## Year 8 Chemistry Homework

In this booklet you will find copies of the homework question that will be set throughout Year 7 for chemistry. If you lose your homework, please print out the corresponding pages and complete the questions.

| Name: | Due Date |
|---|---|

Match the scientific vocabulary below to the definitions in the table.
Try to make sure you can spell and remember what each word means.

**Atomic Number** **Chemical Formula** **Chemical Symbol** **Compound**

**Element** **Molecule** **Relative Formula Mass**

| Scientific vocabulary | Definition |
|---|---|
| | Substances that all other materials are made up of, and which contain only one type of atom. They cannot be broken down into other substances. |
| | Pure substances made up of atoms of two or more elements, strongly joined together. |
| | A group of two or more (up to thousands) atoms strongly joined together. Most non-metal elements exist either as small or giant versions of this. |
| | A one- or two-letter code for an element that is used by scientists in all countries. |
| | A formula that shows the elements present in a compound and their relative proportions. |
| | The number of protons (which equals the number of electrons) in an atom. It is sometimes called the proton number. |
| | The sum of the relative atomic masses of the atoms in the numbers shown in the formula. |

**Q1.** The chemical formulae for four acids are shown in the table below.

| sulphuric acid | hydrochloric acid | nitric acid | ethanoic acid |
|---|---|---|---|
| $H_2SO_4$ | HCl | $HNO_3$ | $CH_3COOH$ |

(i) Give the **name** of the element that is present in all four acids.

.....

(ii) Give the **names** of the two **other** elements present in sulphuric acid.

1. .....

2. .....

(iii) How many atoms are there in the formula $HNO_3$ (nitric acid)?

.....

**Q2.** Gemstones called rubies are made from an aluminium compound with the formula $Al_2O_3$.

The chemical symbol for aluminium is Al.

(i) Give the name of the element that is combined with aluminium in this compound.

.....

(ii) Suggest the name of the compound with the formula $Al_2O_3$.

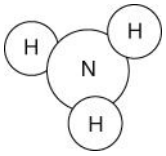
.....
.

(iii) How many atoms are there in the formula $Al_2O_3$?

.....

**Q3.** By counting up the atoms, write the chemical formula beside each of the molecules.

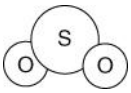
**1**




_____

**ammonia**

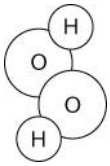
**2**




_____

**sulfur dioxide**

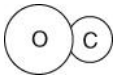
**3**




_____

**hydrogen peroxide**

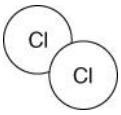
**4**




_____

**carbon monoxide**

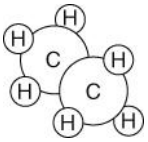
**5**




_____

**chlorine**

**6**




_____

**ethane**

**Q4.** Draw a diagram of a methane molecule below, formula $CH_4$.

| Name: | Due Date |
|---|---|

Match the scientific vocabulary below to the definitions in the table.
Try to make sure you can spell and remember what each word means.

**Atom** **Electron** **Isotope** **Mass Number**

**Neutron** **Nucleus** **Proton** **Shell**

| Scientific vocabulary | Definition |
|---|---|
| | The smallest part of an element that can exist. |
| | A tiny positive particle found inside the nucleus of an atom. |
| | A dense particle found in the nucleus of an atom. It is electrically neutral, carrying no charge. |
| | A tiny particle with a negative charge. Electrons orbit the nucleus of atoms or ions in shells. |
| | The very small and dense central part of an atom that contains protons and neutrons. |
| | An area in an atom, around its nucleus, where electrons are found. |
| | Atoms that have the same number of protons but different number of neutrons, i.e., they have the same atomic number but different mass numbers. |
| | The number of protons plus neutrons in the nucleus of an atom. |

**Q1** What is the approximate radius of an atom? Tick (✓) **one** box.

0.1 m ☐ 0.1 mm ☐ 0.1 nm ☐

**Q2** What is the charge of an electron? Tick (✓) **one** box.

–1 ☐

0 ☐

+1 ☐

**Q3.** **Figure 1** represents an atom of sulfur.

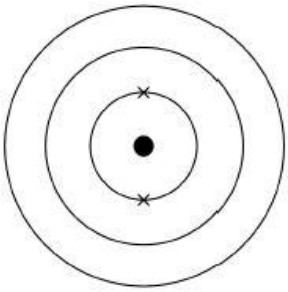
**Figure 1**

$^{32}_{16}S$

(a) Complete the table below.

| **Particle** | **Number of particles in a sulfur atom** |
|---|---|
| Electron | 16 |
| Neutron | |
| Proton | |

(b) Complete the electron shell diagram of the sulfur atom.



