**Newton’s Laws Unit Study Guide**

* Newton’s 1st Law of Motion
  + An object at rest tends to stay at rest and an object in motion tends to stay in motion unless acted upon by an outside net force.
* Newton’s 2nd Law of Motion
  + Force = mass X acceleration
* Newton’s 3rd Law of Motion
  + For every action there is an equal and opposite reaction
* Mass is scalar and measured in kilograms
* Weight is a downward force (vector) caused by gravity and is measured in Newtons
  + The weight of an object depends on its location (Earth, Moon, Space, etc.), the mass never changes.
* Equilibrium – Occurs when the net force equals zero Newtons.
* Net force – The sum of all force vectors acting on an object.
* Balanced Force – whenever an exerted force is paired with a force of equal magnitude in the opposite direction, then both forces are balanced.
* Normal Force- the force exerted by a surface on an object in the direction perpendicular to the surface.
* Free-body Diagrams: (not on an incline)

FN

Ff FA

FW

* + FN = FW, when there is no additional upward or downward forces.
  + To find an object’s weight, multiply mass by 9.8m/s2
* Be able to solve an equation using the formula F = ma
* Friction
  + 2 types
    - Static -- Stationary
    - Kinetic -- moving
* μ is the coefficient of friction—this is a unit less number telling how smooth or rough a surface is.
* Be able to solve an equation using the formula Ff =μFN
* For forces on an Incline, be able to calculate Net force, Applied force, Force of friction, Normal force, Weight, and acceleration

Examples of Word problems:





