S2 Chemistry Topic

06/10/2026

In this Unit you will learn about:

1. States of Matter

2. The Periodic Table

3. Properties of Elements.

4. Elements, Compounds and Mixtures

States of Matter

06/10/2026

Education Scotland Experiences, and Outcomes

- **SCN 3-05a:** By contributing to experiments and investigations, I can develop my understanding of models of matter and can apply this to changes of state and the energy involved as they occur in nature.

- **SCN 3-16b:** I have taken part in practical investigations into solubility using different solvents and can apply what I have learned to solve everyday practical problems.

States of Matter

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States of Matter

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Starter:

What’s the difference between the objects below?

States of Matter

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Learning Intentions:

- To identify solids and liquids by their properties and give everyday examples of each.
- To describe the particles in a solid, liquid and gas.

States of Matter

06/10/2026

Success Criteria

- ❑ I can identify solids and liquids by their properties and give everyday examples of each.
- ❑ I can describe the particles in a solid, liquid and gas.

Tick me at the end if ***you can*** …

States of Matter

Matter is anything which has a mass and occupies a space.

There are three main states of matter:

- solid
- liquid
- gas

States of Matter

Page 5

Activity:

Classify items as solids, liquids and gases.

Solid	Liquid	Gas

Extension:

Think of some examples of your own and add them to your table.

Date **Classify items as solids, liquids and gases**

Draw a table in your book with 3 columns with headings of solid, liquid and gas, like the one below:

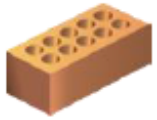
Solid	Liquid	Gas

Smoke

Spoon

Milk

Pencil


Brick

Fumes

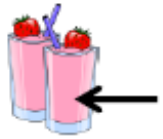
Water

Wind

Juice

Ice cube

Steam


Milkshake

Extension: Think of some examples of your own and add them.

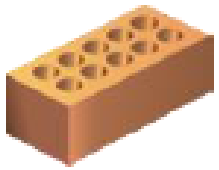
States of Matter

Smoke

Spoon

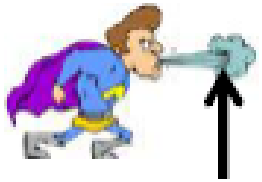
Milk

Pencil

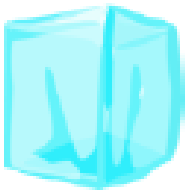

Brick

Fumes

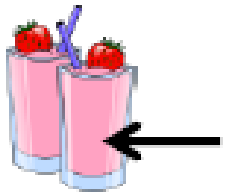
Water


Wind

Juice


Ice cube

Steam


Milkshake

Extension:
Think of some examples of your own and add them to your table.

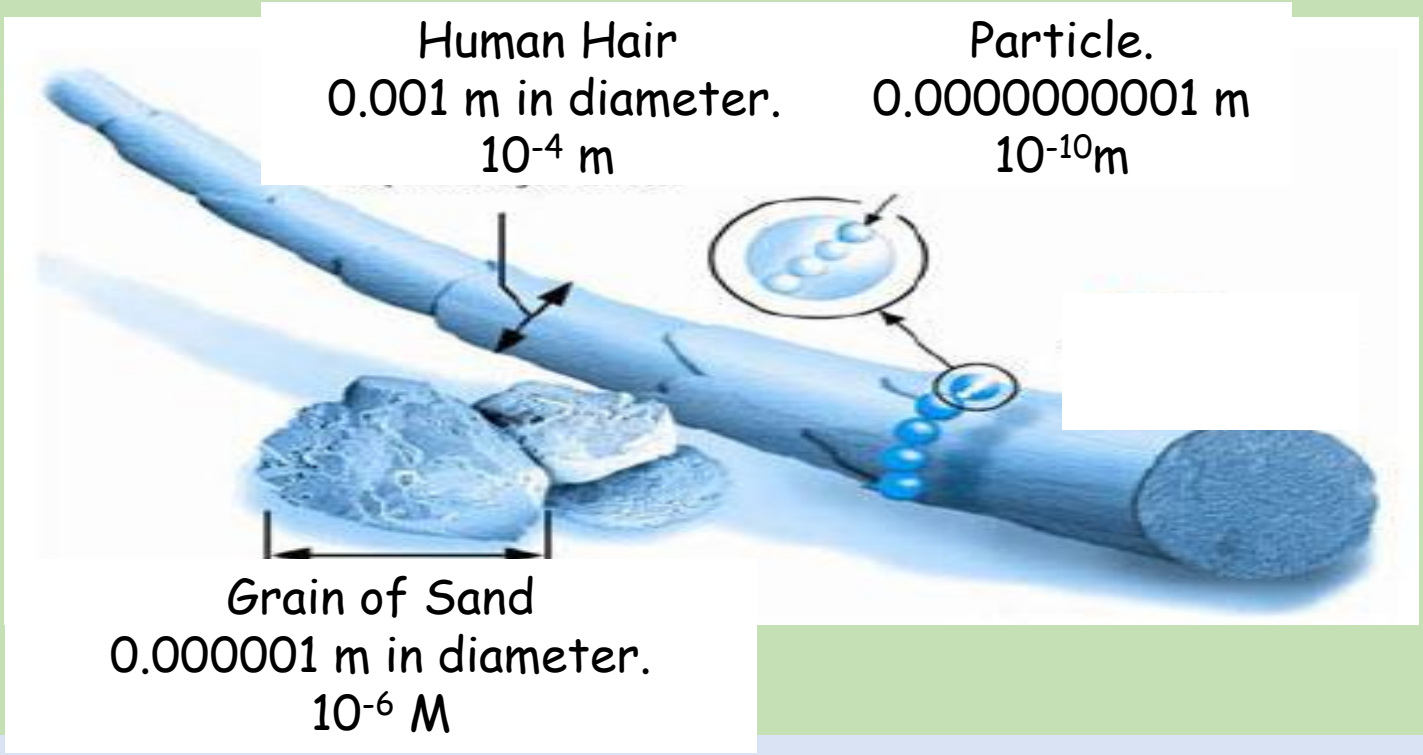
States of Matter

States of matter song:
Matter Chatter (song for kids about solids, liquids, and gases) 3:14 mins

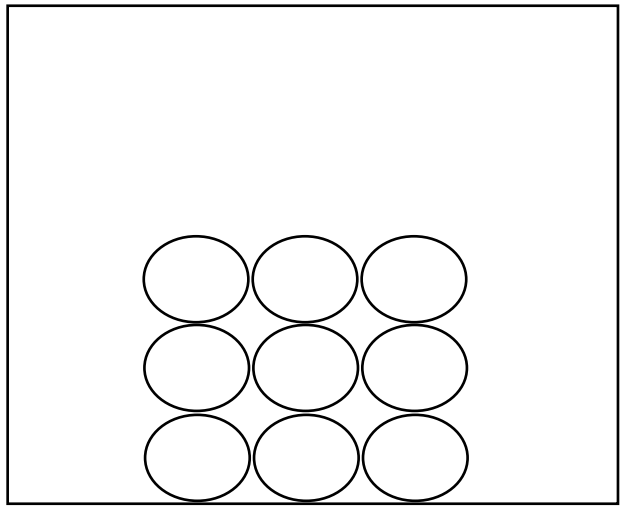
Particles

All matter is made from tiny **particles** called **atoms**.

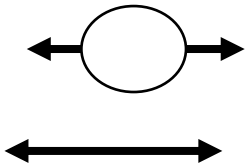
Particles are always **moving**.

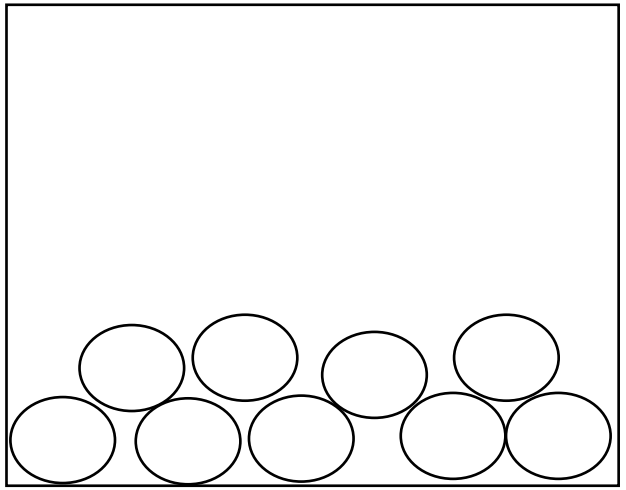


Solid, liquid or gas

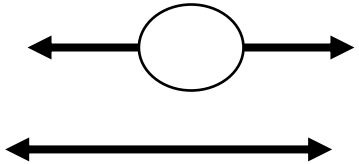


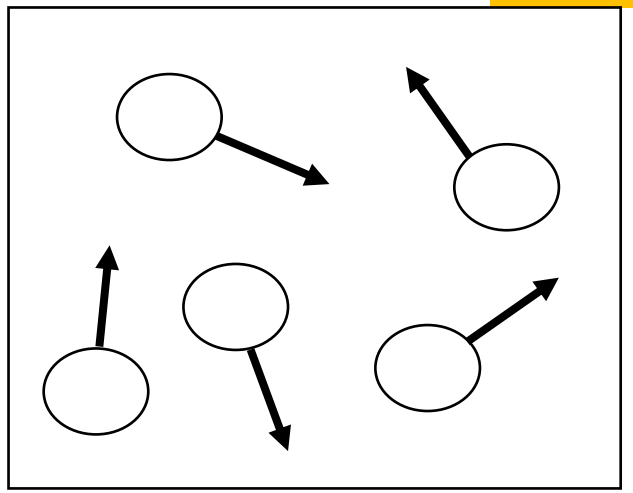
SOLID





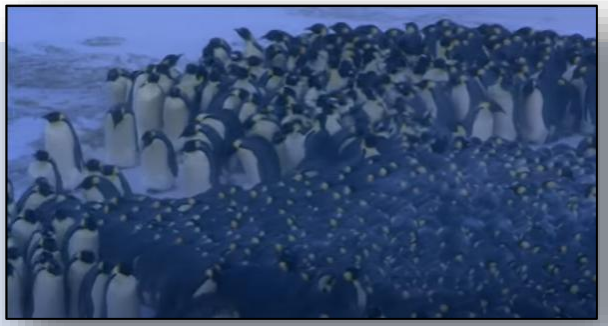
LIQUID





GAS

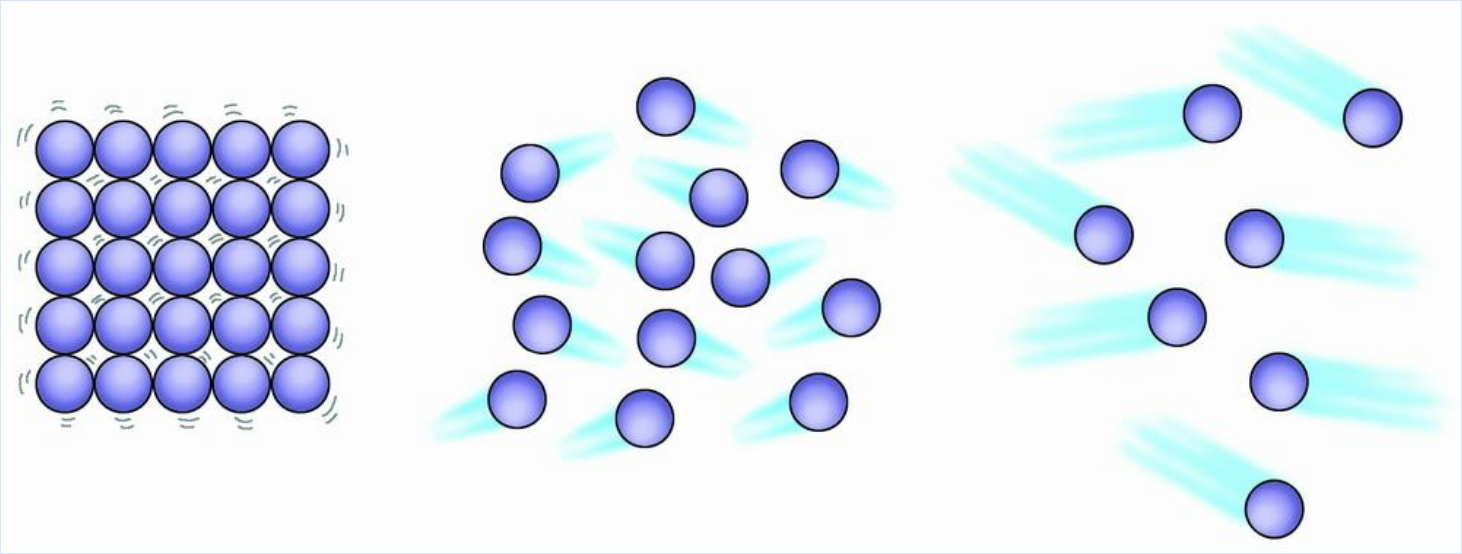
[How can a penguin "huddle" be compared to a solid, liquid and gas?]



[Video link]

Solid, liquid or gas

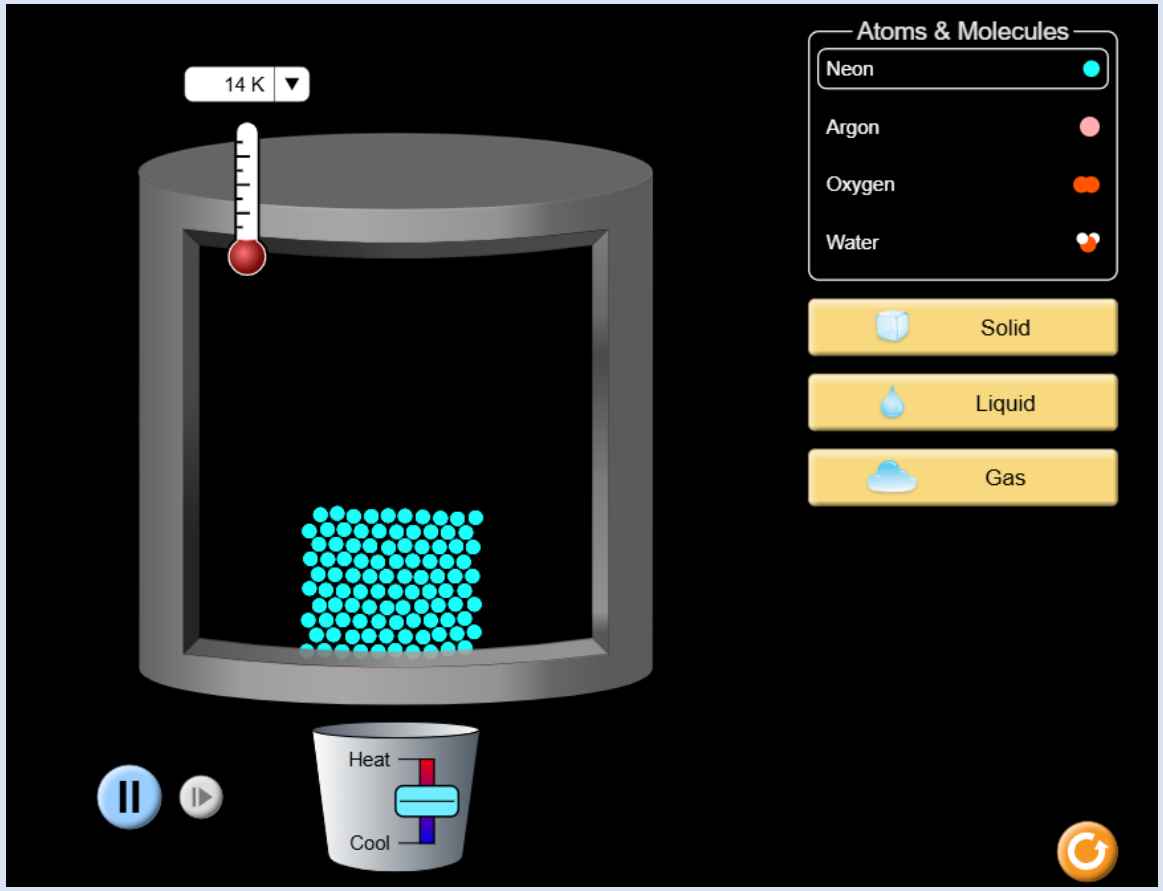
Activity: Act it out and move around like a solid, liquid and gas.



Solid, liquid or gas

Activity: Use the ‘States of Matter’ simulator to investigate solids, liquids and gases.

https://phet.colorado.edu/sims/html/states-of-matter-basics/latest/states-of-matter-basics_en.html



SCAN ME

States of Matter

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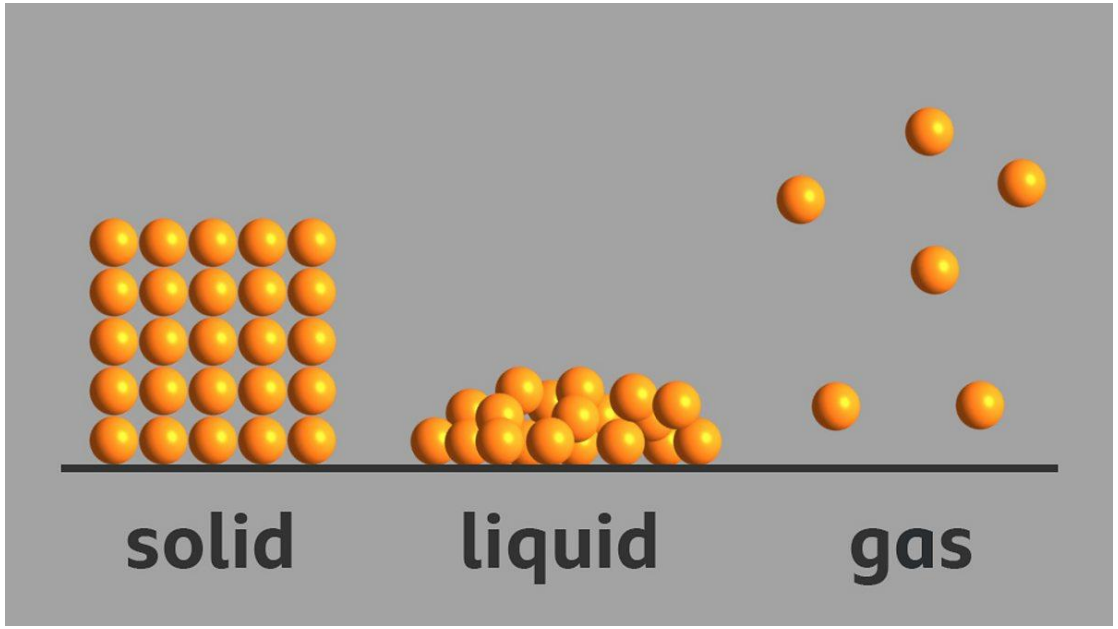
Plenary:

Describe how the particles **move** in a:

- Solid
- Liquid
- Gas



Tick me at the end if ***you can*** …

Success Criteria

❑I can identify solids and liquids by their properties and give everyday examples of each.

❑I can describe the particles in a solid, liquid and gas

Properties of solids, liquids and gases

06/10/2026

Starter:

1. Draw the particle arrangement of a solid, liquid and gas.

Solid

Liquid

Gas

2. Describe how the particles in a solid, liquid and gas move.

Properties of solids liquids and gases

06/10/2026

Learning Intentions:

- To describe the properties of solids, liquids and gases.
- To describe the properties of a non-Newtonian fluid.

Properties of solids liquids and gases

06/10/2026

Success Criteria

- ❑ I can describe the properties of solids, liquids and gases.
- ❑ I can describe the properties of a non-Newtonian fluid.

Tick me at the end if ***you can*** …

Properties of solids liquids and gases

Aim: **To investigate the properties of solids, liquids and gases.**

	Change Volume? (be compressed)	Change shape?	Flow?
Solid			
Liquid			
Gas			

We will complete three different activities to investigate if solids, liquids and gases can:

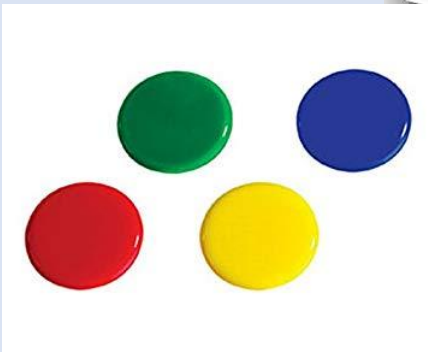
- change volume?
- change shape?
- flow?

Properties of solids liquids and gases

Activity 1

Look at the different solids in the tub on your table and decide the following:

1. Does the shape of a solid change?
2. Has it changed volume?
3. Can it flow?



Properties of solids liquids and gases

Aim: To investigate the properties of solids, liquids and gases.

	Change Volume? (be compressed)	**Change shape?**	**Flow?**
Solid	**No**	**No**	**No**
Liquid			
Gas			

Properties of liquids

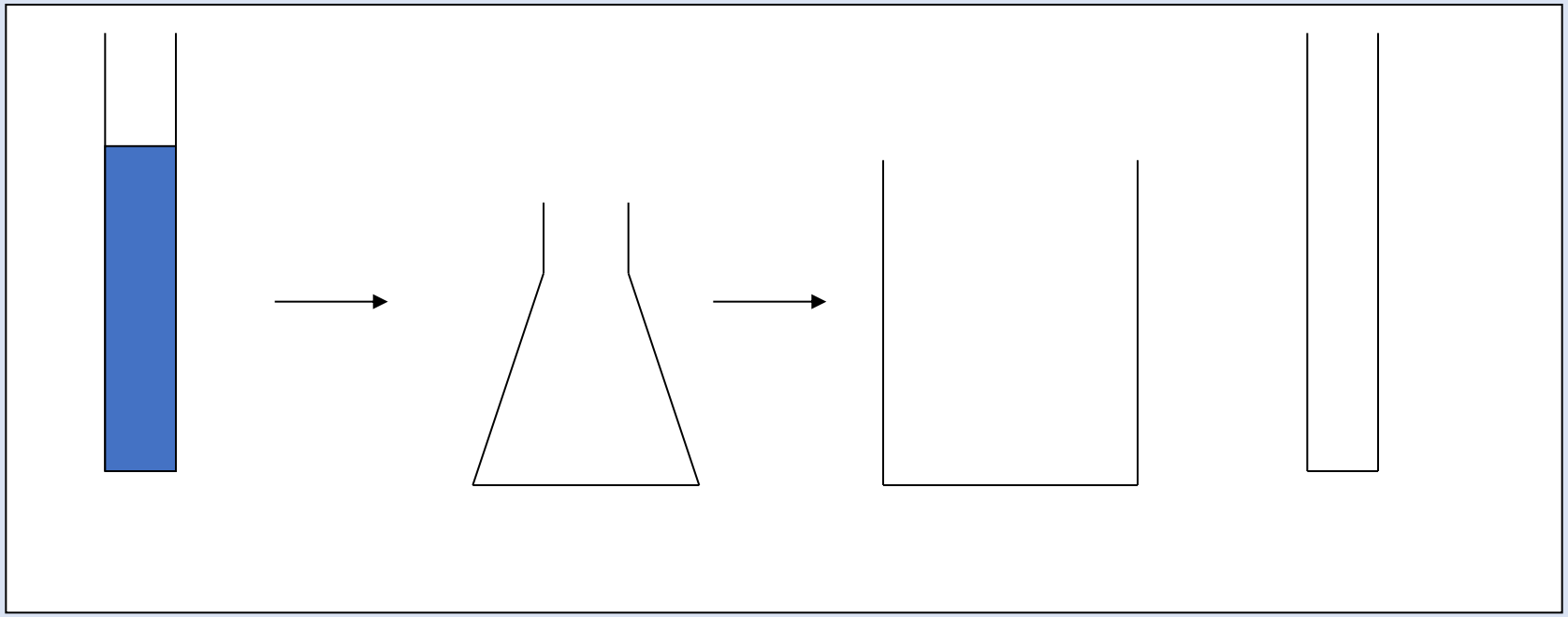
Activity 2:

- Measure 50ml of water in a measuring cylinder and add ONE drop of food colouring.
- Transfer this to a beaker.
- Transfer this to a conical flask
- Transfer this to the original measuring cylinder.

1. What shape does the coloured water have in each of the containers?
2. Has it changed volume?
3. Can it flow?

Properties of liquids

1. Does the water change shape?
2. Does the water keep its volume ?
3. Does the water flow?



Properties of solids liquids and gases

Aim: To investigate the properties of solids, liquids and gases.

	Change Volume? (be compressed)	**Change shape?**	**Flow?**
Solid	No	No	No
Liquid	No	Yes	Yes
Gas			

Properties of gases

Activity 3

- Can you pour a gas?
- Watch the demonstration with a candle and carbon dioxide…..

- Do gases **flow**? Can you “pour” a gas?

Properties of solids liquids and gases

Aim: To investigate the properties of solids, liquids and gases.

	Change Volume? (be compressed)	**Change shape?**	**Flow?**
Solid	No	No	No
Liquid	No	Yes	Yes
Gas	Yes	Yes	Yes

What about if something behaves like a solid and a liquid?

Jon Tickle WALKS on Custard! | Brainiac (3.45)

Making Slime - Cornflour and Water

Aim: To investigate the properties of a non-Newtonian fluid.

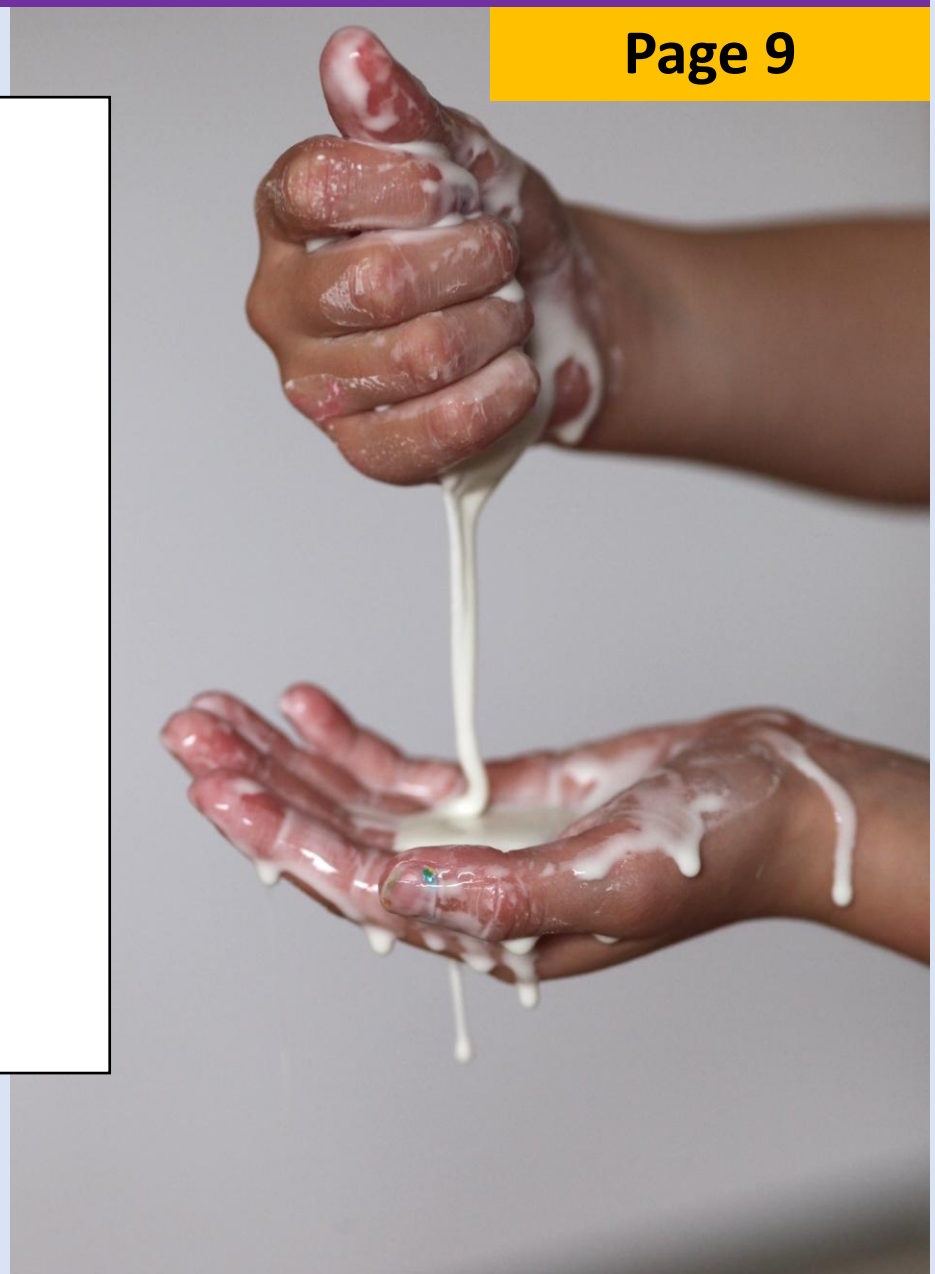
Method: Your teacher will give you specific instructions on how to carry out this activity.

