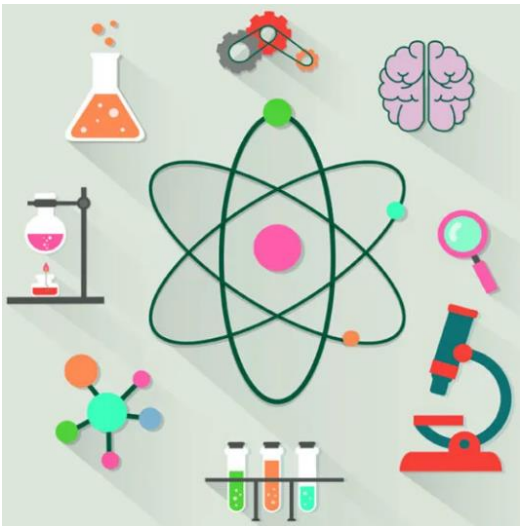
Kirkcaldy High School



BGE Science

The Periodic Table

Name:_____

Class:_____

Teacher:_____

Date _____

Expectations and Outcomes Learner Evaluation

Topic: The Periodic Table

Experience and Outcomes	Date Completed (dd/mm/yy)	Evaluation How happy are you with it? (☺ ? ☹)
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.	f	
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 as alkali metals, group 7as halogens and group 8 as Noble gases.		
I can state that metals are conductors of electricity.		
I can state that metals have different reactivities.		
I can state that some metals react with water		
I can state that some metals react with acids		
I can identify patterns of reactivity.		
I can state that metals are good conductors of electricity.		
I can state that substances that do not conduct electricity are known as insulators.		
I can use flame colour to identify elements.		
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.		

Date _____

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.		
I can state that it is not easy to separate compounds into elements		
I can state that energy is often needed to break apart elements in a compound.		
I can plan my experiment.		
I can safely perform a filtration experiment.		
I can safely perform an evaporation experiment.		

Periodic Table of the Elements

Column 1	Column 2			Column 3	Column 4	Column 5	Column 6	Column 7	Column 0
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**			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**	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**	104 Rutherfordium **Rf**	105 Dubnium **Db**	106 Seaborgium **Sg**	107 Bohrium **Bh**	108 Hassium **Hs**	109 Meitnerium **Mt**	110 Darmstadtium **Ds**	111 Roent-genium **Rg**	112 Copernicium **Cn**	113 Nihonium **Nh**	114 Flerovium **Fl**	115 Moscovium **Mc**	116 Livermorium **Lv**	117 Tennessine **Ts**	118 Oganesson **Og**

Key

Atomic Number
Name of Element
Symbol

TRANSITION METALS

58–71 ●

90–103 ■

●	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**

Elements below the dark line are metals.

Date _____

Date _____

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

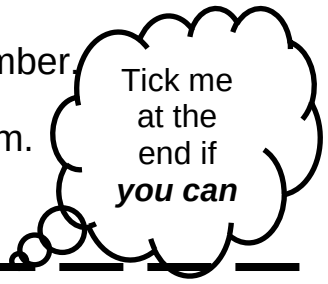
- To learn that the periodic table organises elements by atomic number.
- To understand that an element is made of one type of atom.
- To learn to write symbols for elements using the periodic table.

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.



The Periodic Table

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

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

The elements are arranged by _____ _____.

Date _____

Visit the large Periodic Table upstairs in Science, or use the QR code to find the uses of some elements.

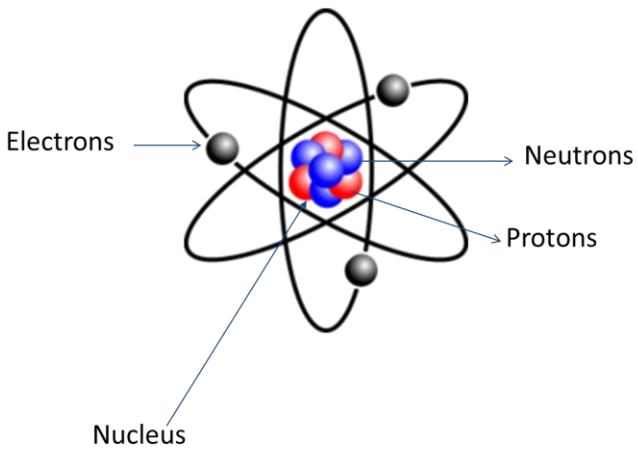
Element	Use

Elements & Atoms

An _____ is a substance made up of only one type of _____.

