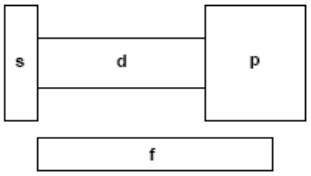
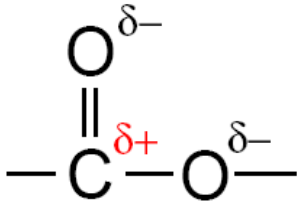
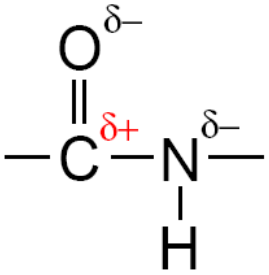
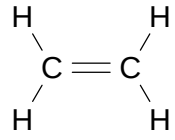
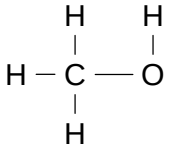
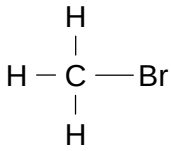
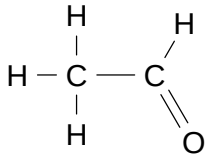
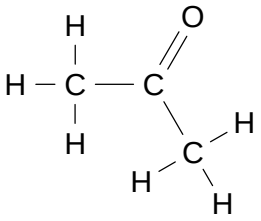
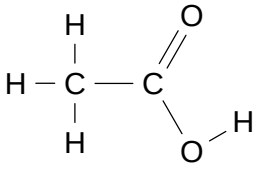
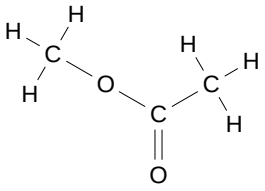
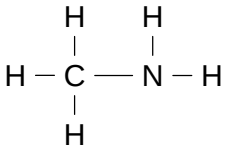
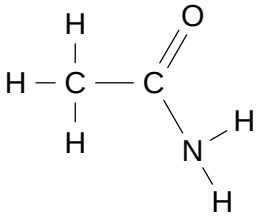
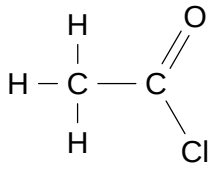
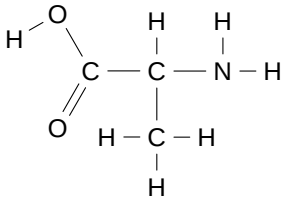
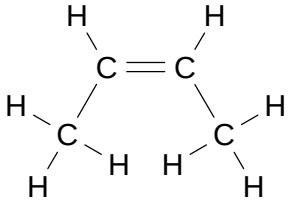
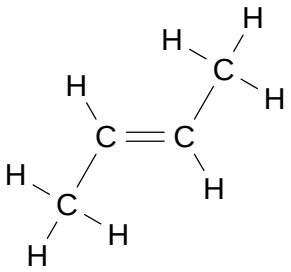
atoms with ... the same atomic number but different mass number	the number of protons in the nucleus of an atom	the sum of the protons and neutrons in the nucleus of an atom	the simplest, whole number, ratio of elements in a compound e.g. CH_2 or CHO
isotope	**atomic number**	**mass number**	**empirical formula**
the exact number of atoms of each element in the formula of a compound	oppositely charged ions held together in a crystal lattice by electrostatic attraction	a shared pair of electrons, one electron being supplied by each atom either side of the bond	a shared pair of electrons, both electrons being supplied by one atom in the bond
molecular formula	**ionic bond**	**covalent bond**	**dative covalent (co-ordinate) bond**
the ability of an atom to attract the pair of electrons in a covalent bond to itself	many atoms joined together in a regular array by a large number of covalent bonds	a covalent bond where shared pair of electrons is displaced to one end as Different atoms = different electronegativities	energy required to remove one mole of electrons from one mole of gaseous atoms to form one mole of gaseous positive ions
electro-negativity	**macro (giant) molecule**	**polar bond**	**first ionisation energy**
the enthalpy change when one mole of a compound is formed in its standard state from its elements in their standard states	the enthalpy change when one mole of a substance undergoes complete combustion in its standard state	the energy required to break one mole of gaseous bonds to form gaseous atoms	the enthalpy change of a reaction is independent of the path taken
standard enthalpy of formation	**standard enthalpy of combustion**	**bond (dissociation) enthalpy**	**Hess's law**

