# Implications of Inertia

***Instructions****: There are many more applications of Newton's 1st Law of Motion. Several applications are listed below; use inertia to explain the situations below. Please use full sentences.*

1. Blood rushes from your head to your feet while quickly stopping when riding on a descending elevator.
2. The head of a hammer can be tightened onto the wooden handle by banging the bottom of the handle against a hard surface.
3. A brick is painlessly broken over the hand of a physics teacher by slamming it with a hammer. (CAUTION: do not attempt this at home!)
4. To dislodge ketchup from the bottom of a ketchup bottle, it is often turned upside down and thrust downward at high speeds and then abruptly halted.
5. Headrests are placed in cars to prevent whiplash injuries during rear-end collisions.
6. While riding a skateboard (or wagon or bicycle), you fly forward off the board when hitting a curb or rock or other object that abruptly halts the motion of the skateboard.

***Instructions****: Use your understanding of inertia to answer the questions below. Please use full sentences.*

1. Imagine a place in the cosmos far from all gravitational and frictional influences. Suppose that you visit that place and throw a rock. Will the rock gradually stop or continue in motion in the same direction at constant speed?
2. Mac and Tosh are arguing in the cafeteria. Mac says that if he flings his Jell-O with a greater speed it will have a greater inertia. Tosh argues that inertia does not depend upon speed, but rather upon mass. Who do you agree with? Explain why.
3. Supposing you were in space in a weightless environment; would it require a force to set an object in motion?
4. Ben Tooclose is being chased through the woods by a bull moose that he was attempting to photograph. The enormous mass of the moose is extremely intimidating. Yet, if Ben makes a zigzag pattern through the woods, he will be able to use the large mass of the moose to his own advantage. Explain.
5. Little Cindy Lou Who stands on her toes and spots two bricks resting on the edge of a table. She acquires an intense desire to know which of the two bricks are most massive. Since Cindy 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 Cindy to determine which of the two bricks is most massive. What difference will Cindy observe and how can this observation lead to the necessary conclusion?