Physics

Newton's First Law – Playing with Inertia

Name:_____ Block:_____

Picture this: You're in the car driving along the Metro Detroit Autobahn (also known as I-696) at 78 m/hr. Suddenly, the car in front of you slams on the brakes, so you respond by slamming on your brakes. What happens? The car is slowing down very rapidly, however you keep moving – good thing you were wearing your seat belt! Why did the car stop, but you keep moving???

Everyone is familiar with Newton's First Law of Motion. It says "an object with no force acting on it moves with constant velocity." In other words, *An object at rest stays at rest and an object in motion stays in motion unless acted on by an outside force.* Newton's First Law deals with an object's inertia – an object's tendency to maintain a constant state of motion or no motion – and will be the basis for today's exploration.

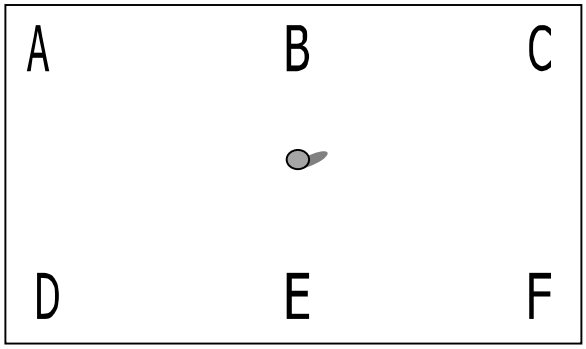
In this activity, you will be given several different scenarios in which you must make and test predictions based on Newton's First Law. You will place "cargo" in the center of a "truck bed" and simulate different movements of the "truck" to show what actually happens to your "cargo".

Materials:

- Box Lid
- Large Marble

Procedure:

1. Use a marker to label the inside of your box lid to match the diagram below.



2. Read the scenario listed in the table and then for each one you must:
    a. Predict where the marble will roll ***first***.
    b. Explain why you have predicted this in terms of Newton's First Law.
    c. Test your prediction (in other words, simulate the scenario).
    d. Explain your results – did it match your prediction, why or why not?