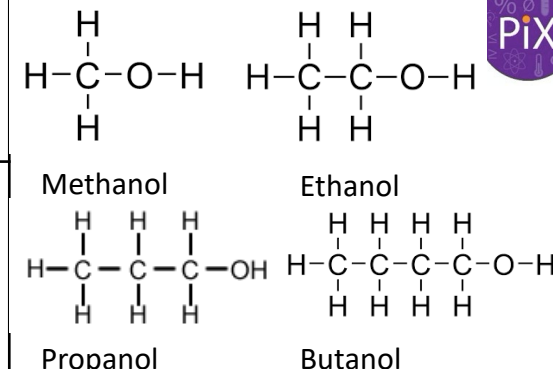


<b>Alkenes</b>	<i>Hydrocarbons with a double carbon-carbon bond.</i>
<b>Unsaturated</b>	<i>Alkenes are unsaturated because they contain two fewer hydrogen atoms than their alkane counterparts.</i>
<b>General formula for alkenes</b>	<b>C<sub>n</sub>H<sub>2n</sub></b>

Structure and formula of alkenes

<b>Functional group</b>	<i>Alkenes are hydrocarbons in the functional group C=C.</i>	The functional group of an organic compound determined their reactions.
<b>Alkene reactions</b>	<i>Alkenes react with oxygen in the same way as other hydrocarbons, just with a smoky flame due to incomplete combustion.</i>	Alkenes also react with hydrogen, water and the halogens. The C=C bond allows for the addition of other atoms.



Reactions of alkenes

**Reactions of alkenes and alcohols**

Alcohols

<b>Functional group</b>	<b>-OH</b> <i>For example: CH<sub>3</sub>CH<sub>2</sub>OH</i>	Methanol, ethanol, propanol and butanol are the first four of the homologous series.
<b>Alcohol reactions</b>	<i>Alcohols react with sodium, air and water.</i>	<p>Alcohols and sodium: bubbling, hydrogen gas given off and salt formed.</p> <p>Alcohols and air: alcohols burn in air releasing carbon dioxide and water.</p> <p>Alcohols and water: alcohols dissolve in water to form a neutral solution.</p>
<b>Fermentation</b>	<i>Ethanol is produced from fermentation.</i>	When sugar solutions are fermented using yeast, aqueous solutions of ethanol are produced. The conditions needed for this process include a moderate temperature (25 – 50°C), water (from sugar solution) and an absence of oxygen.

**AQA GCSE Organic chemistry 2 (CHEMISTRY ONLY)**

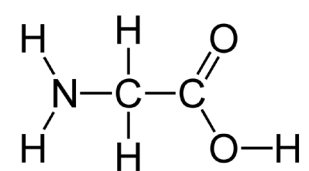
**Synthetic and naturally occurring polymers**

Carboxylic acids

Addition polymerisation

**Amino acids**

Amino acids have two functional groups in a molecule. They react by condensation polymerisation to produce peptides.

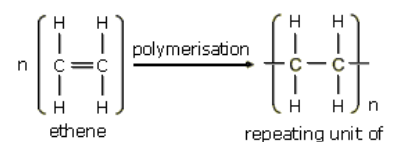


Condensation polymerisation (HT only)

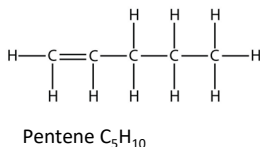
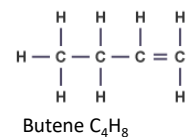
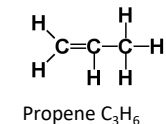
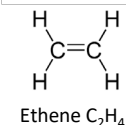
DNA and naturally occurring polymers

<b>DNA</b>	<i>Deoxyribonucleic acid is a large molecule essential for life. DNA gives the genetic instructions to ensure development and functioning of living organisms and viruses.</i>
<b>DNA structure</b>	<i>Most DNA molecules are two polymer chains made from four different monomers, called nucleotides. They are in the double helix formation.</i>
<b>Natural polymers</b>	<i>Other naturally occurring polymers include proteins, starch and cellulose and are all important for life.</i>

