Inertia and Mass

Read from **Lesson 1** of the **Newton's Laws** chapter at **The Physics Classroom**:

http://www.physicsclassroom.com/Class/newtlaws/u2l1a.html
http://www.physicsclassroom.com/Class/newtlaws/u2l1b.html

MOP Connection: Newton's Laws: sublevel 1

1. **Inertia** is _____

   _____

2. The amount of inertia possessed by an object is dependent solely upon its _____.

3. Two bricks are resting on edge of the lab table. Shirley Sheshort stands on her toes and spots the two bricks. She acquires an intense desire to know which of the two bricks are most massive. Since Shirley is vertically challenged, she is unable to reach high enough and lift the bricks; she can however reach high enough to give the bricks a push. Discuss how the process of pushing the bricks will allow Shirley to determine which of the two bricks is most massive. What difference will Shirley observe and how can this observation lead to the necessary conclusion?

4. Would Shirley Sheshort be able to conduct this same study if she was on a spaceship in a location in space far from the influence of significant gravitational forces? _____ Explain your answer.

5. If a moose were chasing you through the woods, its enormous mass would be very threatening. But if you zigzagged, then its great mass would be to your advantage. Explain why.

6. Inertia can best be described as _____.
   a. the force which keeps moving objects moving an stationary objects at rest.
   b. the willingness of an object to eventually lose its motion
   c. the force which causes all objects to stop
   d. the tendency of any object to resist change and keep doing whatever its doing

7. Mass and velocity values for a variety of objects are listed below. Rank the objects from smallest to greatest inertia. _____ < _____ < _____ < _____

Pre-Conceptions

Students typically have many pre-conceived notions regarding concepts in Physics. It has always proven useful to bring these ideas to the forefront of your mind and to make an effort to evaluate their correctness. The following statements pertain in one way or another to common notions regarding central concepts of this unit. Identify each statement as being either true (**T**) or false (**F**).

Force and Motion - What Do You Believe?

The following statements pertain in one way or another to common notions regarding force and motion. Identify each statement as being either true (**T**) or false (**F**).

T or F?		Statement
_____	1.	A force is required to keep an object moving in a given direction.
_____	2.	An upward moving object must be experiencing (or at least usually does experience) an upward force.
_____	3.	A rightward moving object must be experiencing (or at least usually does experience) a rightward force.
_____	4.	A ball is moving upwards and rightwards towards its peak. The ball experiences a force that is directed upwards and rightwards.
_____	5.	If a person throws a ball with his hand, then the force of the hand upon the ball is experienced by the ball for at least a little while after the ball leaves the hand.
_____	6.	A cannonball is shot from a cannon at a very high speed. The force of the explosion will be experienced by the cannonball for several seconds (or a least a little while).
_____	7.	If an object is at rest, then there are no forces acting upon the object.

Mass and Weight - What Do You Believe?

The following statements pertain in one way or another to common notions regarding mass and weight. Identify each statement as being either true (**T**) or false (**F**).

T or F?		Statement
_____	1.	Objects do NOT weigh anything when placed in a vacuum.
_____	2.	All objects weigh the same amount when placed in a vacuum, regardless of their mass.
_____	3.	An object weighs less on the moon than it does on the Earth.
_____	4.	The mass of an object on the moon is the same as its mass on the Earth.
_____	5.	A high-speed object (say, moving at 200 mi/hr) will weigh less than the same object when at rest.
_____	6.	A high-speed object (say, moving at 200 mi/hr) will possess measurably more mass than the same object when at rest.
_____	7.	Weight is measured in pounds; mass is measured in Newtons.
_____	8.	A free-falling object still has weight.
_____	9.	Weight is the result of air pressure exerted upon an object.

