

Intro Physics

The Physics Playground

Overview

Kinematics - Motion

Dynamics - Forces

Energy - Conserved Quantity

Kinematics

Displacement - how far

Speed - how fast

Velocity - how fast and in what direction

$$v = \Delta d / \Delta t$$

Acceleration - change in velocity

$$a = \Delta v / \Delta t$$

Dynamics

Newton's Laws of Motion

1st: Objects in motion stay in motion at a constant velocity, objects at rest stay at rest, unless acted on by a net force

$$\text{2nd: } \Sigma F = m * a \quad \text{or} \quad a = \Sigma F / m$$

$$\text{Gravity Force: } F_g = m * g$$

$$\text{Spring Force: } F_s = k * x$$

$$\text{Normal Force: } F_N = \text{reactive force}$$

$$\text{Friction Force: } F_f \leq \mu * F_N$$

Energy

Conservation Laws - define the boundaries of the system

Kinetic Energy - energy of motion

$$KE = \frac{1}{2} * m * v^2$$

Gravitational Potential Energy - energy from position in gravitational field

$$PE_g = m * g * h$$

Spring Potential Energy - energy in spring from being stretched or compressed

$$PE_s = \frac{1}{2} * k * x^2$$

Internal Energy - energy inside of a system (includes Thermal energy)