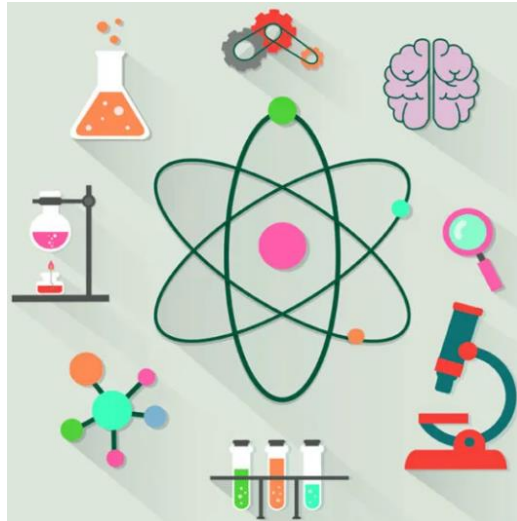


# Kirkcaldy High School



## BGE Science

### Science in the Environment

### Chemistry

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Teacher: \_\_\_\_\_

**Expectations and Outcomes Learner Evaluation****Topic:** Chemistry

<b>Experience and Outcomes</b>	<b>Date Completed (dd/mm/yy)</b>	<b>Evaluation How happy are you with it?</b> (☺ ? ☹)
I can state that the periodic table organises elements by atomic number.		
I can state an element as being made of one type of atom.		
I can write symbols for elements using the periodic table.		
I can state that the metal elements are found on the left-hand side of the periodic table.		
I can state that the non-metal elements are found on the right-hand side of		
I can describe a group as a vertical column in the periodic table.		
I can describe a period as a horizontal row in the periodic table.		
I can name groups 1,7 and 8.		
I can state that metals are conductors of heat and electricity.		
I can state that metals are strong.		
I can state that metals have different reactivities.		
I can identify patterns of reactivity.		
I can perform an experiment safely.		
I can describe my observations in an experiment		
I can state that some metals react with acids		
I can state that some reactive metals react with acids		
I can state that less reactive metals will not react with acids.		

# The Periodic Table

## Starter

1. What do you know about the Periodic table?

\_\_\_\_\_

2. Name any elements that you have heard of.

\_\_\_\_\_

3. Describe what your elements are used for

\_\_\_\_\_

## Learning Intentions

- To learn that the periodic table organises elements by atomic number.
- To understand that an element is made of one type of atom.
- To learn to write symbols for elements using the periodic table.

## Success Criteria

- I can state that the periodic table is organised by atomic number.
- I can describe an element as being made of one type of atom.
- I can write symbols for elements using the periodic table.



Tick me  
at the  
end if  
*you*

---

## The Periodic Table

The Periodic table of elements contains all of the elements in the world. It was put together by a Russian Chemist Dimitri Mendeleev.

Everything in the world is made of the 118 elements in the Periodic table.

The elements are arranged by atomic number.

Visit the large Periodic Table upstairs in Science.

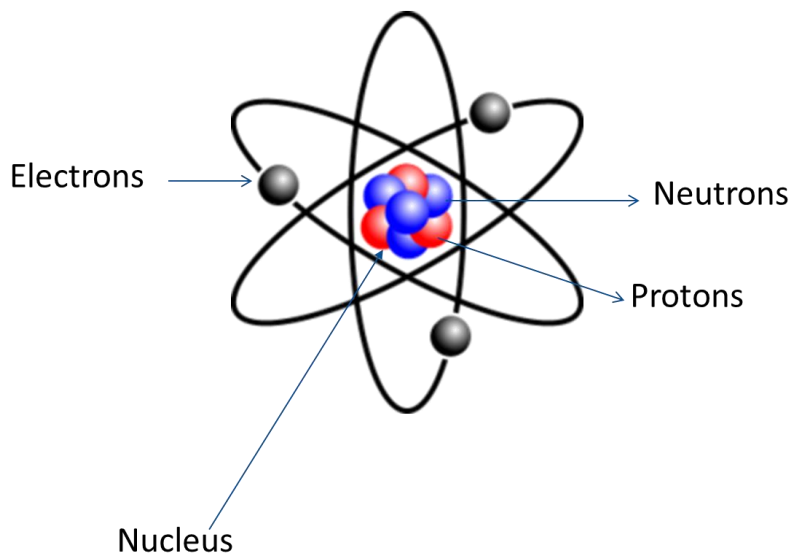
Element	Use

### Elements & Atoms

An element is a substance made up of only one type of atom.

Everything that exists is made of atoms. An atom is the basic building block of any material.

An atom was originally thought to be the smallest unit of matter, but Scientific research has shown they are made up of even smaller particles.



## Element Symbols

- Each element has its own **unique** symbol.
- The first letter in the symbol must be CAPITAL letter.
- If there is a second letter in the symbol, this must be lower case.
- For example, the symbol for Helium is He.

### Questions

- Use the Periodic table and write down the symbol for:

Oxygen \_\_\_\_\_

Helium \_\_\_\_\_

Magnesium \_\_\_\_\_

Lithium \_\_\_\_\_

Hydrogen \_\_\_\_\_

A few elements have symbols that come from the Latin name for the element.

- Write the symbol for:

Silver \_\_\_\_\_

Gold \_\_\_\_\_

Iron \_\_\_\_\_

- Can you find out what the Latin word **is** for:

Silver \_\_\_\_\_

Gold \_\_\_\_\_

Iron \_\_\_\_\_

**Activity** – Matching elements to their Symbol

Use your Periodic Table to match the name and symbol. Circle the element name and connect to the *correct symbol*. Watch out for sneaky ones!

