

## Index

### A

#### absolute temperature scale

Thermometers and Temperature Scales

#### absolute zero

Thermometers and Temperature Scales

12.3: Temperature and Temperature Scales

12.5: Ideal Gas Law

14.25: Entropy

14.26: The Third Law of Thermodynamics

#### acceleration

1.2: Units

2.3: Acceleration

2.5: Free-Falling Objects

4.4: Average and Instantaneous Acceleration

5.10: Vectors Revisited

6.3: Newton's Laws

7.13: Velocity, Acceleration, and Force

#### Acceleration due to Gravity

4.7: Free Fall

#### acceleration vector

5.3: Acceleration Vector

#### Adiabatic

12.5: Ideal Gas Law

14.7: Adiabatic Processes for an Ideal Gas

#### adiabatic index

13.2: Specific Heat

#### adiabatic process

14.5: Thermodynamic Processes

14.7: Adiabatic Processes for an Ideal Gas

#### ame constant acceleration

4.7: Free Fall

#### angular

11.14: Angular Acceleration

#### Angular acceleration

10.16: Torque and Angular Acceleration

11.2: Rotational Variables

11.13: Quantities of Rotational Kinematics

#### Angular frequency

5.5: Uniform Circular Motion

#### Angular momentum

7.19: Angular vs. Linear Quantities

11.20: Angular Momentum

11.21: Conservation of Angular Momentum

11.25: Conservation of Angular Momentum

11.26: Vector Nature of Rotational Kinematics

#### angular motion

10.9: Introduction

#### angular position

11.2: Rotational Variables

11.13: Quantities of Rotational Kinematics

#### angular velocity

7.13: Velocity, Acceleration, and Force

7.16: Kepler's Laws

7.19: Angular vs. Linear Quantities

10.9: Introduction

11.2: Rotational Variables

11.12: Conservation of Energy

11.13: Quantities of Rotational Kinematics

11.15: Rotational Kinematics

11.17: Rotational Kinetic Energy

11.26: Vector Nature of Rotational Kinematics

#### anticommutative property

3.9: Products of Vectors (Part 2)

#### application

1.1: The Basics of Physics

#### approximation

1.3: Significant Figures and Order of Magnitude

#### Artificial satellite

7.16: Kepler's Laws

#### associative

3.2: Scalars and Vectors (Part 1)

#### asteroid

7.11: Introduction to UCM and Gravitation

14.25: Entropy

#### astronomical unit

7.16: Kepler's Laws

#### atom

12.2: Introduction

#### Average Acceleration

4.4: Average and Instantaneous Acceleration

#### average power

8.5: Power

#### average speed

4.3: Instantaneous Velocity and Speed

#### Avogadro's number

12.5: Ideal Gas Law

Molecular Model of an Ideal Gas

#### axis

5.10: Vectors Revisited

### B

#### ballistics

7.14: Types of Forces in Nature

#### banked curve

7.6: Centripetal Force

#### basal metabolic rate

8.22: Power

#### base quantities

1.7: Units and Standards

#### base quantity

1.7: Units and Standards

#### base unit

1.7: Units and Standards

#### Base units

1.7: Units and Standards

#### bilateral symmetry

5.11: Projectile Motion Revisited

#### black body

13.4: Methods of Heat Transfer

#### blackbody

13.5: Global Warming

#### Boltzmann constant

Molecular Model of an Ideal Gas

12.7: Kinetic Theory

#### boundary

14.2: Thermodynamic Systems

#### Boyle's Law

14.23: The First Law of Thermodynamics

#### breaking stress

10.6: Elasticity and Plasticity

#### brine

12.3: Temperature and Temperature Scales

#### Brownian motion

12.2: Introduction

12.5: Ideal Gas Law

#### Bulk modulus

10.4: Stress, Strain, and Elastic Modulus (Part 1)

#### bulk strain

10.4: Stress, Strain, and Elastic Modulus (Part 1)

#### bulk stress

10.4: Stress, Strain, and Elastic Modulus (Part 1)

### C

#### calorie

Heat Transfer, Specific Heat, and Calorimetry

14.23: The First Law of Thermodynamics

#### calorie (cal)

Heat Transfer, Specific Heat, and Calorimetry

#### calorimeter

Heat Transfer, Specific Heat, and Calorimetry

13.2: Specific Heat

#### calorimetry

Heat Transfer, Specific Heat, and Calorimetry

13.1: Introduction

#### Carnot cycle

14.16: The Carnot Cycle

14.25: Entropy

#### Carnot engine

14.16: The Carnot Cycle

#### CARNOT'S PRINCIPLE

14.16: The Carnot Cycle

#### Celsius scale

Thermometers and Temperature Scales

#### center of gravity

10.2: Conditions for Static Equilibrium

#### Center of mass

7.15: Newton's Law of Universal Gravitation

9.9: Center of Mass (Part 1)