<b>Functional group</b>	<b>-COOH</b> <i>For example: CH<sub>3</sub>COOH</i>	Methanoic acid, ethanoic acid, propanoic acid and butanoic acid are the first four of the homologous series.
<b>Carboxylic acid reactions</b>	<i>Carboxylic acids react with carbonates, water and alcohols.</i>	<p>Carboxylic acids and carbonates: These acids are neutralised by carbonates</p> <p>Carboxylic acids and water: These acids dissolve in water.</p> <p>Carboxylic acids and alcohols: The acids react with alcohols to form esters.</p>
<b>Strength (HT only)</b>	<i>Carboxylic acids are weak acids</i>	<p>Carboxylic acids only partially ionise in water.</p> <p>An aqueous solution of a weak acid with have a high pH (but still below 7).</p>

<b>Polymers</b>	<i>Alkenes are used to make polymers by addition polymerisation.</i>	Many small molecules join together to form polymers (very large molecules).
<b>Displaying polymers</b>	<i>In addition polymers, the repeating unit has the same atoms as the monomer.</i>	<p>It can be displayed like this:</p> 

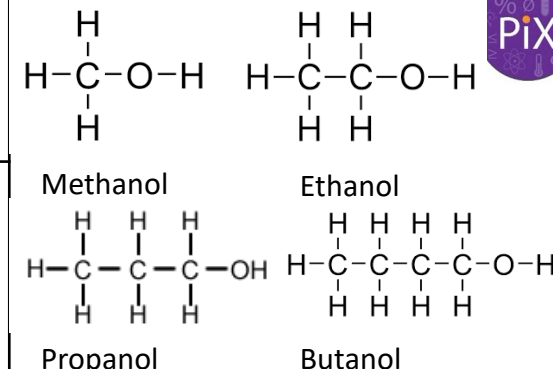
<b>Condensation polymerisation</b>	<i>Condensation polymerisation involves monomers with two functional groups</i>	When these types of monomers react they join together and usually lose small molecules, such as water. This is why they are called condensation reactions.
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	<b>Hydrocarbons with a double carbon-carbon bond.</b>
	<b>Alkenes are unsaturated because they contain two fewer hydrogen atoms than their alkane counterparts.</b>
	<b>C<sub>n</sub>H<sub>2n</sub></b>

Structure and formula of alkenes

	<b>Alkenes are hydrocarbons in the functional group C=C.</b>	The functional group of an organic compound determined their reactions.
	<b>Alkenes react with oxygen in the same way as other hydrocarbons, just with a smoky flame due to incomplete combustion.</b>	Alkenes also react with hydrogen, water and the halogens. The C=C bond allows for the addition of other atoms.



Reactions of alkenes

Reactions of alkenes and alcohols

Alcohols

Carboxylic acids

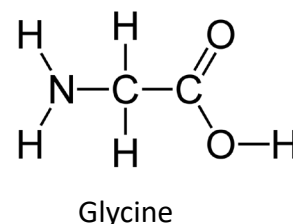
Addition polymerisation

AQA GCSE Organic chemistry 2 (CHEMISTRY ONLY)

Synthetic and naturally occurring polymers

Amino acids

Amino acids have two functional groups in a molecule. They react by condensation polymerisation to produce peptides.



DNA and naturally occurring polymers

Condensation polymerisation (HT only)

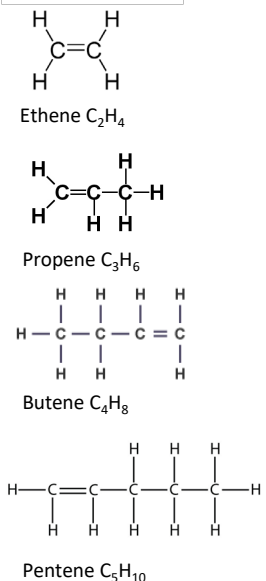
	<b>-COOH</b> <b>For example: CH<sub>3</sub>COOH</b>	Methanoic acid, ethanoic acid, propanoic acid and butanoic acid are the first four of the homologous series.
	<b>Carboxylic acids react with carbonates, water and alcohols.</b>	Carboxylic acids and carbonates: These acids are neutralised by carbonates Carboxylic acids and water: These acids dissolve in water. Carboxylic acids and alcohols: The acids react with alcohols to form esters.
	<b>Carboxylic acids are weak acids</b>	Carboxylic acids only partially ionise in water. An aqueous solution of a weak acid will have a high pH (but still below 7).

