projectiles Launched Horizontally

11. Which hits the ground first, a bullet dropped from a gun, or a bullet fired simultaneously from the same height?
12. There are some that claim a high-speed bullet will travel over a hundred feet or more without dropping, are they correct?
13. Does the horizontally speed of an object effect it's time of fall?
14. If an object is thrown horizontally from a cliff, what variable(s) would you need to know in order to predict how long the object will be in the air?



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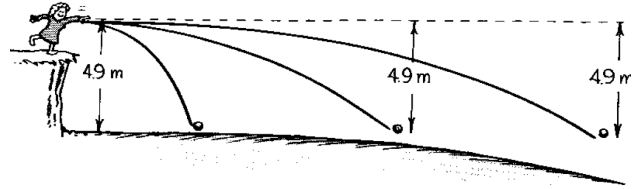


Chapter 3 Projectile Motion

Leap of Faith (Revisited)

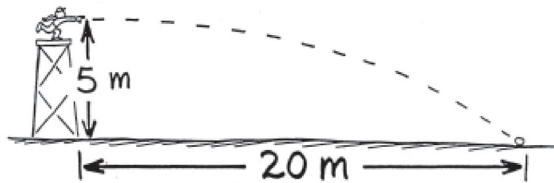
15. Doc Fizzix is trying to determine if he will be successful leaping from the 32nd floor of his dorm room into the pool below, what measurements are important in determining if he should attempt such a leap?

21. If you could throw an object fast enough, how would the curvature of the Earth effect the time an object was in the air?



Brain Challenge

A baseball pitcher throws a ball horizontally from a tower 5 meters tall and the ball lands 20 meters downrange.

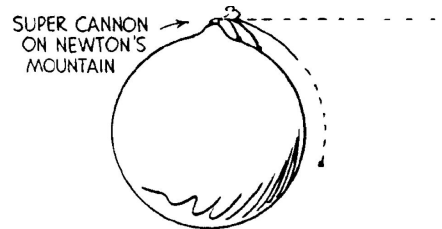


2.4 Satellite Motion

22. In 1-sec, how far does an object fall?

23. If you could throw an object fast enough, how would the curvature of the Earth effect the time an object was in the air?

24. What is Newton's mountain?



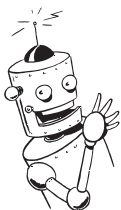
- 16. If the baseball was dropped from rest at the top of the tower, how long would it be in the air?
- 17. If the baseball is thrown horizontally how long will it be in the air?
- 18. At what speed was the ball thrown?
- 19. How long would it be in the air if it was thrown twice as fast?
- 20. If the ground at the far end of the field was sloped downward, would the ball be in the air for the same amount of time before it hits the ground?

25. In 1-sec, how far does an object fall?

26. Describe orbital/satellite motion.

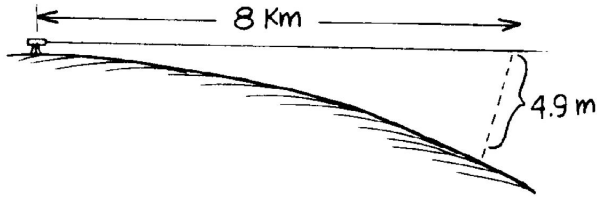
27. What is the curvature of the Earth?

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Chapter 3 Projectile Motion

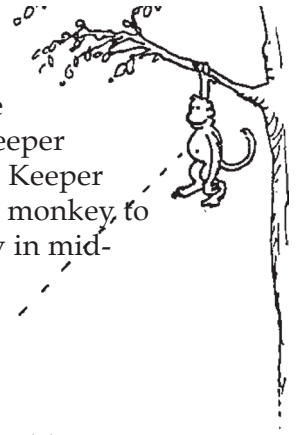
28. How fast must an object be thrown in order to cause it to go into orbit around the Earth?



29. Near the surface of Earth, how fast does a stone have to be thrown to orbit Earth?

30. Why are satellites launched into space?

34. If the monkey lets go of the branch at the instant the Keeper shoots the food, should the Keeper aim above, at, or below the monkey to get the food to the monkey in mid-air?



35. At what angle should you hold a garden hose so that the stream of water will go the farthest?

36. A plane drops a package, where does the package land in reference to the plane above?

2.3 Angled Projectiles

31. How far below an initial straight-line path will a projectile fall in one second?

32. Does your answer depend on the angle of launch or on the initial speed of the projectile?

37. To bomb a tank factory the Flying Fortress should drop its bomb load:
 a. before it is over the target.
 b. when it is directly over the target.
 c. after passing over the target.

Brain Challenge

A zookeeper devises a rubber-band gun to shoot food to a monkey who is too shy to come down from the trees.

33. If the monkey does not move, should the Keeper aim above, at, or below the monkey?