9.10: Center of Mass (Part 2)

9.18: Center of Mass

10.11: Stability

10.15: The Center of Gravity

#### Centrifugal force

7.14: Types of Forces in Nature

#### centripetal

7.11: Introduction to UCM and Gravitation

7.12: Non-Uniform Circular Motion

7.13: Velocity, Acceleration, and Force

#### centripetal acceleration

5.5: Uniform Circular Motion

#### Centripetal force

7.6: Centripetal Force

#### CFC

14.24: The Second Law of Thermodynamics

#### chemical reaction

12.2: Introduction

#### Circular motion

7.13: Velocity, Acceleration, and Force

#### Clausius statement of the second law of thermodynamics

14.12: Reversible and Irreversible Processes

#### closed system

9.5: Conservation of Linear Momentum (Part 1)

9.6: Conservation of Linear Momentum (Part 2)

9.14: Introduction

14.2: Thermodynamic Systems

#### coefficient of linear expansion

Thermal Expansion

#### coefficient of performance

14.14: Refrigerators and Heat Pumps

#### coefficient of volume expansion

Thermal Expansion

cold reservoir

[14.13: Heat Engines](#)

Collisions

[9.8: Collisions in Multiple Dimensions](#)

combustion

[13.2: Specific Heat](#)

Commutative

[3.2: Scalars and Vectors \(Part 1\)](#)

component

[5.10: Vectors Revisited](#)

compressibility

[10.4: Stress, Strain, and Elastic Modulus \(Part 1\)](#)

compressive strain

[10.4: Stress, Strain, and Elastic Modulus \(Part 1\)](#)

compressive stress

[10.4: Stress, Strain, and Elastic Modulus \(Part 1\)](#)

[10.13: Applications of Statics](#)

concentration

[12.11: Diffusion](#)

condensation

[Phase Changes](#)

conduction

[Mechanisms of Heat Transfer](#)

conservation

[8.21: Potential Energy and Conservation of Energy](#)

[9.14: Introduction](#)

Conservation of angular momentum

[11.21: Conservation of Angular Momentum](#)

conservation of energy

[9.16: Collisions](#)

[14.4: First Law of Thermodynamics](#)

conservation of momentum principle

[9.16: Collisions](#)

conservative force

[8.15: Conservative and Non-Conservative Forces](#)

[8.21: Potential Energy and Conservation of Energy](#)

conserved quantity

[8.16: Conservation of Energy](#)

constant acceleration

[4.5: Motion with Constant Acceleration \(Part 1\)](#)

[4.7: Free Fall](#)

constant velocity

[5.9: Motion in Two Dimensions](#)

convection

[Mechanisms of Heat Transfer](#)

conversion

[1.2: Units](#)

conversion factor

[1.8: Unit Conversion](#)

coordinate

[5.10: Vectors Revisited](#)

Coordinate axes

[5.10: Vectors Revisited](#)

Coriolis Force

[7.6: Centripetal Force](#)

Coulomb force

[8.21: Potential Energy and Conservation of Energy](#)

Critical temperature

[Molecular Model of an Ideal Gas](#)

cyclic process

[14.5: Thermodynamic Processes](#)

## D

Dalton's law of partial pressures

[Pressure, Temperature, and RMS Speed](#)

deformation

[10.14: Elasticity, Stress, Strain, and Fracture](#)

degeneracy

[14.26: The Third Law of Thermodynamics](#)

degree Celsius

[Thermometers and Temperature Scales](#)

degree Fahrenheit

[Thermometers and Temperature Scales](#)

degree of freedom

[9.16: Collisions](#)

[12.2: Introduction](#)

[Heat Capacity and Equipartition of Energy](#)

demagnetization

[14.26: The Third Law of Thermodynamics](#)

derived quantity

[1.7: Units and Standards](#)

derived unit

[1.7: Units and Standards](#)

derived units

[1.7: Units and Standards](#)

diagram

[2.4: Problem-Solving for Basic Kinematics](#)

differential

[12.10: Thermal Stresses](#)

diffusion

[12.11: Diffusion](#)

dimension

[1.4: Solving Physics Problems](#)

[9.16: Collisions](#)

Dimensional Analysis

[1.9: Dimensional Analysis](#)

dimensionally consistent

[1.9: Dimensional Analysis](#)

dimensionless

[1.9: Dimensional Analysis](#)

direction angle

[3.4: Coordinate Systems and Components of a Vector \(Part 1\)](#)

disorder

[14.18: Entropy on a Microscopic Scale](#)

[14.25: Entropy](#)

displacement

[2.1: Basics of Kinematics](#)

[3.2: Scalars and Vectors \(Part 1\)](#)

[4.2: Position, Displacement, and Average Velocity](#)