	<b>Alkenes are used to make polymers by addition polymerisation.</b>	Many small molecules join together to form polymers (very large molecules).
	<b>In addition polymers, the repeating unit has the same atoms as the monomer.</b>	It can be displayed like this:  ethene      repeating unit of poly(ethene)

	<b>-OH</b> <b>For example: CH<sub>3</sub>CH<sub>2</sub>OH</b>	Methanol, ethanol, propanol and butanol are the first four of the homologous series.
	<b>Alcohols react with sodium, air and water.</b>	Alcohols and sodium: bubbling, hydrogen gas given off and salt formed. Alcohols and air: alcohols burn in air releasing carbon dioxide and water. Alcohols and water: alcohols dissolve in water to form a neutral solution.
	<b>Ethanol is produced from fermentation.</b>	When sugar solutions are fermented using yeast, aqueous solutions of ethanol are produced. The conditions needed for this process include a moderate temperature (25 – 50°C), water (from sugar solution) and an absence of oxygen.

	<b>Deoxyribonucleic acid is a large molecule essential for life. DNA gives the genetic instructions to ensure development and functioning of living organisms and viruses.</b>
	<b>Most DNA molecules are two polymer chains made from four different monomers, called nucleotides. They are in the double helix formation.</b>
	<b>Other naturally occurring polymers include proteins, starch and cellulose and are all important for life.</b>

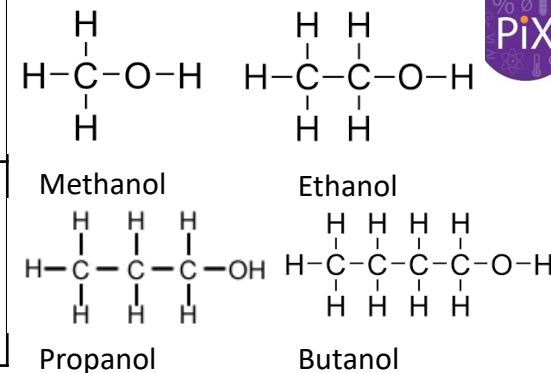
	<b>Condensation polymerisation involves monomers with two functional groups</b>	When these types of monomers react they join together and usually lose small molecules, such as water. This is why they are called condensation reactions.
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<b>Alkenes</b>	
<b>Unsaturated</b>	
<b>General formula for alkenes</b>	

Structure and formula of alkenes

<b>Functional group</b>		The functional group of an organic compound determined their reactions.
<b>Alkene reactions</b>		Alkenes also react with hydrogen, water and the halogens. The C=C bond allows for the addition of other atoms.



Reactions of alkenes

Reactions of alkenes and alcohols

Alcohols

AQA GCSE Organic chemistry 2 (CHEMISTRY ONLY)

Synthetic and naturally occurring polymers

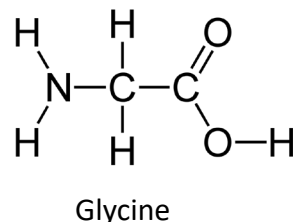
Carboxylic acids

Addition polymerisation

Condensation polymerisation (HT only)

Amino acids

Amino acids have two functional groups in a molecule. They react by condensation polymerisation to produce peptides.