Everything that exists is made of _____. 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.



Date _____

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 _____

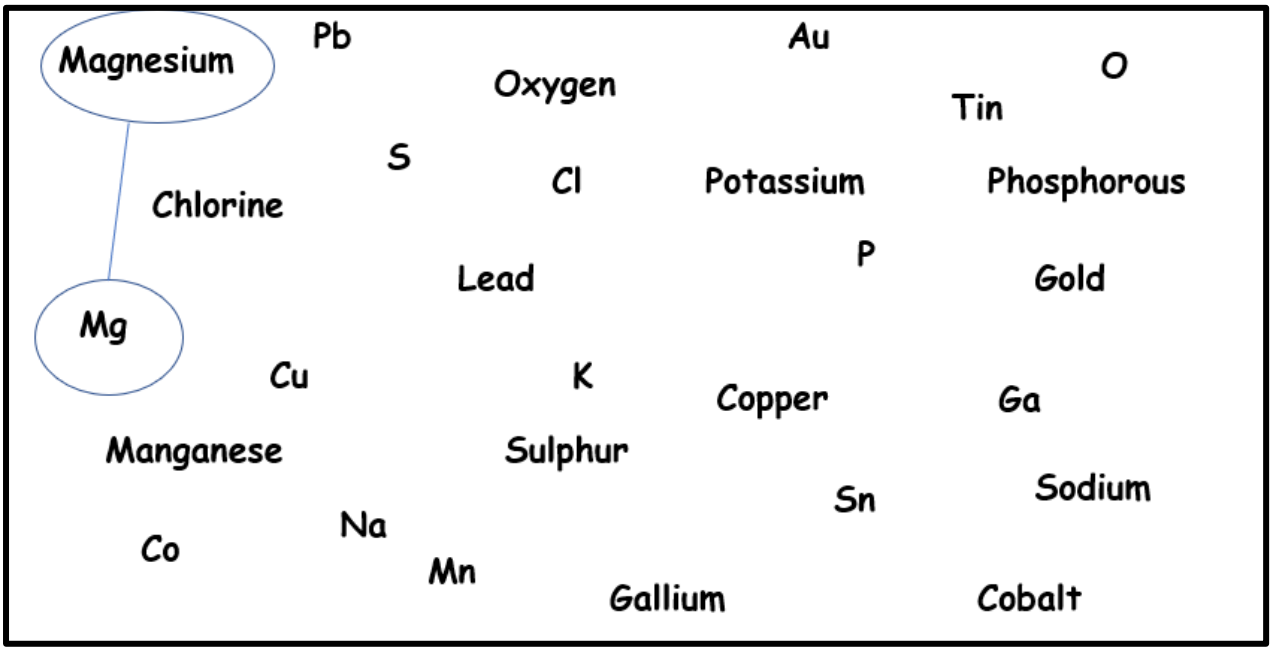
Gold _____

Iron _____

Date _____

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!



Plenary – Element Bingo

Write 6 elements from elements with atomic number 1-20.

Date _____

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.
- The names for groups 1, 7 and 8.

Success Criteria

- ❑ I can state that 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 the periodic table.
- ❑ I can use the periodic table to find information about elements.
- ❑ I can name groups 1, 7 and 8.

Categorising Elements

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

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

Scan the QR code to identify the metals and non-metals in the table.

Or use the laminated periodic table to identify the metals and non-metals in the table on the next page.

Date _____

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

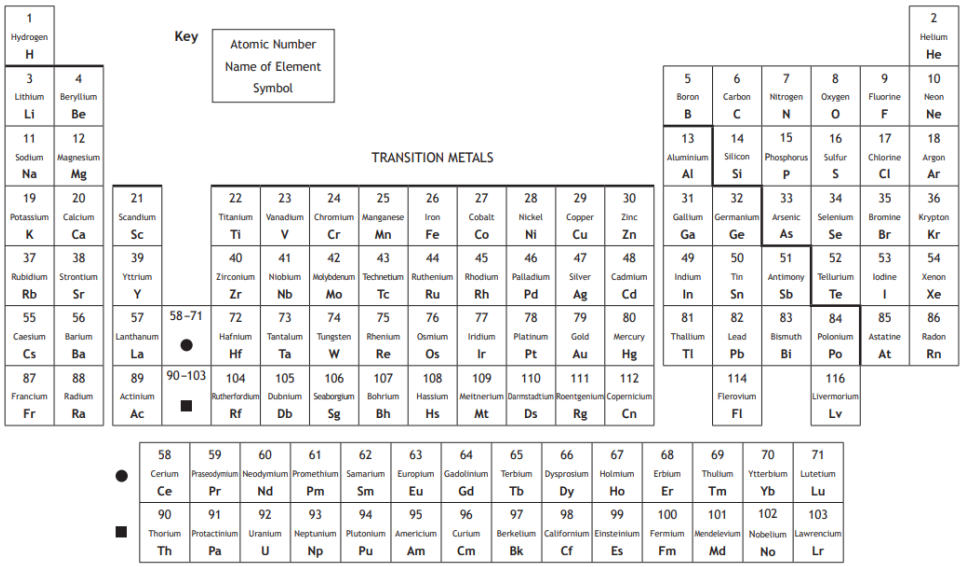
Use the Period table with solid, liquid, gas categorisation to help you identify the state of matter each element exists in at room temperature.