[5.10: Vectors Revisited](#)

dissipative force

[8.21: Potential Energy and Conservation of Energy](#)

distance traveled

[4.2: Position, Displacement, and Average Velocity](#)

distributive

[3.2: Scalars and Vectors \(Part 1\)](#)

diurnal

[7.14: Types of Forces in Nature](#)

Dot product

[3.8: Products of Vectors \(Part 1\)](#)

[8.10: Work Done by a Constant Force](#)

drag force

[7.7: Drag Force and Terminal Speed](#)

Dynamics

[1.4: Solving Physics Problems](#)

[6.7: Further Applications of Newton's Laws](#)

[6.9: Forces](#)

## E

eccentricity

[7.16: Kepler's Laws](#)

effectiveness

[14.14: Refrigerators and Heat Pumps](#)

efficiency

[14.13: Heat Engines](#)

elastic

[9.7: Types of Collisions](#)

[9.15: Conservation of Momentum](#)

[10.6: Elasticity and Plasticity](#)

[10.14: Elasticity, Stress, Strain, and Fracture](#)

Elastic collision

[9.14: Introduction](#)

[9.16: Collisions](#)

Elastic limit

[10.6: Elasticity and Plasticity](#)

elastic modulus

[10.4: Stress, Strain, and Elastic Modulus \(Part 1\)](#)

[10.5: Stress, Strain, and Elastic Modulus \(Part 2\)](#)

Electromagnetic Radiation

[8.24: Further Topics](#)

emissivity

[Mechanisms of Heat Transfer](#)

[13.4: Methods of Heat Transfer](#)

energy

[8.9: Introduction](#)

energy conservation

[8.16: Conservation of Energy](#)

English units

[1.7: Units and Standards](#)

enthalpy

[13.2: Specific Heat](#)

entropy

[12.3: Temperature and Temperature Scales](#)

[14.17: Entropy](#)

[14.24: The Second Law of Thermodynamics](#)

[14.25: Entropy](#)

environment

[14.2: Thermodynamic Systems](#)

equal vectors

[3.6: Algebra of Vectors](#)

equation

[6.5: Problem-Solving](#)

Equation of state

[14.2: Thermodynamic Systems](#)

equilibrium

[6.7: Further Applications of Newton's Laws](#)

[10.2: Conditions for Static Equilibrium](#)

[10.10: Conditions for Equilibrium](#)

[12.8: Phase Changes](#)

[12.11: Diffusion](#)

[13.6: Phase Equilibrium](#)

[14.2: Thermodynamic Systems](#)

equilibrium point

[8.17: Potential Energy Diagrams and Stability](#)

equipartition theorem

[Heat Capacity and Equipartition of Energy](#)

estimation

[1.10: Estimates and Fermi Calculations](#)

evaporation

[Phase Changes](#)

[13.6: Phase Equilibrium](#)

exact differential

[8.15: Conservative and Non-Conservative Forces](#)

explosion

[9.7: Types of Collisions](#)

## exponent

1.3: Significant Figures and Order of Magnitude

## extensive variable

14.2: Thermodynamic Systems

## external force

6.9: Forces

9.9: Center of Mass (Part 1)

9.10: Center of Mass (Part 2)

## F

### Fahrenheit scale

Thermometers and Temperature Scales

### Faraday constant

12.5: Ideal Gas Law

### fictitious force

7.14: Types of Forces in Nature

### Final Velocity

4.5: Motion with Constant Acceleration (Part 1)

### first equilibrium condition

10.2: Conditions for Static Equilibrium

### first law of thermodynamics

8.24: Further Topics

12.5: Ideal Gas Law

14.4: First Law of Thermodynamics

14.24: The Second Law of Thermodynamics

### fission

8.24: Further Topics

### fluid

6.7: Further Applications of Newton's Laws

### force

6.1: Introduction

6.2: Force and Mass

6.9: Forces

8.11: Work Done by a Variable Force

9.16: Collisions

10.10: Conditions for Equilibrium

### fossil fuels

8.23: CASE STUDY: World Energy Use

### frame of reference

2.1: Basics of Kinematics

### free fall

2.5: Free-Falling Objects

4.7: Free Fall

6.12: Mass and Weight

### freezing

Phase Changes

### Friction

6.3: Newton's Laws

6.7: Further Applications of Newton's Laws

7.4: Friction (Part 1)

7.5: Friction (Part 2)

