

Velocity & Acceleration Notes

- **Motion** is a change in an object's position over time
- Any time something's position changes, it is motion
- **Speed** is a measure of how quickly that motion occurs
 - Speed is a scalar quantity-it just tells you the number and a unit
- When we know the direction and the speed of an object, we call it **Velocity**
- The velocity of an object can stay the same or it can change
- **Acceleration** is a change in an object's velocity
- There are 3 main types of acceleration:
 - Positive Acceleration
 - The speed of the object increases
 - Examples: Runners starting a race, a pitcher throwing a baseball
 - Negative Acceleration
 - The speed of the object decreases
 - Examples: A car stopping at a red light, a ball rolling to a stop
 - Changing Directions
 - Because velocity measures BOTH speed and direction and acceleration is a change in an object's velocity, any time an object changes directions, it is accelerating
 - Examples: NASCAR races, ball on a string
- To calculate acceleration:
 - You need to know 3 things:
 - Final Velocity (V_f)
 - Initial Velocity (V_i)
 - Time (T)
 - Use this formula: Acceleration (A) = $\frac{V_f - V_i}{T}$
- What is the acceleration of an object if its final velocity is 20m/s and the initial velocity is 10m/s and the motion took 2s to complete?
 - Step 1-Write the formula $A = \frac{V_f - V_i}{T}$
 - Step 2-Replace V_f with the final velocity $A = \frac{20m/s - V_i}{T}$
 - Step 3-Replace V_i with the initial velocity $A = \frac{20m/s - 10m/s}{T}$
 - Step 4-Subtract V_f from V_i $A = \frac{10m/s}{T}$
 - Step 5-Replace T with the time $A = \frac{10m/s}{2s}$
 - Step 6-Divide by T and record your unit as m/s^2 $A = 5m/s^2$