**Q4.**

(a) Which sub-atomic particles are present in the nucleus of an atom?

_____ and _____

(b) There are two isotopes of the element chlorine:

$^{35}_{17}Cl$ $^{37}_{17}Cl$

Describe, in terms of **sub-atomic particles**, **one** similarity and **one** difference between atoms of the two isotopes of chlorine.

Similarity

_____

Difference

_____

| Name: | Due Date |
|---|---|

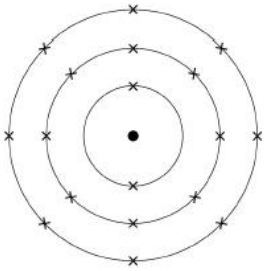
Match the scientific vocabulary below to the definitions in the table.
Try to make sure you can spell and remember what each word means.

**Chemical Properties** **Group** **Noble Gases** **Period**

**Periodic Table** **Physical Properties** **Trend** **Unreactive**

| Scientific vocabulary | Definition |
|---|---|
| | A table which shows all the elements arranged in columns and rows. Elements with similar properties are grouped together. |
| | A column of the Periodic Table. The elements in a group have similar properties. |
| | A row of the Periodic Table. There are trends in the properties of the elements across a period. |
| | Features of the way a substance reacts with other substances. |
| | Features of a substance that can be observed without changing the substance itself e.g. appearance |
| | A pattern in properties, such as an increase or decrease. |
| | The name for elements in the group on the right of the Periodic Table. Noble gases include helium, neon, argon, and krypton. Also known as the Group 0 elements. |
| | Elements that take part in few chemical reactions are unreactive. |

**Q1** Argon is very unreactive. The diagram represents the electronic structure of an argon atom.



(a) How does the electronic structure show that argon is unreactive?

_____

_____

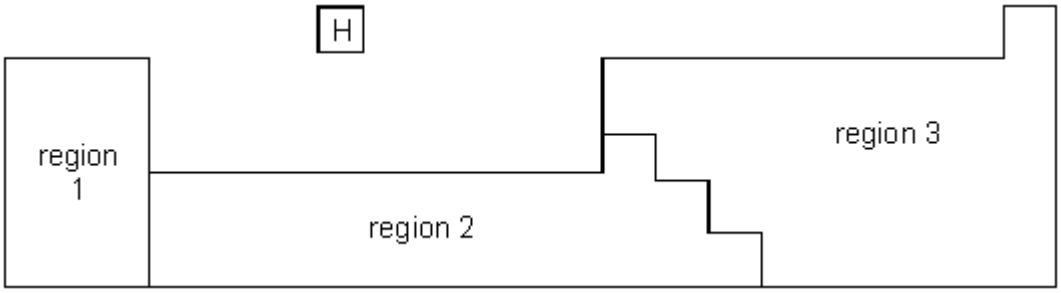
(b) What is the name of the group that contains argon? Tick (✓) **one** box

Alkali metals ☐

Halogens ☐

Noble gases ☐

**Q2** The diagram shows an outline of part of the Periodic Table of Elements.




(a) What is the name of the element with the symbol H?

……

(b) In which regions of the Periodic Table are the following types of element found?

(i) non-metals (such as oxygen and chlorine);

region ……

(ii) very reactive metals (such as sodium and potassium);

region ……

(iii) less reactive metals (such as copper and zinc).

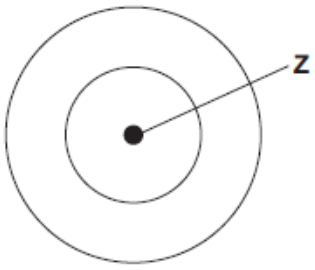
region ……

(c) Why is copper sulphate **not** found in the Periodic Table?

……

**Q3** **Figure 1** shows an atom with two energy levels (shells).

**Figure 1**




(i) Complete **Figure 1** to show the electronic structure of a boron atom.

(ii) What does the central part labelled **Z** represent in **Figure 1**?

_____

# Year 8 Chemistry Homework

| Name: | Due Date |
|---|---|

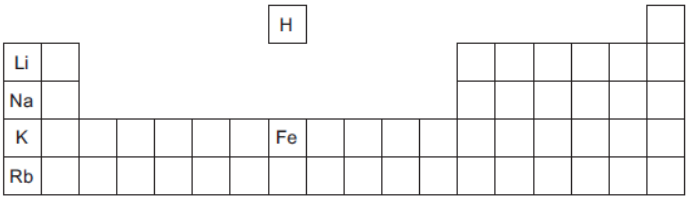
Match the scientific vocabulary below to the definitions in the table.
Try to make sure you can spell and remember what each word means.