- Add cornflour to a cup or beaker.
- Add a **small** amount of water to the cornflour and mix with a spatula.
- Keep adding water until you make a paste – don’t add too much water at once or it will be too runny!

Making Slime - Cornflour and Water

Aim: **To investigate the properties of a non-Newtonian fluid.**

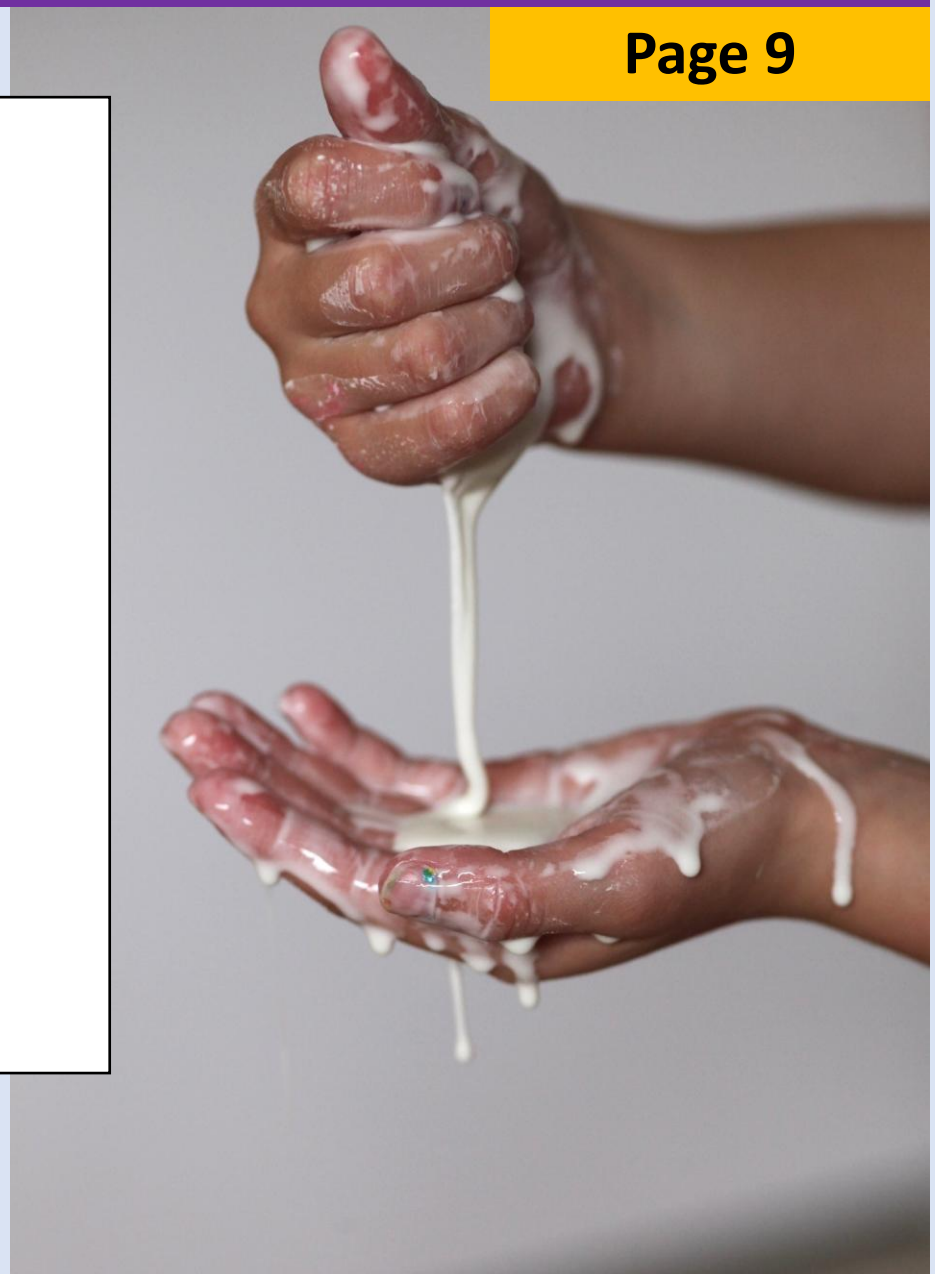
Method: *(What did you do?)*



Making Slime - Cornflour and Water

Results?: *(What did you observe?)*

Conclusion: *(What did you find out?)*



Solid, Liquid, or Gas? Sort them!

Steam	Ice	Tar	Glass
Hair gel	Carrots	Stone	Dr Murray
Butter	Oxygen	Plastic	Gold

Paper	Shampoo	Mercury	Jelly	Beans
Wood	Lipstick	Paint	Oil	Irn Bru
Air	Concrete	Ink	Wax	Farts
Tea	Salt	Carbon Dioxide	Iron	Hair Mouse

A Non-Newtonian Fluid

[Non-Newtonian Fluid in Slow Motion - The Slow Mo Guys (4:15)]

[What Kind of Liquid Lets You Run Across Its Surface? | Street Science (2.28)]

[CBBC: Blue Peter - Radzi walks on custard! (4.12)]

Solid or Liquid?

06/10/2026

Plenary

Explain how it is possible to walk on custard.

Tick me at the end if ***you can*** …

Success Criteria

- ❑ I can describe the properties of solids, liquids and gases.
- ❑ I can describe the properties of a non-Newtonian fluid.

Solid or Liquid?

06/10/2026

Starter:

1. Are these substances solid, liquid or gas? Explain your thinking.

Paint

Jelly

Custard

Changing States

06/10/2026

Learning Intentions:

- To explain changes of state.

Success Criteria

- ❑ I can explain changes of state.

Tick me at the end if ***you can*** …

Mission: Rescue the Frozen Treasure!

A precious coin has become trapped inside a block of ice, and you have been asked to recover it without damaging the coin.

Can you use science to rescue the precious coin before time runs out?

Plan it

- Decide what you will use to recover the coin (water, dropper, beaker, salt).

Experiment

Time how long it takes to recover the coin using your method.

Mission: Rescue the Frozen Treasure!

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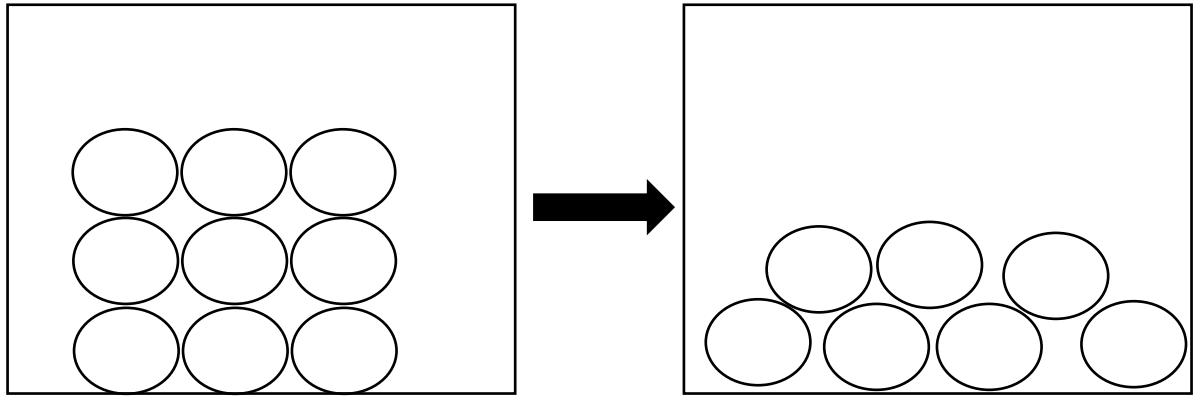
Describe the State Change



Solid **Liquid**

Mission 2: Dry the KHS sports kit!

A flood has caused the KHS football strips to get soaked. Design a way to quickly dry the kit for the match.

Can you use science to dry the kit before time runs out?

Plan it

- Decide what you will use to dry the kit (washing line, fan, heater).

- **Experiment**

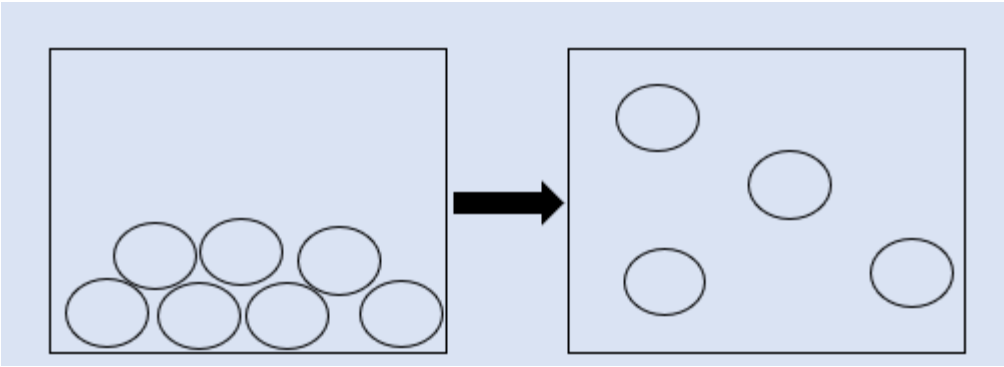
Time how long it takes to dry the shirt.

Changing States

06/10/2026

When the shirt dries what happens to the liquid water?

Name the state change



Changing States

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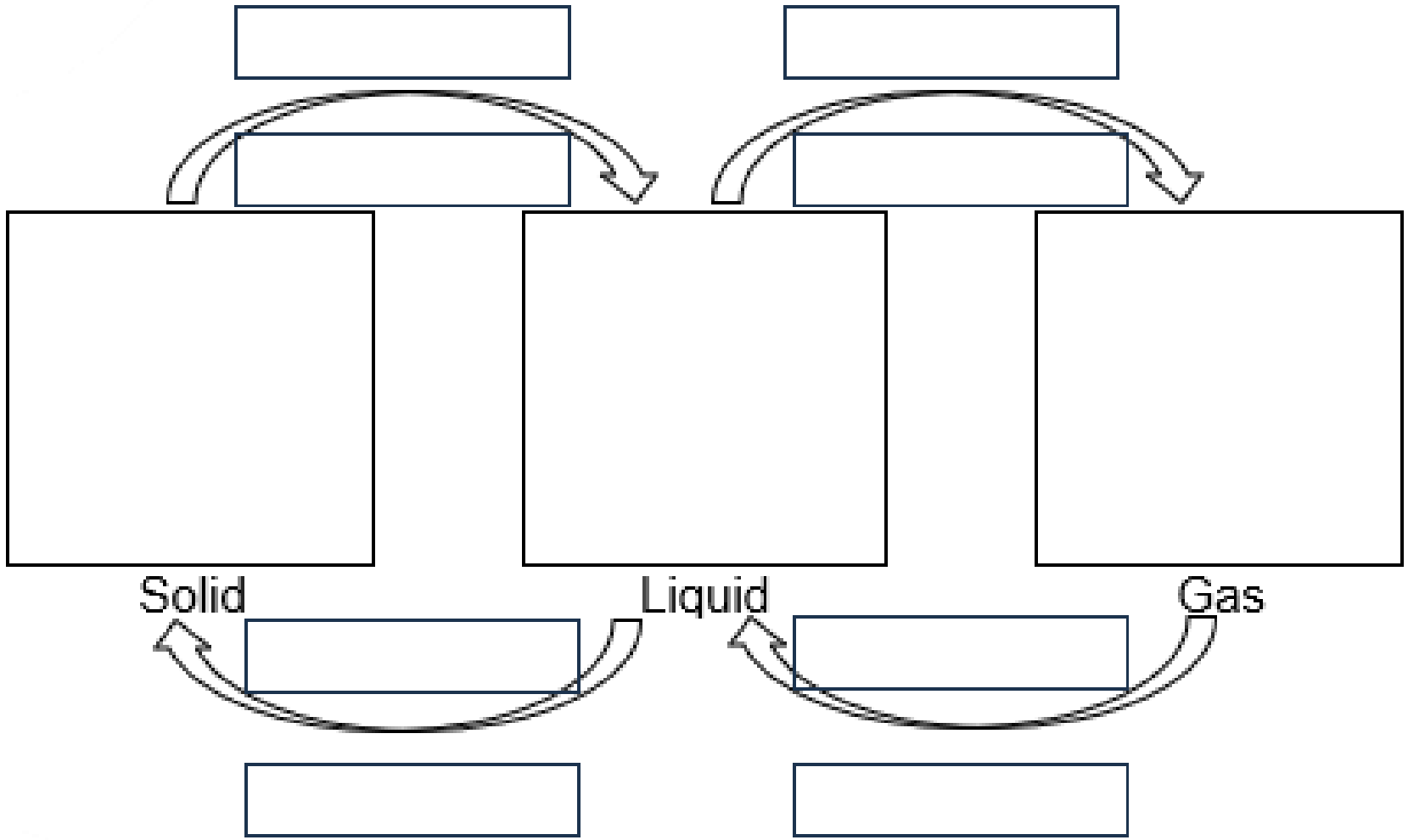
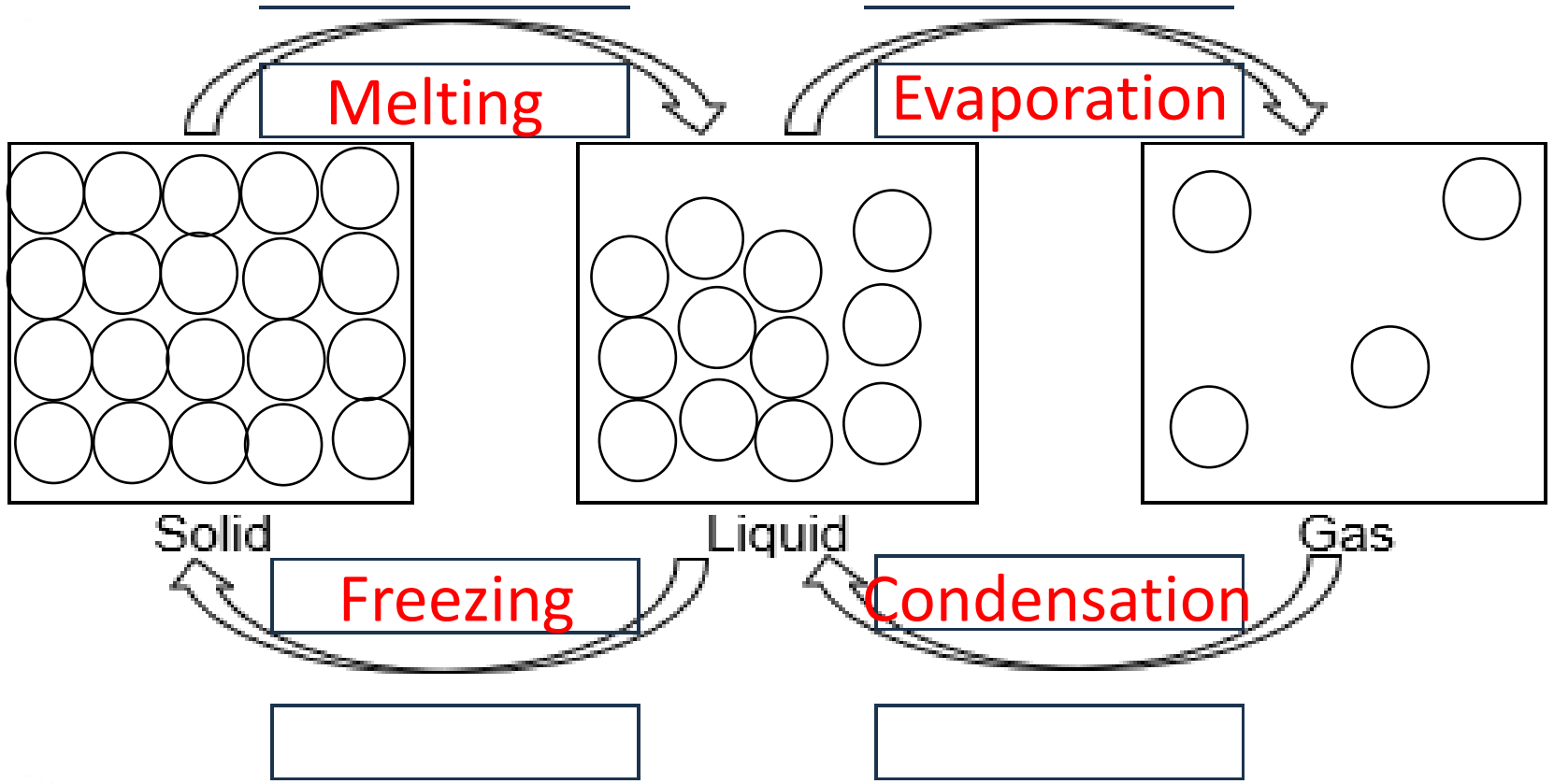
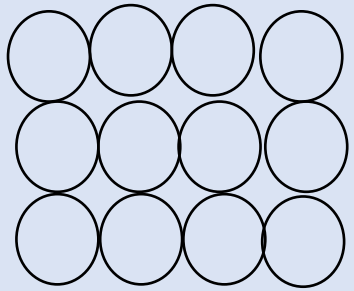


Changing States

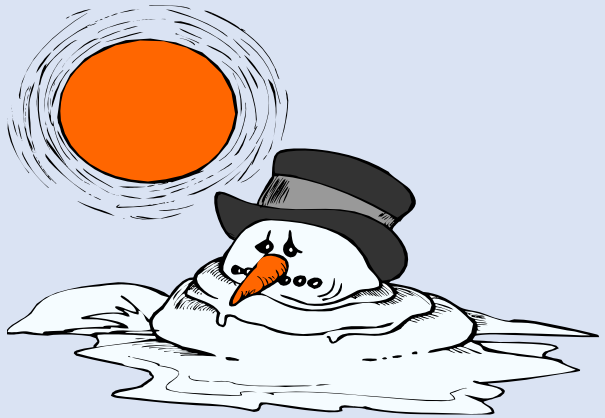
06/10/2026

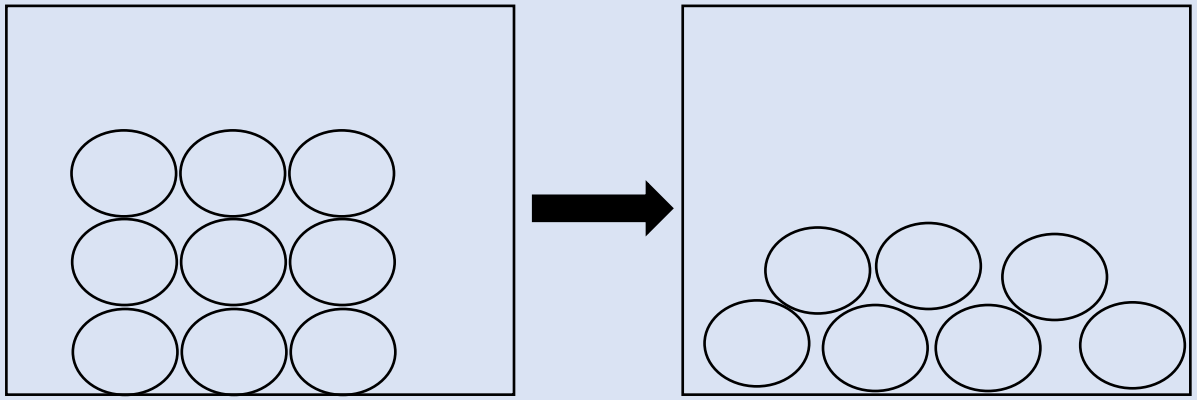




Changing States

When a solid is heated the particles start to vibrate as they gain energy and it melts to become a liquid.



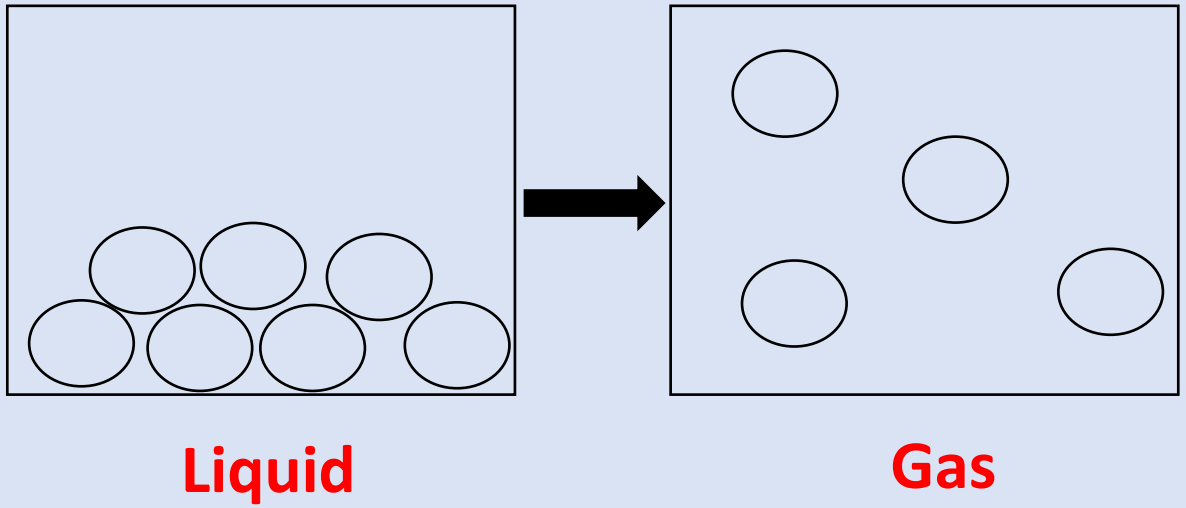


Solid

Liquid

Changing States

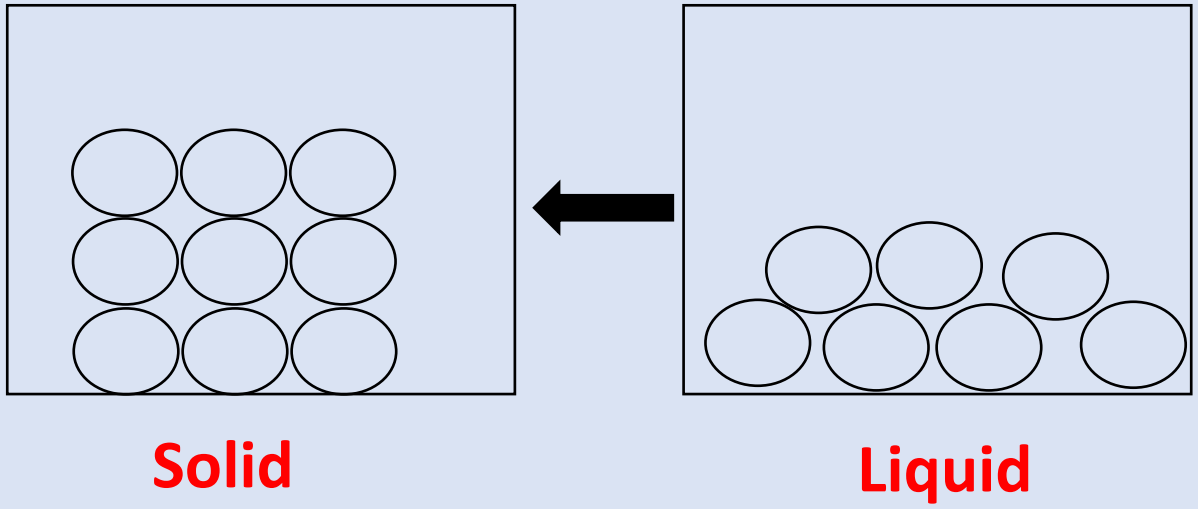
When a liquid is heated it boils and becomes a gas i.e. Boiling.



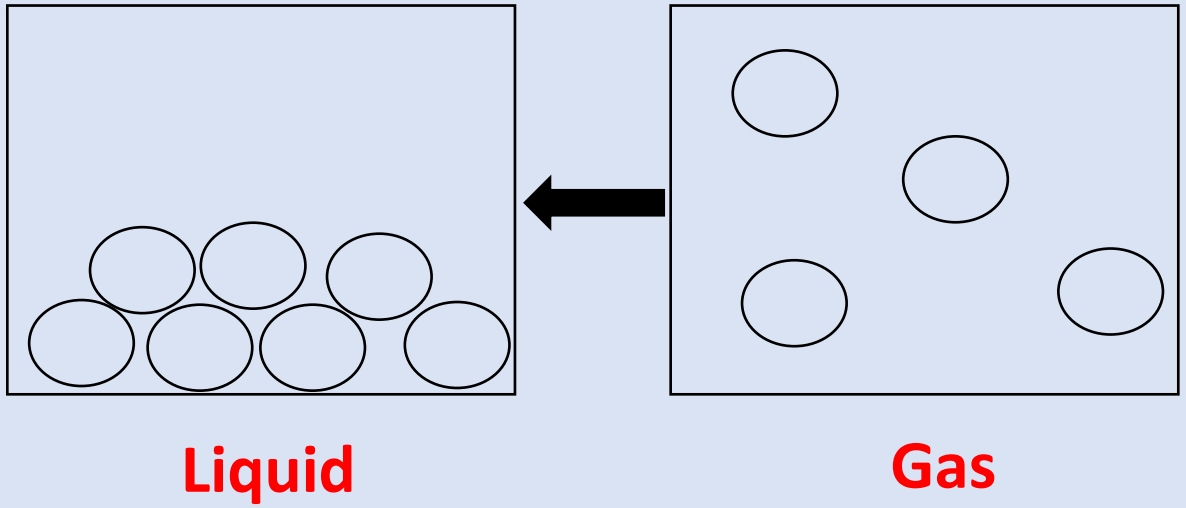
If a liquid becomes a gas without bubbling we call it evaporation.

Changing States

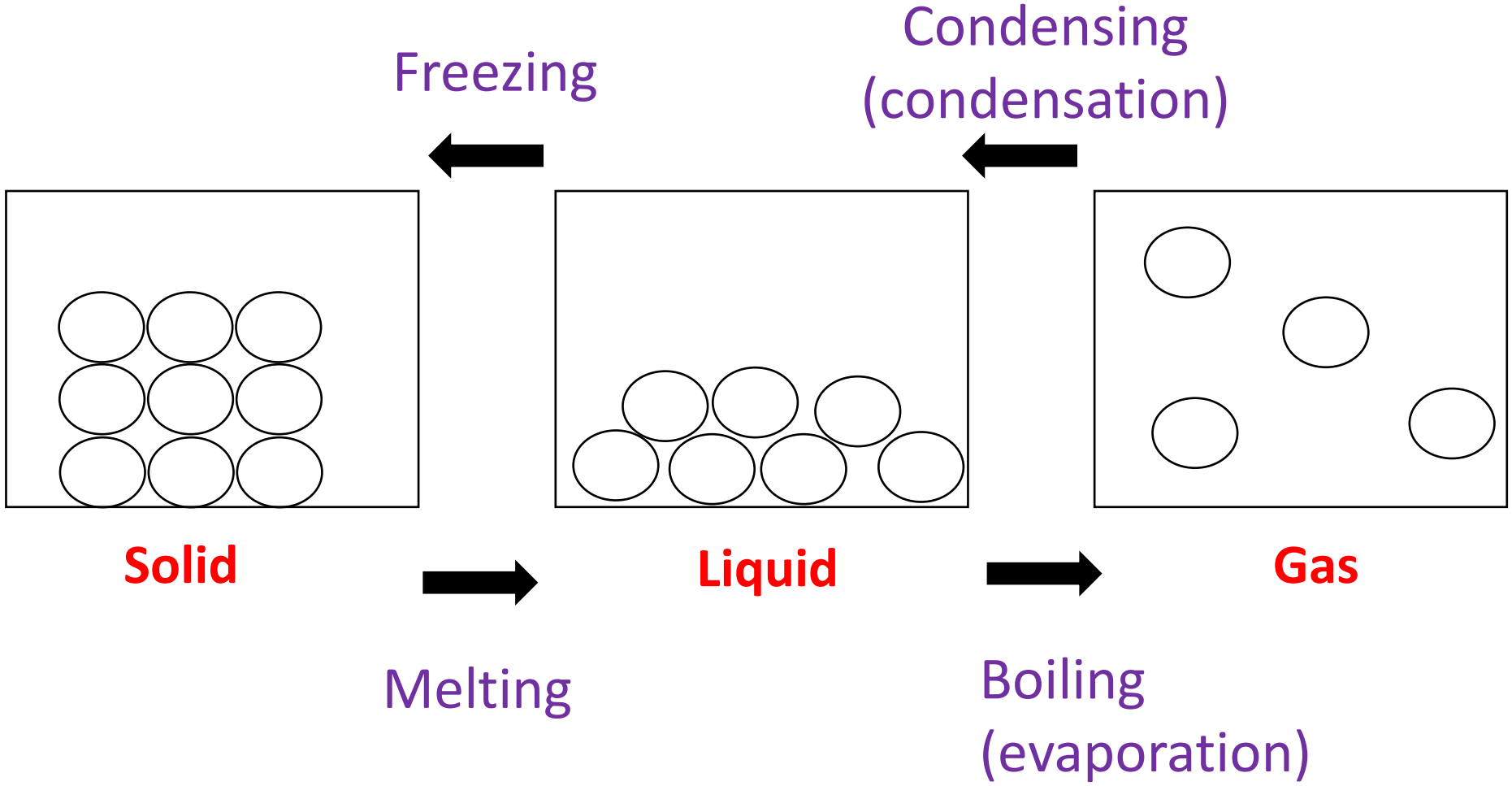
When a liquid is cooled until it becomes a solid we say it freezes.