Magnesium	Pb		Au		O
		Oxygen		Tin	
Chlorine	S	Cl	Potassium		Phosphorous
		Lead		P	Gold
Mg	Cu		K	Copper	Ga
Manganese		Sulphur			Sodium
Co	Na		Sn		
	Mn	Gallium			Cobalt

**Plenary** – True or false?

1. The symbol for oxygen is O? \_\_\_\_\_
2. The symbol for potassium is P? \_\_\_\_\_
3. The symbol for both sodium and sulfur is S? \_\_\_\_\_
4. The symbol from sodium is Na? \_\_\_\_\_
5. The symbol for sodium comes from its Latin name? \_\_\_\_\_

# The Periodic Table

## Starter:

Use the periodic table to help you answer the following questions:

1. Write the symbol for sulfur
2. Write the symbol for Sodium?
3. Which element has the symbol O?
4. Is HE the correct symbol for Helium?

## Learning Intentions

To learn:

- about ways elements can be categorised in the Periodic table.
- about the position of metal and non-metals elements in the periodic table

## Success Criteria

- I can state that metal elements are found on the right hand side of the periodic table.
  - I can state that the non-metal elements are found on the right hand side of the periodic table.
  - I can use the periodic table to find information about elements.
- 

## Categorising Elements

The elements can be categorised in different ways. For example:

- Metals and non-metals
- Solids, liquids and gases

## Metals & Non-metals

1 Hydrogen <b>H</b>																	2 Helium <b>He</b>						
3 Lithium <b>Li</b>	4 Beryllium <b>Be</b>																	5 Boron <b>B</b>	6 Carbon <b>C</b>	7 Nitrogen <b>N</b>	8 Oxygen <b>O</b>	9 Fluorine <b>F</b>	10 Neon <b>Ne</b>
11 Sodium <b>Na</b>	12 Magnesium <b>Mg</b>	<b>TRANSITION METALS</b>																13 Aluminium <b>Al</b>	14 Silicon <b>Si</b>	15 Phosphorus <b>P</b>	16 Sulfur <b>S</b>	17 Chlorine <b>Cl</b>	18 Argon <b>Ar</b>
19 Potassium <b>K</b>	20 Calcium <b>Ca</b>	21 Scandium <b>Sc</b>	22 Titanium <b>Ti</b>	23 Vanadium <b>V</b>	24 Chromium <b>Cr</b>	25 Manganese <b>Mn</b>	26 Iron <b>Fe</b>	27 Cobalt <b>Co</b>	28 Nickel <b>Ni</b>	29 Copper <b>Cu</b>	30 Zinc <b>Zn</b>	31 Gallium <b>Ga</b>	32 Germanium <b>Ge</b>	33 Arsenic <b>As</b>	34 Selenium <b>Se</b>	35 Bromine <b>Br</b>	36 Krypton <b>Kr</b>						
37 Rubidium <b>Rb</b>	38 Strontium <b>Sr</b>	39 Yttrium <b>Y</b>	40 Zirconium <b>Zr</b>	41 Niobium <b>Nb</b>	42 Molybdenum <b>Mo</b>	43 Technetium <b>Tc</b>	44 Ruthenium <b>Ru</b>	45 Rhodium <b>Rh</b>	46 Palladium <b>Pd</b>	47 Silver <b>Ag</b>	48 Cadmium <b>Cd</b>	49 Indium <b>In</b>	50 Tin <b>Sn</b>	51 Antimony <b>Sb</b>	52 Tellurium <b>Te</b>	53 Iodine <b>I</b>	54 Xenon <b>Xe</b>						
55 Caesium <b>Cs</b>	56 Barium <b>Ba</b>	57 Lanthanum <b>La</b>	58-71 ●	72 Hafnium <b>Hf</b>	73 Tantalum <b>Ta</b>	74 Tungsten <b>W</b>	75 Rhenium <b>Re</b>	76 Osmium <b>Os</b>	77 Iridium <b>Ir</b>	78 Platinum <b>Pt</b>	79 Gold <b>Au</b>	80 Mercury <b>Hg</b>	81 Thallium <b>Tl</b>	82 Lead <b>Pb</b>	83 Bismuth <b>Bi</b>	84 Polonium <b>Po</b>	85 Astatine <b>At</b>	86 Radon <b>Rn</b>					
87 Francium <b>Fr</b>	88 Radium <b>Ra</b>	89 Actinium <b>Ac</b>	90-103 ■	104 Rutherfordium <b>Rf</b>	105 Dubnium <b>Db</b>	106 Seaborgium <b>Sg</b>	107 Bohrium <b>Bh</b>	108 Hassium <b>Hs</b>	109 Meitnerium <b>Mt</b>	110 Darmstadtium <b>Ds</b>	111 Roentgenium <b>Rg</b>	112 Copernicium <b>Cn</b>	114 Flerovium <b>Fl</b>		116 Livermorium <b>Lv</b>								