**Alkali Metals** **Group1** **Group 7** **Halogens**

| Scientific vocabulary | Definition |
|---|---|
| | The elements in the left column of the Periodic Table, including lithium, sodium, and potassium. Also called the alkali metals. |
| | Another name for the elements found in Group 1 of the Periodic Table. |
| | The second from the right group of the Periodic Table. Elements include fluorine, chlorine, bromine, and iodine. Also known as the halogens. |
| | Another name for the elements found in Group 7 of the Periodic Table. |

**Q1** **Figure 1** shows the position of six elements in the modern periodic table.

**Figure 1**




(i) Complete the sentence.

In the periodic table, rubidium (Rb) is in

Group _____ .

(ii) Which of these three elements is the most reactive?

Lithium (Li) ☐

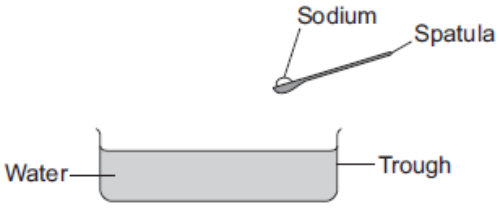
Sodium (Na) ☐

Potassium (K) ☐

**Figure 2** shows sodium being put into water.

(iii) Describe **two** observations that can be seen when sodium is put into water.

**Figure 2**




1. _____

_____

2. _____

_____

**Q2** The elements in group 7 of the periodic table are known as the halogens.

| | melting point in °C | boiling point in °C | relative atomic mass | colour of element at room temperature, 20°C |
|---|---|---|---|---|
| fluorine | –220 | –188 | 19 | very pale yellow |
| chlorine | –101 | –34 | 35.5 | greenish yellow |
| bromine | –7 | 59 | 80 | reddish brown |
| iodine | 114 | 184 | 127 | dark grey |
| astatine | | | 210 | |

(i) Predict the physical state of astatine at room temperature.

.....

(ii) Predict the colour of astatine at room temperature. (Circle the correct answer)

**colourless** **yellow** **brown** **black**

(iii) Chlorine gas consists of molecules.

What is the formula of a chlorine gas molecule?

Tick (✓) **one** box.

Cl ☐ $Cl^2$ ☐ $Cl_2$ ☐ 2Cl ☐

(iv) Which Group 7 element is the most reactive? Tick (✓) **one** box.

Bromine ☐

Chlorine ☐

Fluorine ☐

Iodine ☐

| Name: | Due Date |
|---|---|

Match the scientific vocabulary below to the definitions in the table.
Try to make sure you can spell and remember what each word means.

**Displacement** **Oxidation** **Oxide** **Reactivity**

**Reactivity Series** **Reduction**

| **Scientific vocabulary** | **Definition** |
|---|---|
| | The tendency of a substance to undergo a chemical reaction. |
| | A list of metals in order of how vigorously they react. |
| | A reaction where a more reactive metal takes the place of a less reactive metal in a compound. |
| | A chemical reaction in which a substance combines with oxygen. |
| | A substance made up of a metal or non-metal element joined to oxygen. |
| | A chemical reaction in which a substance loses oxygen. |

**Q1**. The word equation below shows a reaction used in an industrial process.

chromium oxide + aluminium → chromium + aluminium oxide

(a) Name the products of this reaction.

_____

(b) In the reaction one substance is reduced.

(i) Name the substance which is reduced.

_____

(ii) What happens to the substance when it is reduced?

_____

_____

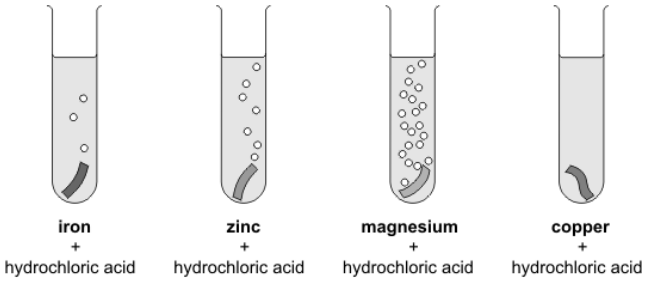
**Q2**. One step in the manufacture of lead is the reduction of lead oxide with carbon. Lead and carbon dioxide are the products of this reaction. Write a word equation for this reaction.

_____

**Q3.** Ruth put a piece of a different metal in each of four test tubes.

She poured 10 $cm^3$ of hydrochloric acid onto each metal.

Look at the diagrams.




(i) How do these show if a metal reacts with the acid?

.....

(ii) **On the lines below**, put the **four** metals in the order of how strongly they react with the acid.

**most reactive** .....

.....

.....