Groups & Periods in the Periodic Table

In the Periodic Table, each row is called a _____and each column is called a _____.

Colour in groups 1, 7 & 8

1 2 **3 4 5 6 7 8**



Key:

☐ **alkali metals**

☐ **halogens**

☐ **noble gases**

Date _____

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 Nobel gas

- ❑ I can name groups 1,7 and 8.

Date _____

Reactivity of Metals

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 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 with Water

One way that we can experimentally show that metals have different _____ 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? List some examples:

_____

_____

_____

_____

Aim _____

_____

Date _____

Method

Results

Metal	Observation	Order of reactivity
copper		
iron		
zinc		
magnesium		
Calcium		
lithium		
sodium		
potassium		

Conclusion

_____

_____

Evaluation

_____

Date _____

Reactivity of Metals with Acids

Starter

1) Why is jewellery made from silver and gold?

2) Why are 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 reactivity of metals with acid.

Success Criteria

- ❑ I can state that some metals react with acids.

Reactivity of Metals with Acids

Aim _____

_____

Method

Date _____

Results

Metal	Observations	Order of Reactivity
Magnesium		
Zinc		
Iron		
Copper		

Conclusion

_____

_____

Evaluation

_____

_____

Plenary

Predict what if Sodium was reacted with acid

_____

_____

Word equations extension

hydrochloric acid + Zinc → Zinc chloride + Hydrogen

Hydrochloric acid + Iron → _____ + Hydrogen

Hydrochloric acid + Magnesium → _____ + _____

Date _____

Properties of Elements

Starter – true or false

1. Copper makes a good electrical wire because it can conduct electricity. _____
2. Sodium would make a poor cooking pot because it is so reactive. _____
3. Potassium makes a good metal for jewellery because its unreactive _____

Learning Intentions

- To learn about conductivity of different materials.

Success Criteria

- ❑ I can state that substances that do not conduct electricity are known as insulators
- ❑ I can state that metals are good conductors of electricity.

Conductivity

One way in which elements can be classified is by their ability to _____ electricity.

Conductors of electricity have uses in _____, _____, _____.

Substances that do not conduct electricity are known as _____ .

Aim _____

_____

Method

Date _____

Results

Conductors	Non-Conductors

Conclusion

_____

_____

Plenary

Complete the passage

_____ are good conductors of electricity. Metals can be found on the _____ side of the periodic table. _____ are not conductors of electricity, these are described as _____. These are found on the _____ side of the periodic table. The exception to this is _____ with is a conductor.

Word Bank

Left Right Graphite Non-metal Metal Insulators

Date _____

Identifying elements

Starter

1) Put these metals in order of reactivity: Copper, Potassium, Magnesium

   _____ _____ _____

2) Complete the word equation:

   _____ + hydrochloric acid → Magnesium Chloride + hydrogen

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

_____

_____

Learning Intentions

- To learn that when elements are burned, they produce specific colours in the flame. The colours can be used to identify the element.

Success Criteria

❑ I can use flame colours to identify elements.

Identifying elements

When elements are burned, they produce specific colours. The colours they produce can be used to identify the element. Astronomers use a similar technique to identify which elements are present in distant stars.

Date _____

Flame Tests

Aim _____

_____

Method

Results

Metal	Colour
Unknown 1	
Unknown 2	

Conclusion

_____

_____

Date _____

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 _____ is a substance made up of only one type of _____.
Elements are found in the _____ Table.