58 ● Cerium <b>Ce</b>	59 Praseodymium <b>Pr</b>	60 Neodymium <b>Nd</b>	61 Promethium <b>Pm</b>	62 Samarium <b>Sm</b>	63 Europium <b>Eu</b>	64 Gadolinium <b>Gd</b>	65 Terbium <b>Tb</b>	66 Dysprosium <b>Dy</b>	67 Holmium <b>Ho</b>	68 Erbium <b>Er</b>	69 Thulium <b>Tm</b>	70 Ytterbium <b>Yb</b>	71 Lu <b>Lu</b>
90 ■ Thorium <b>Th</b>	91 Protactinium <b>Pa</b>	92 Uranium <b>U</b>	93 Neptunium <b>Np</b>	94 Plutonium <b>Pu</b>	95 Americium <b>Am</b>	96 Curium <b>Cm</b>	97 Berkelium <b>Bk</b>	98 Californium <b>Cf</b>	99 Einsteinium <b>Es</b>	100 Fermium <b>Fm</b>	101 Mendelevium <b>Md</b>	102 Nobelium <b>No</b>	103 Lawrencium <b>Lr</b>

**Key**     Metals     Non-metals

1 Hydrogen <b>H</b>																	2 Helium <b>He</b>						
3 Lithium <b>Li</b>	4 Beryllium <b>Be</b>																	5 Boron <b>B</b>	6 Carbon <b>C</b>	7 Nitrogen <b>N</b>	8 Oxygen <b>O</b>	9 Fluorine <b>F</b>	10 Neon <b>Ne</b>
11 Sodium <b>Na</b>	12 Magnesium <b>Mg</b>	<b>TRANSITION METALS</b>																13 Aluminium <b>Al</b>	14 Silicon <b>Si</b>	15 Phosphorus <b>P</b>	16 Sulfur <b>S</b>	17 Chlorine <b>Cl</b>	18 Argon <b>Ar</b>
19 Potassium <b>K</b>	20 Calcium <b>Ca</b>	21 Scandium <b>Sc</b>	22 Titanium <b>Ti</b>	23 Vanadium <b>V</b>	24 Chromium <b>Cr</b>	25 Manganese <b>Mn</b>	26 Iron <b>Fe</b>	27 Cobalt <b>Co</b>	28 Nickel <b>Ni</b>	29 Copper <b>Cu</b>	30 Zinc <b>Zn</b>	31 Gallium <b>Ga</b>	32 Germanium <b>Ge</b>	33 Arsenic <b>As</b>	34 Selenium <b>Se</b>	35 Bromine <b>Br</b>	36 Krypton <b>Kr</b>						
37 Rubidium <b>Rb</b>	38 Strontium <b>Sr</b>	39 Yttrium <b>Y</b>	40 Zirconium <b>Zr</b>	41 Niobium <b>Nb</b>	42 Molybdenum <b>Mo</b>	43 Technetium <b>Tc</b>	44 Ruthenium <b>Ru</b>	45 Rhodium <b>Rh</b>	46 Palladium <b>Pd</b>	47 Silver <b>Ag</b>	48 Cadmium <b>Cd</b>	49 Indium <b>In</b>	50 Tin <b>Sn</b>	51 Antimony <b>Sb</b>	52 Tellurium <b>Te</b>	53 Iodine <b>I</b>	54 Xenon <b>Xe</b>						
55 Caesium <b>Cs</b>	56 Barium <b>Ba</b>	57 Lanthanum <b>La</b>	58-71 ●	72 Hafnium <b>Hf</b>	73 Tantalum <b>Ta</b>	74 Tungsten <b>W</b>	75 Rhenium <b>Re</b>	76 Osmium <b>Os</b>	77 Iridium <b>Ir</b>	78 Platinum <b>Pt</b>	79 Gold <b>Au</b>	80 Mercury <b>Hg</b>	81 Thallium <b>Tl</b>	82 Lead <b>Pb</b>	83 Bismuth <b>Bi</b>	84 Polonium <b>Po</b>	85 Astatine <b>At</b>	86 Radon <b>Rn</b>					
87 Francium <b>Fr</b>	88 Radium <b>Ra</b>	89 Actinium <b>Ac</b>	90-103 ■	104 Rutherfordium <b>Rf</b>	105 Dubnium <b>Db</b>	106 Seaborgium <b>Sg</b>	107 Bohrium <b>Bh</b>	108 Hassium <b>Hs</b>	109 Meitnerium <b>Mt</b>	110 Darmstadtium <b>Ds</b>	111 Roentgenium <b>Rg</b>	112 Copernicium <b>Cn</b>	114 Flerovium <b>Fl</b>		116 Livermorium <b>Lv</b>								
58 ● Cerium <b>Ce</b>	59 Praseodymium <b>Pr</b>	60 Neodymium <b>Nd</b>	61 Promethium <b>Pm</b>	62 Samarium <b>Sm</b>	63 Europium <b>Eu</b>	64 Gadolinium <b>Gd</b>	65 Terbium <b>Tb</b>	66 Dysprosium <b>Dy</b>	67 Holmium <b>Ho</b>	68 Erbium <b>Er</b>	69 Thulium <b>Tm</b>	70 Ytterbium <b>Yb</b>	71 Lu <b>Lu</b>										
90 ■ Thorium <b>Th</b>	91 Protactinium <b>Pa</b>	92 Uranium <b>U</b>	93 Neptunium <b>Np</b>	94 Plutonium <b>Pu</b>	95 Americium <b>Am</b>	96 Curium <b>Cm</b>	97 Berkelium <b>Bk</b>	98 Californium <b>Cf</b>	99 Einsteinium <b>Es</b>	100 Fermium <b>Fm</b>	101 Mendelevium <b>Md</b>	102 Nobelium <b>No</b>	103 Lawrencium <b>Lr</b>										

**Key**     Solid     Liquid     Gas



Use both of your Periodic Tables to decide if the Element is a metal or a non-metal and a solid/liquid/gas.

