

Force & Motion Notes



Work is measured in joules.
 $W = \text{force} \times \text{distance}$

Net Force = Measure of the Total forces acting on an object

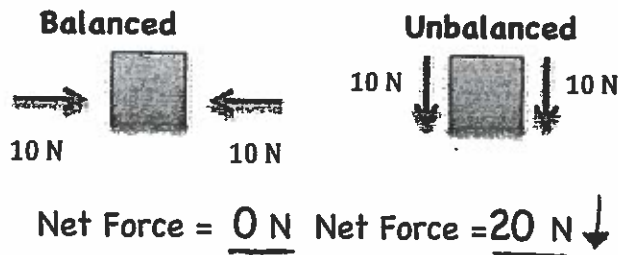
Force = mass \times acceleration
 $F = ma$

Balanced Force = All forces are equal so no change in position, direction, or motion occurs. Total Net Force is Zero "0".

Unbalanced Force = Unequal forces acting on an object causing it to change position, direction, or motion. Total net force is NOT zero "0".

Forces acting in the **SAME** direction should be **ADDED**.

Forces acting in **OPPOSITE** directions should be **SUBTRACTED**.



Speed = distance traveled in a given amount of time

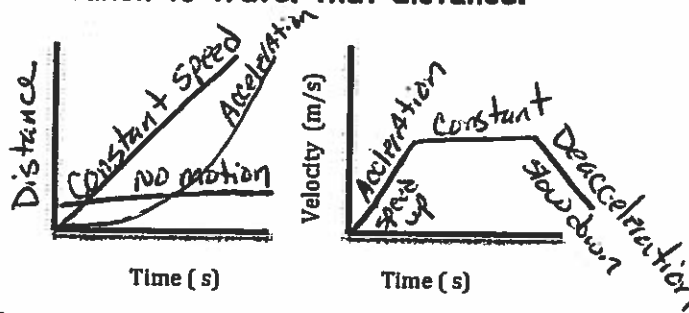


Speed = $\frac{\text{distance}}{\text{time}}$
 Unit: m/s

Constant speed = speed that does not increase or decrease.
 Example: cruise control

Instantaneous speed = an exact speed at a specific moment (time)
 Example: radar gun, photogate

Average speed = total distance traveled divided by the total time taken to travel that distance.



Velocity = Speed with direction

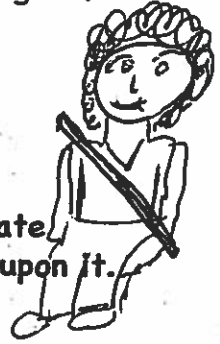
Acceleration = any change in speed or direction. Slowing down, speeding up, changing direction. Taking off, coming to a stop.

Newton's Laws

1st Law of Inertia = objects stay in current state unless another force acts upon it.

Low mass = low inertia
 High mass = high inertia

Force Acting on Car not Person
 Seatbelt holds person in car.



2nd Law of Force & Acceleration = Acceleration depends on an object's mass and magnitude of the force acting upon it.

$F = ma$



more MASS = more force needed

3rd Law of Action - Reaction Relationship between every action and reaction force.

