

Forces & Pressure

Newton's Laws of Motion

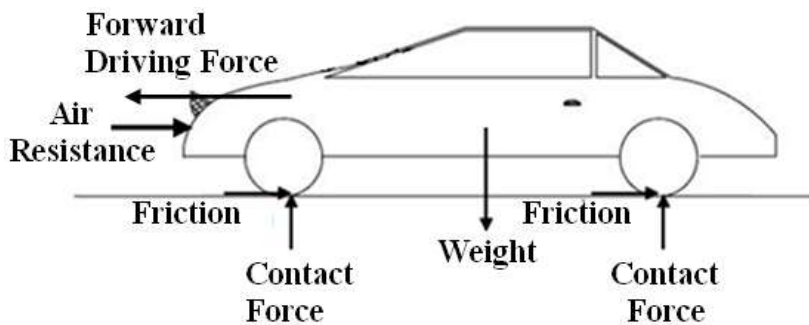
1st Law: Every object will continue in its state of rest or uniform motion in a straight line unless a resultant force acts on it.
(rest or $v = \text{constant}$)

2nd Law: When a resultant force acts on an object of constant mass, the object will accelerate in the direction of the resultant force.
(acceleration against velocity => deceleration)

$$F = ma$$

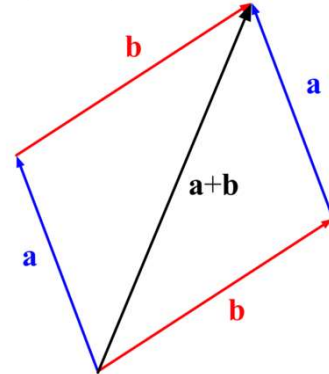
3rd Law: body A exerts a force F_{AB} on body B, then body B will exert an equal and opposite force F_{BA} on body A
(Action Reaction Pair)

Free-body diagram



Vector Diagram

To study translation, move all forces to center of gravity.



Pressure (base SI unit: pascal)

1 pascal = 1 N/m²

$$p = \frac{F}{A}$$

If F is constant, A min, p is max; A max, p is min.