Element	Metal/non-metal	Solid/liquid/gas
Oxygen		
Aluminium		
Sodium		
Helium		
Bromine		
Mercury		
Hydrogen		

### Plenary

Use your coloured in Periodic table in your booklet to help you answer these questions. Circle the error and make the correction.

Example: hydrogen has the symbol h and is a gas.

1. Nitrogen has the symbol N and is a metal element.
2. Carbon has the symbol ca and is a non-metal element.
3. Lithium has the symbol li and is a metal element.
4. Sodium has the symbol Na and is a liquid metal.

# Groups in the Periodic Table

## Starter:

Using your periodic table:

1. Give an example of a metal. \_\_\_\_\_
2. Give an example of a non-metal gas. \_\_\_\_\_
3. Give an example of a liquid metal. \_\_\_\_\_
4. Write symbol for each of your elements \_\_\_\_\_

## Learning Intentions:

- To learn what a group and a period are in the periodic table.
- To learn about groups of the Periodic Table.
- To learn the names of groups 1, 7 and 8.

## Success Criteria

- I can describe a group as a vertical column in the periodic table.
- I can describe a period as a horizontal row in the periodic table.
- I can name groups 1,7 and 8.

## Groups and Periods

In the Periodic Table, each row is called a Period and each column is called a Group.

The elements in the same group react in a similar way.

Key																			
Atomic Number		Name of Element		Symbol															
1	Hydrogen	H															2	Helium	He
3	Lithium	Li	4	Beryllium	Be												5	Boron	B
11	Sodium	Na	12	Magnesium	Mg												13	Aluminum	Al
19	Potassium	K	20	Calcium	Ca												31	Gallium	Ga
37	Rubidium	Rb	38	Strontium	Sr												49	Indium	In
55	Cesium	Cs	56	Barium	Ba												81	Thallium	Tl
87	Francium	Fr	88	Radium	Ra												114	Flerovium	Fl
118	Oganesson	Og															116	Livermorium	Lv

## Colour in groups 1, 7 & 8

1 2

3 4 5 6 7 8

1												2						
1 Hydrogen H													2 Helium He					
3 Lithium Li	4 Beryllium Be											5 Boron B	6 Carbon C	7 Nitrogen N	8 Oxygen O	9 Fluorine F	10 Neon Ne	
11 Sodium Na	12 Magnesium Mg	TRANSITION METALS										13 Aluminium Al	14 Silicon Si	15 Phosphorus P	16 Sulfur S	17 Chlorine Cl	18 Argon Ar	
19 Potassium K	20 Calcium Ca	21 Scandium Sc	22 Titanium Ti	23 Vanadium V	24 Chromium Cr	25 Manganese Mn	26 Iron Fe	27 Cobalt Co	28 Nickel Ni	29 Copper Cu	30 Zinc Zn	31 Gallium Ga	32 Germanium Ge	33 Arsenic As	34 Selenium Se	35 Bromine Br	36 Krypton Kr	
37 Rubidium Rb	38 Strontium Sr	39 Yttrium Y	40 Zirconium Zr	41 Niobium Nb	42 Molybdenum Mo	43 Technetium Tc	44 Ruthenium Ru	45 Rhodium Rh	46 Palladium Pd	47 Silver Ag	48 Cadmium Cd	49 Indium In	50 Tin Sn	51 Antimony Sb	52 Tellurium Te	53 Iodine I	54 Xenon Xe	
55 Caesium Cs	56 Barium Ba	57 Lanthanum La	58-71 ●	72 Hafnium Hf	73 Tantalum Ta	74 Tungsten W	75 Rhenium Re	76 Osmium Os	77 Iridium Ir	78 Platinum Pt	79 Gold Au	80 Mercury Hg	81 Thallium Tl	82 Lead Pb	83 Bismuth Bi	84 Polonium Po	85 Astatine At	86 Radon Rn
87 Francium Fr	88 Radium Ra	89 Actinium Ac	90-103 ■	104 Rutherfordium Rf	105 Dubnium Db	106 Seaborgium Sg	107 Bohrium Bh	108 Hassium Hs	109 Meitnerium Mt	110 Darmstadtium Ds	111 Roentgenium Rg	112 Copernicium Cn	114 Flerovium Fl		116 Livermorium Lv			
58 Cerium Ce	59 Praseodymium Pr	60 Neodymium Nd	61 Promethium Pm	62 Samarium Sm	63 Europium Eu	64 Gadolinium Gd	65 Terbium Tb	66 Dysprosium Dy	67 Holmium Ho	68 Erbium Er	69 Thulium Tm	70 Ytterbium Yb	71 Lutetium Lu					
90 Thorium Th	91 Protactinium Pa	92 Uranium U	93 Neptunium Np	94 Plutonium Pu	95 Americium Am	96 Curium Cm	97 Berkelium Bk	98 Californium Cf	99 Einsteinium Es	100 Fermium Fm	101 Mendelevium Md	102 Nobelium No	103 Lawrencium Lr					

Key:  alkali metals  halogens  noble gases

### Notes from Videos

- Alkali metals
- Halogens
- Noble gases
- Transition metals

## Plenary

Choose the correct words to complete the sentences below:

1. The alkali metals are a group of reactive/unreactive metals/non-metals.
2. The halogens are a group of reactive/unreactive metals/non-metals.
3. The Noble gases are a group of reactive/unreactive metals/non-metals.
4. The alkali metals are a group of reactive/unreactive metals/non-metals.

