Law of Inertia

Why do we wear seatbelts? For safety, of course. The way that seatbelts save many lives each year can be explained well by Newton's first law of motion.

Newton's first law of motion is also known as the law of inertia. All objects have inertia as it is a property of matter. Inertia is the tendency for an object to either stay at rest or remain in motion, unless acted upon by an unbalanced force.

When you are riding in a car, you and the car have the same speed. You are in motion. According to the law of inertia, you and the car will remain in motion until acted upon by an unbalanced force.

When the brakes are applied to the car, the friction applied acts as an unbalanced force, slowing the car to a stop. What happens to you when the brakes are applied?

Because of inertia, you are still moving, despite the car slowing. The seatbelt acts as the unbalanced force that changes your motion, keeping you in your seat.

Think of how unsecured items in the car tend to travel forward when the brakes are applied. That's inertia in action.

During car accidents, seat belts keep everyone in their seats, which saves lives. Car seats for children are also fighting inertia everyday!

Changes in motion can only occur when an unbalanced force is applied. For example, a ball rolling on the ground would remain in motion forever if not for unbalanced forces acting on it. Which forces will cause the ball to stop?

The friction of the grass will act as an unbalanced force to slow the ball. The gravity of Earth is the greatest unbalanced force, pulling the ball toward the center of the planet. These two forces will work together to bring the ball to a stop.

Objects with more mass have more inertia than objects with less mass. This means that the more mass an object has, the more force it takes to overcome its inertia. Remember that objects at rest also have inertia.

To change the motion of any object, the mass is not the only factor. The change in motion will also depend on the size of the force applied.