

# Newton's 2<sup>nd</sup> Law

- Force is a vector
- Adding all the force vectors on an object will tell you the acceleration (also vector) times its mass

$$\vec{F}_{net} = \sum \vec{F} = m \vec{a}$$

- Like any vector equation, you can also work in one component at a time

$$F_{net,x} = m a_x$$

$$F_{net,y} = m a_y$$

$$F_{net,z} = m a_z$$

# Force Problem Tips

- Frequently objects have more than one force on them
  - You can only ignore some of them if you know they cancel (add to zero)
- Force is a vector, add components, not magnitudes
- LON-CAPA problems asking for force or acceleration (without components) really mean magnitudes of them

# Force Pairs (Newton's 3<sup>rd</sup>)

- If one object exerts a force on another, it also receives a force on it of equal magnitude but opposite direction