

Class 10 Science: Chapter-wise Revision Notes

All 13 chapters of Class 10 Science (NCERT) with the points boards ask most. Use with your textbook.

1. Chemical reactions and equations

- A balanced equation has equal numbers of each atom on both sides. Types: combination, decomposition, displacement, double displacement, redox.
- Oxidation: gain of oxygen or loss of hydrogen/electrons. Reduction: the opposite. Corrosion (rusting) and rancidity are oxidation in daily life.
- Exothermic reactions release heat (burning, respiration). Endothermic absorb heat (photosynthesis).
- Precipitation, change in colour, gas evolution or temperature change show a chemical reaction.

2. Acids, bases and salts

- Acids give H^+ ions in water; bases give OH^- . pH scale 0-14: below 7 acidic, 7 neutral, above 7 basic.
- Acid + metal gives salt + hydrogen. Acid + base gives salt + water. Acid + carbonate gives salt + water + carbon dioxide.
- Common salt (NaCl), baking soda ($NaHCO_3$), washing soda ($Na_2CO_3 \cdot 10H_2O$), bleaching powder ($CaOCl_2$) and plaster of Paris ($CaSO_4 \cdot \frac{1}{2}H_2O$) are important compounds with known uses.
- pH in daily life: stomach acid is about 1.5; tooth decay starts below pH 5.5; antacids neutralise excess acid.

3. Metals and non-metals

- Reactivity series (high to low): K, Na, Ca, Mg, Al, Zn, Fe, Pb, H, Cu, Hg, Ag, Au. A more reactive metal displaces a less reactive one from its salt.
- Ionic compounds have high melting points and conduct electricity when molten or dissolved.
- Extraction depends on reactivity: electrolysis for the most reactive, reduction with carbon for the middle, heating for the least.
- Alloys: brass (Cu + Zn), bronze (Cu + Sn), steel (Fe + C), solder (Pb + Sn).

4. Carbon and its compounds

- Carbon forms covalent bonds and shows catenation. Allotropes: diamond, graphite, fullerene.
- Alkanes (C_nH_{2n+2}), alkenes (C_nH_{2n}), alkynes (C_nH_{2n-2}). Functional groups: alcohol ($-OH$), aldehyde ($-CHO$), ketone ($>C=O$), carboxylic acid ($-COOH$).
- Ethanol and ethanoic acid are two key compounds. Esterification: acid + alcohol gives ester (sweet smell). Saponification makes soap.
- Soaps clean through micelles. In hard water, soaps form scum; detergents do not.

5. Life processes

- Nutrition: autotrophic (photosynthesis) and heterotrophic. Human digestion: mouth (amylase), stomach (pepsin, HCl), small intestine (bile, pancreatic juice), absorption by villi.
- Respiration: aerobic (with oxygen) gives much more energy than anaerobic. ATP is the energy currency.
- Transport: heart has 4 chambers; double circulation. Xylem moves water up; phloem moves food (translocation). Excretion: nephron is the unit of the kidney.

6. Control and coordination

- Nervous system: neuron, reflex arc (receptor, sensory neuron, spinal cord, motor neuron, effector). Brain: fore-, mid- and hind-brain.
- Plant hormones: auxin (growth), gibberellin, cytokinin (cell division), abscisic acid (growth inhibitor). Tropisms: phototropism, geotropism.
- Animal hormones: insulin (low sugar), thyroxine (iodine needed), adrenaline (emergency), growth hormone.

7. How do organisms reproduce?

- Asexual: fission, budding, regeneration, spore formation, vegetative propagation. Sexual: two parents, variation.
- Flower: stamen (male), pistil (female). Pollination then fertilisation. Human reproduction: sperm and egg, fertilisation, zygote, embryo, placenta.
- Contraceptive methods and the importance of the health of the reproductive system.

8. Heredity

- Mendel studied pea plants: dominant and recessive traits. F_2 phenotypic ratio from a monohybrid cross 3 : 1; dihybrid ratio 9 : 3 : 3 : 1.
- Sex determination in humans: XX female, XY male; the father's chromosome decides the sex of the child.
- Traits are carried by genes on chromosomes; variation is the basis of evolution.

9. Light: reflection and refraction

Mirror formula: $1/v + 1/u = 1/f$ | Magnification $m = -v/u = \text{image height} \div \text{object height}$ | $f = R/2$

Lens formula: $1/v - 1/u = 1/f$ | Power $P = 1/f$ (f in metres); unit dioptre (D)

Snell's law: $\sin i / \sin r = \text{constant} = \text{refractive index } n$ | $n = c / v$

- Sign convention (Cartesian): distances measured from the pole; the direction of incident light is positive. Concave mirror and convex lens f is negative or positive respectively as per the convention.
- Concave mirrors are used in torches, shaving mirrors and dentists' mirrors; convex mirrors in vehicle rear-view mirrors.

10. The human eye and the colourful world

- Parts: cornea, iris, pupil, lens, retina, optic nerve. The ciliary muscles change the focal length (accommodation).
- Defects: myopia (nearsighted, corrected with a concave lens), hypermetropia (farsighted, convex lens), presbyopia (old age, bifocal lens), cataract.
- Dispersion by a prism gives a spectrum; a rainbow is formed by dispersion in raindrops. Scattering explains the blue sky and red sunrise. Atmospheric refraction: twinkling of stars.

11. Electricity

$V = I R$ (Ohm's law) | $R = \rho L / A$ | Power $P = V I = I^2 R = V^2 / R$

Series: $R = R_1 + R_2 + R_3$ | Parallel: $1/R = 1/R_1 + 1/R_2 + 1/R_3$

Heat produced $H = I^2 R t$ (Joule's law) | Energy $= P \times t$; 1 kWh = 3.6×10^6 J

- Current $I = \text{charge} \div \text{time}$. Ammeter is in series; voltmeter is in parallel. Resistance rises with length and falls with area.

12. Magnetic effects of electric current

- A current-carrying wire produces a magnetic field (Oersted). Right-hand thumb rule gives its direction.
- A force acts on a current-carrying conductor in a magnetic field. Fleming's left-hand rule: motor. Fleming's right-hand rule: generator.
- Electric motor converts electrical energy into mechanical energy; generator does the opposite. AC changes direction; DC flows one way. In India, AC frequency is 50 Hz.
- Domestic circuits: live (red), neutral (black), earth (green) wires; fuse and earthing give safety.

13. Our environment

- Food chain: producers, then consumers (herbivores, carnivores), then decomposers. Only about 10% energy passes to the next trophic level.
- Ozone layer protects from UV rays; CFCs harm it. Waste: biodegradable and non-biodegradable. Manage waste responsibly.

Tip: Use the "3-part answer": definition or law, short explanation or formula, labelled diagram or example. For numericals, units can fetch half the marks.

30-day science plan

- Days 1-10: chemistry (1-4). Days 11-20: biology (5-8, 13). Days 21-28: physics (9-12). Last 2 days: diagrams and formulas. Take a sample paper every Sunday.