DNA and naturally occurring polymers

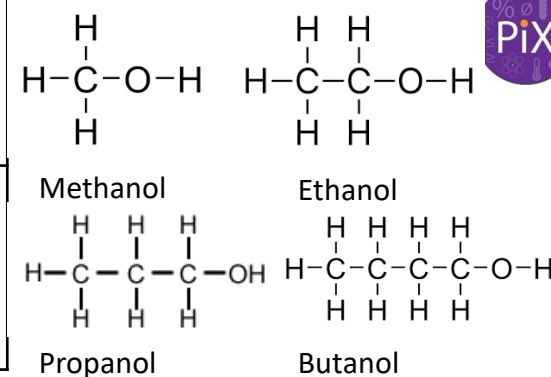
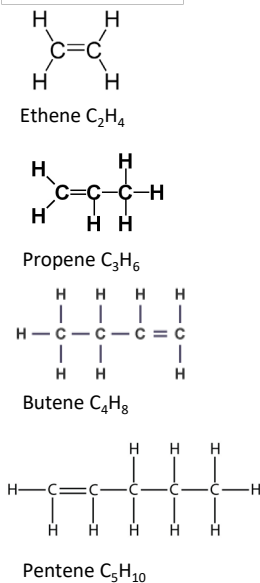
<b>Functional group</b>		Methanol, ethanol, propanol and butanol are the first four of the homologous series.
<b>Alcohol reactions</b>		<p>Alcohols and sodium: bubbling, hydrogen gas given off and salt formed.</p> <p>Alcohols and air: alcohols burn in air releasing carbon dioxide and water.</p> <p>Alcohols and water: alcohols dissolve in water to form a neutral solution.</p>
<b>Fermentation</b>		When sugar solutions are fermented using yeast, aqueous solutions of ethanol are produced. The conditions needed for this process include a moderate temperature (25 – 50°C), water (from sugar solution) and an absence of oxygen.

<b>DNA</b>	
<b>DNA structure</b>	
<b>Natural polymers</b>	

<b>Functional group</b>		Methanoic acid, ethanoic acid, propanoic acid and butanoic acid are the first four of the homologous series.
<b>Carboxylic acid reactions</b>		Carboxylic acids and carbonates: These acids are neutralised by carbonates
		Carboxylic acids and water: These acids dissolve in water.
		Carboxylic acids and alcohols: The acids react with alcohols to form esters.
<b>Strength (HT only)</b>		<p>Carboxylic acids only partially ionise in water.</p> <p>An aqueous solution of a weak acid with have a high pH (but still below 7).</p>

<b>Polymers</b>		Many small molecules join together to form polymers (very large molecules).
<b>Displaying polymers</b>		<p>It can be displayed like this:</p> $n \left( \begin{array}{c} \text{H} & \text{H} \\   &   \\ \text{C} & = & \text{C} \\   &   \\ \text{H} & \text{H} \end{array} \right) \xrightarrow{\text{polymerisation}} \left[ \begin{array}{c} \text{H} & \text{H} \\   &   \\ - \text{C} - & \text{C} - \\   &   \\ \text{H} & \text{H} \end{array} \right]_n$ <p>ethene                      repeating unit of poly(ethene)</p>

<b>Condensation polymerisation</b>		When these types of monomers react they join together and usually lose small molecules, such as water. This is why they are called condensation reactions.
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Structure and formula of alkenes	Alkenes		Functional group		
	Unsaturated		Alkene reactions		
	General formula for alkenes				
			Reactions of alkenes	Alcohols	
			Reactions of alkenes and alcohols		
			AQA GCSE Organic chemistry 2 (CHEMISTRY ONLY)		
			Synthetic and naturally occurring polymers		
Carboxylic acids	Addition polymerisation	Amino acids	DNA and naturally occurring polymers	Functional group	
				Alcohol reactions	
				Fermentation	
Carboxylic acid reactions	Condensation polymerisation (HT only)	Glycine	DNA structure	DNA	
				Natural polymers	
Strength (HT only)			Condensation polymerisation		
Polymers					
Displaying polymers		It can be displayed like this: $n \begin{array}{c} \text{H} & \text{H} \\   &   \\ \text{C} = \text{C} \\   &   \\ \text{H} & \text{H} \end{array} \xrightarrow{\text{polymerisation}} \left[ \begin{array}{c} \text{H} & \text{H} \\   &   \\ -\text{C} - & \text{C}- \\   &   \\ \text{H} & \text{H} \end{array} \right]_n$ ethene repeating unit of poly(ethene)			