

CTech Unit 1 Know Its ATOMIC STRUCTURE

Draw the symbol for sodium include its atomic mass and atomic number (what do they tell us)

What are the charges and masses of electrons, protons and neutrons

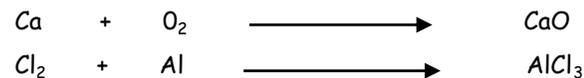
Where are electrons and neutrons and protons found in an atom?

Describe 3 models for the atom

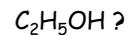
Draw the electronic configuration for argon

What are the 2 steps in distillation?

Balance the following equation:



How many atoms and elements are there is:



What is an isotope?

How would you separate sand and salt from a mixture of sand and sea water?

How do ions form?

KEY WORDS:

Electron
Proton
Neutron
Shell
Electronic Configuration
Orbit

ASSESSMENT:



CTech Unit 1 Know Its- Structure & Bonding

Chemical Bonding

Elements react to form compounds by what 3 methods?

What do atoms of metals in Group 1 make when they combine with atoms of non-metals in Group 7?

A metal atom loses electrons and forms _____ ions.

When non-metallic elements join together they form _____ bonds.

How many electrons do elements in Group 1 have in their outer shell?

Covalent bonding

When is a covalent bond formed?

Which group need to gain a single electron therefore forming a single covalent bond?

How many bonds can an atom of an element in Group 5 make?
Draw a diagram using symbols and lines to show the covalent bonds in oxygen O_2 and hydrogen sulfide H_2S .

Ionic Bonding

Ionic compounds are held together by _____ forces between oppositely charged ions.

The ions form a giant _____ strong forces of attraction act throughout the structure.

What type of diagram is used to represent atoms and ions?

Draw a diagram showing sodium atoms and chlorine atoms.

Formulae of Ionic compounds

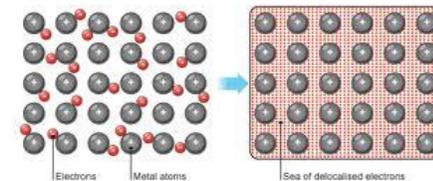
Why are ionic compounds neutral?

Write the formula for calcium fluoride, copper(II) chloride and iron(III) hydroxide.

Metals

Atoms in metals are closely packed and arranged in layers. In the highest energy level the electrons are delocalised.

This means they can move about freely between atoms.



The delocalised electrons strongly attract the positive ions and hold the giant structure together.

KEY WORDS:

Covalent
Ion
Ionic
Delocalised
Lattice

ASSESSMENT:



CTech Unit 1 Know Its- Structure & Properties

Properties of Polymers

What do the properties of a polymer depend on?

What can also change the properties of a polymer that is produced?

What is the difference between thermosoftening polymers and thermosetting polymers?

Nanoscience

This is the study of small particles that are between 1 and 100 nanometres in size.

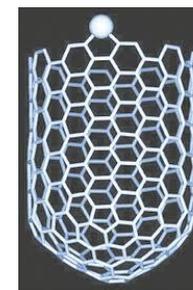
How big is a nanometre?

Nanoparticles behave differently from the bulk materials they are made of.

Why does research need to be done into possible issues that might arise from increased use?

Properties

	Melting point high/low	State at room temperature	Do they carry electrical charge?	Do they conduct electricity?
Giant ionic structures				
Simple molecules				
Giant covalent structures				
Giant metallic structures				



KEY WORDS:
 Macromolecule
 Fullerene
 Intermolecular
 Nanoscience
 Shape memory alloy

ASSESSMENT:



CTech Unit 1 Know Its-How much?

The Mass of atoms

What is the relative mass of protons and neutrons?
The atomic number of an atoms is its number of protons, what is this equal to?

What is the mass number?

Isotopes are atoms of the same element with different numbers of _____.

Masses of atoms & moles

Relative atomic masses (A_r) are used to compare the masses of atoms.

The relative atomic mass of an element in grams is called one _____ of atoms of the element.

Relative formula mass (M_r) can be found by adding up the relative atomic masses of the atoms in its formula.

Calculate the mass of one mole of sodium hydroxide, NaOH

Don't forget one mole of any substance is its relative formula mass in grams.

Percentages and Formulae

The relative atomic masses of the elements in a compound and its formula can be used to work out its percentage composition.

What is the percentage by mass of oxygen (O) in sodium hydroxide (NaOH)?

First, work out the relative formula mass of the compound, using the A_r values for each element.

In the case of sodium hydroxide, these are Na = 23, O = 16, H = 1. (You will be given these numbers in the exam.)

Next, divide the A_r of oxygen by the M_r of NaOH, and multiply by 100 to get a percentage.

KEY WORDS:

Mass number
Isotope
Atomic number
Mole

ASSESSMENT:



CTech Unit 1 Know Its- How much cont.

Equations & Calculations

Chemical equations show the _____ and products of a reaction.

Balanced symbol equations can be used to calculate the masses of reactants and products in a chemical reaction.

Don't forget correct units if calculating mass!

Reversible reactions

In a reversible reaction the _____ of the reaction can react to make the original reactants.

What sign is used to show a reversible reaction?

Ammonium chloride decomposes to produce ammonia and hydrogen chloride, when cooled ammonia and hydrogen chloride react to produce _____.

Instrumental analysis

Modern instrumental techniques provide fast, accurate and sensitive ways of analysing chemical substances. Compounds in a mixture can be separated using what?

Once the compounds are separated they can be identified using what?

In gas chromatography the mixture is carried by a gas through a long column packed with particles of a solid. Individual compounds travel at _____ speeds through the column and come out at different times, the _____ of substance is recorded against time. The retention time can be compared with results for known compounds to identify the compounds in the mixture.

Yield of a chemical reaction

Percentage yield = $\frac{\text{(amount of product collected)}}{\text{maximum amount of product possible}} \times 100\%$

The yield of a chemical reaction describes what?

The percentage yield of a chemical reaction tells us how much product is made compared with the maximum amount that could be made.

Why is it important to maximise yield and minimise energy wasted?

Analysing substances

What substances are added to food to improve its qualities?

What can be used to detect and identify artificial colours?

KEY WORDS:

Yield
Reversible reaction
Chromatography
Mass spectrometer

ASSESSMENT:



CTech Unit 1 Know Its- Rates & Energy

How Fast?

The rate can be found by measuring how much of a reactant is used, or how much product is formed.

How can a graph tell us the rate of reaction at that time?

How does a graph show that the reaction is fast?

Collision theory & surface area

What does the collision theory state?

What is the minimum amount of energy required to react called?

Name 3 things that will increase the rate of reaction.

What happens when you increase the surface area of a solid?

Exothermic & Endothermic reactions

When is a reaction exothermic?

When is a reaction endothermic?

Give an example of an exothermic reaction.

Thermal decomposition reactions need to be heated continuously to keep the reaction going.

The effects of the following on a reaction

Temperature	Concentration or pressure	Catalysts
Reactions happen quicker		A catalyst is not used up in a chemical reaction

Fill in the table with information on what effect each has on a reaction.

Using energy transfers from reactions

Exothermic reactions can be used in hand warmers and self heating cans. Give one advantage and one disadvantage of a reusable hand warmer compared with a single use hand warmer.

Endothermic changes can be used in instant cold packs for sports injuries.

In reversible reactions the reaction in one direction is exothermic and in the reverse direction it will be endothermic.

KEY WORDS:
 Catalyst
 Collision theory
 Activation energy
 Gradient
 Exothermic
 Endothermic

ASSESSMENT:

