

Properties and Uses of substances

I can state that all substances are made up of atoms.

I can state that an element is a chemical substance which cannot be broken down into anything simpler; it is made up of one type of atom only.

I can describe each element using chemical symbols e.g. N is Nitrogen, O is Oxygen.

I can state that when elements combine they make compounds.

I can state that when atoms join together they make molecules.

I can state that a mixture is when two or more substances are mixed together but not chemically joined.

I can state that elements can be sorted into metals and non-metals.

I can describe how some compounds can be broken down using electricity.

I can state that air is a mixture of gases: 78% Nitrogen; 21% Oxygen and 1% other gases.

I can state that a solution is made when two substances completely mix through each other.

I can state that the solute is the substance (solid) which dissolves.

I can state that the solvent is the substance (liquid) which the solute dissolves in.

I can state that a substance which does not dissolve is said to be insoluble.

I can state that a saturated solution is formed when no more solid will dissolve at a given temperature.

I can demonstrate how filtration is used to separate an insoluble substance from a liquid.

I can explain how distillation is used to separate mixtures of liquids due to the different liquids having different boiling points.

Chemical Changes

I can carry out experiments to identify a chemical reaction.

I can safely carry out experiments to identify a chemical reaction.

I can state that a chemical reaction can involve a chemical change (solid formed, gas given off, colour change) or an energy change (heat, light, sound given out).

I can state that in a chemical reaction a new substance is always formed.

I can safely carry out an experiment to demonstrate the effect of concentration on rate of reaction

I can state that increasing the concentration of a reactant can increase the rate of reaction.

I can carry out an experiment to demonstrate the effect of particle size on rate of reaction.

I can state that decreasing the particle size of a reactant can increase the rate of reaction.

I can carry out an experiment to demonstrate the effect of temperature on rate of reaction.

I can state that increasing the temperature of a reactant can increase the rate of reaction.

I can state the meaning of the words: catalyst and enzyme.

I can state the test for oxygen.

I can give two every day examples of concentration, temperature, particle size and catalyst affecting chemical reactions.

I can discuss the effect of corrosion.

I can define combustion and give examples.

I can react acids and bases with indicators to produce different colour changes.

Atomic structure and bonding

- I can name group 1, 7 and 0 of the periodic table.
- I can state the names of the seven diatomic elements.
- I can label a diagram of an atom.
- I can state the mass, charge and position of a proton, neutron and electron within an atom.
- I can state the meaning of atomic number and mass number.
- I can use the atomic number and mass number to determine the number of protons, neutrons and electrons within an atom.
- I can use the data book to write the electronic arrangement of the first 20 elements.
- I can draw diagrams showing the outer electrons in an element.
- I can draw diagrams showing covalent molecules.
- I can explain the meaning of the term 'ion'.
- I can describe how ionic bonds are formed.
- I can describe some properties of ionic compounds.
- I can draw the apparatus required to test for conductivity.
- I can use valencies to write chemical formula.
- I can write word and chemical equations

Fuels

- I can state the products of combustion of fuels.
- I can state the composition of air and demonstrate this using a pie chart.
- I can state that combustion is another name for burning and is an exothermic reaction.
- I can describe the tests for oxygen and for carbon dioxide.
- I can state that a fossil fuel is a finite resource and will eventually run out.
- I can name different fossil fuels.
- I can describe how fossil fuels are formed.
- I can state the products of incomplete combustion (burning in limited supply of air) and write word equations for complete and incomplete combustion of fuels.
- I can explain how carbon monoxide is formed.
- I can state that carbon monoxide is harmful as it can act as a poison in our bloodstream
- I can describe what happens in an oil refinery.
- I can describe how different fractions are obtained from crude oil by fractional distillation.
- I can state what a hydrocarbon is.
- I can state that alkanes are a family of hydrocarbons.
- I can name the first 8 alkanes and give their chemical formulae.
- I can draw the structures of the first 8 alkanes.
- I can describe some of the problems with fossil fuels.
- I can describe how ethanol is produced from glucose by the process of fermentation in the presence of yeast.
- I can write a word equation for the fermentation reaction.

Carbohydrates

- I can state that carbohydrates are an energy store.
- I can explain that carbohydrates burn releasing their energy.
- I can state the products of combustion and the combustion equation.
- I can describe how green plants make carbohydrates by photosynthesis.
- I can state the products of photosynthesis and the photosynthesis equation.
- I can describe how carbohydrates are broken down by the process of respiration to produce energy
- I can state the tests for oxygen, carbon dioxide and water.
- I can name the main greenhouse gases.
- I can describe the enhanced greenhouse effect.
- I can state the causes of climate change on Earth.
- I can describe some of the effects of climate change.
- I can distinguish between glucose and starch by investigating their solubility and observing their reaction with iodine.
- I can test carbohydrates for the presence of glucose and starch.
- I can state the tests for glucose and starch (Benedict's solution – glucose, iodine solution – starch).
- I can state what an enzyme is.
- I can describe fermentation and state the fermentation equation.
- I can set up a fermentation reaction.
- I can explain how the concentration of alcohol can be increased from a simple fermentation by the process of distillation.

Metals and Alloys

- I can state that metals react with oxygen to produce metal oxides.
- I can state that metals react with water to form metal hydroxides and hydrogen.
- I can state that metals react with acid to form salts and hydrogen.
- I can state the chemical formulae for hydrochloric acid, nitric acid and sulphuric acids.
- I can write word and chemical formula equations for the reactions of metals with oxygen
- I can write word and chemical formula equations for the reactions of metals with water
- I can write word and chemical formula equations for reactions of metals with acids.

Acids and Alkalis

- I can state that acids have a pH number below 7.
- I can state that alkalis have a pH number above 7.
- I can state that pure water and neutral solutions have a pH equal to 7.
- I can use Universal indicator to carry out an experiment to measure the pH of a solution.
- I can state that the pH scale is a series of numbers from 0 to 14 which are used to describe whether a solution is acidic, alkaline or neutral.
- I can identify compounds containing N,P,K which are used to make fertilisers