Unit 2

Oxidation, Reduction, and Redox Equation Writing

SOURCE LOCK

Built from SCH3U video-distilled notes, video range P14–P24, 11 lessons. No outside textbook text added.

Big idea

- Redox questions are bookkeeping questions about oxidation numbers and electron transfer.

Lesson map

- P14 Oxidation Number Basics (30m 14s)
- P15 Core Ideas of Oxidation and Reduction (38m 52s)
- P16 Oxidizing Agents and Reducing Agents (44m 29s)
- P17 Showing Electron Transfer (21m 2s)
- P18 Balancing Redox Equations (55m 23s)
- P19 General Patterns in Redox Reactions (1h 20m)
- P20 Comproportionation and Disproportionation (28m 28s)
- P21 Writing Redox Equations in New Contexts (40m 22s)

Core Notes

What to know

- Oxidation number increases mean oxidation; oxidation number decreases mean reduction.
- An oxidizing agent causes another species to lose electrons and is itself reduced.
- A reducing agent causes another species to gain electrons and is itself oxidized.
- Use fixed oxidation-number rules first, then solve the remaining unknowns by total charge.
- For balancing, track the element whose oxidation number changes and make electron loss equal electron gain.

Problem-solving workflow

- Mark oxidation numbers for changing elements.
- Decide whether the reaction is best handled forward, backward, or from both sides.
- List the oxidation-number change per atom and include subscripts.
- Use the least common multiple of electron change to set key coefficients.
- Finish with atom balance, then charge balance, then the reaction medium.

Common traps

- Do not ignore subscripts when computing total oxidation-number change.
- A higher oxidation number does not automatically mean stronger oxidizing power in every question.
- In acidic or basic media, add H^+, OH^-, and H_2O according to the medium and charge balance.
- For unfamiliar redox equations, first infer products from the prompt before balancing.

Teacher Moves

WHY THESE MATTER

These are the teacher-style moves distilled from the video notes: how to decide, not just what to memorize.

Move 1

- Track oxidation-number increase/decrease before balancing coefficients. | Source: P15 00:06:18, P16 00:30:02, P19 01:01:23.

Move 2

- Name the oxidizing agent and reducing agent from electron transfer, not from memory alone. | Source: P16 00:38:29, P19 00:24:56, P20 00:26:18.

Move 3

- Assign fixed or obvious oxidation numbers first, then solve the rest. | Source: P14 00:03:54.

Move 4

- Forward balancing works well when changing elements are clear on the reactant side. | Source: P18 00:03:10.

Move 5

- Start balancing from the side that gives one clean changing variable. | Source: P18 00:07:38.

Move 6

- Reverse balancing is useful when the single changing variable is clearer in the products. | Source: P18 00:20:09.

Move 7

Move 7

- In basic medium, use OH^- and H_2O to finish charge and atom balance. | Source: P24 00:03:27.

Move 8

- Include subscripts when counting the total oxidation-number change. | Source: P24 00:06:47.

Move 9

- In acidic medium, use H^+ and H_2O to finish charge and atom balance. | Source: P24 00:11:28.

Worked Example Cards

video-pattern example

Assign the oxidizing agent

Source: Unit 2 teacher move, P15–P20

1. In $Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$, Zn changes from 0 to +2.
2. Cu changes from +2 to 0.
3. Zn loses electrons, so Zn is oxidized and acts as the reducing agent.
4. Cu^{2+} gains electrons, so Cu^{2+} is reduced and acts as the oxidizing agent.

Answer: Oxidizing agent: Cu^{2+}. Reducing agent: Zn.

video-pattern example

Count electron change with subscripts

Source: Unit 2 teacher move: include subscripts

1. Find the changing element first.
2. Write the oxidation-number change per atom.
3. Multiply by the number of changing atoms in the formula.
4. Use the least common multiple so electron loss equals electron gain.

Answer: Use total electron change, not only the change on one atom.

Practice prompts

- Rank oxidizing/reducing strength from a given redox equation.
- Balance a redox equation in acidic solution.
- Balance a redox equation in basic solution.