Name _____ Period _____ Date _____

The Law of Inertia

Pre-Test - Post-Test

1. The law of inertia states that an object _____.

A) that is not moving will never move unless a force acts on it.
B) will continue moving at the same velocity unless an outside force acts on it.
C) at rest will remain at rest unless acted on by an outside force.
D) will continue moving in a straight line unless an outside force acts on it.
E) all of the above

2. A truck is moving at constant velocity. Inside the storage compartment a rock is dropped from the midpoint of the ceiling and strikes the floor bellow. The rock hits the floor _____.

A) exactly bellow the midpoint of the ceiling.
B) ahead of the midpoint of the ceiling.
C) behind of the midpoint of the ceiling.
D) more information is needed to solve this problem.

3. If the force of gravity suddenly stopped acting on the planets, they would

A) spiral slowly away from the sun.
B) move in straight lines tangent to their orbits.
C) fly straight away from the sun.
D) continue to orbit the sun.
E) spiral slowly towards the sun.

4. Compared to its weight on earth, a 10-kg object on the moon will weigh

A) more.
B) less.
C) the same.

5. Compared to its mass on earth, the mass of a 10-kg object on the moon is

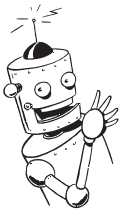
A) more.
B) less.
C) the same.

6. Which has more mass, 10 kg of feathers or 10 kg of bricks?

A) 10 kg of feathers.
B) 10 kg of bricks.
C) same
D) depends on where they are weighed.

7. You would have the largest mass of gold if your chunk of gold weighed 1 N on

A) Earth.
B) the planet Jupiter.
C) the moon.



Name _____ Period _____ Date _____

The Law of Inertia

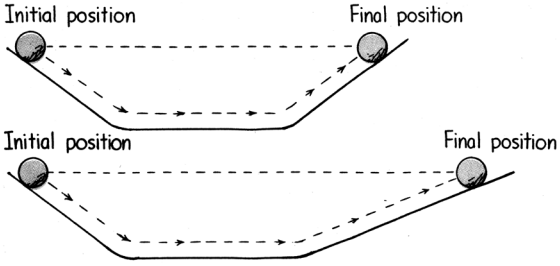
Aristotle on Motion

1. How did Aristotle view the cause of an object's motion?

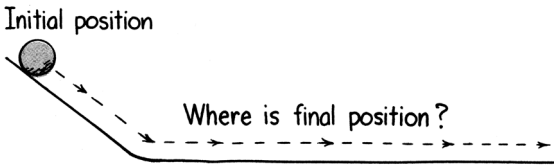
2. How would Aristotle explain the continued motion of an object through the air?

Galileo on Motion

3. Galileo let a ball roll down one incline and then up another. Compared with its initial height, how high did the ball roll up the second incline?



4. How did Galileo view the cause of an object's continued motion?



5. What does the term *inertia* mean?

6. According to Galileo, what would eventually cause all objects to stop moving on Earth?

Newton's Law of Inertia

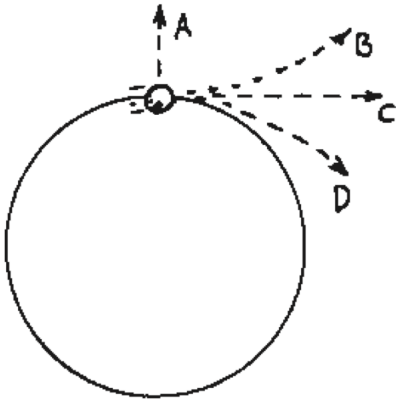
Every object continues in its state of rest, or of motion in a straight line at constant speed, unless it is compelled to change that state by forces exerted upon it.

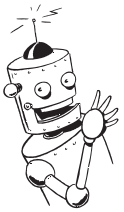
7. When was Isaac Newton born?

