

Chapter 11 · The Four Formative-Only Topics

CBSE Class 12 Chemistry (043) · NOT in the 70-mark board paper · kept because schools still test them

READ THIS FIRST — WHY THIS CHAPTER EXISTS

The official 2026-27 syllabus lists these four topics and then says, in its own words, that they "will be assessed only formatively to reinforce understanding without adding to summative assessments."

So they are **NOT** part of the 70-mark board examination and carry no unit marks. They are also **not** in the 10-unit marks table.

They are kept here, at a summary level only, because **school unit tests and internal assessments still ask them**, and because dropping prescribed content silently is worse than flagging it. **Revise the ten real units first** — come here only if you have time left.

1. Surface Chemistry

ADSORPTION

Adsorption is the accumulation of a substance at a **surface**; **absorption** is uniform distribution **throughout** the bulk. **Sorption** is when both occur.

Basis	PHYSISORPTION	CHEMISORPTION
Forces	Weak van der Waals	Chemical bond
Enthalpy	Low, 20–40 kJ mol ⁻¹	High, 80–240 kJ mol ⁻¹
Specificity	Not specific	Highly specific
Reversibility	Reversible	Irreversible
Temperature	Decreases with rise	First increases, then decreases
Layers	Multilayer	Monolayer

Factors affecting adsorption of gases on solids: nature of the gas (easily liquefiable gases adsorb more), **surface area** (more area → more adsorption), **pressure** (increases adsorption), and **temperature** (generally decreases physisorption).

COLLOIDS

Basis	True solution	Colloid	Suspension
Particle size	< 1 nm	1–1000 nm	> 1000 nm
Tyndall effect	No	Yes	Yes
Filterability	Passes all filters	Passes filter paper, not ultrafilter	Retained

Lyophilic sols are solvent-loving, **reversible and stable** (starch, gum). **Lyophobic** sols are solvent-hating, **irreversible and need a stabiliser** (metal sols).

Coagulation is the precipitation of a colloid by adding an electrolyte. **Hardy–Schulze rule:** the greater the **charge on the coagulating ion**, the greater its power — $\text{Al}^{3+} > \text{Ba}^{2+} > \text{Na}^{+}$ for a

negative sol.

Emulsions: oil in water (milk) and water in oil (butter), stabilised by an **emulsifier**.

2. Isolation of Elements

THE THREE STAGES

1. **Concentration of the ore:** hydraulic washing (density), magnetic separation, froth flotation (sulphide ores), leaching (chemical, e.g. bauxite with NaOH).

2. **Reduction to the crude metal:** calcination (heating in limited air, for carbonates) and roasting (heating in excess air, for sulphides), followed by reduction with **carbon**, or by **electrolysis** for very reactive metals such as Al, Na and Mg.

3. **Refining:** electrolytic refining (Cu), zone refining (Si, Ge — uses different solubility of impurities in solid and molten states), vapour phase refining (Mond process for Ni, van Arkel for Ti and Zr), and chromatography.

Ellingham diagram: plots ΔG° against temperature and shows which reducing agent works at which temperature — a reduction is feasible when ΔG° becomes negative.

3. Polymers

CLASSIFICATION AND EXAMPLES

Homopolymer: one monomer (polythene, PVC). **Copolymer:** two or more (Buna-S from butadiene + styrene; nylon-6,6).

Addition polymerisation: monomers with double bonds add on with **no by-product** — polythene, PVC, polystyrene, Teflon.

Condensation polymerisation: repeated condensation with **loss of a small molecule** (usually water) — nylon-6,6 (adipic acid + hexamethylenediamine), terylene/dacron (ethylene glycol + terephthalic acid), bakelite.

Natural rubber is **cis-polyisoprene**; **vulcanisation** with sulphur makes it harder and more elastic by forming cross-links.

Biodegradable polymers: PHBV and nylon-2-nylon-6.

4. Chemistry in Everyday Life

MEDICINES BY FUNCTION

Class	Does what	Examples
Analgesic	Relieves pain	Aspirin, paracetamol, morphine (narcotic)
Tranquiliser	Treats stress, anxiety	Equanil, valium, barbiturates
Antiseptic	Applied to living tissue	Dettol, savlon, 0.2% phenol
Disinfectant	Applied to non-living objects	1% phenol , chlorine in water
Antibiotic	Kills or inhibits microbes	Penicillin, chloramphenicol
Antacid	Reduces stomach acid	Ranitidine, omeprazole, $\text{Mg}(\text{OH})_2$
Antihistamine	Treats allergy	Cetirizine, brompheniramine
Antifertility	Birth control	Norethindrone, ethynylestradiol

Phenol is the classic trap: 0.2% is an antiseptic, 1% is a disinfectant — the same substance, different concentration.

Food chemicals: **preservatives** (sodium benzoate), **artificial sweeteners** (aspartame — unstable when cooked; saccharin; sucralose — stable at cooking temperature), **antioxidants** (BHA, BHT).

HOW TO USE THIS CHAPTER — Treat it as insurance for school tests, not board preparation. If your revision time is limited, the **ten examinable units are always the better investment** — every mark in the board paper comes from those. Confirm with your teacher whether your school is testing these four topics this year.