SUBJECT GCE Chemistry RJ — Year 13 LP 5

<table>
<tr>
<td colspan="3">This half term: Skills, Knowledge and Understanding to be developed:
• Skills (students <u>WILL BE ABLE</u> to by the end of the Learning Programme): Students will be able to: draw examples of different types of complex ions; write equations for ligand exchange reactions;
• Knowledge (students <u>WILL KNOW</u> by the end of the Learning Programme): the chemistry of the d-block, with particular reference to catalytic activity, variable oxidation states, complex ions, coloured comppunds.
• Understanding (students <u>WILL DEMONSTRATE THEIR UNDERSTANDING</u> by the end of the learning programme): through:explaining why transition elements form coloured complexes; explaining the catalytic activity if the transition elements.</td>
<td>Key Terms / Words:
Ligand, complex ion, catalyst, homogenous, heterogenous, oxidation state, colorimetry, transition metal.</td>
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<td>LP 5 – Weeks 1 & 2 Learning Outcomes:
Chemistry of the d-block
○ Know the important oxidation states of various elements in the first row of the transition metals.
○ Know how the d-block elements attain various oxidation states in their compounds.
○ Know the most important oxidation states of Cr, Mn, Fe, Co and Cu and the colours of aqueous solutions of these elements.
○ Identify and draw examples of different types of complex ions, including linear, square planar, tetrahedral and octahedral complexes.</td>
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<td>Success criteria
1.Candidates should recall all stable oxidation states for Cr, Mn, Fe, Co and Cu.
2. Be able to draw in 3-D octahedral and tetrahedral complexes.</td>
<td>Homework LP 5 1/3
Complete exam style questions in booklet</td>
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<td>LP 5 – Weeks 3 & 4 Learning Outcomes:
Chemistry of the d-block
○ Explain the origin of colour in transition metal complexes in terms of the splitting of the d-orbitals.
○ Write equations for ligand exchange reactions, and how these can lead to changes in colour and coordination number.
○ (Carry out a practical) and write equations for the reactions of the aqueous solutions of Cr(3+), Fe(2+), Fe(3+) and Cu(2+) with sodium hydroxide both dropwise and in excess. Be able to recall the colours of the solutions and the precipitates involved.
○ Explain the catalytic properties of transition metals and their compounds; both homogenous and heterogenous catalysis.
○ Be able to give examples of the use of specific transition metals and their compounds as catalysts in industrial processes.</td>
<td>Assessment</td>
<td>Success criteria:
3. Students need to be aware that different ligands lead to different splittings and therefore different colours.
4. Recall nickel and iron as the catalysts used in the hydrogenation of alkenes and the Haber process respectively.
5. Recall vanadium(V) oxide as the catalyst used in the contact process and manganese(IV) oxide as an effective catalyst for the decomposition of hydrogen peroxide</td>
<td>Homework LP 5 2/3
Complete exam style questions in booklet</td>
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<td>LP 5 – Weeks 5 & 6 Learning Outcomes:
Chemistry of the d-block
○ Revise all aspects of the d-block in preparation for a CAG assessment.</td>
<td>Assessment
CAG
MARK
GRADE</td>
<td>Success criteria:</td>
<td>Homework LP 5 3/3
Revise for CAG assessment.</td>
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