6. Acceleration

- the rate at which the velocity (speed) of an object is changing
    - The term **"acceleration"** is typically used when the velocity <u>increases</u>.
    - The term **"deceleration"** is typically used when the velocity <u>decreases</u>
        = is when ***negative acceleration*** is occurring.
    - In both cases, "acceleration" is the process that's actually occurring.

$$\text{Acceleration} = \frac{\Delta V}{t}$$

        ΔV is the change in velocity $(V_f - V_i)$
        t is the time it takes for the velocity to change.
    - Acceleration is a representation of <u>Non-Uniform Motion</u>

Units for acceleration:
- Speed and velocity are easily measured in distance/time units, such as miles/hr, m/s, etc.
- Units of acceleration are more complicated
    = have to take other stuff into account.
    - Since velocity is the rate at which position changes, and acceleration is the rate at which velocity changes, acceleration is a **<u>"rate of a rate"</u>**.
        = **TWO** time units (m/s/s or m/s^2, km/h/s)

Sample problems:
 What is the acceleration if we speed up from 10 km/h to 30 km/h in 10 seconds?

    A car is leaving a city and traveling at 15 m/s. As it enters a highway, the driver accelerates at 4 m/s^2 for 5s. Determine the car`s new speed.

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        Acceleration =

        ΔV is the change in velocity **(V_f – V_i)**
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- Acceleration is a representation of _____

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   - Speed and velocity are easily measured in distance/time units, such as miles/hr, m/s, etc.
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        = have to take other stuff into account.
            - Since velocity is the rate at which position changes, and acceleration is the rate at
            which velocity changes, acceleration is a _____
                = **TWO** time units _____

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