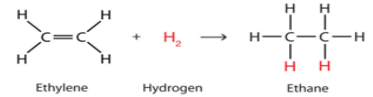
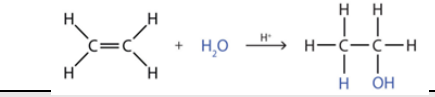
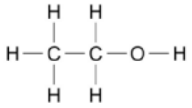
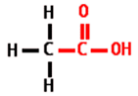
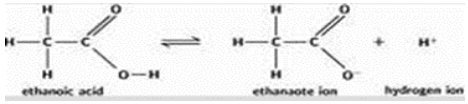
4.7.2 Reactions of alkenes and alcohols (chemistry only)

Reactions of Alkenes		
Combustion	React with oxygen in combustion reactions in the same way as other hydrocarbons, but they tend to burn in air with smoky flames because of incomplete combustion.	
Addition Reactions: double bond becomes a single carbon-carbon bond		
Hydrogenation	Adding hydrogen to the double bond. Bromine is used to test for unsaturation. 60oC & Ni catalyst.	
Halogens	Naming : Give the name of the Halide first but; Chloro, Bromo and Ido.	
Hydration	Adding water. Reaction with steam and a catalyst. Produces an alcohol.	

Alcohols			
Functional Group	-OH	CH_3CH_2OH **$C_nH_{2n+1}OH$** The first 4 alcohols are methanol, ethanol, propanol and butanol.	
Reaction with sodium	Fizzes producing hydrogen gas. Slow reaction compare to in water.	**$2Na + 2C_2H_5OH \rightarrow 2C_2H_3ONa + H_2$**	
Reaction when they burn in air.	Burn with a clean blue flame.	$C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O_{(l)}$	
Reaction in water.	Dissolves in water to form a neutral solution.		
Oxidation	Microbial action or an oxidising agent.	Ethanol + Oxidising agent —> Ethanoic Acid + Water $C_2H_5OH +$ [O] $\rightarrow C_2COOH + H_2O$	
Uses	Solvent, fuels, alcoholic drinks		
Fermentation	Aqueous solutions of ethanol are produced when sugar solutions are fermented using yeast. Warm/moist.	$C_6H_{12}O_6 \rightarrow 2\ CH_3CH_2OH + 2\ CO_2$ glucose ethanol carbon dioxide	

Carboxylic Acid			
Functional Group	–COOH	**CH_3COOH : Ethanoic Acid** Methanoic acid, ethanoic acid, propanoic acid and butanoic acid.	
Weak Acids	Dissolve in water to form weak acidic solution. Partially ionise.		
Reactions	**With carboxylic acids to form salts e.g. metal ethanoate, water and carbon dioxide. The reaction is much slower than with a strong acid.**	With alcohols to form esters (-COO-).	

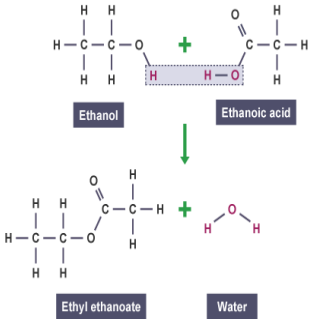
Esters: Functional Group is –COO-

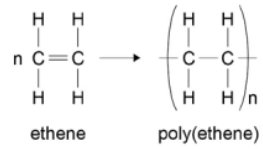
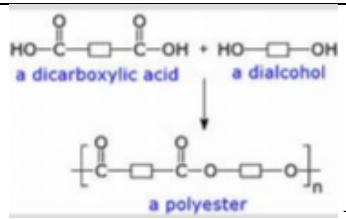
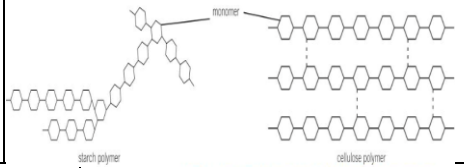
Alcohol + Carboxylic Acid —> Ester + Water

Naming esters : First name is the **Alcohol** and second name is the salt name of the **Carboxyllic acid**

Ethanol + Ethanoic Acid —> Ethyl Ethanoate + Water

Esters are **volatile** compounds are often used as; Food flavorings, perfumes, plastics , solvents and plasticisers.



Polymer	Long chain molecule made up of repeating units.	
Monomer		
Addition Polymerisation	Many small molecules (monomers) join together to form very large molecules (polymers). 1 monomer with a double bond C=C	
Condensation Polymerisation	2 monomers with 2 functional groups. A small molecule is also produced. Dialcohol + Dicarboxylic acid ➔ polyester + Water	 +nH2O
Naturally Occurring Polymers	Amino acids have two different functional groups in a molecule. Amino acids react by condensation polymerisation to produce polypeptides. Different amino acids can be combined in the same chain to produce proteins. Proteins are naturally occurring polymers.	Glycine is H_2NCH_2COOH and polymerises to produce the polypeptide (-$HNCH_2COO$-)n and nH_2O 
	Starch and cellulose are naturally occurring polymers. The monomer is glucose.	
DNA	DNA (deoxyribonucleic acid) is a large molecule essential for life. DNA encodes genetic instructions for the development and functioning of living organisms and viruses.	Most DNA molecules are two polymer chains, made from four different monomers called nucleotides, in the form of a double helix.