**least reactive** .....

**Q4.**

Part of the reactivity series of metals is shown opposite.

| | |
|---|---|
| **most reactive** | potassium |
| | sodium |
| | magnesium |
| | aluminium |
| | iron |
| | lead |
| **least reactive** | copper |

(a) Dan added a piece of magnesium to a solution of copper sulphate. A displacement reaction took place.

The word equation for the reaction is shown below.

magnesium + copper sulphate → magnesium sulphate + copper

Why is this called a displacement reaction?

.....

.....

(b) Look at each pair of chemicals in the table below.

Use the reactivity series to predict whether a displacement reaction would take place. Write **yes** or **no** in the second column and give the reason for your decision.

| **pairs of chemicals** | **Does a displacement reaction take place? yes or no** | **reason** |
|---|---|---|
| iron + sodium chloride | | |
| magnesium + lead nitrate | | |

| Name: | Due Date |
|---|---|

Match the scientific vocabulary below to the definitions in the table.
Try to make sure you can spell and remember what each word means.

**Carbon Monoxide** **Combustion** **Corrosion** **Fuel**

**Incomplete Combustion** **Thermal Decomposition**

| **Scientific vocabulary** | **Definition** |
|---|---|
| | A reaction in which a metal reacts with air and sometimes water to form a metal oxide or hydroxide. |
| | A reaction of a substance with oxygen that gives out heat e.g. burning. Carbon dioxide and water are produced. |
| | Any compound that has stored energy. This energy is released when it burns. |
| | The reaction when a substance burns in a limited supply oxygen. Carbon monoxide, soot and water are produced. |
| | A poisonous gas produced from carbon burning without enough oxygen. |
| | The breakdown of a compound from heating into two or more different products. |

**Q1.** Two pupils heated some copper carbonate in a crucible. They recorded the mass of the crucible and contents before and after heating.


(a) The word equation for this reaction is:

copper carbonate → copper oxide + carbon dioxide

What mass of carbon dioxide is given off in this reaction? Give the unit.

.....

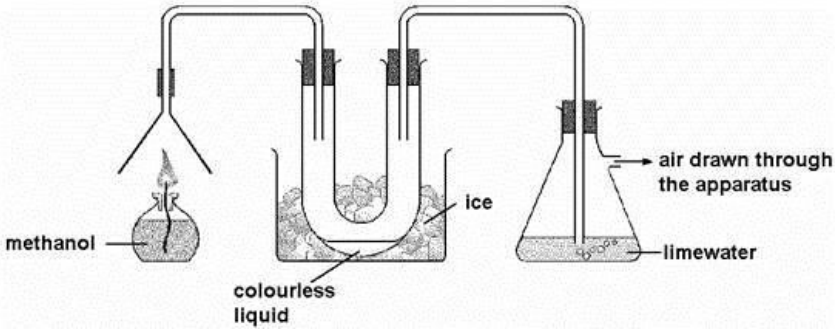
(b) What is the name of this type of chemical reaction? Tick the correct box.

combustion ☐ oxidation ☐

reduction ☐ thermal decomposition ☐

## Q2.

George used the apparatus below to find out what substances are produced when methanol burns.




As the methanol burned, two different gases were produced.

(i) One of these gases condensed in the U-tube to give a colourless liquid. Give the name of this liquid.

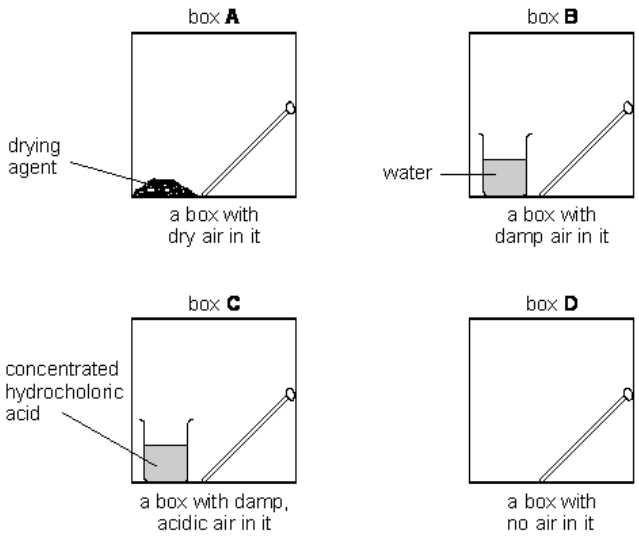
.....

(ii) The other gas turned the lime water cloudy. Give the name of this gas.

.....

## Q3.

Four shiny iron nails are put in small sealed plastic boxes. The labels show what else is in the boxes.