8.21: Potential Energy and Conservation of Energy

9.16: Collisions

### frigorific mixture

12.3: Temperature and Temperature Scales

### fundamental thermodynamic relation

13.2: Specific Heat

### fusion

8.24: Further Topics

## G

### gas constant

12.5: Ideal Gas Law

### geothermal

14.25: Entropy

### gimbal

11.26: Vector Nature of Rotational Kinematics

## gradient

7.14: Types of Forces in Nature

### Gravitational acceleration

6.4: Other Examples of Forces

### gravitational force

7.15: Newton's Law of Universal Gravitation

### gravitational torque

10.2: Conditions for Static Equilibrium

### gravity

4.7: Free Fall

5.11: Projectile Motion Revisited

7.17: Gravitational Potential Energy

### greenhouse effect

Mechanisms of Heat Transfer

13.5: Global Warming

### greenhouse gas

13.5: Global Warming

### Gyroscopes

11.22: Precession of a Gyroscope

## H

### heat

Heat Transfer, Specific Heat, and Calorimetry

14.22: Introduction

14.23: The First Law of Thermodynamics

### Heat capacity

13.2: Specific Heat

### heat engine

14.13: Heat Engines

14.24: The Second Law of Thermodynamics

14.25: Entropy

### heat of reaction

13.2: Specific Heat

### heat pump

14.14: Refrigerators and Heat Pumps

14.15: Statements of the Second Law of Thermodynamics

### Thermodynamics

14.25: Entropy

### heat transfer

Temperature and Thermal Equilibrium

13.1: Introduction

### Hohmann transfer orbit

7.16: Kepler's Laws

### Hooke's law

6.14: Common Forces

### Hooke's law

8.21: Potential Energy and Conservation of Energy

### hot reservoir

14.13: Heat Engines

### humidity

12.8: Phase Changes

### hydrogen bond

12.4: Thermal Expansion

## I

### ideal banking

7.6: Centripetal Force

### ideal energy

12.5: Ideal Gas Law

### Ideal gas

12.2: Introduction

12.3: Temperature and Temperature Scales

12.5: Ideal Gas Law

Molecular Model of an Ideal Gas

12.7: Kinetic Theory

14.7: Adiabatic Processes for an Ideal Gas

14.23: The First Law of Thermodynamics

## Ideal gas law

Molecular Model of an Ideal Gas

## Impulse

9.3: Impulse and Collisions (Part 1)

9.4: Impulse and Collisions (Part 2)

9.14: Introduction

## incline

6.7: Further Applications of Newton's Laws

## induction

7.15: Newton's Law of Universal Gravitation

## inelastic

9.7: Types of Collisions

9.14: Introduction

9.15: Conservation of Momentum

## Inertia

1.2: Units

6.3: Newton's Laws

6.10: Newton's First Law

11.17: Rotational Kinetic Energy

## inertial force

7.6: Centripetal Force

## inertial frame

7.14: Types of Forces in Nature

## inertial reference frame

6.10: Newton's First Law

## Instantaneous

2.2: Speed and Velocity

## instantaneous angular acceleration

11.2: Rotational Variables

## instantaneous angular velocity

11.2: Rotational Variables

## instantaneous speed

4.3: Instantaneous Velocity and Speed

## Instantaneous velocity

4.3: Instantaneous Velocity and Speed

## Integral Calculus

4.8: Finding Velocity and Displacement from Acceleration

## intensive variable

14.2: Thermodynamic Systems

## intermolecular

12.8: Phase Changes

## internal energy

12.5: Ideal Gas Law

Pressure, Temperature, and RMS Speed

13.1: Introduction

14.3: Work, Heat, and Internal Energy

14.4: First Law of Thermodynamics

14.22: Introduction

14.23: The First Law of Thermodynamics

14.24: The Second Law of Thermodynamics

## internal force

9.10: Center of Mass (Part 2)

## International Systems of Units

12.5: Ideal Gas Law

## inverse

7.15: Newton's Law of Universal Gravitation

## irreversibility

14.12: Reversible and Irreversible Processes

## irreversible process

14.12: Reversible and Irreversible Processes

## isentropic

14.18: Entropy on a Microscopic Scale

14.26: The Third Law of Thermodynamics

## isobaric process

14.5: Thermodynamic Processes

## isochoric process

[14.5: Thermodynamic Processes](#)

## isolated system

[8.21: Potential Energy and Conservation of Energy](#)  
[13.1: Introduction](#)

## isothermal process

[14.5: Thermodynamic Processes](#)

## isotropic

[12.4: Thermal Expansion](#)

## J

### joint

[10.13: Applications of Statics](#)

### Joule expansion

[14.7: Adiabatic Processes for an Ideal Gas](#)

## K

### Kelvin scale

[Thermometers and Temperature Scales](#)  
[12.3: Temperature and Temperature Scales](#)

### kilocalorie

[Heat Transfer, Specific Heat, and Calorimetry](#)  
[13.1: Introduction](#)

### kilocalorie (kcal)

[Heat Transfer, Specific Heat, and Calorimetry](#)

### kilogram

[1.7: Units and Standards](#)

