

Topic 2.1 Kinetic Particle Theory

kinetic particle theory all matter is made up of **small and discrete particles** in **random and constant motion**

Topic 2.2 Atomic Structure

atom **smallest particle** of an element that has the chemical properties of it

proton number (atomic) number of **protons** in an atom

nucleon number (mass) number of **protons and neutrons** in an atom

isotopes Atoms of the **same element** with the same number of protons but **different number of neutrons**

ions formed when an atom **gains/loses electrons**

Topic 3.1 & 3.2 Ionic and Covalent Bonding

ionic bonding the **transfer of electrons** from a **metal atom to a non-metal atom**, forming **oppositely charged ions** held together by **strong electrostatic forces of attractions** in an ionic compound

covalent bonding **strong forces of attraction** between **two non-metal atoms** caused by the **sharing of a pair of electrons**

Topic 3.3 Structure and Properties of Materials

element **pure substance** that **cannot be broken down into simpler substances** by chemical means

compound **pure substance** that contains **two or more different elements, chemically combined**

mixture **two or more substances** that are **not chemically combined**

molecule a **group of two or more atoms** that are **chemically combined**

alloy **mixture** of a **metal with one or more other elements**

Topic 4.1 Formulae and Equation Writing

valency number of electrons all atoms need to gain or lose to obtain a **stable electronic configuration**

Topic 4.2 The Mole Concept and Stoichiometry

<i>relative atomic mass (A_r)</i>	the average mass of an atom compared to 1/12 of the mass of a carbon-12 atom
<i>relative molecular mass (A_r)</i>	the average mass of a molecule compared to 1/12 of the mass of a carbon-12 atom
<i>mole</i>	amount of substance which contains as many particles as there are atoms in 12g of carbon-12
<i>avogadro's constant</i>	6.02×10^{23}
<i>molar mass</i>	mass of one mole of any substance
<i>molar volume</i>	one mole of gas occupying 24dm^3 at r.t.p (room temp & pressure)
<i>concentration</i>	amount of solute dissolved in a unit volume of the solvent
<i>limiting reagent</i>	<i>reactant that is completely used up during a chemical reaction</i>

Topic 5 Acid-Base Chemistry

- acid – substance that produces H^+ ions when dissolved in water
- alkali – substance that produces OH^- ions when dissolved in water
- base – any metal oxide or hydroxide that reacts with acid to produce a salt and water only
- amphoteric oxides – metallic oxides that react with both acids and bases to form salt and water
- acidic oxides – non-metallic oxides that react with bases to form salt and water
- neutral oxides – non-metallic oxides that cannot react with either acids or bases

Topic 7 Redox Chemistry

- oxidation – gain of oxygen / loss of hydrogen / loss of electrons
- reduction – loss of oxygen / gain of hydrogen / gain of electrons
- oxidising agent – substance that oxidises another substance and is reduced in the process
- reducing agent – substance that reduces another substance and is oxidised in the process

Topic 8.1 Periodic Trends

- periodic table – list of elements arranged in order of increasing proton (atomic) number
- group – vertical column of elements with the same number of valence electrons
- period – horizontal row of elements with the same number of electron shells

Topic 8.2 Group Properties

- displacement reaction (for metals/halogens) – reaction where a more reactive element displaces a less reactive element from its compound

Topic 9 Chemical Energetics

- exothermic (ΔH = negative) – a change in which heat is given out to the surroundings, causing an increase in the temperature of the surroundings
- endothermic (ΔH = positive) – a change in which heat is taken in from the surroundings, causing a decrease in the temperature of the surroundings
- *enthalpy change (ΔH) (good to know) – overall heat change in a reaction*

Topic 10 Rate of Reactions

- collision theory – for a chemical reaction to take place, collisions between reactive particles must be effective. they must collide with sufficient energy to overcome activation energy for reactants to convert into products & collide with each other with the correct orientation.

Topic 11.1 Fuels and Crude Oil

- crude oil / petroleum – naturally occurring mixture of hydrocarbons which can be separated into useful fractions by fractional distillation
- natural gas – gaseous fuel consisting mainly of methane
- biofuels – alternative renewable energy sources to crude oil and natural gas

Topic 11.2 Hydrocarbons

- homologous series – family of compounds with the same functional group, general formula, and similar chemical properties
- functional group – group of atoms responsible for the characteristic reactions of a particular compound
- general formula – a formula that represents the homologous series of compounds using letters and numbers
- hydrocarbon – compounds that contain only carbon and hydrogen atoms
- saturated hydrocarbons – a hydrocarbon that only contains single bonds between carbon atoms
- unsaturated hydrocarbon – a hydrocarbon that contains one or more double bonds between carbon atoms
- alkane – homologous series of hydrocarbons that contain only carbon-carbon single bonds and carbon-hydrogen bonds
- alkene – homologous series of hydrocarbons that contain at least one carbon-carbon double bond
- cracking – process where long-chain hydrocarbons are broken down into more useful smaller molecules
- polyunsaturated hydrocarbon – hydrocarbons that contain many carbon-carbon double bonds

Topic 11.3 Alcohols and Carboxylic Acids

- alcohol – homologous series of organic molecules that have the hydroxyl (-OH) functional group
- alcohol fermentation – a process where micro-organisms act on carbohydrates to produce ethanol and carbon dioxide
- carboxylic acid – homologous series of organic molecules that have the carboxyl (-COOH) functional group

Topic 11.4 Polymers

- monomer – a molecule that can be bonded to other identical molecules to form a polymer
- polymer – very large organic molecule built from many monomers
- addition polymerisation – the process of joining together a large number of alkene monomers to form a singular product known as a polymer
- non-biodegradable – substance cannot be broken down by bacteria or other living organisms
- depolymerisation – process where polymers are broken down into their monomers

Topic 12 Maintaining Air Quality

- air pollution – introduction of unwanted and harmful chemicals into the atmosphere
- air pollutants – harmful gases not found in a sample of clean air
- carbon cycle – set of processes that regulates the amount of carbon dioxide in the atmosphere (includes photosynthesis, decomposition, respiration, combustion)
- greenhouse gases – gases that trap heat in the atmosphere
- global warming – increase in the average temperature of the Earth's surface due to increasing amounts of greenhouse gases in the atmosphere