## Properties of Metals

### Starter

Use the periodic table to help you answer the following questions:

1. What are the liquid elements are room temperature?
2. Name 2 metal and 2 non-metal elements

### Learning Intentions:

- To learn about the physical properties of metals.

### Success Criteria

- I can state that metals are conductors of heat and electricity.
- I can state that metals are strong.



Property	Definition	Use
Strong		Making bridges

## Plenary

Metal	Property
<b>Copper</b>	Good conductor of electricity (better than aluminium), malleable, does not react with water or air, strong, cheap.
<b>Tungsten</b>	Glowing when hot, very high melting points, (so it does not melt when it gets hot enough to glow), good conductor of electricity
<b>Gold</b>	Shiny, hard, malleable, does not react with water or air, expensive and rare
<b>Aluminium</b>	Low density (not very heavy), malleable, strong (not as strong as steel), good conductor of heat, can conduct electricity, more expensive than copper.
<b>Lead</b>	Malleable, does not react with water and air, strong (not as strong as steel), poisonous when dissolved in water, high density (heavy)
<b>Silver</b>	Shiny, hard, malleable, does not react with water or air, less expensive than gold.
<b>Platinum</b>	Shiny, hard, malleable, does not react with water or air, more expensive than gold.
<b>Steel</b>	Very strong, malleable, very expensive, high density (heavy), can be coated to prevent rusting when in contact with water and air.

Use the information in the table to suggest an element that can be used for each

Use	Metal element that could be used
Electrical Wire	
Jewellery	
Saucepan	

## Reactivity of Metals with Water

### Starter

1. State 3 properties and uses for metals in our everyday life.
2. Explain why you think it is important we understand how reactive metals are.
3. Explain why your jewellery would not be made from Mercury.

### Learning Intentions:

To learn about the different reactivity of metals with water.

### Success Criteria

- I can state that metals have different reactivities.
- I can perform an experiment safely.
- I can describe my observations in an experiment.

---

### Reactivity of metals

One way that we can experimentally show that metals have different reactivities is to react them with water and compare the results.

Think about the metals you use at home that come into contact with water. Do you see them react?

Date \_\_\_\_\_

**Aim** \_\_\_\_\_  
\_\_\_\_\_

**Method**

**Results**

<b>Metal</b>	<b>What do you see?</b>	<b>Order of reactivity</b>
copper		
iron		
zinc		
magnesium		
calcium		
<b>lithium (teacher)</b>		
<b>sodium (teacher)</b>		
<b>potassium (teacher)</b>		



**Conclusion**


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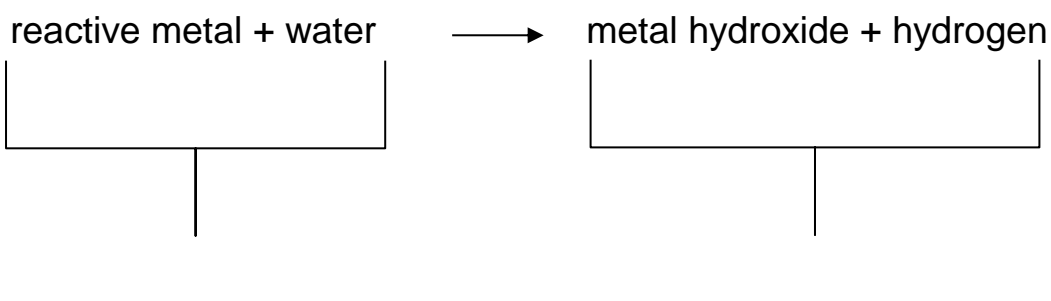
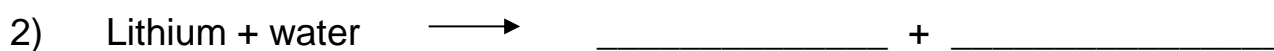
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**Evaluation**


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**Chemical Word Equations****Example:****Questions:**

3) Name the *reactants* and what is the *products* from question 1 and 2?

4) Sodium hydroxide is an alkali, what could you add and what colour change would you observe to prove it is an alkali?

## Reactions of Metals with Acid

### Starter

- 1) Why is jewellery made from silver and gold?
- 2) Why is your water pipes not made from gold?
- 3) Why do you think magnesium is not a good metal to make the forth road bridge?

### Learning Intentions:

- To learn about the different reactivity of metals with acid

### Success Criteria

- I can state that some metals react with acids.

---

## Reactivity of Metals with Acids

Aim \_\_\_\_\_  
\_\_\_\_\_

### Method

**Hypothesis**

---

---

**Results**

<b>Metal</b>	<b>What do you see?</b>	<b>Order of reactivity</b>
Magnesium		
Zinc		
Iron		
Copper		

**Conclusion**

---

---

**Evaluation**

---

---

Some metals can react with acid to produce a salt and hydrogen.  
We can test for hydrogen by adding a lit splint and hearing a 'pop'.

**Word equation:**

reactive metal + acid → metal salt + hydrogen

**Questions:**

1. From your last lesson, predict which will be least reactive and most reactive with acid: copper, magnesium, zinc, tin?

