Inertia and Mass

Lesson Notes

Textbook Definition of Inertia:

Inertia is a property of an object that describes that object's **tendency to resist changes in its state of motion**.

The **state of motion** includes information about the **speed** and the **direction** the object is moving.

Mass is a measurable quantity that provides an indication of the amount of inertia an object has. Inertia depends solely upon mass.

Demonstration: The Tale of Two Bricks

For the same push, the least massive brick experiences a greater acceleration. The more massive brick demonstrates the greater inertia or resistance to change.

Galileo and Inertia Animation

The ball will always continue in motion until it reaches the same height on the opposite ramp. Changing the angle of the opposite ramp only lengthens the time it takes for the ball to reach the same height. If the opposite ramp is horizontal, the ball would continue in motion forever in an effort to reach the same starting height.

Galileo for a Day Experiment

As the amount of friction between a cart and the track is reduces, the cart demonstrates less and less of a rate of deceleration. What happens if the friction is reduced to zero? Once set in motion, the cart would remain in motion forever with a constant velocity.

Newton's First Law:

Objects at rest stay at rest ... resisting change in the state of motion.
Objects in motion keep the same speed and direction of motion ... resisting change in the state of motion.