When a gas is cooled till it becomes a liquid we say it condenses.

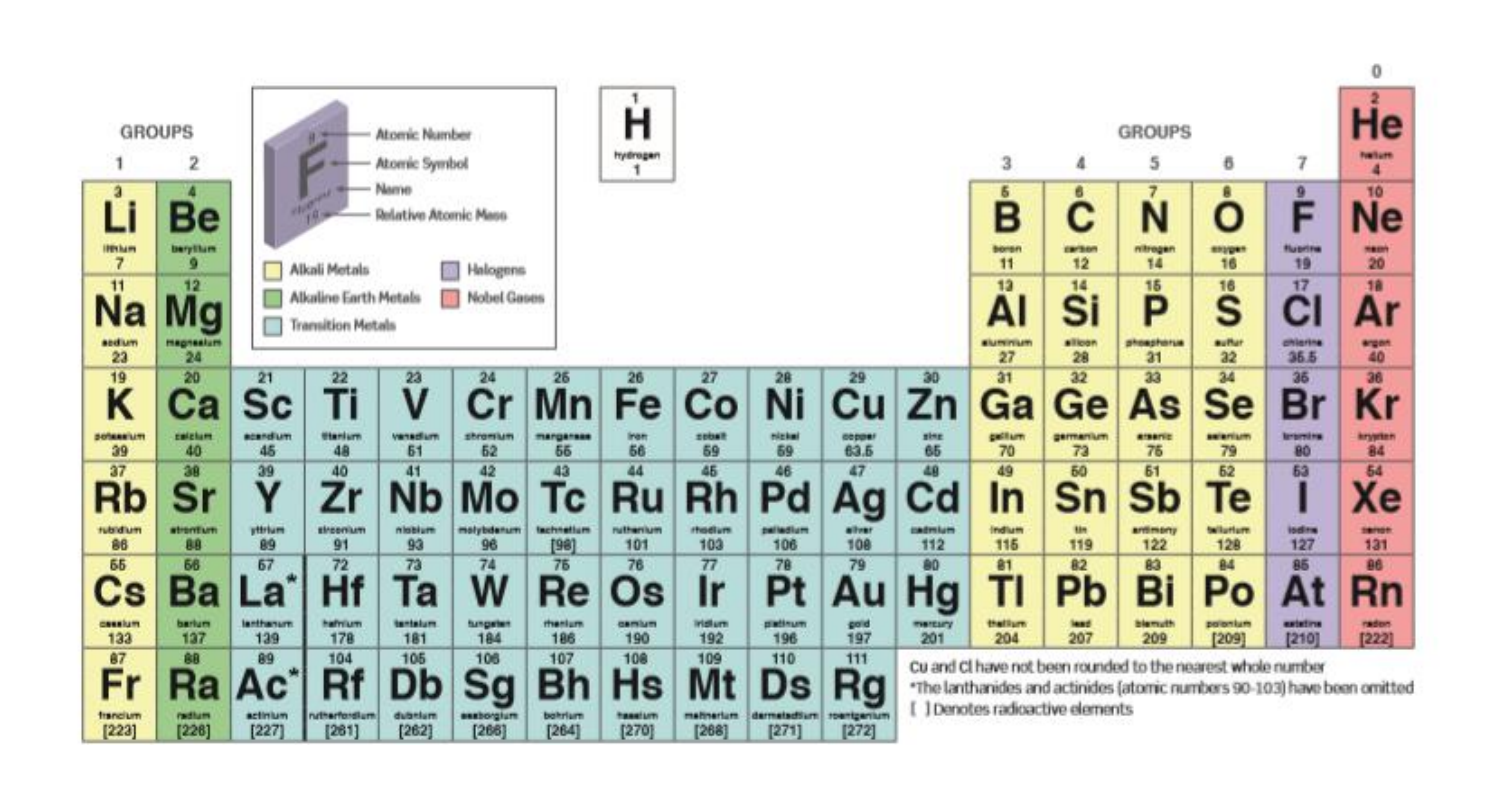


Changing States



The Periodic Table

06/10/2026

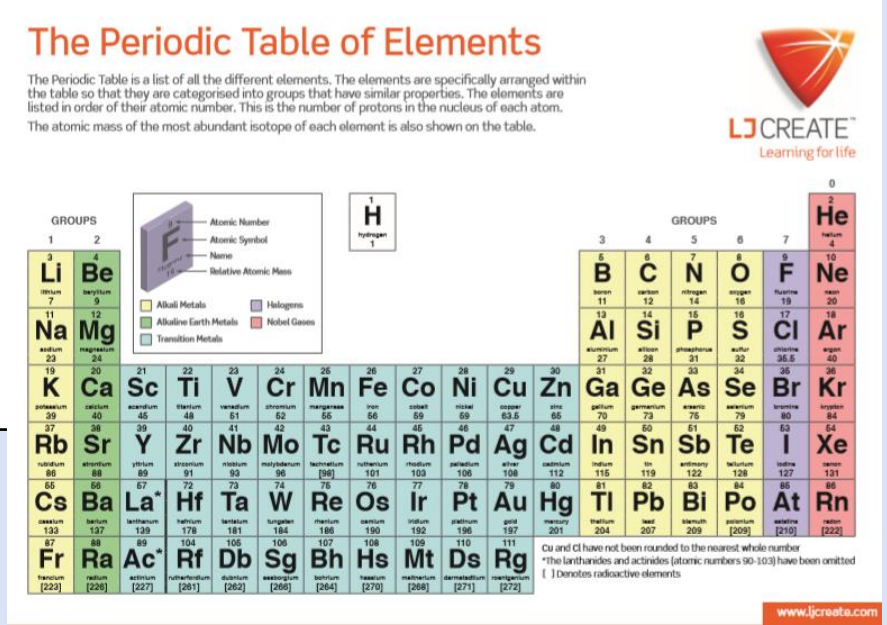


The Periodic Table

06/10/2026

Starter:

1. What do you know about the Periodic table ?
2. Name any elements that you have heard of.
3. What do you think makes an “element” different from other chemical substances?



The Periodic Table

06/10/2026

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.

The Periodic Table

06/10/2026

Success Criteria

- ❑ I can state that the periodic table organises elements 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 can*** …

The Period Table

06/10/2026

The Periodic Table was first proposed by the Russian Chemist Dimitri Mendeleev.

Everything in the world is made of the 118 **Elements** in the Periodic table

Elements are arranged by **atomic number**.

He even left gaps for elements he said hadn’t been developed yet!

Uses of the Elements

- Visit the Large periodic table on the wall upstairs in Science.
- Take your booklet and a pencil.
- Make a note of 4 elements that you've heard of…
- Write their "use" beside their name.
- <u>Or</u> use the QR code to access the interactive periodic table to do this.

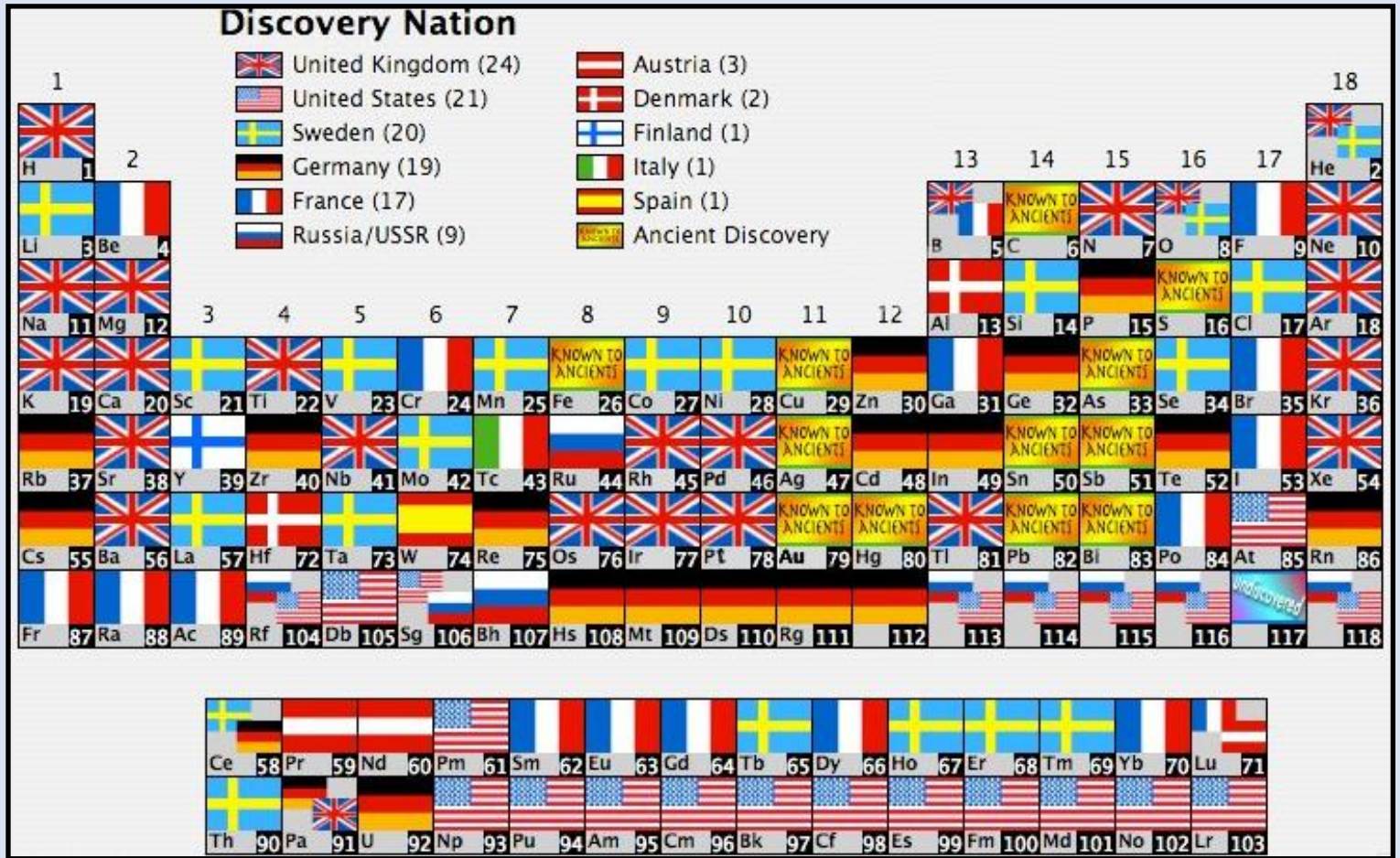
Hydrogen
Helium
Lithium
Beryllium
Boron
Carbon
Nitrogen
Oxygen
Fluorine
Neon
Sodium
Magnesium
Aluminum
Silicon
Phosphorus
Sulfur
Chlorine
Argon
Potassium
Calcium
Scandium
Titanium
Vanadium
Chromium
Manganese
Iron
Cobalt
Nickel
Copper
Zinc
Gallium
Germanium
Arsenic
Selenium
Bromine
Krypton
Rubidium
Strontium
Yttrium
Zirconium
Niobium
Molybdenum
Technetium
Ruthenium
Rhodium
Palladium
Silver
Cadmium
Indium
Tin
Antimony
Tellurium
Iodine
Xenon
Cesium
Barium
57 - 71
Hafnium
Tantalum
Tungsten
Rhenium
Osmium
Iridium
Platinum
Gold
Mercury
Thallium
Lead
Bismuth
Polonium
Astatine
Radon

Uses of the Elements

Element	Use

Uses of the Elements

- The Periodic table is used by all Scientists around the world. The elements were discovered in a variety of countries around the world. You might notice this when reading their names.



Some Interesting Periodic Table facts

Technetium was the first to be made artificially!

The only letter not in the periodic table is the letter J!

Francium is the rarest element on earth!

Hydrogen is the most common element found in the universe. It is also the lightest element!

The phrase ‘mad hatter’ comes from the element mercury, and mercury poisoning.

Do you know anymore?