Compounds

A compound is made of two or more atoms that are chemically _____ to each other

Mixture

Contains atoms or compounds that are mixed but _____ chemically joined together**.**

Date _____

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** _____

_____.

Mixtures can be separated _____ 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.

_____

_____

_____

Plenary – Match the keyword to the definition

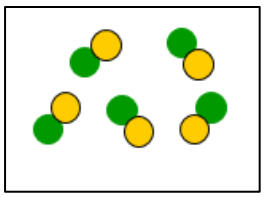
1._____ 2. _____ 3. _____

Date _____

Compounds

Starter:

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



2. Explain your answer to question 1.

_____

_____

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_____ and _____ to each other.

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

Date _____

Making a Compound

Aim

_____

_____

Method

Results

Metal	Observations
Magnesium	
Copper	

Conclusion

_____

_____

Date _____

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

---

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

Date _____

Name the following Compounds

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

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 _____ + _____

Date _____

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	Phosphorus	Oxygen	
Aluminium	Chloring	Oxygen	
Phoshporus	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_____ + _____ +_____

Date _____

Plenary

Elements in the compound	Compound Name
Sodium, chlorine	
Beryllium, oxygen	
Potassium, Nitrogen, oxygen	

Elements in the compound	Compound Name
	Magnesium fluoride
	Zinc oxide
	Copper sulfate

Date _____

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 _____ _____.
- These are strong and often require _____ to be used to break these connections.
- The energy can be supplied as heat, light or _____.

Aim

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

Date _____

Method *Draw and label method.*

Results

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

Conclusion

When copper chloride is electrolysed, a brown solid (_____) form at the _____ electrode and bubbles of a gas which smells like the swimming pool (____) is produced at the_____electrode.

Plenary

1. Complete the word equation:

   Copper chloride ⟶ _____ + Chlorine

2. Identify the compound in the word equation _____
3. Identify the elements. _____
4. Is it easy to break apart compounds? _____

Date _____

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 plan your own experiment
- To safely perform an experiment.
- To separate salt from salt water.

Success Criteria

- ❑ I can plan my experiment.
- ❑ safely perform a filtration experiment.
- ❑ I can safely perform an evaporation experiment.

Purification Techniques

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

Date _____

Planning your Investigation

Look at the sample of rock salt. Describe the sample

_____

_____

Test the solubility of the sample in a test tube. Describe what you saw

_____

_____

_____

_____

State the technique that you can use to remove insoluble impurities.

_____

Name the components that remain in solution?

_____

Suggest a way to purify Sodium chloride (salt) on its own

_____

_____

Date _____

Experiment

Aim To isolate a pure sample of Sodium chloride (salt) from rock salt.

Method (draw diagrams for each step)

Results

Conclusion

_____

_____

Evaluation

_____

Date _____

Literacy Task

Carbon Fibre: A Strong, Lightweight Material

Carbon fibre is a special material made up of thin strands of carbon atoms bonded together in a long, thin shape. It's incredibly strong, yet very lightweight, which makes it useful for many different things, from sports equipment to space exploration.

Carbon fibre is produced through a process called "carbonization." First, a polymer called PAN (polyacrylonitrile) is heated to very high temperatures, around 1,000°C to 3,000°C, in an oxygen-free environment. This forms long chains of carbon atoms that are tightly bonded together. These strands are then woven into fabric or combined with a plastic resin to create a solid material.

The reason carbon fibre is so useful is because of its combination of properties:

- Strength: Carbon fibre is stronger than steel, but much lighter. This makes it ideal for uses where strength is needed without adding extra weight.
- Lightweight: Carbon fibre is about five times lighter than steel, which is one of the key reasons it is used in things like racing cars and aircraft.
- Durability: It is resistant to corrosion and wear, meaning it lasts a long time without degrading.

Uses of Carbon Fibre

- Sports Equipment: Carbon fibre is often used to make things like bicycles, tennis rackets, and golf clubs. It gives these items strength without making them too heavy, helping athletes perform at their best.
- Cars and Airplanes: Many high-performance cars and planes use carbon fibre to reduce their weight, allowing them to go faster and be more fuel-efficient.
- Space Exploration: NASA and other space agencies use carbon fibre in spacecraft because it’s strong and lightweight, which helps keep rockets and satellites from becoming too heavy for launch

Date _____

Environmental Considerations

While carbon fibre is a great material for many applications, it is also expensive to make and recycling it can be tricky. Researchers are working on ways to recycle carbon fibre more effectively, which would help make it more sustainable.