### Kinematic

[2.3: Acceleration](#)  
[2.4: Problem-Solving for Basic Kinematics](#)  
[4.8: Finding Velocity and Displacement from Acceleration](#)  
[5.9: Motion in Two Dimensions](#)  
[11.14: Angular Acceleration](#)  
[11.27: Problem Solving](#)

### Kinematic Equations

[4.8: Finding Velocity and Displacement from Acceleration](#)

### Kinematics

[2.1: Basics of Kinematics](#)

### kinematics of rotational motion

[11.3: Rotation with Constant Angular Acceleration](#)

### kinetic energy

[6.7: Further Applications of Newton's Laws](#)  
[7.18: Energy Conservation](#)  
[8.3: Kinetic Energy](#)  
[8.24: Further Topics](#)  
[9.16: Collisions](#)

### Kinetic Friction

[7.4: Friction \(Part 1\)](#)  
[7.5: Friction \(Part 2\)](#)

### kinetic theory of gases

[12.2: Introduction](#)  
[12.6: The Kinetic Theory of Gases](#)  
[Pressure, Temperature, and RMS Speed](#)  
[12.7: Kinetic Theory](#)

## L

### latent heat of fusion

[13.3: Phase Change and Latent Heat](#)

### latent heat of vaporization

[13.3: Phase Change and Latent Heat](#)

### law

[1.1: The Basics of Physics](#)  
[1.6: The Scope and Scale of Physics](#)

## law of conservation of angular

### momentum

[11.21: Conservation of Angular Momentum](#)

## law of conservation of energy

[14.23: The First Law of Thermodynamics](#)

## Law of Conservation of Momentum

[9.5: Conservation of Linear Momentum \(Part 1\)](#)  
[9.6: Conservation of Linear Momentum \(Part 2\)](#)

## Law of Dulong and Petit

[Heat Capacity and Equipartition of Energy](#)

## Law of inertia

[6.10: Newton's First Law](#)

## length

[1.2: Units](#)

## lever arm

[11.7: Torque](#)

## leverage

[10.13: Applications of Statics](#)

## linear mass density

[9.9: Center of Mass \(Part 1\)](#)  
[9.10: Center of Mass \(Part 2\)](#)  
[11.6: Calculating Moments of Inertia](#)

## Linear momentum

[9.14: Introduction](#)

## linear thermal expansion coefficient

[12.4: Thermal Expansion](#)

## linear velocity

[11.15: Rotational Kinematics](#)

## linearity limit

[10.6: Elasticity and Plasticity](#)

## M

### machines

[10.13: Applications of Statics](#)

### Magnitude

[3.2: Scalars and Vectors \(Part 1\)](#)  
[5.10: Vectors Revisited](#)

### mass

[6.2: Force and Mass](#)

### matter

[1.1: The Basics of Physics](#)

### mean free path

[Pressure, Temperature, and RMS Speed](#)

### mean free time

[Pressure, Temperature, and RMS Speed](#)

### mean motion

[7.16: Kepler's Laws](#)

### mechanical advantage

[10.13: Applications of Statics](#)

### mechanical energy

[8.16: Conservation of Energy](#)

### mechanical equivalent of heat

[Heat Transfer, Specific Heat, and Calorimetry](#)  
[13.1: Introduction](#)

### melting

[Phase Changes](#)

### metabolism

[14.23: The First Law of Thermodynamics](#)

### meteorology

[7.14: Types of Forces in Nature](#)

### Meter

[1.7: Units and Standards](#)

### method of adding percents

[1.11: Significant Figures](#)

## metric system

[1.7: Units and Standards](#)

## microstate

[14.26: The Third Law of Thermodynamics](#)

## model

[1.1: The Basics of Physics](#)  
[1.6: The Scope and Scale of Physics](#)

## molar heat capacity at constant pressure

[14.6: Heat Capacities of an Ideal Gas](#)

## molar heat capacity at constant volume

[Heat Capacity and Equipartition of Energy](#)  
[14.6: Heat Capacities of an Ideal Gas](#)

## mole

[12.5: Ideal Gas Law](#)  
[Molecular Model of an Ideal Gas](#)

## Moment of Inertia

[10.12: Solving Statics Problems](#)  
[11.5: Moment of Inertia and Rotational Kinetic Energy](#)

[12.7: Kinetic Theory](#)

## momentum

[6.3: Newton's Laws](#)  
[9.2: Linear Momentum](#)  
[9.14: Introduction](#)  
[9.16: Collisions](#)  
[11.25: Conservation of Angular Momentum](#)

## most probable speed

[Distribution of Molecular Speeds](#)

## motion

[2.4: Problem-Solving for Basic Kinematics](#)

## muscles

[10.13: Applications of Statics](#)

## N

### natural convection

[13.4: Methods of Heat Transfer](#)

### natural satellite

[7.16: Kepler's Laws](#)

