

Chapter 11 Center of Gravity

Center of Gravity**Pre-Test - Post-Test**

1. The famous Leaning Tower of Pisa doesn't topple over because its center of gravity is:
 - a. above a place of support.
 - b. relatively low for such a tall building.
 - c. stabilized by its structure.
 - d. displaced from its center.
 - e. in the same place as its center of mass.
2. Toss a baseball bat into the air and it wobbles about its.
 - a. light end.
 - b. heaviest point.
 - c. center of mass.
 - d. geometrical center.
3. If a box of granite stones of different size were shaken, small stones would soon migrate to the bottom. The reason this happens is that:
 - a. the mass of the box is lowered.
 - b. the center of gravity of the box is lowered.
 - c. small stones are heavier than larger stones.
 - d. smaller objects fall faster than larger objects.
 - e. none of the above.
4. On a balanced seesaw, a boy three times as heavy as his partner sits
 - a. $1/3$ the distance from the fulcrum.
 - b. less than $1/3$ the distance from the fulcrum.
 - c. more than $1/3$ the distance from the fulcrum.
5. If you balance a broom horizontally on one finger, the center of gravity of the broom will be above your finger-closer to the broom end than the handle end. If you saw the broom in two pieces at that point, and weigh the two parts on a weighing scale, you'll find that the heavier part is the
 - a. broom end.
 - b. handle end.
 - c. both weigh the same.
6. Two people are balanced on a seesaw. What will happen to side A if the person on side B leans toward the center?
 - a. rise.
 - b. fall.
 - c. stay the same.
 - d. not enough information.



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11.1 Torque

1. Why does a ball roll down a hill?
2. What is a Torque and what is the formula for torque?
3. Why do top fuel dragsters have such a long front ends?
4. Why do buses and heavy trucks have large steering wheels?

11.2 Balanced Torque

5. What does balanced torque mean and what is the formula?
6. Is it possible to play seesaw with someone who is lighter or heavier than you?
7. Which half of the broom weighs more, the bristle-end or the sawed-off handle?



8. Rest a meter stick on two fingers as shown. Slowly bring your fingers slowly together. At what part of the stick do your fingers meet?

11.3 Center of Mass

9. How do you locate the center of mass?
10. Toss a baseball bat into the air and it appears to wobble all over the place. Specifically, what place?
11. What is the difference between a cheap ping-pong ball and an expensive one?
12. Why was Doc Fizzix's baseball career cut short at a young age?
13. Where is the most comfortable seat to be in on a bus when traveling on a bumpy road?
14. Give an example of an object where the center of mass is located at a point where there is no mass.
15. Why is the wobbly motion of a single star an indication that the star has a planet or system of planets?
16. What is the objective in balancing a car tires?
17. Why do some high-jumpers arch their bodies into a U-shape when passing over the high bar (the Fosbury flop)? centrifugal force, explain.



Chapter 11 Center of Gravity**11.4 Torque and Center of Mass**

18. Why is it dangerous to roll open the top drawers of a fully loaded file cabinet that is not secured to the floor?

19. How far can the Leaning Tower of Pisa lean before it falls?

11.5 Stability

20. What is the most stable position of an object?.

21. Why don't weebles fall down?

22. Mr. Balmer performs a demonstration in which a ball rolls up hill, explain.

23. You ever throw dice and they keep coming up "7's"? Where is the CG of the dice?

24. How would you get the prize out of a box of cereal without emptying the box?

25. Explain how panning for gold works.

26. Compare the location of the center of mass of males and females.

27. With your toes against a door frame, try to stand on the balls of her feet without toppling backward. Now you explain why it can't be done.

28. Try the following with a group of males and females. Stand exactly two foot lengths away from a wall. Bend over with a straight back and let your head lean against the wall. Then lift a chair that is placed beneath you while your head is still leaning against the wall. With the chair in lifted position, attempt to straighten up. Give a reason why females can generally do this and males cannot.

29. One year Doc Fizzix had a student do the impossible task of touching her toes while her heels were against a wall, how was she able to complete the challenge?

30. What two inventions did Doc Fizzix come up with to help his wife through her pregnancy?

31. Why do some animals have tails?

32. Some times the easiest problems are the hardest. Why does a ball roll down a hill?



