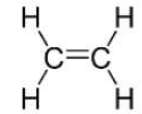
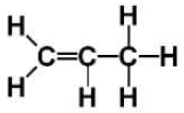
AQA C7b Organic Reactions
CHEMISTRY TRIPLE

Alkenes



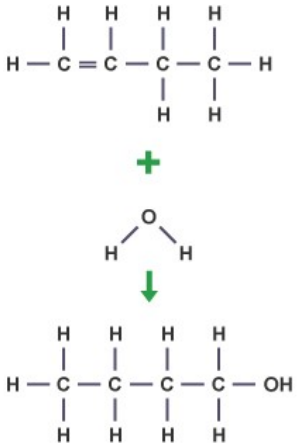
Ethene C_2H_4



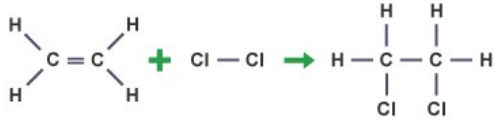
Propene C_3H_6

alkenes	unsaturated hydrocarbons
unsaturated	this means they contain a double bond
general formula	C_nH_{2n}

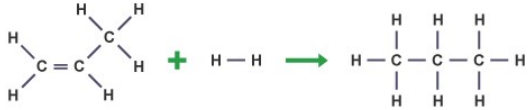
functional group	Alkenes are hydrocarbons with the functional group C=C	The functional group of an organic compound determines their reaction
alkene reactions	Alkenes react with oxygen in the same way as other hydrocarbons, just with a smoky flame due to incomplete combustion	Alkenes also react with hydrogen, water and the halogens. The C=C bond allows for the addition of other atoms. The pictures below show some examples.



alkene + water (steam) → alcohol
This is called hydration, and it needs a temperature of approximately 300°C and an acid catalyst.



chlorine, bromine or iodine can be added

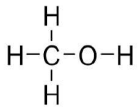


alkene + hydrogen → alkane
This is called hydrogenation, and it needs a nickel catalyst.

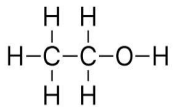
All of these are examples of reactions where molecules add on each side of the double bond, and the double bond breaks to leave a single bond.

Alcohols

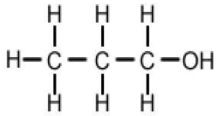
Functional group	Alcohol reactions	Fermentation
-OH For example: CH_3CH_2OH	Alcohols react with sodium, air and water. They are useful as fuels and solvents	Ethanol is produced from fermentation (see below) *(It can also be produced by hydration, see bottom left).*
Methanol, ethanol, propanol and butanol are the first four of the homologous series. **Homologous series =** molecules with the same functional group.	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	When sugar solutions are fermented using yeast, aqueous solutions of ethanol are produced. The conditions needed for this process include a moderate temperature (25-50ºC), water (from sugar solution) and an absence of oxygen.



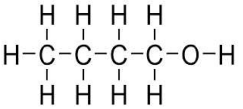
Methanol



Ethanol

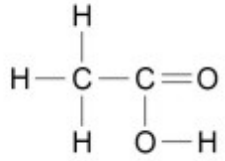
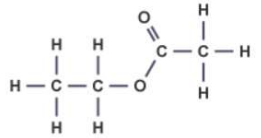


Propanol



Butanol

Carboxylic acids

Functional group	Carboxylic acid reactions	Strength (HT only)
-COOH For example: CH_3COOH	Carboxylic acids react with carbonates (to fizz and form CO_2). For example, ethanoic acid + sodium carbonate → sodium ethanoate + water + carbon dioxide Carboxylic acids dissolve in water. Carboxylic acids react with alcohols to form esters.	Carboxylic acids are weak acids. They only partially ionise in water. An aqueous solution of a weak acid will have a higher pH than a strong acid (but still below 7).
Methanoic acid, ethanoic acid, propanoic acid and butanoic acid are the first four of the homologous series. 		Carboxylic acids react with alcohols to make esters. Esters are volatile and have characteristic smells  Ethyl ethanoate