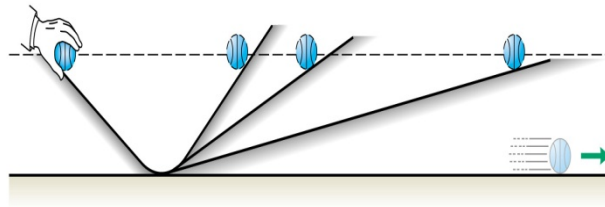


## Inertia

**Check Questions:** Answer all questions briefly but completely.

1. What is inertia?
2. What is the law of inertia?
3. When a ball rolls down an incline, how high will it roll back up another incline?



4. If a ball was to roll down an incline, and there were no obstructions for it to run into, how far would it roll?
5. How does the famous table cloth trick work? This is when someone pulls the table cloth out from object sitting on the table cloth without the object moving?
6. When you are in your car and you hit the gas why do you feel like your body is being pushed into the seat?
7. What do seatbelts have to do with Newton's 1<sup>st</sup> law when you hit the brakes on your car?
8. Why is it dangerous to hit the brakes on your car when you have a tractor trailer following very closely on the interstate?
9. (Hewitt p.57, #27) A Suppose you place a ball in the middle of a wagon that is at rest and then abruptly pull the wagon forward. Describe the motion the ball makes relative to the wagon? To the ground?

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10. When a junk car is compacted into a cube, does its mass change?
  
11. (Hewitt p.57, #29) If an elephant were chasing you, its enormous mass and its great velocity would be very threatening. But, if you zigzag as you run away from the elephant, the elephants mass would be to your advantage. Why?
  
12. When space ships are flying through space, why don't their engines need be constantly be on like in your car?
  
13. Which has more inertia, a car traveling 15m/s or a bicycle traveling 20 m/s?
  
14. Explain what happens to a puck on an air table when it is pushed?
  
15. A truck is equipped with a cannon that points straight up. The truck is moving at a constant velocity when the cannon are fired. Neglecting air resistance, where will the cannon ball strike when it returns?
  
16. Using Newton's First Law, explain the following situations.
  - a. The use of a seat belt, air bag, and head rest in a car.
  
  - b. The best way to get ketchup out of a nearly empty bottle.
  
  - c. Why you will hurt your hand if you hit it against a wall while carrying a heavy load. (and, why it won't hurt that much if you aren't carrying anything...)
  
  - d. Twirling a bucket full of water vertically around in a circle – and not getting wet.
  
  - e. Laying a book on four Styrofoam cups and not having them break, and then *dropping* the book on the cups and squishing them.
  
  - f. A skateboard you are riding on strikes a curb (what happens to you!)