Elements

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

Element

Atom

Atoms

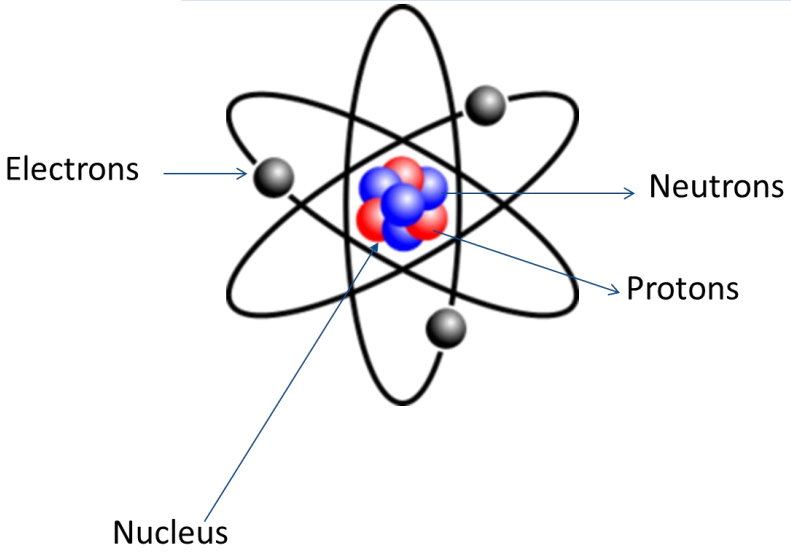
Everything that exists is made up of **atoms!**

(from the Greek word 'atomos' meaning uncuttable!)

An atom is the basic building block of any material.

When something is broken up into smaller and smaller pieces, there come a point that it cannot be broken down any further.

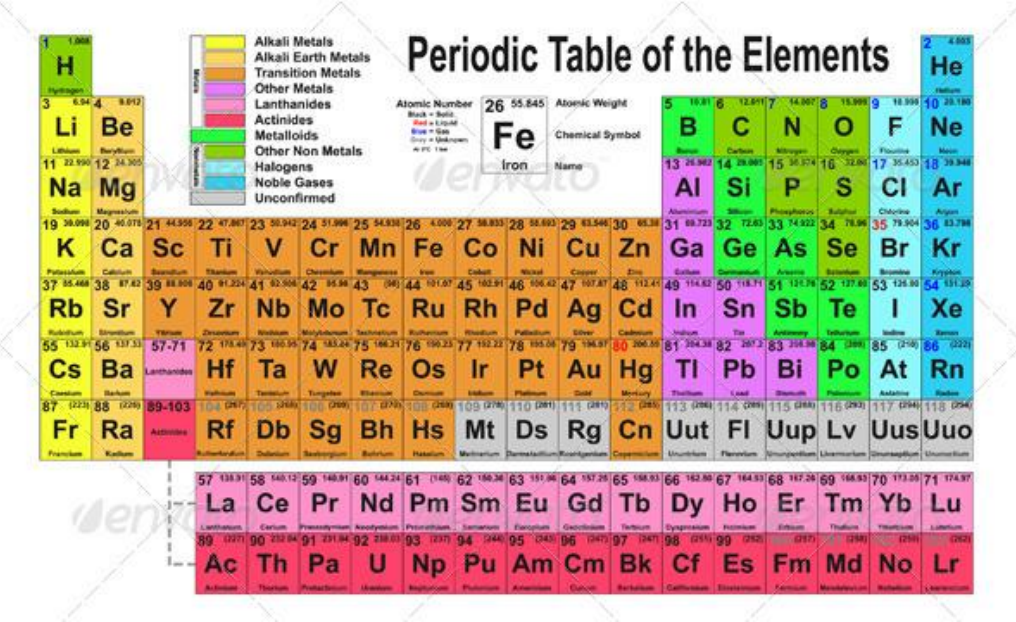
An atom was thought to be the smallest unit of ma
but it is made up of even smaller particles …



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.



Element Symbols

Write down the symbol for:

- Oxygen O
- Helium He
- Magnesium Mg
- Lithium Li
- Hydrogen H

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

- Write the symbol for:
  - Silver → Ag
  - Gold → Au
  - Iron → Fe
- Can you find out what the Latin word **is** for:
  - Silver → Argentum
  - Gold → Aurum
  - Iron → Ferrum

Element Symbols

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

Element Symbols

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

Mg

Pb

Au

O

Oxygen

Tin

S

Cl

Potassium

Phosphorous

Chlorine

P

Lead

Gold

Cu

K

Copper

Ga

Manganese

Sulphur

Sn

Sodium

Na

Co

Mn

Gallium

Cobalt

Element Symbols

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

o their Symbol

h the name and symbol. Circle the element name and

Watch out for sneaky ones!

Au

Oxygen

O

Tin

Cl

Potassium

Phosphorous

P

Lead

Gold

K

Copper

Ga

Sulphur

Sn

Sodium

Mn

Gallium

Cobalt

Element Symbols – Extension (cartoon elements)

Use the laminated periodic tables to write the element symbol and create the name of a cartoon character.

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 _____

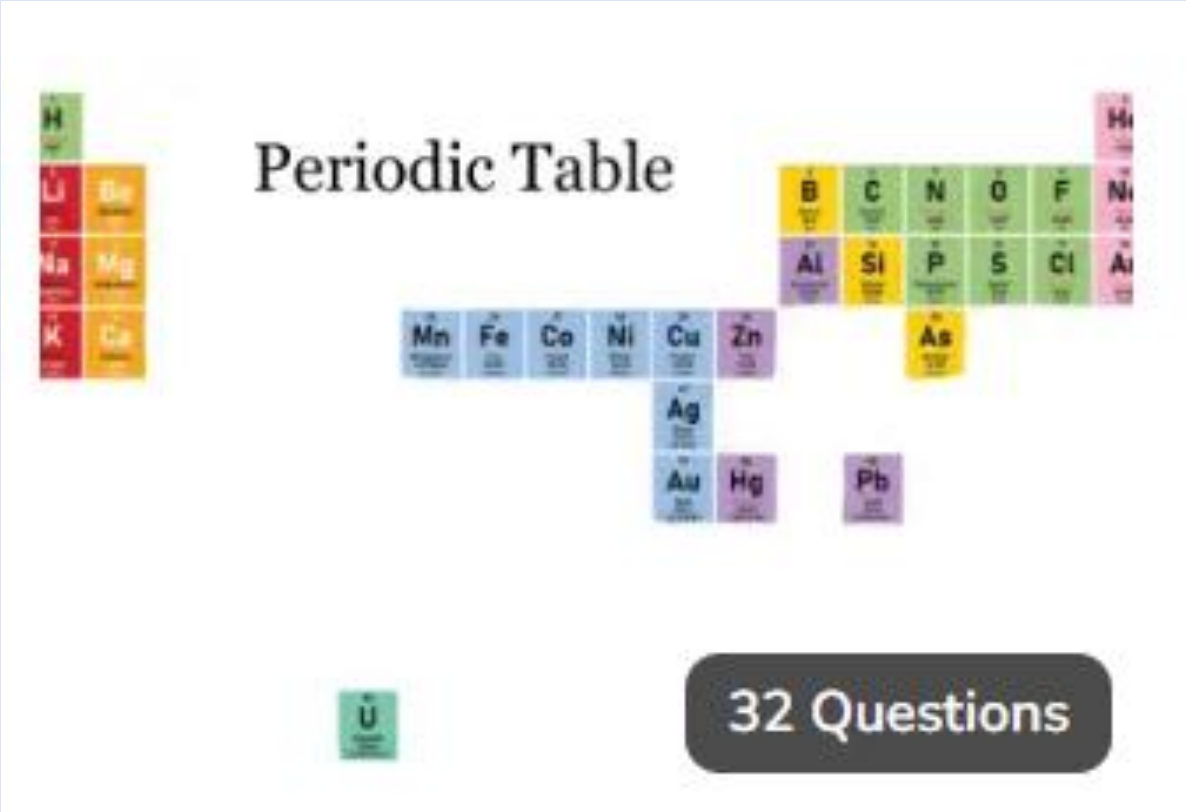
Plenary – Element Bingo

Write 6 elements from atomic number 1-20 on your bingo card.

Plenary – Element Bingo

Blooket

https://dashboard.blooket.com/set/6167474d5e69360037d10a12



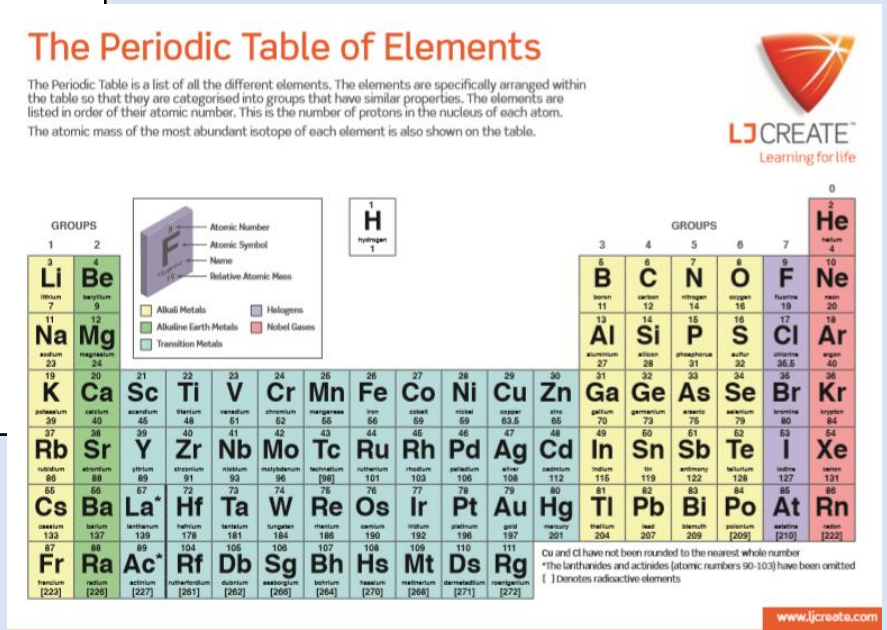
The Periodic Table

06/10/2026

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?



The Periodic Table

Learning Intentions:

To learn:

- some of the ways elements can be categorised in the Periodic table.
- about the position of metal and non-metals elements in the periodic table.
- that a row is known as a period in the periodic table.
- that a column is known as a group in the periodic table.

The Periodic Table

Success Criteria

- ❑ 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 the periodic table.
- ❑ I can use the periodic table to find information about elements.

Categorising the elements

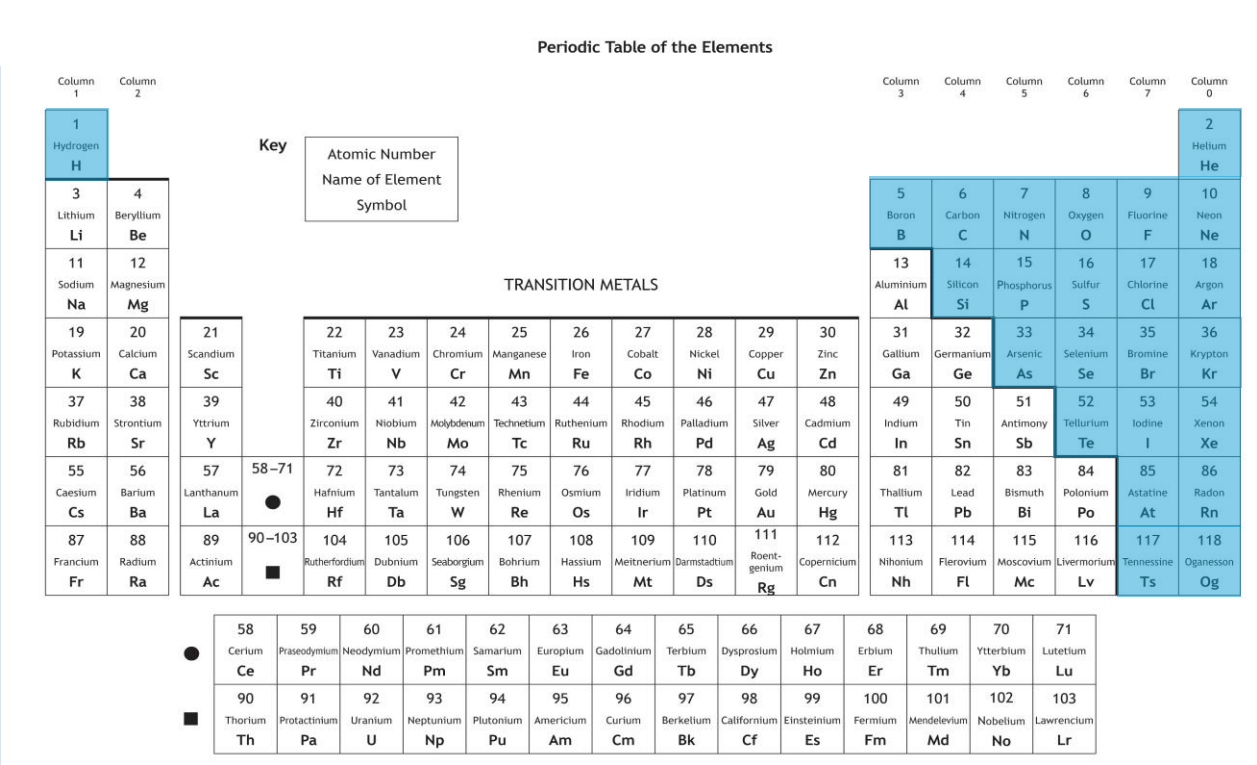
The elements can be categorised in different ways. For example,

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

Metals and Non-metals

Page 10

- Use the laminated periodic table which categorises the elements as metals/non-metals.
- Use this to find out if an element is a metal or non-metal.
- Complete column 1 of the table



