

CLASS 8

SCIENCE

FORMULAS HANDBOOK

Class 8 Science Formulas Handbook (Chapter-wise)

Every key fact, concept and formula from the Class 8 Science NCERT syllabus (Curiosity), organised by chapter. 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: Exploring the Investigative World of Science

Steps of scientific investigation: question → design experiment (identify variables) → change one variable at a time → observe/measure → conclude

Variable: a factor you can deliberately change or control in an experiment (e.g. dough thickness, oil temperature)

Observation/measurement: the outcome you record to test the effect of a variable (e.g. whether the puri puffs, time taken to puff)

Systematic investigation: testing only one variable at a time while holding all others constant, so results can be clearly attributed to a single cause

See full [Chapter 1 Solutions](#)

Chapter 2: The Invisible Living World

Cell structures: cell membrane (entry/exit control), cytoplasm (life processes), nucleus (controls activities/growth), cell wall (plant/fungal/bacterial), nucleoid (bacteria only, no true nucleus)

Organisation: Cell → Tissue → Organ → Organ system → Organism

Yeast: ferments sugar → releases CO₂ + alcohol (bread/cake rising)

Lactobacillus: ferments lactose → lactic acid (curd formation)

Rhizobium: fixes atmospheric nitrogen in legume root nodules

Preservation: high salt/sugar draws water out of microbial cells by osmosis, preventing spoilage

See full [Chapter 2 Solutions](#)

Chapter 3: Health The Ultimate Treasure

Health (WHO): complete physical, mental and social well-being, not just absence of disease

Communicable diseases: spread person-to-person (flu, typhoid, chickenpox, cholera)

Non-communicable diseases: not transmissible (diabetes, asthma, heart disease)

Primary immune response: slow, first exposure; Secondary: fast, memory-cell based, on re-

exposure

Antibiotics: effective against bacteria only, not viruses

See full [Chapter 3 Solutions](#)

Chapter 4: Electricity Magnetic and Heating Effects

Magnetic effect: current-carrying wire produces a magnetic field (Oersted, 1820)

Electromagnet: coil + current = temporary magnet; strength up with more current, more turns, iron core

Heating effect: current through resistance generates heat

Nichrome: higher resistance than copper, used in heating elements

Voltaic cell: chemical reaction between two metal electrodes + electrolyte generates current

See full [Chapter 4 Solutions](#)

Chapter 5: Exploring Forces

Force: SI unit newton (N); push or pull from interaction between two objects

Contact forces: muscular force, friction

Non-contact forces: magnetic, electrostatic, gravitational

Weight = gravitational force on an object (varies by location); Mass = fixed amount of matter (constant everywhere)

Buoyant force = weight of liquid displaced (Archimedes' Principle); floats if buoyant force $\geq$ weight

See full [Chapter 5 Solutions](#)

Chapter 6: Pressure, Winds, Storms and Cyclones

Pressure = Force $\div$ Area; SI unit pascal (Pa) = N/m^2

Liquid pressure increases with the height/depth of the liquid column, independent of the container's shape or width

Wind: air flowing from a high-pressure region to a low-pressure region

Sea breeze (day): land heats faster than sea, creating low pressure over land; cooler air flows from sea to land

Thunderstorm: rising warm moist air → condensation → charge separation between ice (+) and water droplets (−) → lightning (discharge) and thunder (rapid air expansion)

Cyclone: intensifies over warm ocean water; very low-pressure centre (the “eye”) is calm, surrounded by a ring of the highest wind speeds

See full [Chapter 6 Solutions](#)

Chapter 7: Particulate Nature of Matter

All matter is made of tiny particles too small to see individually; breaking/grinding a substance is a physical change, not a chemical one

Solids: particles closely packed in fixed positions, only vibrate; fixed shape and fixed volume

Liquids: particles close together but free to move/slide past each other; fixed volume, no fixed shape (takes container's shape)

Gases: particles far apart, move fast and randomly; no fixed shape or volume

Interparticle attraction: strongest in solids, weaker in liquids, weakest in gases

Dissolving: solute particles fit into the gaps between solvent particles (physical change); differs from a substance like sand that doesn't break down and simply settles

Sublimation: solid changes directly to gas without becoming liquid first, e.g. camphor, dry ice

See full [Chapter 7 Solutions](#)

Chapter 8: Nature of Matter – Elements, Compounds and Mixtures

Element: only one kind of atom; cannot be broken down chemically (e.g. gold, oxygen, hydrogen).

