Unit 14 –Newton’s Laws

Key Terms

- **Newton's 1st law** - An object at rest stays at rest and an object in motion stays in motion with the same speed and in the same direction unless acted upon by an unbalanced force.
- **Newton's 2nd law** : The acceleration of an object as produced by a net force is directly proportional to the magnitude of the net force, in the same direction as the net force, and inversely proportional to the mass of the object.
- **Newton's 3rd law:** For every action, there is an equal and opposite reaction
- **Velocity**: the distance in meters and object travels in one second, units m/s
- **Inertia**: resistance of an object to a change in motion
- **Acceleration**: the rate of change in velocity of an object every second, units m/s^2
- **Distance**: How far in meters (m)
- **Time**: The international system (SI) unit for time in seconds (s)
- **Meter**: The SI unit for distance is meter (m)
- **Gravity**: A force that attracts any objects with mass, ex. The force that pulls objects toward Earth
- **Normal Force (N):** The component of a force that is perpendicular to the surface that an object contacts. For example, the surface of a floor or table that prevents an object from falling.
- $\mathbf{F_{net}}$: the sum of all of the forces

Newton's Laws of Motion

- **Newton's 1st law – Law of Inertia**

An object at rest stays at rest and an object in motion stays in motion with the same speed and in the same direction unless acted upon by an unbalanced force.

- **Newton's 2nd law – Force = Mass * Acceleration** $(\boldsymbol{F = ma})$

The acceleration of an object as produced by a net force is directly proportional to the magnitude of the net force, in the same direction as the net force, and inversely proportional to the mass of the object.

- **Newton's 3rd law – Action = Reaction**

For every action, there is an equal reaction, in the opposite direction

Unit 14 Ch 1 – Newton's 1st Law

An object in motion remains in motion and an object at rest remains at rest, unless acted upon by an unbalanced force.

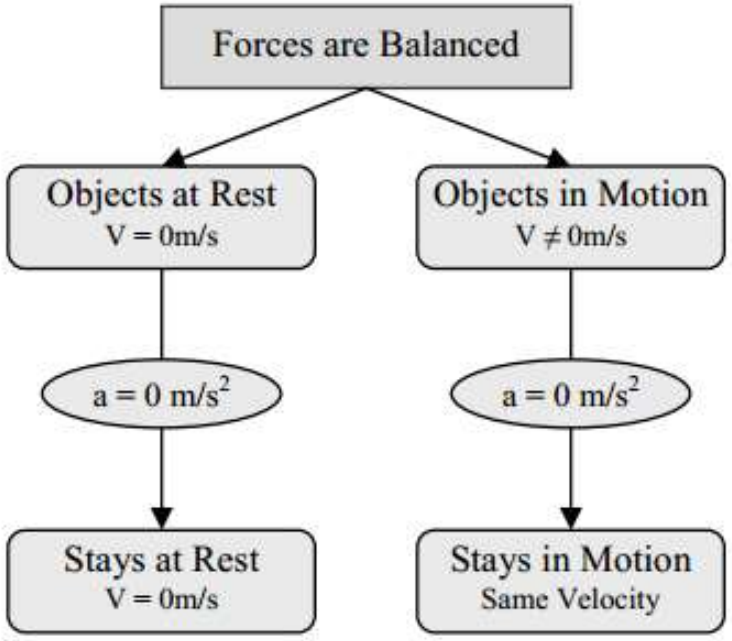
Newton's 1st Law

An object at rest stays at rest and an object in motion stays in motion with the same speed and in the same direction unless acted upon by an unbalanced force.

- If its not moving…it won't move
- If it is moving…it will continue
- It won't get faster or slower

UNLESS

A new, unmatched force acts on the object



An object at rest stays at rest; an object in motion stays in motion