(a) (i) In which **two** boxes will the iron **not** rust or corrode?

..... and

.....

(ii) In which box will the iron corrode the most?

.....

(b) Many parts of bicycles are made from iron or steel. These parts can rust easily, even indoors. Give **two** ways to stop these parts rusting.

1. .....

2. .....

| Name: | Due Date |
|---|---|

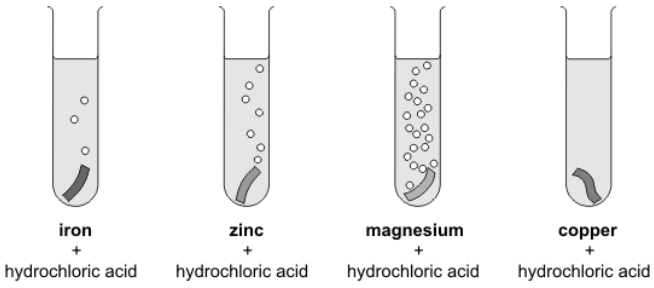
Match the scientific vocabulary below to the definitions in the table.
Try to make sure you can spell and remember what each word means.

**Concentrated** **Dilute** **Acid** **Base** **Neutral** **Strong Acid** **Weak Acid** **pH Scale**

| Scientific vocabulary | Definition |
|---|---|
| | A solution with a pH value less than 7. |
| | A substance that neutralises an acid – those that dissolve in water are called alkalis. |
| | A solution that has a large number of solute particles per unit volume (litre or cubic metre). |
| | A solution that has a small number of solute particles per unit volume (litre or cubic metre). |
| | This shows whether a substance is acidic, alkaline, or neutral. An acid has a pH between 0 and 7. An alkaline has a pH between 7 and 14. A solution of pH 7 is neutral. |
| | An acid in which all of the acid particles split up when it dissolves in water. |
| | An acid in which only some of the acid particles split up when it dissolves in water. |
| | A liquid that is neither acidic nor alkaline and has a pH of 7. |

**Q1.** Ruth put a piece of a different metal in each of four test tubes.

She poured 10 $cm^3$ of hydrochloric acid onto each metal. Look at the diagrams opposite.




(i) How do these show if a metal reacts with the acid?

.....

(ii) **On the lines below**, put the **four** metals in the order of how strongly they react with the acid.

**most reactive** .....

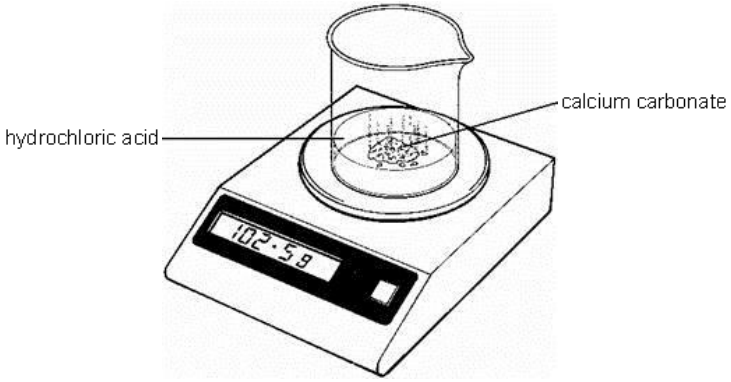
.....

.....

**least reactive** .....

## Q2.

Ben put a beaker weighing 50 g on a balance. He added 50 g of dilute hydrochloric acid and 2.5 g of calcium carbonate to the beaker.
The total mass of the beaker and its contents was 102.5 g.




(a) The hydrochloric acid reacted with the calcium carbonate. How could Ben tell that a chemical reaction was taking place in the beaker?

.....

.....

1 mark

(b) The word equation for the reaction which took place is:

hydrochloric acid + calcium carbonate → calcium chloride + carbon dioxide + water

When the reaction stopped, the total mass had decreased from 102.5 g to 101.4 g.
Some water had evaporated from the beaker.
What else caused the drop in mass?
Use the word equation to help you answer the question.

.....

.....

1 mark

(c) When the reaction stopped, Ben tested the contents of the beaker with universal indicator paper. The calcium carbonate had neutralised the acid.
What is the colour of universal indicator paper in a neutral solution?

.....

1 mark

(d) Metals react with acids.
What gas is produced when a metal reacts with an acid?

.....

1 mark

| Name: | Due Date |
|---|---|

Match the scientific vocabulary below to the definitions in the table.
Try to make sure you can spell and remember what each word means.

