Subject	Year	Term
Chemistry	12	5/6

Topic

6.1.2 Carbonyls

Content (Intent)

Prior Learning (Topic) KS4 Y9 C7 Organic chemistry **KS5 Y12** 4.1.1 Basic concepts 4.1.2 Alkanes 4.1.3 Alkenes 4.2.1 Alcohols 4.2.3 organic synthesis 4.2.4 analytical techniques

Reactions of carbonyl compounds

(a) oxidation of aldehydes using $Cr_2O_7^{2-}/H^+$ (i.e. $K_2Cr_2O_7/H_2SO_4$) to form carboxylic acids

(b) nucleophilic addition reactions of carbonyl compounds with:

(i) $NaBH_4$ to form alcohols

(ii) HCN [i.e. NaCN(aq)/H+(aq)], to form hydroxynitriles **(see also 6.2.4 b)**

(c) the mechanism for nucleophilic addition reactions of aldehydes and ketones with $NaBH_4$ and HCN

Characteristic tests for carbonyl compounds

(d) use of 2,4-dinitrophenylhydrazine to:

(i) detect the presence of a carbonyl group in an organic compound

(ii) identify a carbonyl compound from the melting point of the derivative

(e) use of Tollens' reagent (ammoniacal silver nitrate) to:

(i) detect the presence of an aldehyde group

(ii) distinguish between aldehydes and ketones, explained in terms of the oxidation of aldehydes to carboxylic acids with reduction of silver ions to silver.

Future Learning (Topic) 6.1.3 Carboxylic acids and esters 6.2.1 Amines 6.2.2 Amino acids, amide and chirality 6.2.3 Poly amides and polyesters 6.2.4 Carbon-carbon bond formation 6.2.5 Organic synthesis

How will knowledge and skills be taught? (Implementation)	How will your understanding be assessed & recorded (Impact)
Presentation, notes, worked examples, molymods, model answers and exam style questions. Prac: Testing presence of carbonyl with 2,4-DNPH. Techniques on how to purify the organic solid, technique to measure the temperature of organic solid.	- 1 x standard homework (Grade given. Written feedback. Response expected.)

How can parents help at home?

Look at the topic specific resources on the VLE

Use appropriate websites: MachemGuy, Allery Chemistry, Chemistry World – by Royal Society of Chemistry, ChemGuide.

Take an interest! Ask your children what they have learnt and be curious about their learning.

Helpful further reading/discussion

Reading	Vocabulary Lists	Careers Links
Textbook pages 454-472	*Carbonyl*	Analytical chemist

The Science of Everyday Life by Marty Jopson Why Chemical Reactions Happen by Keeler and Wothers	*Oxidation* *Carboxylic acids* *Nucleophilic substitution* *Aldehydes* *Ketones* *2,4-DNPH* *Tollens'*	Chemical engineer Clinical biochemist Forensic scientist Pharmacologist Process chemist Quality control analyst Research scientist Science writer Site chemist Teacher or lecturer Degrees; Chemistry Biochemistry Biomedical science Biological sciences Medicine Research chemist Veterinary medicine