Compound: two+ elements chemically combined in a fixed ratio; new properties (e.g. water, CO₂, NaCl, FeS).

Mixture: substances physically combined in variable proportions; separable by physical means.

Homogeneous mixture: uniform composition throughout (air, salt water, alloys).

Heterogeneous mixture: visibly distinct parts (sand+water, muddy water).

Electrolysis of water: $\text{H}_2\text{O} \rightarrow \text{H}_2 + \text{O}_2$ in 2:1 ratio, proves water is a compound.

Test for CO₂: turns lime water milky (forms CaCO₃).

See full [Chapter 8 Solutions](#).

Chapter 9: The Amazing World of Solutes, Solvents and Solutions

Solution: uniform mixture of solute (smaller amount) + solvent (larger amount).

Suspension: non-uniform mixture, particles settle (e.g. sand+water) — NOT a solution.

Solubility: max solute that dissolves in a fixed amount of solvent at a given temperature.

Saturated solution: no more solute can dissolve at that temperature.

Solids: solubility usually increases with temperature. Gases: solubility decreases with temperature.

Volume of regular solids = length x width x height.

Volume of irregular solids: water-displacement method (1 mL displaced = 1 cm³).

Density = Mass / Volume. Object floats if its density < liquid's density.

See full [Chapter 9 Solutions](#).

Chapter 10: Light: Mirrors and Lenses

Laws of reflection: angle of incidence = angle of reflection; incident ray, reflected ray and normal lie in the same plane.

Plane mirror: virtual, erect, same-size image; image distance behind mirror = object distance in front.

Concave mirror: can form real or virtual images, enlarged or diminished, depending on object distance.

Convex mirror: always virtual, erect, diminished image; wider field of view than plane mirror; image grows larger as object approaches.

Convex lens: converges light; can form magnified virtual image (object close) or real inverted image (object far).

Concave lens: diverges light; always forms virtual, erect, diminished image, regardless of object distance.

Refraction: light bends when passing between media of different density (e.g. bent-pencil-in-water effect).

See full [Chapter 10 Solutions](#).

Chapter 11: Keeping Time with the Skies

Day = Earth's rotation (~24 hours). Month = Moon's revolution (~29.5 days synodic, ~27.3 days

sidereal). Year = Earth's revolution around Sun (~365.25 days).

Moon phases are caused by how much of its sunlit half faces Earth, not by Earth's shadow (that's a lunar eclipse).

Tidal locking: Moon's rotation period = orbital period, so same face always faces Earth.

Luni-solar calendars add an intercalary month periodically since 12 lunar months (~354 days) fall ~11 days short of a solar year.

Leap year: extra day added roughly every 4 years.

Geostationary satellite: orbital period = 24 hours, matching Earth's rotation, so it stays above the same ground point.

See full [Chapter 11 Solutions](#).

Chapter 12: How Nature Works in Harmony

Population: all individuals of one species in an area. Community: all populations of different species in an area. Ecosystem: community + non-living (abiotic) environment.

Food chain: straight-line sequence of who-eats-whom. Food web: network of overlapping food chains — more stable than a single chain.

Trophic level: an organism's position in a food chain (producer = 1st, herbivore = 2nd, carnivore = 3rd+).

Producers make their own food (photosynthesis); consumers eat other organisms; decomposers break down dead matter and recycle nutrients.

Ecological pyramid: numbers/biomass decrease at each higher trophic level (roughly 10% energy transfer between levels).

Removing a species affects both the trophic level below (less predation) and above (less food) — effects ripple through the food web.

Mangrove forests buffer coastlines against storms/tsunamis and provide marine breeding habitat.

See full [Chapter 12 Solutions](#).

Chapter 13: Our Home: Earth, A Unique Life Sustaining Planet

Habitable zone: region around a star where temperatures allow liquid water; Earth's ~150 million km distance places it here.

Atmosphere: nitrogen/oxygen mix supports breathing, ozone layer blocks UV, greenhouse effect regulates temperature.

Magnetic field: shields atmosphere from solar wind erosion.

Plate tectonics: recycles nutrients, drives long-term carbon cycle, stabilises climate.

Size/gravity balance: too small → atmosphere escapes (Mars-like); too large → atmosphere traps too much heat (Venus-like).

Geodiversity (landforms/rocks) vs biodiversity (living organisms) — related but distinct.

Vegetative propagation: asexual reproduction from stems/roots/leaves (money plant, potato, ginger, sugarcane, bamboo).

See full [Chapter 13 Solutions](#).