

Chapter 10 Centripetal Force

Centripetal Force

Pre-Test - Post-Test

1. If the earth rotated more slowly about its axis, your weight would _____.
 - A) stay the same.
 - B) increase.
 - C) decrease.

2. A person weighs less at the equator than at the poles. The reason for this has to do with the _____.
 - A) higher temperature at the equator, and expansion of matter.
 - B) tidal bulges.
 - C) influence of the sun, moon, and all the planets.
 - D) spin of the earth.
 - E) none of the above

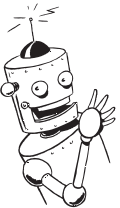
3. What is the direction of the force that acts on clothes in the spin cycle of a washing machine?
 - A) Up
 - B) Outward
 - C) Down
 - D) Inward

4. A tin can whirled on the end of a string moves in a circle because _____.
 - A) the can continually pulls on the string.
 - B) there is an inward force acting on the can.
 - C) there is a force on the can pulling it outward.
 - D) once the can starts moving, that is its natural tendency.
 - E) all of the above

5. 5) If you whirl a tin can on the end of a string and the string suddenly breaks, the can will _____.
 - A) spiral in toward your hand.
 - B) fly directly away from you.
 - C) fly directly toward you.
 - D) spiral away from your hand.
 - E) fly off, tangent to its circular path.

6. A car travels in a circle with constant speed. The net force on the car _____.
 - A) is zero because the car is not accelerating.
 - B) is directed forward, in the direction of travel.
 - C) is directed toward the center of the curve.
 - D) none of the above

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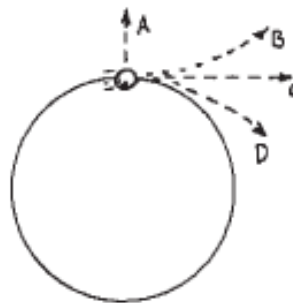
10.1 Linear and Rotation Speed

1. Which moves faster, a horse near the outside of a merry-go-round or a horse near the inside?
2. Distinguish between linear speed and rotational speed.
3. Would it be easier stand on the outer edge of a rotating merry-go-around or closer to the center?
4. Do you weigh less at the north pole or equator?
5. If the earth rotated more slowly about its axis how would that effect your weight at your current location?
6. If you should buy a quantity of gold in Mexico and weigh it carefully on a spring balance, would the same quantity of gold weigh more, less, or the same if weighed on the same spring balance in Alaska?
7. Does a phonograph needle ride faster or slower over the groove at the beginning or the end of the record? How about a CD?

8. If fidelity increases with speed, what part of the record produces the highest fidelity? How about a CD?
9. When a long-range cannonball is fired toward the equator from a northern (or southern) latitude, it lands west of its "intended" longitude. Why?

10.2 Centripetal Force

10. When you whirl a tennis ball at the end of a string in a circular path, what happens to the direction of travel if you stop pulling on the string?

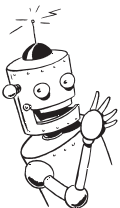


11. What is the direction of the force that is exerted on the tennis ball as you spin it around?
12. What is a centripetal force and what is the formula?

10.3 Centrifugal Force

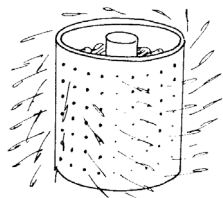
13. What is a centrifugal force?
14. Why does a person on a ride feel like they are being thrown outward?

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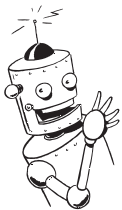
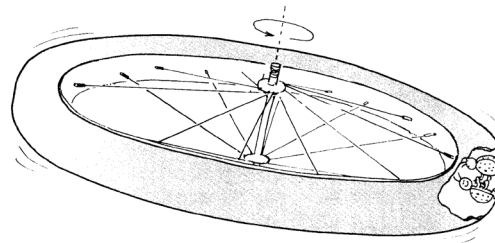
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15. You are a passenger in a car and your friend makes a left turn. You feel like you are being thrown into the door. Do you experiencing an centrifugal force and a centripetal force? Explain
16. Swing a pail of water around rapidly in a circle at arm's length and the water will not spill. Is the water being pulled inward or thrown outward?
17. What is the minimum centripetal acceleration that is required for the water trick to work?
18. Demonstration: Place a coin on the tip of a wire coat hanger and then spin the hanger on your finger. Does it work by centripetal force or centrifugal force, explain.
19. Why is centrifugal force not considered a true force?
20. How does a washing machine remove water from the cloths?
22. How does a car turn a corner? What is/are the variable(s) responsible for assuring that a car can makes a turn?
23. Why is it unwise for you to do any significant braking when your car is in a turn? For example, suppose that while in the curve you decide you are taking it a bit too fast. What happens if you apply the brakes too hard?
24. It is a common ride at most amusement parks. As an individual stands against a wall the ride begins spinning faster and faster. Eventually the floor drops and the person is stuck to the wall. What holds the person to the wall and prevents them from falling? Draw a picture of this setup
25. From problem 23, what would happen if a person was to wearing a wind breaker?



21. Is it an inward force or an outward force that is exerted on the clothes during the spin cycle of an automatic washer?

26. How can you design a space station with a simulated gravity?



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