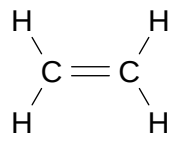
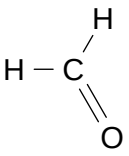
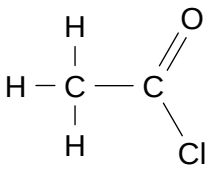
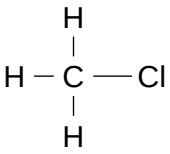
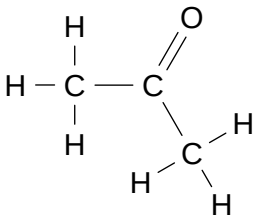
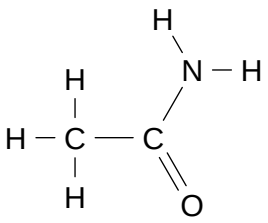
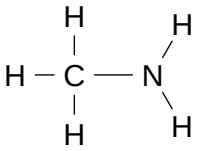
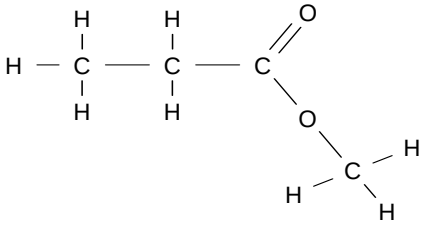
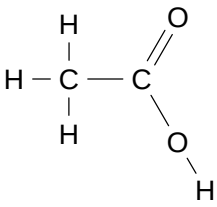
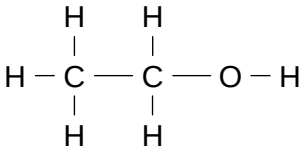
AS90698vs 2 Describe aspects of Organic Chemistry Level 3 5 credits

Nomenclature – means the correct way of naming organic compounds.

Hydrocarbons – compounds only containing hydrogen and carbon.

Level 3 Hydrocarbons include

alkanes	**alkenes**	**alkynes**
Similar chemistry – all hydrocarbons will burn in air (oxygen). <u>Complete combustion</u> results in <u>water and carbon dioxide</u> only as products. <u>Incomplete combustion</u> results in water and carbon dioxide as well as carbon (soot) and carbon monoxide (CO), a toxic, odourless, tasteless gas. Be prepared to write balanced equations for complete combustion.		

Alkene 	**Aldehyde** 	**Acid (acyl) chloride** 
Haloalkane 	**Ketone** 	**Amide** 
Amine 	**Ester** 	
Carboxylic acid 	**Alcohol** 	

At level 3 you need to recognize these different functional groups.

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Chemical Formula – I'm confused by the different types!

The following types of formulae are used at Level 3 Chemistry.

Empirical formula – gives the simplest whole number ratio of atoms found in the molecule.

Eg H not C_2H_2 (ethyne C_2H_2 and benzene C_6H_6 share the same empirical formulae).

Here is **an example** of how to calculate the **empirical formula of a compound**

Analysis of an organic compound show it to contain 40.6% Carbon, 5.5% hydrogen, 23.7% nitrogen and 27.2% oxygen.

	Carbon	**Hydrogen**	**Nitrogen**	**Oxygen**
%	40.6%	8.5%	23.7%	27.2%
Work out the molar ratio (convert % to g and divide by relative atomic mass)	$\frac{40.6}{12}$	$\frac{8.5}{1}$	$\frac{23.7}{14}$	$\frac{27.2}{16}$
Moles ratio	3.38	8.50	1.69	1.70

At this point you need to find the simplest whole number ratio – just divide each molar ratio by the smallest value – in this case it is 1.69

Simplest whole Number ratio	$\frac{3.38}{1.69}$		$\frac{8.50}{1.69}$		$\frac{1.69}{1.69}$		$\frac{1.70}{1.69}$
	2	:	5	:	1	:	1

Empirical formula is C_2H_5NO

If the molar mass of the compound is known, possible **structures** can be drawn for the molecule. Remember that organic molecules can exist as **isomers**.

Molecular formulae must be exact multiples of empirical formulae

Example if the empirical formula is **CH_2O** and the formula mass was 60 g mol^{-1} then a molecular formula could be **$C_2H_4O_2$**

2 functional group isomers. are possible