**Neutralisation** **Salt** **Indicator** **Universal Indicator**

| Scientific vocabulary | Definition |
|---|---|
| | Substances used to identify whether unknown solutions are acidic or alkaline. The colour is different in acidic and alkaline solutions. |
| | An indicator that changes colour to show the pH of a solution. It is a mixture of dyes. |
| | In this reaction, an acid cancels out a base or a base cancels out an acid. |
| | A compound in which the hydrogen atoms of an acid are replaced by atoms of a metal element. |

**Q1.** Bees and wasps are both insects which use a sting as part of their defence. The pH values of their stings are shown on the diagrams.

bee
bee sting, pH 2

wasp
wasp sting, pH 10

(a) Complete the table below to show whether the stings are acidic or alkaline and what colour they would turn universal indicator paper.

| | acid or alkaline | colour of universal indicator paper |
|---|---|---|
| bee sting (pH 2) | | |
| wasp sting (pH10) | | |

(b) The table below shows five household substances and the pH of each substance.

Give the name of **one** substance in the table which would neutralise each sting.

| name of substance | pH of substance |
|---|---|
| bicarbonate toothpaste | 8 |
| lemon juice | 3 |
| vinegar | 4 |
| washing soda | 11 |
| water | 7 |

(i) bee sting .....

(ii) wasp sting .....

## Q2.

The chart is taken from a bottle of *Johnson's pH5.5 Facial Wash*.


(a) From the information in the chart give:

(i) a substance which is almost neutral.

.....

(ii) the substance which is most alkaline.

.....

(b) Tick **one** box to describe Johnson's facial wash.

It is very alkaline. ☐

It is slightly alkaline. ☐

It is neutral. ☐

It is slightly acidic. ☐

(c) A bee sting is acidic. Which **one** of the substances given in the chart would be best to neutralise the sting?

.....

## Q3.

Paul had four substances:

**citric acid** **copper sulphate** **indigestion tablet** **sugar**

He dissolved 1 g of each substance in 20 $cm^3$ of distilled water.
He used universal indicator to find the pH of each solution.

(a) Sugar solution does **not** change the colour of green universal indicator.

What does this tell you about sugar solution?
Tick the correct box.

It is an acid. ☐ It is an alkali. ☐

It is neutral. ☐ It is sweet. ☐

(b) Indigestion tablets neutralise acid in the stomach.
What does this tell you about indigestion tablets?

.....

| Name: | Due Date |
|---|---|

Match the scientific vocabulary below to the definitions in the table.
Try to make sure you can spell and remember what each word means.

**Rate** **Variable** **Surface Area** **Concentration**

| Scientific vocabulary | Definition |
|---|---|
| | The amount of a substance dissolved in a certain volume of liquid. |
| | A measure of the total area that the surface of an object occupies. |
| | How quickly something happens. |
| | A factor that can change. |

**Q1.** Hydrogen peroxide slowly decomposes into water and oxygen.

hydrogen peroxide → water + oxygen

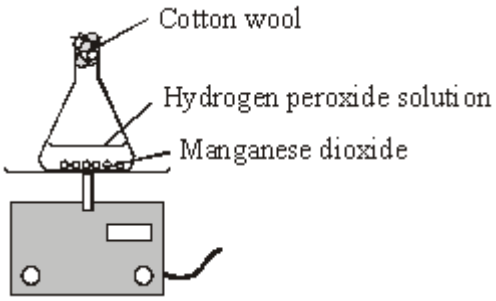
(a) Give **two** ways of increasing the rate of this reaction.

1 .....

2 .....

(b) The diagram shows how the rate of this reaction can be measured.

As the hydrogen peroxide decomposes, the mass of the flask and its contents decreases.




Why does this decrease in mass take place?

.....

.....

## Q2.

Two groups of pupils investigated the factors affecting the time taken for an indigestion tablet to dissolve in 100 $cm^3$ of water.

Group 1 recorded their results in the table opposite..

| tablet | time taken to dissolve (s) |
|---|---|
| whole tablet | 34 |
| broken tablet | 28 |
| finely crushed tablet | 22 |

(a) What factor did group 1 change as they carried out their investigation?

.....

(b) Before the investigation, group 1 made a prediction.
They found this prediction was supported by the results in the table.

What prediction did group 1 make?

.....

.....

Group 2 investigated how the temperature of the water affects the time taken for a whole tablet to dissolve.

Here are their results:

| temperature of water (ºC) | time taken to dissolve (s) |
|---|---|
| 65 | 24 |
| 40 | 35 |
| 15 | 90 |
| 5 | 100 |

(c) What factor did group 2 change as they carried out their investigation?

.....

(d) What pattern do the results recorded by group 2 show?

.....

.....

(e) Look at the results presented by group 1 and group 2.

Both groups used the same type of tablet.

Estimate the temperature of water used by group 1.