weak intermolecular attractions between molecules	a special (stronger) form of dipole-dipole interaction	loss of electrons / increase in oxidation number occurs @ **a**node	gain of electrons / decrease in oxidation number occurs @ **C**athode
van der waals' forces	**hydrogen bonding**	**oxid<u>a</u>tion**	**redu<u>C</u>tion**
25°C 1 mol L^{-1} $H^+(aq)$ $H_2(g)$ @ 1 atmosphere pressure 0.00V	standard electrode potentials - highest positive value	$-\log [H_3O^+]$	inv log (- pH)
standard hydrogen electrode	**best oxidising agent**	**pH**	**$[H_3O^+]$**
same molecular formula, different structural formula	groups fixed in different space as a result of the restricted rotation of double bonds etc.	same structural formula, different arrangement of groups in space.	non-superimposable mirror images due to chiral / asymmetric C atom
structural isomers	**geometrical isomers (cis/trans)**	**stereoisomers**	**optical isomers**
oppositely charged ions held in a regular 3-dimensional arrangement by electrostatic attraction	many atoms joined together in a regular array by a large number of covalent bonds	a region in space where one is likely to find an electron	a 50-50mixture of two enantiomers (optical isomers)
ionic lattice	**covalent network**	**orbital**	**racemic mixture**

lattice of positive ions surrounded by delocalised electrons		can be drawn into rods or wires	can be hammered into sheets
metallic bonding	**periodic table**	**ductile**	**malleable**
species that are proton donors eg HCl, H_2SO_4, NH_4^+	species that are proton acceptors eg OH^-, NH_3, CH_3NH_2	takes place when ions or electrons are free to move	partially dissociates into ions in aqueous solution e.g. ethanoic acid
acids	**bases**	**electrical conductivity**	**weak acid**
solution which resists changes in pH when small quantities of acid or alkali are added	partially reacts to give ions in aqueous solution e.g. ammonia NH_3	completely dissociates into ions in aqueous solution e.g. NaOH	completely dissociates (split up) into ions in aqueous solution e.g. HCl
buffer solution	**weak base**	**strong base**	**strong acid**
occurs when salts dissolve in water to produce solutions which are not neutral	small molecules (monomers) join together into large molecules with repeating units	all the atoms in the monomer are used to form the polymer (monomer has a C=C)	monomers join up the with expulsion of small molecules
salt hydrolysis	**polymerisation**	**addition polymer**	**condensation polymer**

		represents one molecule of a compound, or the simplest ratio of the ions present.	$n = c\,V$ $n = m / M$
ester link	**peptide / amide link**	**formula**	**2 useful formulae**
formed when the H^+ ion of an atom is replaced by a metal ion or the ammonium ion	shape adopted is the one which keeps repulsive forces to a minimum	reaction with water (often acidified or alkaline)	 functional group
salt	**electron pair repulsion theory**	**hydrolysis**	**alkene**
 functional group	 functional group	 functional group	 functional group
alcohol	**haloalkane**	**aldehyde**	**ketone**
 functional group	 functional group	 functional group	 functional group
carboxylic acid	**ester**	**amine**	**amide**

 functional group		containing some double C=C bonds (or triple); each C NOT bonded to max. no. of other atoms (4)	containing only single C-C bonds; each C bonded to max. no. of other atoms (4)
acid / acyl chloride	**amino acid**	**unsaturated**	**saturated**
		to have cis/trans isomerism (geometrical isomerism) you need	CH_3-, C_2H_5-, C_3H_7-, C_4H_9-
cis isomer	**trans isomer**	**2 different groups/atoms on same C of C=C**	**methyl, ethyl, propyl, butyl…**