September 16, 2013

Review:

- If the velocity is ***constant***, then to find how far something travels we use the equation
  - $d = vt$
- If you are driving to St. George to go to Zion's, how far will you have gone if you are driving 60 mph and have driven 2.5 hours?
- What if the Velocity changes?

New Concept----Acceleration

- Accelerations ***<u>change</u>*** velocity
- The equation for acceleration is:
  - $a = \frac{\Delta v}{t} = \frac{v_f - v_i}{t}$
- What does all of this mean?
- Assume an acceleration of 15 km/hr/s

Time	Velocity	Acceleration
0 sec	0 m/s	15 km/hr/s
1 sec	15 km/hr	15 km/hr/s
2sec	30 km/hr	15 km/hr/s
…	…	…
5 sec	50 km/hr	15 km/hr/s
T sec	15(t) km/hr	15 km/hr/s

Can you do this in General?

- The equation for the velocity at any time for any acceleration is given by the following:
  - $v_f = at$
- What if the velocity does not begin at zero?
  - Redo the chart
    - $v_f = v_i + at$

Where is this used in our world today? What would happen if I pushed you out of an airplane with a speedometer strapped to your back?

Time	Velocity	Acceleration
0 sec	0 m/s	
1 sec	10 m/s	
2sec	20 m/s	
…	…	…
5 sec	50 m/s	
T sec	10(t) m/s	

- The acceleration you would experience is caused by gravity and is given the symbol g.
  - g=-10 m/s^2 (the actual value is g = -9.8 m/s^2)

- So this is a special case called free fall.
    - FREE FALL: Motion in one dimension where gravity is the ONLY acceleration.
- The equations of Motion then become:
    - $v = \frac{d}{t} or\ d = vt$ For use when there is NO acceleration.
    - $v_f = v_i + at$ When there is acceleration. If it is a case of free fall, then a=g=-10m/s^2

Free Fall: We have said nothing about how far something falls. This relationship is a bit more involved.

$$d = \frac{1}{2}at^2$$

If we solve for t in this equation, then we have the following:

$$t = \sqrt{\frac{2d}{g}}$$

If we drop an object and measure how long it takes us to catch it, we can solve for our reaction time.

Assignment P25:11-25

Reaction Time Lab?