Physical Science Notes 2-3 Acceleration

- Acceleration is the rate of change in the speed of an object.
  - The units for acceleration are meters per second per second or m/s^2
- To determine the rate of acceleration for an object, you use the formula below.

$$\text{Acceleration} = \frac{\text{Final Speed} - \text{Initial Speed}}{\text{Time}}$$

$$a = \frac{V_2 - V_1}{T} \qquad T = \frac{V_2 - V_1}{a} \qquad V_2 = V_1 + (a)(t)$$

- A positive value for acceleration shows speeding up, negative value for acceleration shows slowing down. Slowing down is also called deceleration.

Examples

A skater increases her velocity from 2.0 m/s to 10.0 m/s in 3.0 seconds. What is the skater's acceleration?

Looking For: Acceleration	**Solution:**
Given: Beginning Speed: 2.0m/s Final Speed: 10.0 m/s Change in time: 3 s	a= 10.0-2.0/3 a= 2.7 m/s^2
Relationship A = V_2-V_1/t	

A car accelerates at a rate of 3.0 m/s^2. If the car's original speed is 8.0 m /s, how many seconds will it take the car to reach a final speed of 25.0 m/s?

Looking For: Time	**Solution:**
Given: Beginning Speed: 8.0m/s Final Speed: 25m/s Acceleration: 3.0 m/s^2	T= 25-8/3 T= 5.7 s
Relationship T= v_2-v_1/a	

A cart has an initial velocity of 5.0 m/s, if it accelerates at a rate of 3.00 m/s^2 for 10 seconds, what is the final velocity?

Looking For: Final Speed	**Solution:**
Given: Beginning Speed: 5.0 m/s Acceleration: 3.00 m/s2 Time: 10 s	V_2 = 5.0 + (3 x 10) V_2 = 35 m/s
Relationship: V_2= V_1 + (a x T)	