

CLASS 9

SCIENCE

FORMULAS HANDBOOK

Class 9 Science Formulas Handbook (Chapter-wise)

Every key fact and formula from the Class 9 Science NCERT syllabus, organised by chapter, in one place. Cross-linked to our full Chapter-wise Solutions. More chapters will be appended here as their Solutions are published.

Contents

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Chapter 1: Matter in Our Surroundings

Temperature conversion: $K = ^\circ C + 273$; $^\circ C = K - 273$

States of matter order (density, usually): solid > liquid > gas

Interparticle force order: solid > liquid > gas

Kinetic energy order: gas > liquid > solid

State changes: fusion (solid→liquid), vaporisation (liquid→gas), condensation (gas→liquid), solidification (liquid→solid), sublimation (solid→gas), deposition (gas→solid)

Factors increasing evaporation rate: higher temperature, larger surface area, higher wind speed, lower humidity

See full [Chapter 1 Solutions](#)

New Syllabus (Exploration, 2026-27)

Chapter 1: Entering the World of Secondary Science

Scientific method: observation → hypothesis → testing → model/theory.

Law: mathematical pattern (e.g. Newton's laws); Theory: well-substantiated explanation.

SI units standardise measurement; estimation aids reasoning.

Chapter 2: Cell: The Building Block of Life

Prokaryotic (no nucleus) vs Eukaryotic (true nucleus).

Plant-only: cell wall, large vacuole, chloroplast.

Mitochondria: powerhouse; Mitosis: 2 identical cells; Meiosis: 4 gametes, half chromosomes.

Chapter 3: Tissues in Action

Plant: Meristematic (growth) vs Permanent (specialised).

Animal: Epithelial, Connective, Muscular, Nervous.

Tendon: muscle-bone; Ligament: bone-bone.

Chapter 4: Describing Motion Around Us

$$v = u + at; s = ut + \frac{1}{2}at^2; v^2 = u^2 + 2as.$$

Position-time slope = velocity; Velocity-time slope = acceleration, area = displacement.

Chapter 5: Exploring Mixtures and their Separation

Solution (dissolved) < Colloid (Tyndall effect) < Suspension (settles).

Techniques: crystallisation, distillation, chromatography, sublimation, centrifugation, coagulation.

Chapter 6: How Forces Affect Motion

Newton 1: inertia; Newton 2: $F=ma$; Newton 3: action-reaction (different bodies).

Chapter 7: Work, Energy and Simple Machines

$$W = F \times d; KE = \frac{1}{2}mv^2; PE = mgh; P = W/t.$$

Mechanical advantage = load/effort.

Chapter 8: Journey Inside the Atom

Thomson (plum pudding) → Rutherford (nucleus) → Bohr (shells).

Shells: $2n^2$ (K=2, L=8, M=18); Isotopes: same element, diff mass; Isobars: diff element, same mass.

Chapter 9: Atomic Foundations of Matter

Conservation of Mass, Constant Proportions → Dalton's theory.

Ionic (transfer e^-) vs Covalent (share e^-); criss-cross method for formulae.

Chapter 10: Sound Waves: Characteristics and Applications

Longitudinal wave; needs medium; $v = \lambda f$.

Frequency → pitch; Amplitude → loudness; Echo needs $\geq 17m$.

Chapter 11: Reproduction: How Life Continues

Pollination → Fertilisation → Seed/Fruit; Seed dispersal.

Human: testes/ovaries, fertilisation in fallopian tube, ~28-day menstrual cycle.

Chapter 12: Patterns in Life: Diversity and Classification

5 Kingdoms: Monera, Protista, Fungi, Plantae, Animalia.

Binomial nomenclature: Genus + species (italicised).

Viruses: acellular, living/non-living boundary.

Chapter 13: Earth as a System: Energy, Matter and Life

5 Spheres: Geo, Hydro, Atmo, Cryo, Bio.

Cycles: Water, Carbon, Nitrogen, Oxygen.