### net external force

[6.9: Forces](#)

### net force

[6.3: Newton's Laws](#)

### net work

[8.4: Work-Energy Theorem](#)

### Newton

[6.9: Forces](#)

### Newton's first law of motion

[6.10: Newton's First Law](#)

### Newton's second law

[6.11: Newton's Second Law](#)

### Newton's second law for rotation

[11.8: Newton's Second Law for Rotation](#)

### Newton's second law of motion

[6.11: Newton's Second Law](#)

### Newton's third law

[6.13: Newton's Third Law](#)

### Newton's third law of motion

[6.13: Newton's Third Law](#)

[9.17: Rocket Propulsion](#)

### Newton's Law of Gravitation

[7.17: Gravitational Potential Energy](#)

### Newtonian mechanics

[12.7: Kinetic Theory](#)

### noble gas

[12.7: Kinetic Theory](#)

## Nonconservative Forces

8.21: Potential Energy and Conservation of Energy  
noninertial frame of reference

7.6: Centripetal Force

## normal

6.4: Other Examples of Forces

## normal force

6.14: Common Forces  
7.11: Introduction to UCM and Gravitation

## normal pressure

10.4: Stress, Strain, and Elastic Modulus (Part 1)

## null vector

3.6: Algebra of Vectors

## O

### open system

14.2: Thermodynamic Systems

### order of magnitude

1.3: Significant Figures and Order of Magnitude  
1.6: The Scope and Scale of Physics

### origin

5.10: Vectors Revisited

### orthogonal vectors

3.2: Scalars and Vectors (Part 1)

### oxidation

14.23: The First Law of Thermodynamics

## P

### Pa

10.4: Stress, Strain, and Elastic Modulus (Part 1)

### parallel axis

11.6: Calculating Moments of Inertia

### parallel vectors

3.2: Scalars and Vectors (Part 1)

### parallelogram rule

3.3: Scalars and Vectors (Part 2)

### partial pressure

Pressure, Temperature, and RMS Speed

### Pascal

10.4: Stress, Strain, and Elastic Modulus (Part 1)

### peak speed

Distribution of Molecular Speeds

### pendentive

10.13: Applications of Statics

### Pendulums

8.24: Further Topics

### perfect engine

14.15: Statements of the Second Law of Thermodynamics

### perfect refrigerator (heat pump)

14.15: Statements of the Second Law of Thermodynamics

### perfectly inelastic

9.7: Types of Collisions

### perihelion

7.16: Kepler's Laws

### perpendicular

6.4: Other Examples of Forces  
6.7: Further Applications of Newton's Laws

### phase diagram

Phase Changes

### Phase transition

Phase Changes

## physical quantity

1.7: Units and Standards

## physics

1.6: The Scope and Scale of Physics

## planet

7.11: Introduction to UCM and Gravitation

## Plasma

12.8: Phase Changes

## plastic behavior

10.6: Elasticity and Plasticity

## plumb line

9.18: Center of Mass

## point mass

7.15: Newton's Law of Universal Gravitation

## point particle

9.18: Center of Mass

## polar coordinate system

3.5: Coordinate Systems and Components of a Vector (Part 2)

## Polar coordinates

3.5: Coordinate Systems and Components of a Vector (Part 2)

## position

2.3: Acceleration  
4.2: Position, Displacement, and Average Velocity

## positive feedback

13.4: Methods of Heat Transfer

## potential

8.21: Potential Energy and Conservation of Energy  
12.4: Thermal Expansion

## potential energy

7.17: Gravitational Potential Energy  
7.18: Energy Conservation  
8.14: Potential Energy of a System  
8.24: Further Topics

## potential energy diagram

8.17: Potential Energy Diagrams and Stability

## potential energy difference

8.14: Potential Energy of a System

## power

8.5: Power  
8.22: Power

## Precession

11.22: Precession of a Gyroscope

## prefix

1.2: Units

## Pressure

10.4: Stress, Strain, and Elastic Modulus (Part 1)

## Projectile motion

5.4: Projectile Motion

## proportionality limit

10.6: Elasticity and Plasticity

## propulsion

7.18: Energy Conservation

## PV diagram

Molecular Model of an Ideal Gas

## Q

### Quantum mechanics

11.25: Conservation of Angular Momentum

## R

### radial

7.12: Non-Uniform Circular Motion

## radial coordinate

3.5: Coordinate Systems and Components of a Vector (Part 2)