.....°C

| Name: | Due Date |
|---|---|

Match the scientific vocabulary below to the definitions in the table.
Try to make sure you can spell and remember what each word means.

**Carbon Cycle** **Fossil Fuel** **Greenhouse Gas** **Atmosphere**

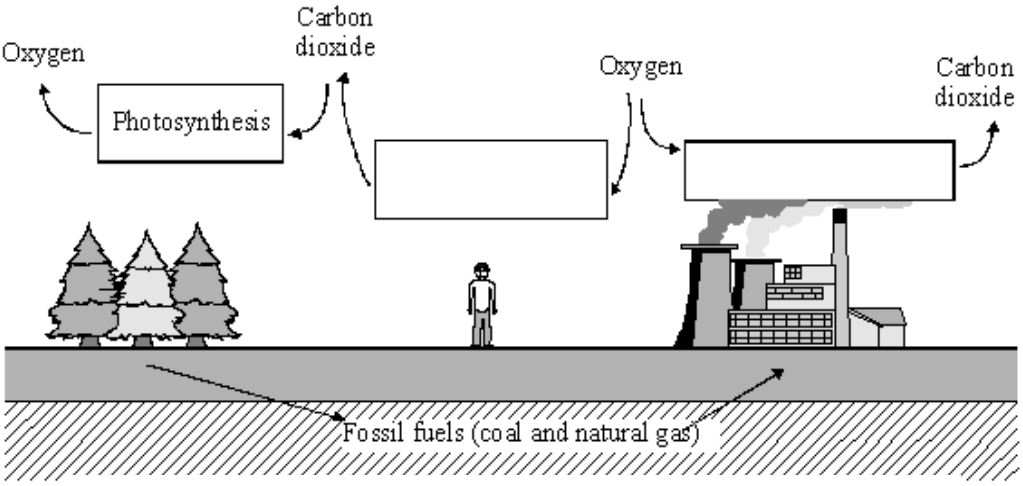
**Climate Change** **Global Warming** **Greenhouse Effect**

| **Scientific vocabulary** | **Definition** |
|---|---|
| | The mixture of gases surrounding the Earth. |
| | This shows carbon sinks and summarises how carbon and its compounds enter and leave the atmosphere and these sinks. |
| | A long-term change in weather patterns. |
| | A fuel made from the remains of animals and plants that died millions of years ago. They include coal, oil, and natural gas. |
| | The gradual increase in the average surface temperature of the Earth. |
| | When energy from the Sun is transferred to the thermal energy store of gases in Earth's atmosphere. This effect keeps the surface of the Earth warmer than it would otherwise be. |
| | A gas that contributes to the greenhouse effect, such as carbon dioxide. |

**Q1** In the carbon cycle the amounts of carbon dioxide and oxygen in the air are changed by several processes.

The names of some processes are given in the box below.

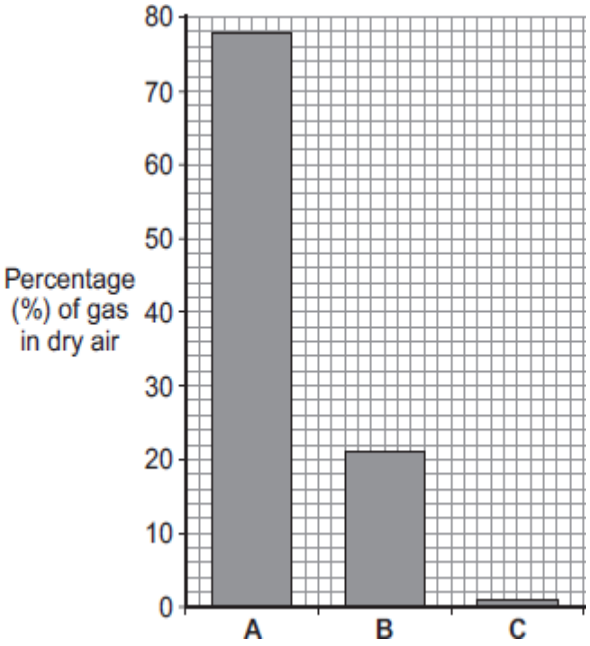
Choose the correct process for each box in the diagram. The first one has been done for you.




combustion decomposition neutralisation
photosynthesis respiration

**Q2** This question is about the Earth's atmosphere today.

(a) The bar chart shows the percentage by mass of the gases in dry air from the atmosphere.




(i) What percentage of the atmosphere is gas **A**?

..... %.

(ii) Use gases from the box to answer this question.

