

Newton's Three Laws of Motion

11.2-11.3

Objectives

- Students will be able to state Newton's first and second laws and apply them to understanding different situations.
- Identify the law that says that objects change their motion only when a net force is applied.
- Relate the first law of motion to important applications, such as a seat belt safety issues.
- Calculate force, mass, and acceleration by using Newton's second law.

Newton's First Law of Motion

- Isaac Newton restated Galileo's conclusions as his first law
- Newton's First Law: objects at rest remain at rest, objects in motion remain in motion w/ same velocity unless acted upon by an unbalanced force.
- Aka "Law of Inertia" – Lazy Law
- Inertia- resistance of an object to change in speed or direction of its motion.
 - Closely related to mass (easier to push/pull empty, rather than full box)
 - Reason people wear seat belts

Newton's First Law of Motion



An object at rest will remain at rest...

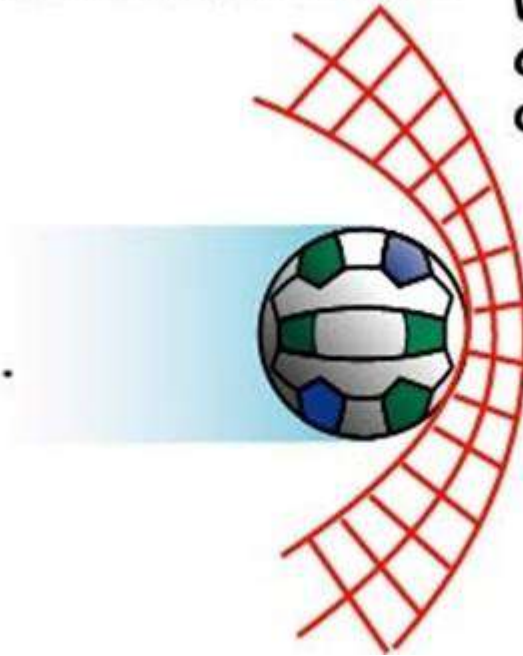


Unless acted on by an unbalanced force.



An object in motion will continue with constant speed and direction,...

... Unless acted on by an unbalanced force.



Examples of Newton's First Law

- Blood rushes from your head to your feet while quickly stopping when riding on a descending elevator.
- The head of a hammer can be tightened onto the wooden handle by banging the bottom of the handle against a hard surface.
- 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!)
- 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.
- Headrests are placed in cars to prevent whiplash injuries during rear-end collisions.
- 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.