## Radians

7.13: Velocity, Acceleration, and Force

## radiation

1.2: Units  
Mechanisms of Heat Transfer

## radiative transfer

13.5: Global Warming

## reference frame

5.6: Relative Motion in One and Two Dimensions

## Refrigerator

14.14: Refrigerators and Heat Pumps

## relative

5.12: Multiple Velocities

## relative velocity

5.6: Relative Motion in One and Two Dimensions

## renewable

8.18: Sources of Energy

## renewable forms of energy

8.23: CASE STUDY: World Energy Use

## reorientate

5.11: Projectile Motion Revisited

## resultant

3.2: Scalars and Vectors (Part 1)  
6.6: Vector Nature of Forces

## resultant vector

3.2: Scalars and Vectors (Part 1)

## reversible

14.23: The First Law of Thermodynamics  
14.25: Entropy

## reversible process

14.5: Thermodynamic Processes  
14.12: Reversible and Irreversible Processes

## right hand rule

11.26: Vector Nature of Rotational Kinematics

## rigid

6.7: Further Applications of Newton's Laws

## rigid body

9.18: Center of Mass

## rms

12.7: Kinetic Theory

## Rocket equation

9.11: Rocket Propulsion

## rolling motion

11.19: Rolling Motion

## Rotation

11.25: Conservation of Angular Momentum

## rotational dynamics

11.8: Newton's Second Law for Rotation

## Rotational Inertia

10.16: Torque and Angular Acceleration  
11.12: Conservation of Energy  
11.16: Dynamics  
11.28: Linear and Rotational Quantities

## rotational kinetic energy

11.5: Moment of Inertia and Rotational Kinetic Energy

## rotational work

11.9: Work and Power for Rotational Motion

## S

### Scalar

2.1: Basics of Kinematics  
5.10: Vectors Revisited



## scalar components

3.4: Coordinate Systems and Components of a Vector (Part 1)

## scalar equation

3.2: Scalars and Vectors (Part 1)

## Scalar product

3.8: Products of Vectors (Part 1)

## scientific method

1.1: The Basics of Physics

## scientific notation

1.3: Significant Figures and Order of Magnitude

## second

1.7: Units and Standards

## second equilibrium condition

10.2: Conditions for Static Equilibrium

## second law of thermodynamics

14.17: Entropy

14.24: The Second Law of Thermodynamics

## second law of thermodynamics (Kelvin)

14.15: Statements of the Second Law of Thermodynamics

## selective absorber

13.5: Global Warming

## Shear modulus

10.4: Stress, Strain, and Elastic Modulus (Part 1)

## shear strain

10.4: Stress, Strain, and Elastic Modulus (Part 1)

## shear stress

10.4: Stress, Strain, and Elastic Modulus (Part 1)

## SI Units

1.7: Units and Standards

12.5: Ideal Gas Law

## sidereal year

7.16: Kepler's Laws

## significant figures

1.11: Significant Figures

## specific heat

12.5: Ideal Gas Law

13.2: Specific Heat

## stable equilibrium

10.11: Stability

## Standard atmosphere

12.3: Temperature and Temperature Scales

## state functions

14.4: First Law of Thermodynamics

## static

1.4: Solving Physics Problems

6.7: Further Applications of Newton's Laws

## Static Equilibrium

10.2: Conditions for Static Equilibrium

10.11: Stability

## Static Friction

7.4: Friction (Part 1)

7.5: Friction (Part 2)

## Stirling engine

14.17: Entropy

## Strain

6.7: Further Applications of Newton's Laws

10.4: Stress, Strain, and Elastic Modulus (Part 1)

10.5: Stress, Strain, and Elastic Modulus (Part 2)

10.14: Elasticity, Stress, Strain, and Fracture

## stress

6.7: Further Applications of Newton's Laws

10.4: Stress, Strain, and Elastic Modulus (Part 1)

10.5: Stress, Strain, and Elastic Modulus (Part 2)

12.10: Thermal Stresses

## stroboscopic

2.4: Problem-Solving for Basic Kinematics

## sublimation

13.3: Phase Change and Latent Heat

## supercritical

Molecular Model of an Ideal Gas

## surface mass density

11.6: Calculating Moments of Inertia

## surroundings

14.2: Thermodynamic Systems

## symmetrical

5.11: Projectile Motion Revisited

## symmetry

6.3: Newton's Laws

## system

9.5: Conservation of Linear Momentum (Part 1)

9.6: Conservation of Linear Momentum (Part 2)

## T

### tangent

6.7: Further Applications of Newton's Laws

### tangential acceleration

5.5: Uniform Circular Motion

11.13: Quantities of Rotational Kinematics

### Temperature

Temperature and Thermal Equilibrium

### tensile strain

10.4: Stress, Strain, and Elastic Modulus (Part 1)

10.5: Stress, Strain, and Elastic Modulus (Part 2)

### tensile stress

10.4: Stress, Strain, and Elastic Modulus (Part 1)

10.5: Stress, Strain, and Elastic Modulus (Part 2)