Key

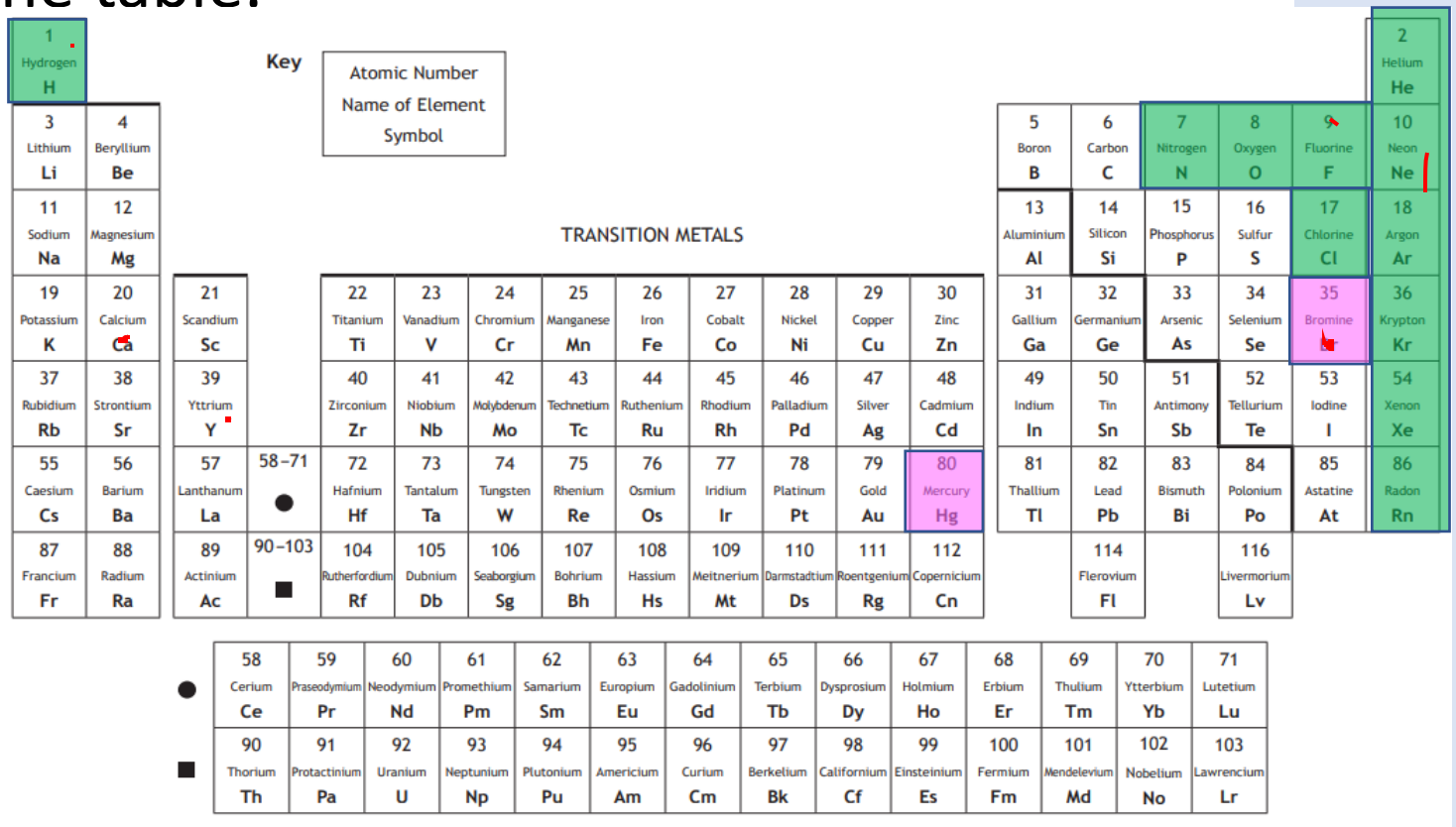
Metal

Non-metal

Solids, liquids and gases

Page 10

- Use the laminated periodic table which categorises the elements as solids/liquids/gases.
- Use this to find out if an element is a solid, liquid or gas.
- Complete column 2 of the table.



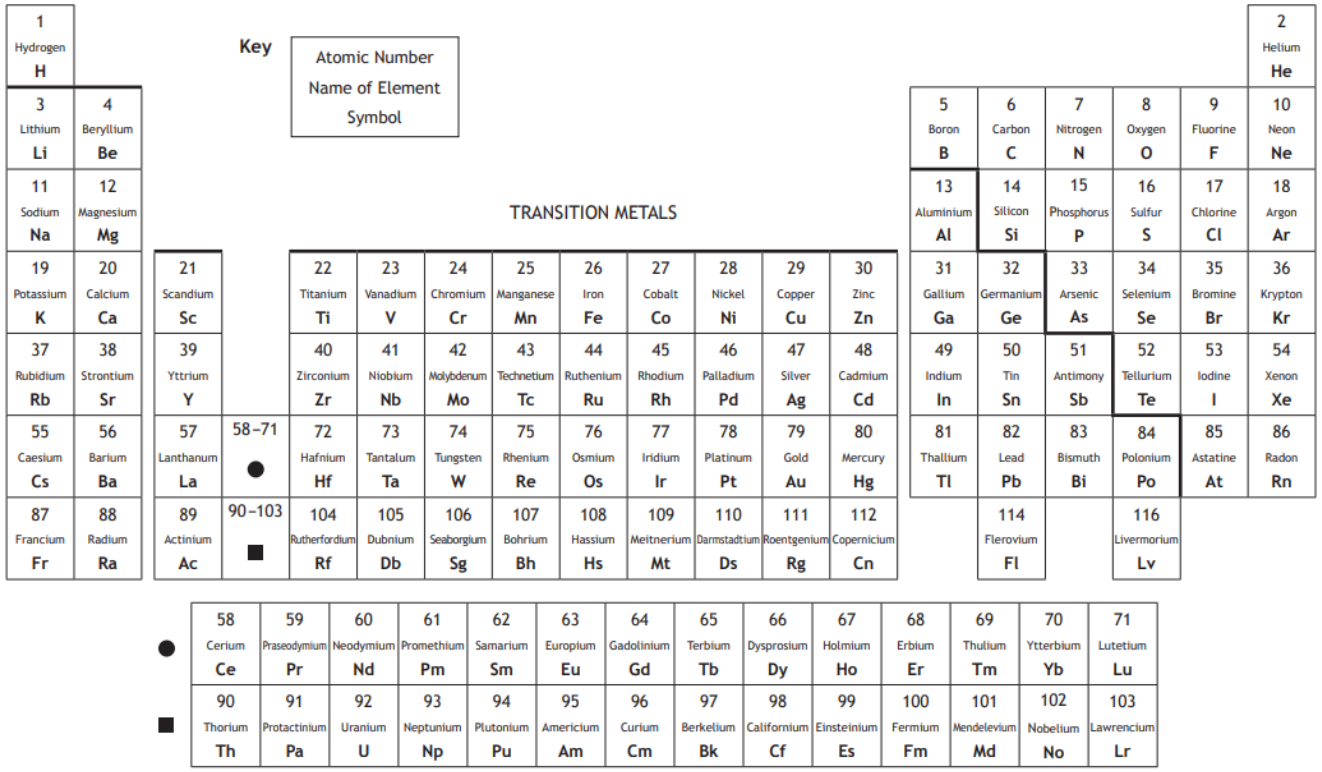
Categorising elements

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		

Groups and Periods

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



Groups in the Periodic table

Key

Atomic Number
Name of Element
Symbol

TRANSITION METALS

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	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

Alkali metals Halogens Noble gases

Plenary – Spot the errors

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 (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.

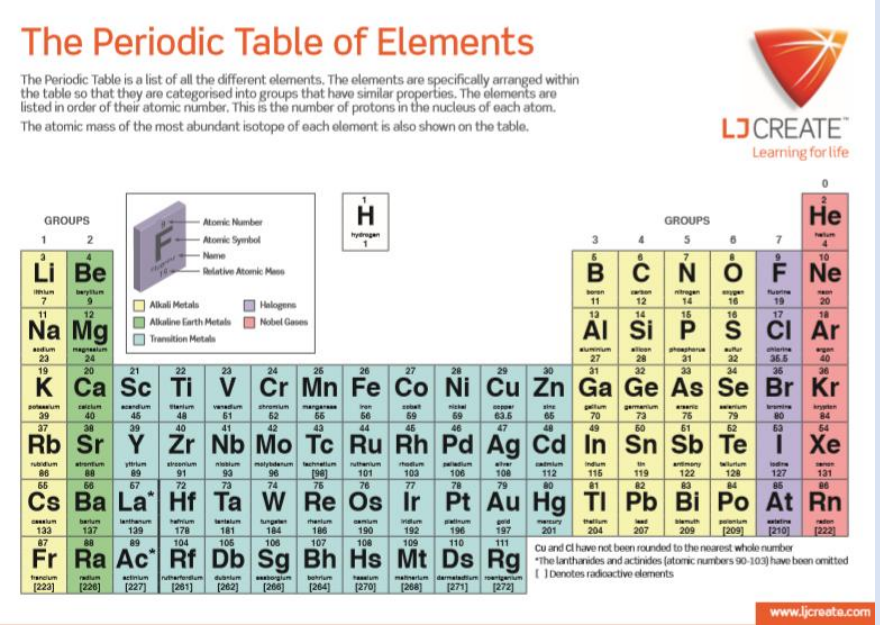
Reactivity of Metals

06/10/2026

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



Reactivity of Metals

06/10/2026

Learning Intentions:

- To learn that metals do not all react in the same way.
- To learn about the different reactivity of metals with water.

Reactivity of Metals

06/10/2026

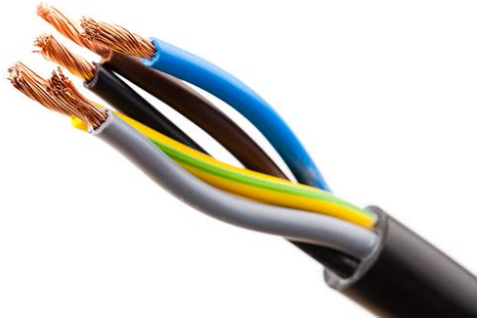
Success Criteria

- ❑ 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

06/10/2026

Think about the metals we see in the world around us.



Reactivity of Metals with Water

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?

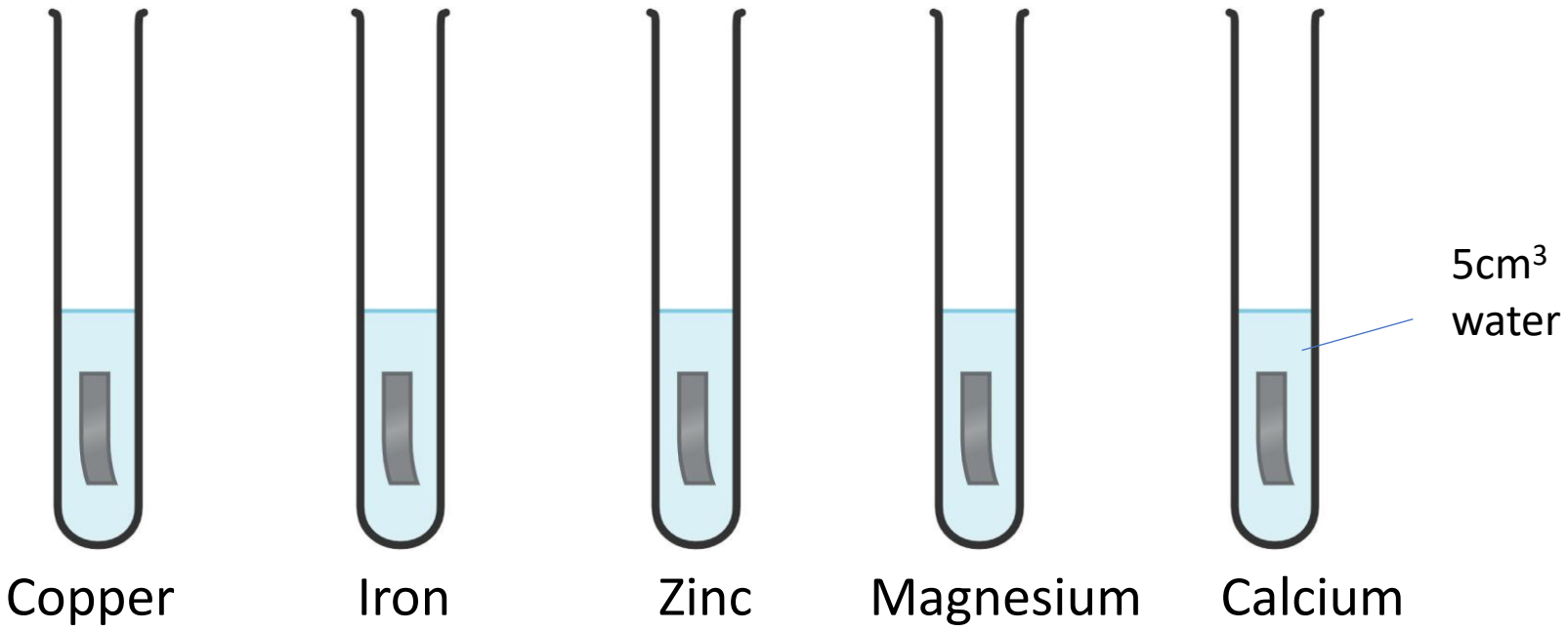
List these metals in your work book.

Reactivity of Metals with Water - Part 1 Pupil experiment

Aim

To find out which metal is most reactive with water.

Method Part 1: *Draw method*



Reactivity of Metals with Water - Part 1 Pupil experiment

Results: (Record your observations)

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

Reactivity of Metals with Water - Part 1 Pupil experiment

Metal	What do you see?	Order of reactivity
copper	No reaction	
iron	No reaction	
zinc	No reaction	
magnesium	No reaction	
calcium	Fizzing, bubbling, ‘pops’ with a lit splint	
lithium (teacher)		
sodium (teacher)		
potassium (teacher)		

Remaining metals will be reacted with water by your teacher next lesson.