---

---

2. Not even the teacher is allowed to react potassium, sodium or lithium with acid. Why?

---

---

3. Do you think silver and gold will be reactive or unreactive? Why?

---

---

**Plenary**

Give an example of a metal that could be used for water pipes. Explain your choice.

---

---

## Reactivity of Metals with Oxygen

### Starter

- 1) Using your knowledge from previous lessons, predict which metals will react with Oxygen.
- 
- 

- 2) Complete the word equation

\_\_\_\_\_ + hydrochloric acid → Magnesium Chloride + hydrogen

- 3) Describe how you could prove that Hydrogen was produced.
- 
- 

### Learning Intentions

- We are learning how different metals react with oxygen.

### Success Criteria

- I can state that some reactive metals react with Oxygen.
  - I can state that less reactive metals will not react with Oxygen.
- 

## Reactivity of Metals with Oxygen

Aim \_\_\_\_\_

---

### Method

**Results**

Metal	What do you see?	Order of reactivity
Magnesium		
Zinc		
Iron		
Copper		

**Conclusion**

---

---

**Evaluation**

---

---

**Word Equation:**

Metal + oxygen  $\longrightarrow$  metal oxide

**Example:**

sodium + oxygen  $\longrightarrow$  sodium oxide

Write the word equations for the experiment you have just carried out using the example above.

Magnesium + Oxygen  $\longrightarrow$

## Extraction of Metals

### Starter

1) Explain why is jewellery made from silver and gold?

---

---

2) Explain why water pipes are not made from gold?

---

---

3) Explain why Magnesium is not a good metal to make the forth road bridge?

---

---

### Learning Intentions

- We are learning how to extract different metals for everyday use.

### Success Criteria

- I can state that most metals are found as compounds called ores.
- Unreactive metals are found as native metals.
- Metals can be extracted from their ores.

---

### Extraction of Native Metals

- Some of the unreactive metals can be found uncombined, these are described as Native metals.
- The more **reactive** a metal is, the more **difficult** it is to extract from its ore.
- Ores of **less reactive** metals are easy to break down and can be extracted by **heating with carbon**.
- Ores of **reactive metals** are difficult to break down and can be extracted by **electrolysis**.

## Extraction of Copper

### Aim

---

---

### Method

### Results

---

---

### Conclusion

---

---

### Plenary

1. What did you learn today?

2. A question that I have is...



## Elements Compounds and Mixtures

### Starter:

1. What is the name of the “chart” that shows all the known elements?
2. Why is this “chart” laid out in a particular way?
3. What term describes a vertical column?

### Learning Intentions

- To learn about elements, compounds and mixtures and the differences between them.

### Success Criteria

- I can state that an element is composed of only 1 type of atom.
  - I can state that a mixture is composed of two or more substances that are not chemically linked.
- 

### Elements

An element is a substance made up of only one type of atom.

Elements are found in the \_\_\_\_\_ Table.

### Compounds

Contains atoms and/or compounds that are mixed but **not chemically joined together**.

### Mixture

Contains atoms and/or compounds that are mixed but **not chemically joined together.**

Question	Element, Compound or Mixture
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

### Separating Mixtures

- Mixtures contain 2 or more substances that are **not** chemically joined.
- Mixtures can be separated easily as the atoms are not chemically joined.



Activity: Collect a tube containing an iron and sulfur mixture and a magnet.

Describe what happens when the magnet is close to the mixture.

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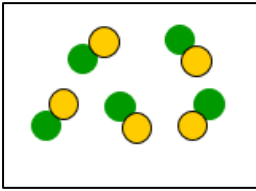
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## Compounds

### Starter:

1. Does this particle diagram show an element, compound or a mixture?



2. Explain your answer to question 1.

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### Learning Intentions

- To learn that compounds are made of elements that are chemically linked to each other.
- Compounds cannot be separated into their parts easily.

### Success Criteria

- I can state that a compound is made of two or more elements that are chemically connected to each other.
- I can state that compounds are not easily separated in their parts.



### Making a Compound

**Making a compound** often needs energy to make the elements **react** and **connect** to each other.

Draw a particle diagram for the reaction of two elements forming a compound.

## Making a Compound

### Aim

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### Method

### Results

Metal	Observations
Magnesium	
Copper	

### Conclusion

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## Naming Compounds

### Starter:

Magnesium costs £3.00 per meter. One meter of Magnesium can be cut into 20 x 5cm strips.

1. Calculate the cost per strip (you can use a calculator).
2. Calculate the cost if 240 strips are needed by the science department.

### Learning Intentions

- To learn how to name elements in compounds.

### Success Criteria

- I can name a compound made from 2 elements.
- I can name a compound made from 3 elements where one element is oxygen

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## Naming Compounds

Compounds containing two elements end with -ide

Metal name goes first, followed by the non-metal element. The non-metal element takes the ending ide.