10.13: Applications of Statics

### tension

6.14: Common Forces

### Terminal velocity

7.7: Drag Force and Terminal Speed

### the component form of a vector

3.4: Coordinate Systems and Components of a Vector (Part 1)

### the Dot Product

3.8: Products of Vectors (Part 1)

### The Scalar Product

3.8: Products of Vectors (Part 1)

### theory

1.1: The Basics of Physics

1.6: The Scope and Scale of Physics

### thermal conductivity

13.4: Methods of Heat Transfer

### thermal energy

14.24: The Second Law of Thermodynamics

### thermal equilibrium

Temperature and Thermal Equilibrium

12.9: The Zeroth Law of Thermodynamics

13.1: Introduction

14.22: Introduction

### thermal expansion

Thermal Expansion

### thermal stress

Thermal Expansion

### thermodynamic process

14.5: Thermodynamic Processes

### thermodynamic system

14.2: Thermodynamic Systems

### thermodynamic temperature

14.22: Introduction

## thermodynamics

12.3: Temperature and Temperature Scales

12.8: Phase Changes

14.22: Introduction

## third law of thermodynamics

14.18: Entropy on a Microscopic Scale

## thrust

6.3: Newton's Laws

6.13: Newton's Third Law

## time

4.4: Average and Instantaneous Acceleration

## Torque

8.12: Work-Energy Theorem

9.18: Center of Mass

10.10: Conditions for Equilibrium

10.12: Solving Statics Problems

10.16: Torque and Angular Acceleration

11.7: Torque

11.16: Dynamics

11.17: Rotational Kinetic Energy

11.25: Conservation of Angular Momentum

11.26: Vector Nature of Rotational Kinematics

11.28: Linear and Rotational Quantities

## torques

6.7: Further Applications of Newton's Laws

## total acceleration

5.5: Uniform Circular Motion

## total displacement

4.2: Position, Displacement, and Average Velocity

## total linear acceleration

11.4: Relating Angular and Translational Quantities

## trajectory

5.4: Projectile Motion

5.11: Projectile Motion Revisited

## translation

10.10: Conditions for Equilibrium

## Trigonometry

1.4: Solving Physics Problems

## triple point

Thermometers and Temperature Scales

12.3: Temperature and Temperature Scales

## turning point

8.17: Potential Energy Diagrams and Stability

## U

### ultimate stress

10.6: Elasticity and Plasticity

### Uniform Circular Motion

11.28: Linear and Rotational Quantities

### uniform motion

6.3: Newton's Laws

### Unit vector

3.2: Scalars and Vectors (Part 1)

5.10: Vectors Revisited

### units

1.7: Units and Standards

### universal gas constant

Molecular Model of an Ideal Gas

## V

### van der Waals equation of state

Molecular Model of an Ideal Gas

### vapor

12.8: Phase Changes

### vapor pressure

Pressure, Temperature, and RMS Speed

**vaporization**

[13.6: Phase Equilibrium](#)

**vector**

[2.1: Basics of Kinematics](#)

[5.10: Vectors Revisited](#)

[6.2: Force and Mass](#)

[6.6: Vector Nature of Forces](#)

[7.19: Angular vs. Linear Quantities](#)

[10.9: Introduction](#)

**vector components**

[3.4: Coordinate Systems and Components of a Vector \(Part 1\)](#)

**vector equation**

[3.2: Scalars and Vectors \(Part 1\)](#)

**vectors**

[3.2: Scalars and Vectors \(Part 1\)](#)

**velocity**

[2.2: Speed and Velocity](#)

[2.3: Acceleration](#)

[4.4: Average and Instantaneous Acceleration](#)

[5.10: Vectors Revisited](#)

[6.2: Force and Mass](#)

[7.13: Velocity, Acceleration, and Force](#)

**velocity vector**

[5.2: Displacement and Velocity Vectors](#)

**Vienna Standard Mean Ocean Water**

[12.5: Ideal Gas Law](#)

**volume strai**

[10.4: Stress, Strain, and Elastic Modulus \(Part 1\)](#)

**volume stress**

[10.4: Stress, Strain, and Elastic Modulus \(Part 1\)](#)

**W****watt**

[8.22: Power](#)

**weight**

[6.12: Mass and Weight](#)

[7.15: Newton's Law of Universal Gravitation](#)

**Work**

[8.2: Work](#)

[8.10: Work Done by a Constant Force](#)

[8.11: Work Done by a Variable Force](#)

[11.12: Conservation of Energy](#)

**work done by a force**

[8.2: Work](#)

**Y****Young's modulus**

[10.4: Stress, Strain, and Elastic Modulus \(Part 1\)](#)

[10.5: Stress, Strain, and Elastic Modulus \(Part 2\)](#)

**Z****zeroth law of thermodynamics**

[Temperature and Thermal Equilibrium](#)

[12.9: The Zeroth Law of Thermodynamics](#)