1. Name the process that forms carbon fibre.

   _____

2. What are two key properties of carbon fibre that make it useful for various applications?

   _____

3. Give three examples of items or industries that use carbon fibre and explain why it is beneficial in those cases.

   _____

   _____

   _____

4. Why is carbon fibre considered to be more durable than some other materials?

   _____

   _____

   _____

5. What is one challenge related to carbon fibre that researchers are currently working to improve?

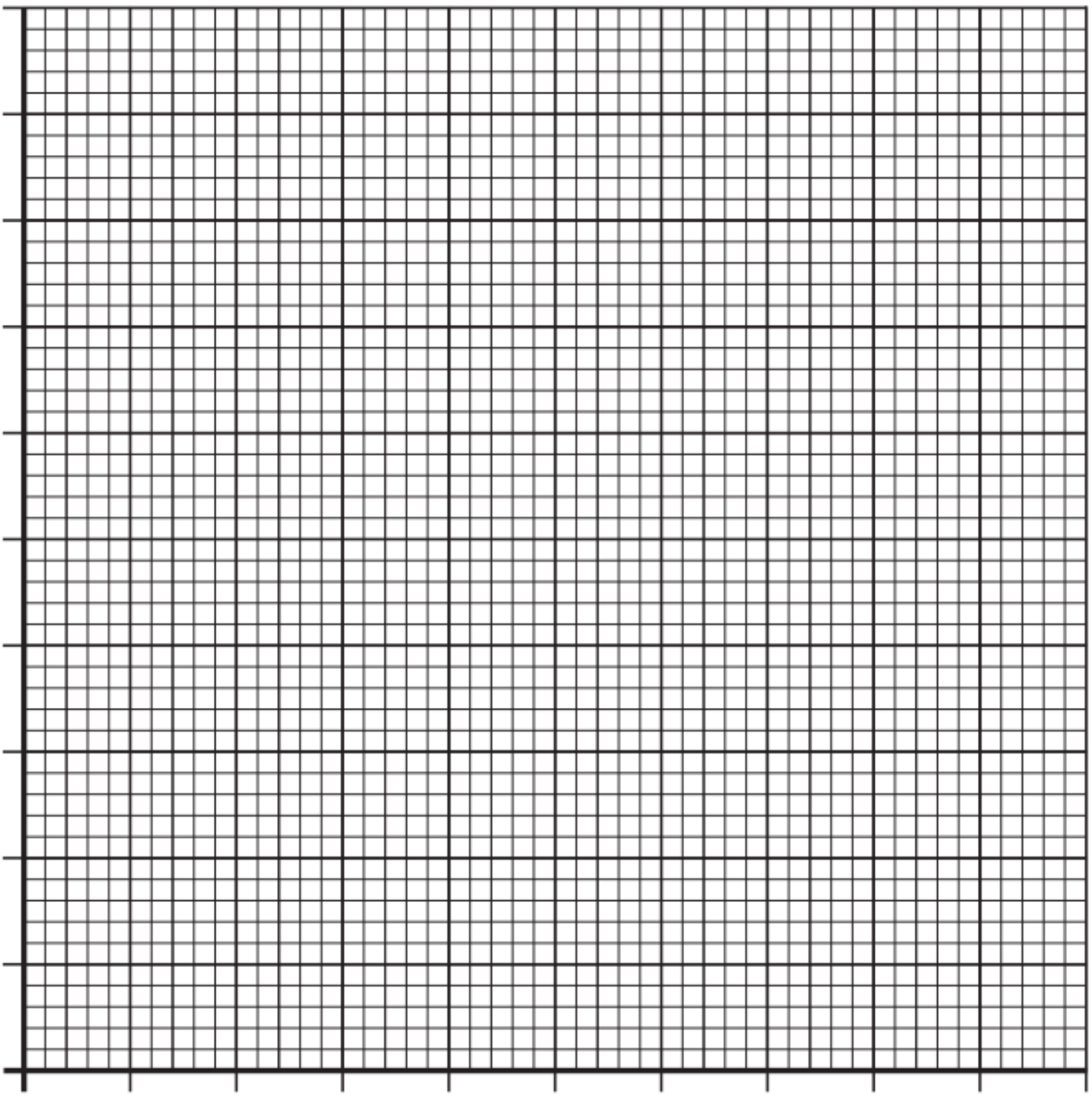
   _____

   _____

   _____

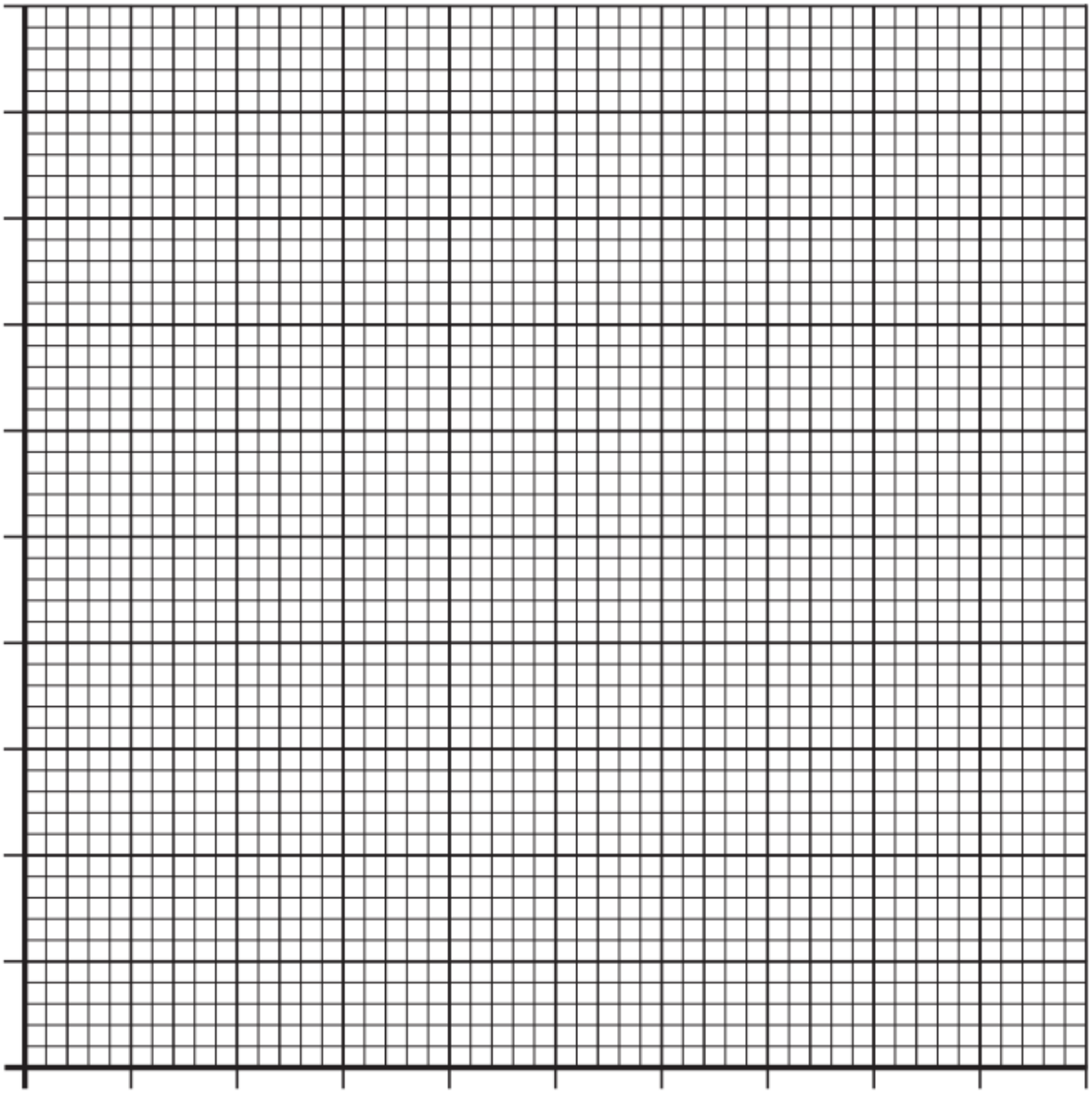
Date _____

Additional graph paper for numeracy tasks:



Date _____

Additional graph paper for numeracy tasks:



Date _____

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

Date _____

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, yetrium _____

Boron, aluminium, oxygen, oxygen _____

Sulphur, lithium, nitrogen, potassium, yetrium _____

Aluminium, iodine, cerium _____

Oxygen, scandium, argon _____

Polonium, calcium, hydrogen, oxygen, nitrogen, tantalum, sulphur _____

Phosphorus, iodine, potassium, actinium, hydrogen, uranium _____

Scandium, radium, technetium, hydrogen, yetrium _____

Date _____