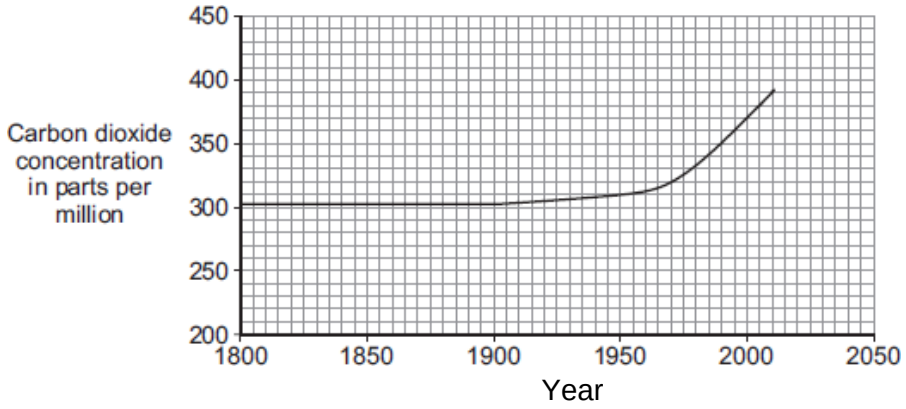
| | | | |
|---|---|---|---|
| **bromine** | **hydrogen** | **nitrogen** | **oxygen** |

Name gas **A** and gas **B** shown on the bar chart.

Gas **A**:
.....

Gas **B**:
.....

(b) The concentration of carbon dioxide in the atmosphere has changed.
The graph shows how the concentration of carbon dioxide has changed since 1800.




(i) Describe how the concentration of carbon dioxide has changed since 1800.

.....

.....

(ii) Complete the following sentence.

The main process that has caused the change in carbon dioxide is the burning

of ..... .

| Name: | Due Date |
|---|---|

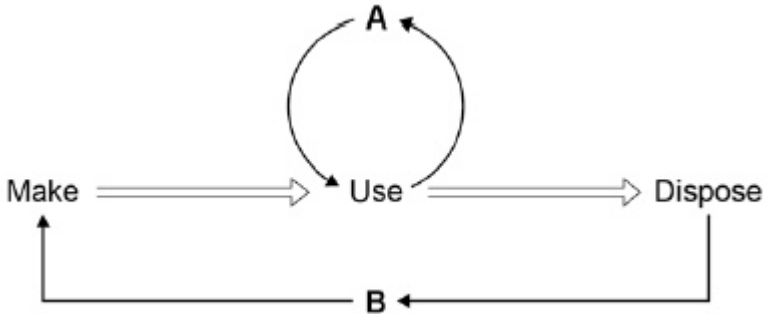
Match the scientific vocabulary below to the definitions in the table.
Try to make sure you can spell and remember what each word means.

**Composite Material** **Natural Resources** **Recycling**

**Ceramic** **Extraction** **Polymer** **Ore**

| Scientific vocabulary | Definition |
|---|---|
| | A hard, durable, non-metallic material which is generally unaffected by heat e.g. china and glass |
| | A mixture of two or more materials with contrasting properties, combined to produce a material with the properties of both. |
| | Separation of a metal from a metal compound. |
| | Materials from the Earth, its atmosphere, and the oceans, which act as raw materials for making a variety of products. |
| | A naturally occurring rock that contains enough of a mineral to make it worth getting the mineral – and then the metal it includes – out of the rock. |
| | A molecule made by joining up thousands of smaller molecules in a repeating pattern. |
| | Collecting and processing a material so that it can be used again. |

**Q1.** The production of plastic bags uses limited resources. The diagram shows two ways (**A** and **B**) of saving limited resources.




Name **A** and **B**.

Choose the answers from the box.

| recycle | reduce | release | reuse | reverse |
|---|---|---|---|---|

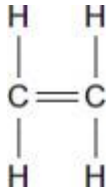
**A** _____

**B** _____

## Q2.

Crude oil is used to make useful substances such as alkenes and plastics.

(a) The alkene shown is ethene.



(i) Tick (✓) the correct formula for ethene.

| Formula | Tick (✓) |
|---|---|
| $CH_4$ | |
| $C_2H_4$ | |
| $C_2H_6$ | |

(ii) Tick (✓) the name of the plastic formed when many ethene molecules join together.

| Name of plastic | Tick (✓) |
|---|---|
| Poly(ethene) | |
| Poly(ethenol) | |
| Poly(propene) | |

(b) Draw a ring around the correct answer in the box to complete the sentence.

Plastic waste needs to be removed from beaches because it

| |
|---|
| decomposes. |
| is reactive. |
| is not biodegradable. |

(c) Suggest a problem caused by most plastics going to landfill sites.

.....

.....

(d) Suggest **one** way of reducing the amount of plastics going to landfill sites.

.....

.....