8. Describe the motion of a moving object when no forces act upon it.

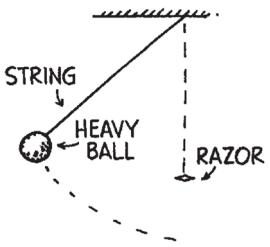
9. To say that an object moves in a straight-line path at constant speed implies what about its velocity?

10. If the force of gravity between a planet and the Sun suddenly disappeared, what path would a planet follow?

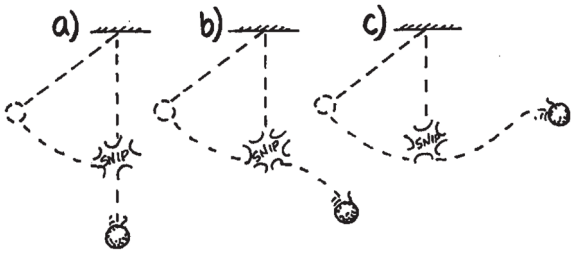




11. A ball is tied to the end of a string and allowed to swig like a pendulum. When the ball is released and swings to its lowest point, the string is cut by a razor as shown below.



a) Which path does the ball follow after the string is cut.



Mass and Weight

12. What is mass and what does it measure?

13. How do you measure mass?

14. What is weight?

15. How do you measure weight?

16. How do you calculate weight?

17. Distinguish between mass and weight.

18. What does the term "MASS" really stand for?

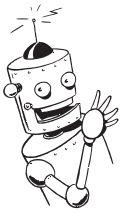
19. Does a person diet to lose mass or to lose weight?

20. Would it be easier to push a car on the moon or earth? Explain

21. Why is it to your advantage to zigzag if you are being chased by an elephant?

22. In tearing a paper towel or plastic bag from a roll, why is a sharp jerk more effective than a slow pull?

23. Ask a friend to drive a small nail into a piece of wood placed on top of a pile of books on your head. Why doesn't this hurt you?



24. What is the proper way to tighten the head on a hammer? Explain

25. You are taking a drink of water when one of the ice cubes is in the way. Without touching the ice cube can you move it so that it is not in your way by turning the glass? Explain

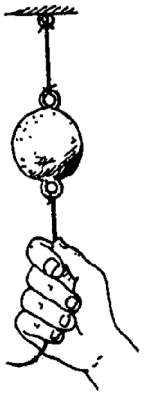
26. If you're at rest in your car and someone runs into you from behind you can suffer a serious neck injury called whiplash, what does this have to do with Newton's first law?

27. A common mistake is made by people who load a truck or trailer with a lot of mass but underestimate the stopping distance. Discuss

28. In this classic demonstration a mass is suspended by a string, and pulled from below.

a) Which string will break is the string is pulled quickly? Explain

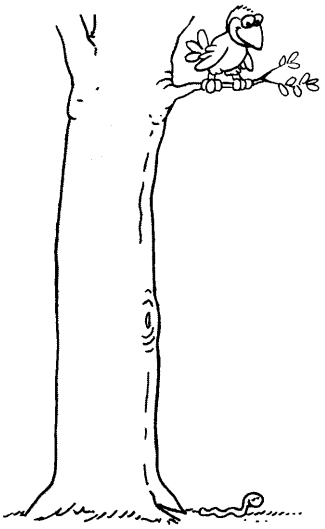
b) Which string will break if pulled slowly? Explain



Inertia Reference Frames

29. If you are standing inside a moving bus and drop a coin directly above your foot, where will it land?

30. Does the classic bird-and-worm argument prove that the earth must be at rest? Explain



31. The Earth rotates at more than 1000 km/h If you stand on the east side of a wall and jump into the air, why doesn't the wall slam into you?

32. What concept was missing in people's minds in the sixteenth century when they couldn't believe the Earth was moving?

33. You are in a falling elevator. At the moment before the elevator hits the ground you jump upwards or you step off the falling elevator. Will this save your life? Explain.