KOTHARI INTERNATIONAL SCHOOL, NOIDA
LESSON PLAN

GRADE: *IGCSE A Level*

SUBJECT: *CHEMISTRY* **SUBJECT TUTOR:** Lakshmi Prabha

TIME PERIOD: 5th April -15th April 2023

TEACHING TIME : 06 Hrs 35 Min /08 PERIODS

SYLLABUS: Organic Chemistry

CLASS TEST WILL BE CONDUCTED AT THE END OF THE CHAPTER

Topic and Concept	Learning Objectives	Methodology with Teaching Aids
Phenols	3 Explaining the acidity of phenol The relative acidities of water, phenol and ethanol.	Asking learners what data they could look up in data tables to compare the acidity of water, phenol and ethanol. When you have established that the answer is pKa values, ask learners to assign pKa values to each substance and place them in order of least to most acidic. Making clear that phenol is a very weak acid as shown by its lack of reactivity with sodium carbonate (or hydrogen carbonate). Add some sodium carbonate to a solution of phenol and ask learners to explain how they know there is no reaction. [lack of bubbles of carbon dioxide produced] Encouraging learners to research the reason why phenol is weakly acidic. Their discussion should be centred around the stability of the phenoxide anion. www.chemguide.co.uk/organicprops/phenol/acidity.htm
Phenols	Recalling the chemistry of phenol as exemplified by the following reactions: (a) with bases, for example NaOH(aq) to produce sodium phenoxide (b) with Na(s) to produce sodium phenoxide and H2(g) (c) in NaOH(aq) with diazonium salts, to give azo compounds (d) nitration of the aromatic ring with dilute HNO3(aq) at room temperature to give a mixture of 2-nitrophenol and 4-nitrophenol (e) bromination of the aromatic ring with Br2(aq) to form 2,4,6– tribromophenol. 32.2.5 Explain why the reagents and conditions for the nitration and bromination	. Learners need to know that the reactions of phenol in this objective can be classified according to: (i) reactions possible because of the acidity of the phenolic -OH groups (ii) ring substitution reactions Reactions possible because of the acidity of the phenolic -OH group Explain that phenol can react with sodium hydroxide because sodium hydroxide is a strong base and is able to remove the proton from the phenol producing the phenoxide ion. The reaction of phenol with sodium also produces sodium phenoxide. Demonstrate the reaction of phenol by melting a small quantity (in a fume cupboard). Then add a small piece of sodium to it. Fizzing will be observed of hydrogen gas. The resulting product is sodium phenoxide. Azo compounds can be prepared by the reaction of sodium hydroxide and diazonium salts. This reaction is covered in topic 34.2 Phenylamine and azo compounds. Ring substitution reactions Nitration Ask learners to predict and explain the effect of having an -OH

	of phenol are different from those for benzene Recalling that the hydroxyl group of a phenol directs to the 2, 4 and 6 positions.	group on the benzene ring. Learners should be able to explain that the -OH group is activating and 2, 4 directing. They should compare the conditions needed for the nitration of phenol, to benzene. Finally, ask learners to suggest why the use of concentrated nitric acid is not recommended. Bromination Learners predict what product is formed again noting the ease of reaction. This reaction can be demonstrated in the fume cupboard: Bromine water is carefully added to an aqueous solution of phenol. A white precipitate of 2, 4, 6 - tribromophenol is formed and the bromine water is decolourised