

SALWAN PUBLIC SCHOOL, RAJENDRA NAGAR

CLASS – X

LESSON PLAN

CHAPTER-3: METALS AND NON-METALS

CHAPTER-1:	Science :(METALS AND NON-METALS)
Class Transaction	PART-II
(5-6 days)	Total: 5 periods (approx. 35 min each) Sub-Topic: Minerals and Ores Sub-Topic: Metallurgy- main steps involved Sub-Topic: Extraction of metals of low reactivity Sub-Topic: Extraction of metals of medium reactivity Sub-Topic: Roasting and Calcination Sub-Topic: Extraction of metals of high reactivity Sub-Topic: Electrolytic refining of Copper Sub-Topic: Corrosion and alloys
Pre-requisite for the course (KNOWLEDGE)	This lesson requires the following pre-knowledge: • Metals are obtained from minerals and ores. • Minerals are taken out of earth by the mining process. • Metals taken out of earth are purified to get pure metals. • Almost all metals corrode for example rusting of iron. • Alloys are mixtures of metals which are used in our daily life.
Learning Objectives	Students will be able to: • Understand the difference between minerals and ores. • Comprehend the various steps involved in metallurgy. • Distinguish between roasting and calcination processes. • Write chemical reactions involved in the extraction of metals of low, medium and high reactivities. • Explain the process of electrolytic refining of copper. • Know how the corrosion process affects metals. • Understand the properties of commonly used alloys.
Teachers' activity (Methodology used)	<u>Inquiry based learning instructional strategies:</u> • Teacher will introduce the topic by asking students as to from where we get metals which are in use all around us. Some samples of ores may be shown to students to arouse their interest in the topic. • Questions to be posed to students: (Inquisitiveness) ➤ Why do we need to separate impurities from the ore? ➤ How do we separate metal from the ore?

	➤ Which is the first step involved? ➤ What is the difference between a mineral and an ore? ➤ How do we get almost 100% pure metals? • <u>Brain storming technique:</u>(Triggering the thinking process of students) Teacher would explain the main steps involved in Metallurgy – ➤ What are the possible methods which can be used to remove impurities from ore? (Focus on - Concentration of ore) ➤ Are all these methods - physical methods? (The teacher will give examples) ➤ Can we use same method for converting different types of ores like sulphide, carbonate or oxide to metal oxides? ➤ How can we obtain metal from its oxide? (Recall Reduction process) ➤ What are the different reducing agents which can be used to obtain metal? ➤ Do we get pure metal after reduction? What can be done to purify metals? (Concept of Refining) • Discussion points: Explanation of concepts: ➤ The difference between roasting and calcination processes. ➤ Thermite reaction (focus on its use in daily life). ➤ Stress upon the difference in Electrolytic Reduction and Electrolytic Refining. ➤ Detailed description of Electrolytic Refining process (Diagrammatic representation) (Focus on Cathode, anode, electrolyte used) • Demonstration of conditions required for Rusting of Iron Experiment: (Activity based learning -Critical thinking) Activity: Take three dry test tubes. Add one iron nail in each test tube. Add distilled water in the first test tube, anhydrous Calcium chloride in the second and boiled distilled water (put some oil also) in the third and make observations. Interpret the observations and write down the conclusions made. Discussion points: ➤ Corrosion is not a wasteful process in every case. ➤ Iron Pillar in Delhi has not rusted till date. Discuss. • Brainstorm on the variety of alloys used in our daily life. Stress upon the necessity of using alloys.
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	• Recapitulation (Collaborative learning): Example- Draw a FLOW CHART indicating the steps involved in Metallurgy and refining to get pure metal.
Students' Learning Outcomes	Students would be able to: • Explain the difference between minerals and ores. • State the various metallurgical steps in obtaining metal from ore. • Differentiate between roasting and calcination processes. • Write chemical reactions involved in the extraction of metals of low, medium and high reactivities. • Describe the process of electrolytic refining of copper with the help of a labelled diagram. • Define corrosion and explain the conditions required for rusting. • Give examples of commonly used alloys.
Assessment	• Continuously monitor student's learning growth by asking oral questions. • Promoting active involvement of students in their own learning by asking students to focus on written practice of chemical equations in the class. • Experiential Learning by hands on experimental activities • Mind-map on Metallurgy
Self-Study, Assignments, Homework	• Self-Study (reinforcing the concepts by going through the chapter in the book)-The teacher would ensure that each student should bring NCERT textbook to the class. • Discussion of NCERT back exercise questions by the teacher in the class. Students will write the answers in their classwork notebooks. Teacher will take rounds in the class to ensure that all the students do written practice. • Homework (Question Bank): On completion of the chapter, students will be answer the following revision questions in their homework notebooks: Q.1 State the metallurgical steps involved in obtaining pure metal from a) Zinc blende ore and b) Cinnabar ore. Write chemical equations also. Q 2 Write the differences between Roasting and Calcination process in a tabular form with the help of chemical equations. Q 3 Draw a well labelled diagram to explain the Electrolytic refining of Copper. Label Cathode, Anode and Electrolyte.

	Q4 List the main ores of Mercury, Copper, Zinc, Iron, Aluminium and Sodium. Q 5 How is pure Copper obtained from its ore? Write the metallurgical steps involved. (Give chemical equations also) Q 6 Explain the conditions required for rusting of Iron. Q 7 State the properties and uses of Steel, Stainless steel, Brass, Bronze and Solder alloys in a tabular form. Q 8 What is Thermite reaction? Give an example. (write chemical equations)
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