### Example:

Compound

Elements

lithium chloride

lithium and chlorine

magnesium oxide

magnesium and oxygen

**Name the following Compounds**

<b>Element 1</b>	<b>Element2</b>	<b>Name of compound</b>
<b>iron</b>	<b>sulphur</b>	
<b>magnesium</b>	<b>nitrogen</b>	
<b>sodium</b>	<b>chlorine</b>	
<b>tin</b>	<b>oxygen</b>	
<b>aluminium</b>	<b>bromine</b>	
<b>nickel</b>	<b>iodine</b>	
<b>zinc</b>	<b>sulphur</b>	
<b>lithium</b>	<b>nitrogen</b>	

**Identify the elements in the following compounds?**

1. Sodium fluoride      \_\_\_\_\_      +      \_\_\_\_\_
2. Lithium bromide      \_\_\_\_\_      +      \_\_\_\_\_
3. Calcium oxide      \_\_\_\_\_      +      \_\_\_\_\_
4. Aluminium chloride      \_\_\_\_\_      +      \_\_\_\_\_
5. Phosphorus sulphide      \_\_\_\_\_      +      \_\_\_\_\_
6. Caesium chloride      \_\_\_\_\_      +      \_\_\_\_\_

### Naming Compounds with 3 Elements

Compounds containing two element AND oxygen end in -ite or -ate

First part of the name comes from the metal, then the non-metal, then add the suffix ate at the end for Oxygen.

Example: copper sulfate is made from copper, sulfur and oxygen

Element 1	Element 2	Element 3	Name of Compound
Sodium	Sulfur	Oxygen	Sodium Sulfate
Potassium	Nitrogen	Oxygen	
Sodium	Sulfur	Oxygen	
Beryllium	Phosphate	Oxygen	
Aluminium	Chlorine	Oxygen	
Phosphorus	Oxygen	Sulfur	
Caesium	Nitrogen	Oxygen	
Oxygen	Copper	Sulfur	

#### Which elements are in the following compounds?

1. Sodium nitrate \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

2. Lithium sulphate \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

3. Calcium phosphate \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

4. Aluminium chlorate \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

5. Phosphorus sulphite \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

**Plenary**

<b>Elements in the compound</b>	<b>Compound Name</b>
Sodium, chlorine	
Zinc oxide	
Copper sulfate	
Sodium phosphate	
Potassium bromide	



## Separating Compounds

### Starter

Name the compound made from the following elements?

1. Sodium and chlorine \_\_\_\_\_
2. Iron and nitrogen \_\_\_\_\_
3. Magnesium, sulfur and oxygen \_\_\_\_\_
4. Copper, nitrogen and oxygen \_\_\_\_\_

### Learning Intentions

- To learn about different techniques to separate compounds.

### Success Criteria

- I can state that it is not easy to separate compounds into elements.
  - Energy is often need to break apart elements in a compound.
- 

### Separating Compounds

- The connections between elements in a compound are called chemical bonds.
- These are strong and often require energy to be used to break these connections. The energy can be supplied as heat, light or electricity.

### Aim :

To find out if Copper Chloride can be separated into the elements copper and chlorine using electricity.

### Method:

**Results**

	Observations	
	Before the experiment	After the experiment
POSITIVE carbon rod		
NEGATIVE carbon rod		

**Conclusion**

When copper chloride is electrolysed, a brown solid (\_\_\_\_\_) forms at the \_\_\_\_\_ electrode and bubbles of a gas which smells like the swimming pool (\_\_\_\_\_) is produced at the \_\_\_\_\_ electrode.

**Evaluation**


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**Plenary**

1. Complete the word equation:

Copper chloride  $\longrightarrow$  \_\_\_\_\_ + Chlorine

2. Identify the compound in the word equation \_\_\_\_\_

3. Identify the elements. \_\_\_\_\_

4. Is it easy to break apart compounds? \_\_\_\_\_

## Purification Techniques

### Starter

1. How would you separate salt from sea water?
2. How would you separate sand from sea water?
3. Describe the meaning of the word soluble.
4. Describe the meaning of the word insoluble.

### Learning Intentions

- To learn how to use different separation techniques.
- To safely perform an experiment.
- To separate salt from salt water.

### Success Criteria

- I can safely perform a filtration experiment.
  - I can safely perform an evaporation experiment.
- 

### Purification Techniques

- A pure substance is made up of only one component.
- The differences in properties will determine the method of purification that can be used.
- Filtration is used to separate an insoluble solid from a liquid.
- Evaporation is used to remove a liquid from a soluble solid.

## Purification Techniques

### Aim

To investigate how to make pure Sodium chloride.

