AP Chemistry

CED Contents

AP Chem CED Units (clickable)

Note

If you have a local file named `ap-chem-ced.md`, keep it beside this `.tex` as your "source of truth". This template is pre-filled with the standard AP Chem unit/topic outline so it compiles cleanly even without that file.

How to use:
Click unit titles to jump to the Unit Preview page.

Keep Unit Previews short; dump details into Topic pages.

Unit Preview

Core move:
Count moles, analyze composition, read PES, predict trends.

CED Topic checklist

- Moles + molar mass; mass composition
- Empirical / molecular formula basics
- Atomic structure; electron configuration
- Photoelectron spectroscopy (PES) interpretation
- Periodic trends (radius, IE, EN) & reasoning

Must-draw diagrams (your "visual anchors")

- PES spectrum sketch & how peaks map to subshells
- Periodic trend arrows + "why" notes

What you should be able to do

- Convert between mass, moles, particles
- Use composition data to infer formulas
- Justify trends with effective nuclear charge/shielding

Unit 2: Molecular and Ionic Compound Structure and Properties

Unit Preview

CED Topic checklist

- Types of chemical bonds; electronegativity & polarity
- Lewis diagrams, resonance, formal charge
- VSEPR shapes + molecular polarity
- Hybridization (conceptual) & bond angles
- Ionic solids, metallic bonding (property links)
- Molecular orbital (qualitative: bond order, magnetism)

Must-draw diagrams (your "visual anchors")

- Lewis + resonance set (NO_3^-, CO_3^{2-}, SO_4^{2-})
- VSEPR shape map (AX_mE_n) + polarity check
- MO diagrams for O_2, N_2 (qualitative)

What you should be able to do

- Draw Lewis reliably; choose best resonance contributor
- Predict shape + polarity; count electron domains correctly
- Connect bonding type to melting point/conductivity trends

Core move:
Structure → bonding model → properties.

Unit Preview

Core move:
IMFs explain phase + properties.

CED Topic checklist

- Intermolecular forces (LDF, dipole, H-bonding, ion-dipole)
- Properties: boiling/melting, viscosity, surface tension
- Solids/liquids/gases; particulate diagrams
- Ideal gas law, kinetic molecular theory
- Solutions + solubility (qualitative patterns)

Must-draw diagrams (your "visual anchors")

- IMF ranking ladder + "why" examples
- Heating curve (phase change) + where energy goes
- PV/nRT sketch + KMT particle diagram

What you should be able to do

- Rank substances by BP/VP using structure + IMFs
- Explain deviations from ideal behavior conceptually

Unit 4: Chemical Reactions

Unit Preview

CED Topic checklist

- Net ionic equations; spectators
- Precipitation & solubility rules (patterns)
- Oxidation numbers; redox basics
- Stoichiometry in reactions; limiting reagent
- Titrations (basic setup + endpoints concept)

Must-draw diagrams (your "visual anchors")

- Redox "electron bookkeeping" template
- Titration curve idea (strong/strong baseline)

What you should be able to do

- Write net ionic equations
- Identify oxidized/reduced; connect to electron transfer
- Solve limiting reagent / yield problems cleanly

Core move:
Balance + classify + quantify.

Unit Preview

Core move:
Rates reveal mechanisms.

CED Topic checklist

- Rate laws; determining order from data
- Integrated rate laws (conceptual + basic calculations)
- Arrhenius; activation energy
- Mechanisms; rate-determining step; intermediates
- Catalysis (how it changes pathway)

Must-draw diagrams (your "visual anchors")

- Energy diagram: catalyzed vs uncatalyzed
- Mechanism step map (slow step $\rightarrow$ rate law pieces)

What you should be able to do

- Extract rate law from experiments
- Interpret energy diagrams + explain catalyst effect
- Match plausible mechanism to rate law (qualitative)

Unit Preview

Core move:
Energy accounting + directionality.

CED Topic checklist

- Enthalpy; calorimetry; Hess's law
- Entropy (qualitative drivers)
- Gibbs free energy; spontaneity; ΔG
- Thermodynamic favorability vs rate (contrast)

Must-draw diagrams (your "visual anchors")

- Enthalpy diagram (exo/endo) + sign conventions
- $\Delta G = \Delta H - T\Delta S$ sign table

What you should be able to do

- Use Hess's law / formation enthalpies
- Reason about spontaneity using ΔG, ΔS

Unit Preview

CED Topic checklist

- Equilibrium expressions; K and Q
- Manipulating K; linking to ΔG° (qualitative)
- Le Châtelier's principle (stress-response reasoning)
- Solubility equilibrium K_{sp} (conceptual + basic)

Must-draw diagrams (your "visual anchors")

- ICE-table skeleton (generic)
- Q vs K direction decision flow

What you should be able to do

- Write K expressions correctly
- Predict shifts and composition changes

Core move:
Q vs K + Le Châtelier.

Unit Preview

Core move:
pH + buffers + titration logic.

CED Topic checklist

- Acid/base definitions; strong vs weak
- pH/pOH; K_a, K_b; relationships
- Buffers; Henderson–Hasselbalch (when appropriate)
- Titrations (weak/strong curve features)

Must-draw diagrams (your "visual anchors")

- pH scale + log intuition
- Titration curve feature map (equivalence, buffer region)

What you should be able to do

- Compute/interprete pH in common scenarios
- Explain buffer behavior qualitatively + with K_a

Unit Preview

CED Topic checklist

- Galvanic vs electrolytic cells
- Cell diagrams; half-reactions
- E°, ΔG°, and K relationships
- Nernst equation (conceptual + basic use)

Must-draw diagrams (your "visual anchors")

- Cell schematic (anode/cathode, electron flow)
- E–Q trend via Nernst (qualitative)

What you should be able to do

- Identify anode/cathode; direction of electron flow
- Connect E° sign to spontaneity

Core move:
Electrochem + ΔG + equilibrium connection.