

Inertia and Mass

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



<http://www.physicsclassroom.com/Class/newtlaws/u211a.html>
<http://www.physicsclassroom.com/Class/newtlaws/u211b.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. _____ < _____ < _____ < _____

v = 2 m/s
m = 10 kg

Object A

v = 0 m/s
m = 20 kg

Object B

v = 4 m/s
m = 5 kg

Object C

v = 3 m/s
m = 8 kg

Object D

Balanced vs. Unbalanced Forces

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

<http://www.physicsclassroom.com/Class/newtlaws/u211c.html>
<http://www.physicsclassroom.com/Class/newtlaws/u211d.html>

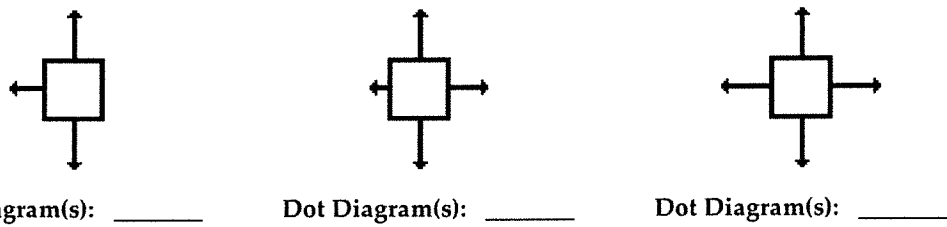
MOP Connection: Newton's Laws: sublevels 2 and 3

Review: An object at rest ... _____;
 An object in motion _____;
 unless ... _____.

- The amount of force required to keep a 6-kg object moving with a constant velocity of 2 m/s is ___ N.
 a. 0.333 b. 2 c. 3 d. 6 e. 12
 f. ... nonsense! A force is NOT required to keep an object in motion.
- Renatta Oyle is having car troubles. She is notorious for the trail of oil drops that she leaves on the streets of Glenview. Observe the following oil traces and indicate whether Renatta's car is being acted upon by an unbalanced force. Give a reason for your answers.

	Unbalanced Force?
a. Reason: _____	Yes or No
b. Reason: _____	Yes or No
c. Reason: _____	Yes or No

- Each one of the dot diagrams in question #2 can be matched to a force diagram below. The force diagrams depict the individual forces acting upon the car by a vector arrow. The arrow direction represents the direction of the force. The arrow length represents the strength of the force. Match the dot diagrams from #2 to a force diagram; not every force diagram needs to be matched.



- If the net force acting upon an object is 0 N, then the object MUST _____. Circle one answer.
 a. be moving b. be accelerating c. be at rest
 d. be moving with a constant speed in the same direction e. either c or d.