

# Force

A force is a push or a pull  
↳ half of an interaction

Examples

pulling < door

pushing < door / kicking / shopping cart

pushing pencil

throwing

air pressure

skeliton / muscles

Gravity

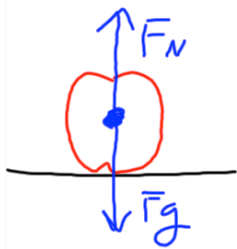
Air Resistance - Friction Nuclear

Tension

Supporting Force =  $\begin{matrix} \text{Normal} \\ \text{Force} \end{matrix} F_N$

## Drawing Forces

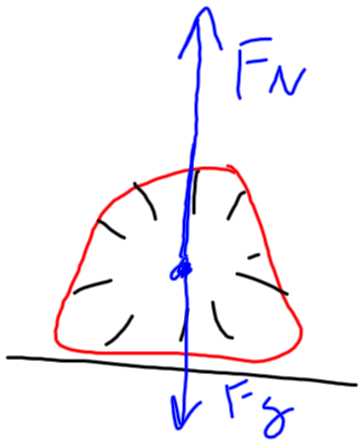
Force Vectors = Force arrows  
= arrows that represent forces



- The direction of the arrow is the direction of the force

- The length of the arrow is the magnitude (size) of the force

- Always draw the force vector from the center of the object



## Forces

Gravity -  $F_g$

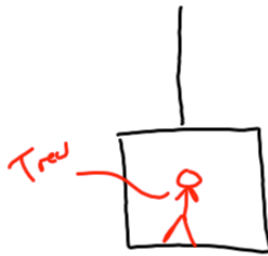
Normal force = Supporting  $F_N$

cancel out  $\left\{ \begin{array}{l} \text{air pressure inside the ball} \\ \text{air pressure outside the ball} \end{array} \right.$

elasticity

Normal Force is larger than the force of gravity because it causes the ball to bounce up

## Frictionless Elevator



## Forces

Gravity -  $F_g$

Traffic Weight -  $F_{T_{elev}}$

~~air pressure~~

~~air resistance~~

Rail holding up -  $F_{Tension}$

~~Friction~~

Free body diagram

FBD - a diagram of the forces acting on an object