### Method


### Results

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### Conclusion

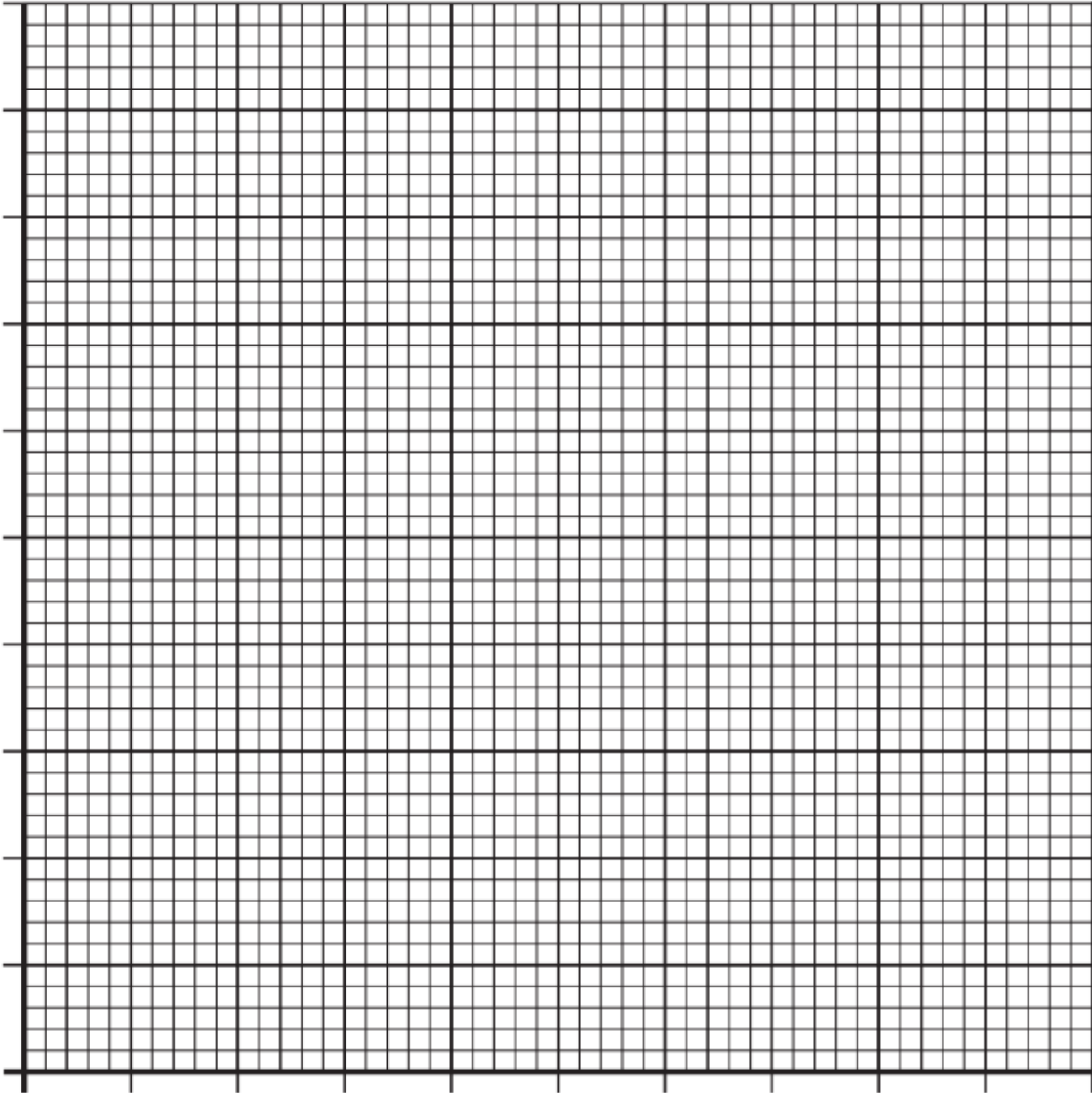
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### Evaluation

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**Additional graph paper for numeracy tasks:**



### Extension Tasks

L	U	T	E	T	I	U	M	K	J	X	Z	P	S
I	N	D	I	U	M	K	X	W	S	U	D	M	O
V	U	Q	X	P	Z	I	R	I	D	I	U	M	D
E	N	E	P	T	U	N	I	U	M	I	B	J	I
R	T	D	J	F	G	Y	T	W	D	T	N	Z	U
M	R	S	T	W	R	C	H	R	O	M	I	U	M
O	I	W	Z	U	M	K	O	P	W	B	U	W	J
R	U	J	C	U	P	F	P	K	S	X	M	K	R
I	M	R	I	Q	R	H	B	R	O	M	I	N	E
U	E	M	S	E	A	B	O	R	G	I	U	M	L
M	S	B	H	J	H	U	R	A	N	I	U	M	P
O	L	T	I	N	N	E	O	N	K	X	R	W	J
T	U	N	G	S	T	E	N	Z	L	Q	T	Z	S
R	O	E	N	T	G	E	N	I	U	M	K	Q	P

Can you find the following chemical elements in the grid?

LUTETIUM	UNUNTRIUM
TUNGSTEN	LIVERMORIUM
OSMIUM	BORON
MERCURY	SODIUM
URANIUM	CHROMIUM
NEPTUNIUM	BROMINE
RUTHERFORDIUM	INDIUM
DUBNIUM	TIN
SEABORGIUM	IRIDIUM
ROENTGENIUM	NEON



# Cartoon Elements

Use the periodic table to find the symbols for the groups of elements below. Each group should spell a different cartoon character

Tungsten, oxygen, oxygen, dysprosium \_\_\_\_\_

Phosphorus, iodine, nitrogen, nobelium, carbon, hydrogen, iodine, oxygen \_\_\_\_\_

Rhenium, platinum, argon \_\_\_\_\_

Sulphur, hydrogen, rhenium, potassium \_\_\_\_\_

Argon, iodine, aluminium \_\_\_\_\_

Tin, oxygen, oxygen, phosphorus, yttrium \_\_\_\_\_

Carbon, hydrogen, iodine, phosphorus \_\_\_\_\_

Fluorine, lithium, potassium \_\_\_\_\_

Samarium, iodine, thorium, erbium, sulphur \_\_\_\_\_

Sulphur, cobalt, oxygen, boron, yttrium \_\_\_\_\_

Boron, aluminium, oxygen, oxygen \_\_\_\_\_

Sulphur, lithium, nitrogen, potassium, yttrium \_\_\_\_\_

Aluminium, iodine, cerium \_\_\_\_\_

Oxygen, scandium, argon \_\_\_\_\_

Polonium, calcium, hydrogen, oxygen, nitrogen, tantalum, sulphur \_\_\_\_\_

Phosphorus, iodine, potassium, actinium, hydrogen, uranium \_\_\_\_\_

Scandium, radium, technetium, hydrogen, yttrium \_\_\_\_\_



