

Forces Part I



What is a force?

- Definition:
 - A push or pull applied to an object that has the potential to cause a change in the objects motion
 - Can make a stopped object move
 - Can make a moving object speed up, slow down, stop, or change directions
- Variable: F
- Unit: Newton (N)
- Forces acting on objects are represented by arrows that show the magnitude (size) and direction



How do we represent forces?

- A force diagram is a visual representation of a scenario
 - Ex. 1: Child A pulls on the teddy bear with a 5N force to the right while Child B pulls on the teddy bear with a 10N force to the left



- Ex. 2: Child A pulls on a teddy bear with a 5N force to the right while Child B pulls on the teddy bear with a 5N force to the left



- Ex. 3: Mover A pulls on a heavy box with a 20N force to the right while Mover B pushes on the box with a 20N force to the right



What are balanced and unbalanced forces?

- The net force is the sum of all of the forces acting on an object
 - Balanced forces occur when the net force is zero
 - This means these forces cancel out and there is no change in the objects motion; moving objects keep moving and stationary objects remain stopped
 - Unbalanced forces occur when the net force is not zero
 - This means these forces do not cancel out and the object will accelerate (change its motion in some way)



What are balanced and unbalanced forces?

- Examples of Balanced Forces

- You push on a box while your friend pushes on the box in the opposite direction and the box does not move
- You push on a heavy bookshelf and it does not move
- You are ice skating, and even though you are not actively moving your feet, you are still gliding in the same direction you were when you were pushing your feet

- Examples of Unbalanced Forces

- You press on the gas pedal in the car, causing it to go faster
- You press on the break pedal in the car, causing it to slow down and stop
- You turn the wheel of the car, causing the car to make a turn



What is friction?

- Friction is a force that opposes motion
 - This means that it acts in the direction opposite to the motion
- Types of Friction
 - Static: Objects standing still
 - Sliding: Sliding, dragging, etc. objects
 - Rolling: Rolling, etc. objects
 - Fluid: Objects moving through liquid or gas
 - Includes air resistance