Reaction of Metals with Water

06/10/2026

Starter – on a white board

1State the symbol for

a. Magnesium
b. Calcium
c. Zinc
d. Iron
e. Copper

2. When these metals were added to water which ones reacted?

Reaction of Metals with Water

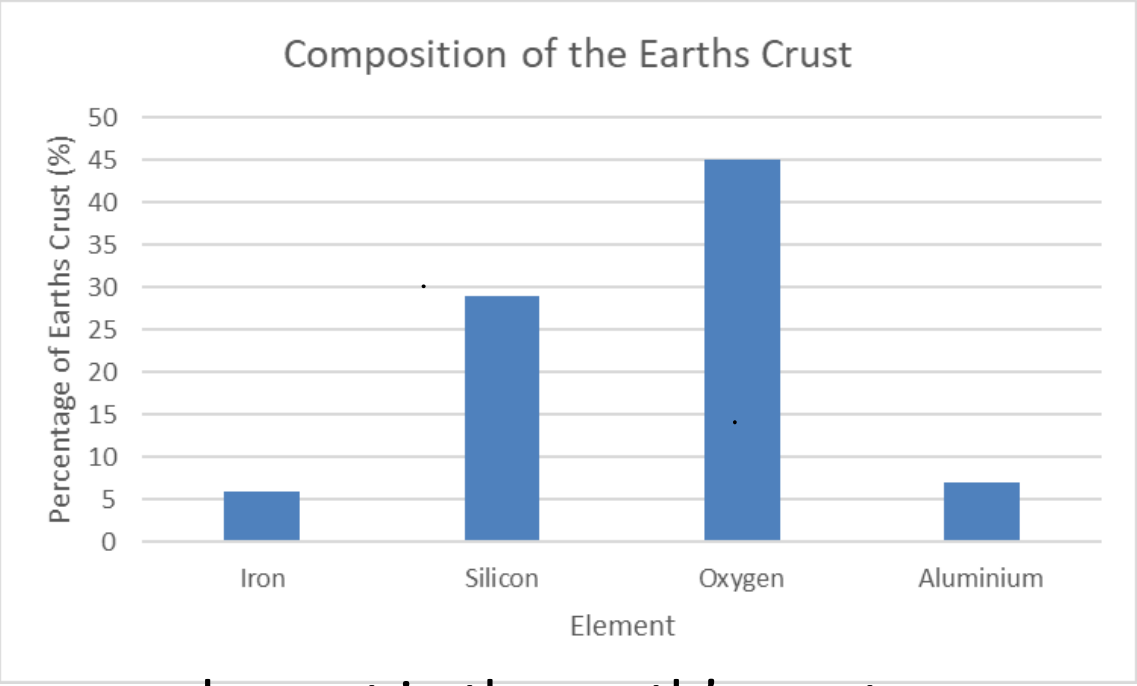
Learning Intentions:

Continue to learn about the different reactivity of metals with water.

Skills – Interpreting a graph

Page ?

The graph shows the composition of elements in the earths crust. Use the graph to answer the questions in your booklet.



1. Name the most common element in the earth's crust.
2. State the percentage of the earths crust that is made from Iron.
3. State the element that makes up 7% of the earth's crust?

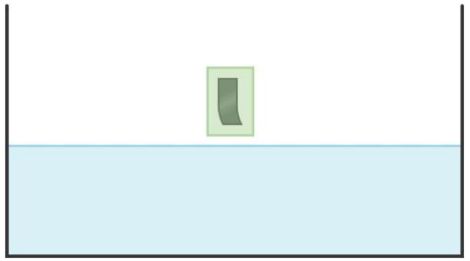
Reaction of Metals with Water

Success Criteria

- ❑ 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.

Reaction of Metals with Water- part 2 teacher demo

Method Part 2: *Draw method*



Watch your teacher demonstrate the reaction of the alkali metals with water

Reactivity of Metals with Water - Part 2 Teacher demo

Metal	**What do you see?**	**Order of reactivity**
copper	No reaction	
iron	No reaction	
zinc	No reaction	
magnesium	No reaction	
calcium	Fizzing, bubbling, ‘pops’ with a lit splint	
lithium (teacher)	Fizzing gas given off	
sodium (teacher)	Fizzes, metal balls fizzes in the water	
potassium (teacher)	Catches fire, burns with a lilac flame	

Record your results and number the elements in order to most reactive (1) to least reactive (8)

Reactivity of Metals with Water

Complete your lab report by writing your conclusion.

<u>Conclusion:</u> *Answer your aim*

Reaction of Metals with Acid

06/10/2026

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?

Reaction of Metals with Acid

Learning Intentions:

To learn about the different reactivity of metals with acid.

Reactivity of Metals with Acid

Success Criteria

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

Reactivity of Metals with Acid

Acid rain is a pollution problem which can corrode buildings and damage trees and lakes.

Strong acids react with some metals.

Reactivity of Metals with Acid

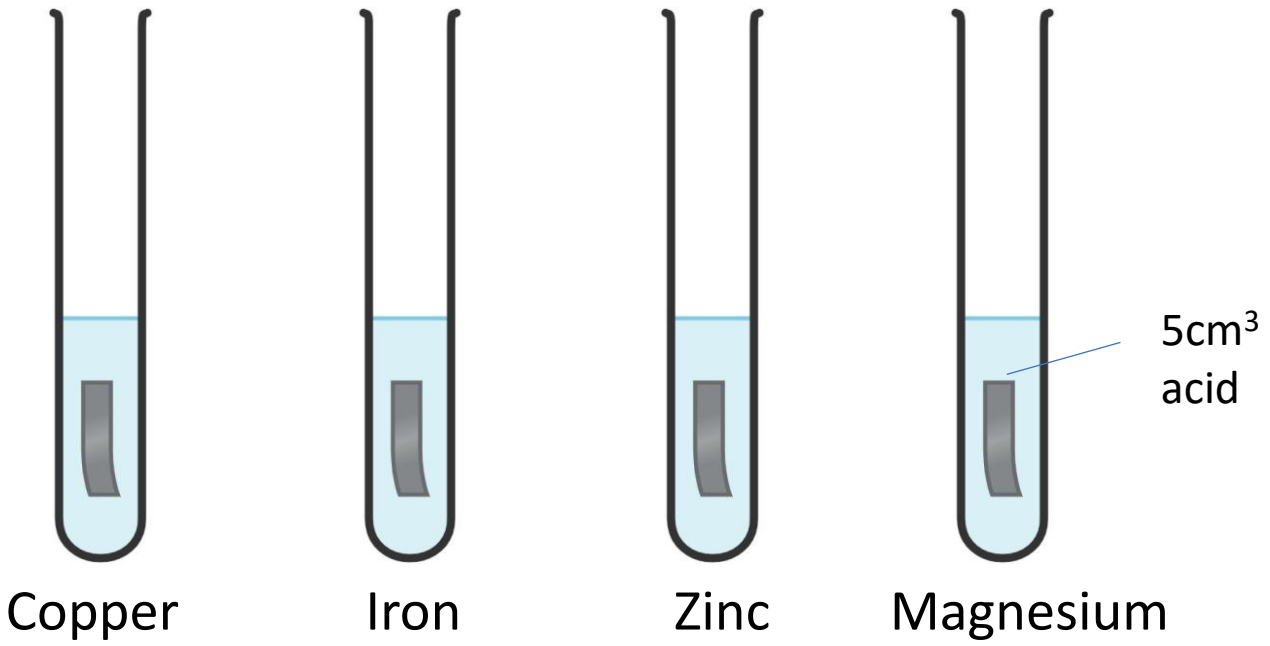
By reacting metals with an acid, we can compare the reactivity of the metal.

Reactivity of Metals with Acid

Aim

To find out which metal is most reactive with acid.

Method: *Draw method*



Reactivity of Metals with Acid

Results:

Metal	What do you see?	Order of reactivity
Magnesium	Some fizzing giving off hydrogen gas. Test tube gets warm.	
Zinc	Little bit of fizzing giving off hydrogen gas.	
Iron	Some bubbles of hydrogen gas	
Copper	No reaction.	

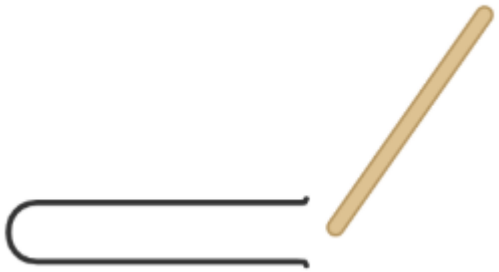
Conclusion: *Answer your aim*

Testing for Hydrogen (optional)

We can prove that the gas formed was Hydrogen by testing the gas with a lit splint. If Hydrogen is present this will burn with a sqeaky pop.

1. Collect the gas formed when metal reacts with Hydrochloric acid

2. Test the gas with a lit splint



Plenary

Predict what would happen if sodium reacted with acid.

Extension – Word equations

<u>Word equation</u>:

reactive metal + acid ⟶ metal salt + hydrogen

Hydrochloric acid + Zinc ⟶ Zinc chloride + hydrogen

Hydrochloric acid + Iron ⟶ _____ + hydrogen

Hydrochloric acid + magnesium ⟶ _____ + _____

⟶ Means Changes into

\+ Means combined with

Extension – Word equations

<u>Word equation</u>:

reactive metal + acid ⟶ metal salt + hydrogen

Hydrochloric acid + Zinc ⟶ Zinc chloride + hydrogen

Hydrochloric acid + Iron ⟶ _Iron chloride_ + hydrogen

Hydrochloric acid + magnesium ⟶ _Magnesium chloride_ + _hydrogen_

⟶ Means Changes into

\+ Means combined with

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. _____

Starter – True or false

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

Learning Intentions:

To learn about the conductivity of different materials.

Properties of elements

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.

Conductors

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

Conductors of electricity have uses in Electronics, computing and Communication.

Substances that do not conduct electricity are known as insulators.

Conductors

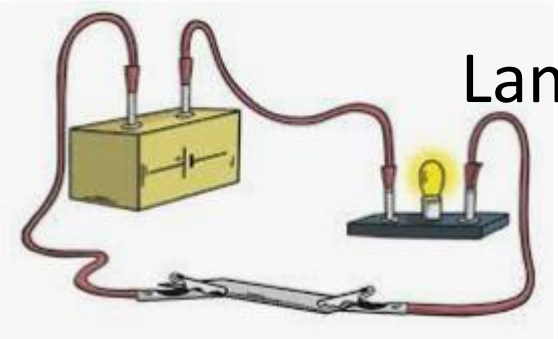
Aim

To test the conductivity of a set of substances and determine if they are conductors or insulators.

Conductors

Method

Cell



Lamp

Test material

Draw a circuit diagram for your method

Conductors

Results

Conductors	Insulators

Determine which elements are metals/non-metals to help you make a conclusion for your experiment.

Conductors

Conclusion

Conductors	Insulators

PhET Conductors and Insulators Lab Simulation

Learning Intention: I can use the simulation to test which objects are conductors and insulators.

1. Use the simulation Circuit Construction Kit: **DC INTRO**

2. Use the down arrow on the toolbar on the left side of the simulation to find the objects to test.

3. Create a circuit using **1 battery, wires, and 1 bulb, and 1 object**. Fill in the table below, the first one is done for you.

PhET Conductors and Insulators Lab Simulation

Object	Does bulb light? Yes or No	Conductor or Insulator
Paper Clip	Yes	Conductor
Dollar bill		
Fuse		
Coin		
Eraser		
Pencil		
Hand		
Dog		

PhET Conductors and Insulators Lab Simulation

1. What type of material is most likely a conductor? Wood or Metal? Explain your thinking. Use the information from your table to help you answer the question.

2. Do you think a piece of paper would be a conductor or insulator? Explain your thinking.

3. People who work with electricity wear protective gear like gloves. Do you think they should wear gloves made of metal or rubber? Explain your thinking.

PhET Conductors and Insulators Lab Simulation

- Look around the classroom. Try to find 3 objects that would most likely be conductors and insulators. Fill in your response in the table below.

Conductors around the classroom	**Insulators around the classroom**

Plenary

Complete the passage using word from the word bank

_____ 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 _____ which is a conductor.

Word bank

Left	Right	graphite	Non-metal Metals	Insulator

Plenary

Complete the passage using word from the word bank

___Metals___ are good conductors of electricity. Metals can be found on the __Left_ side of the periodic table. __Non-metal___ are not conductors of electricity, these are described as ___Insulator___. These are found on the _Right__ side of the periodic table. The exception to this is __graphite__ which is a conductor.

Word bank

Left	Right	graphite	Non-metal Metals	Insulator

Starter

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

Potassium → Magnesium → Copper

2. Complete the word equation:

Magnesium + hydrochloric acid → Magnesium chloride + hydrogen

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

You can test the gas with a lit splint. If hydrogen is present, it will make a "squeaky pop" sound when the splint is placed near the gas.

Identifying Elements

06/10/2026

Learning Intentions:

- To learn that when metal elements are burned they produce a specific colour, this is called a flame test.
- Flame tests can be used to identify metal elements.

Identifying Elements

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.

Today you will test some metal samples and observe the flame colour. You can then use this information to identify the metal present in 3 unknown samples.

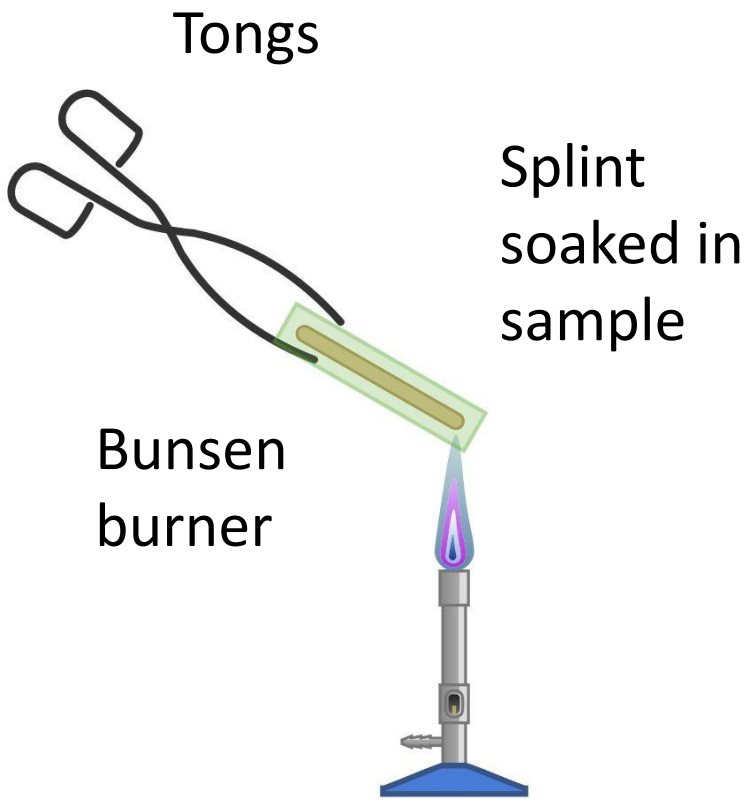
Identifying Elements

Aim

To identify the metal present in 3 unknown samples, using flame colour data.

Identifying Elements

Method



Identifying Elements

Results

Metal	Colour
Unknown 1	
Unknown 2	

Identifying Elements

Conclusion

In conclusion unknown sample A was found to contain_____. Whilst unknown sample B contains _____.

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?

Elements, Compounds and Mixtures

06/10/2026

Learning Intentions

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

Elements, Compounds and Mixtures

06/10/2026

Success Criteria

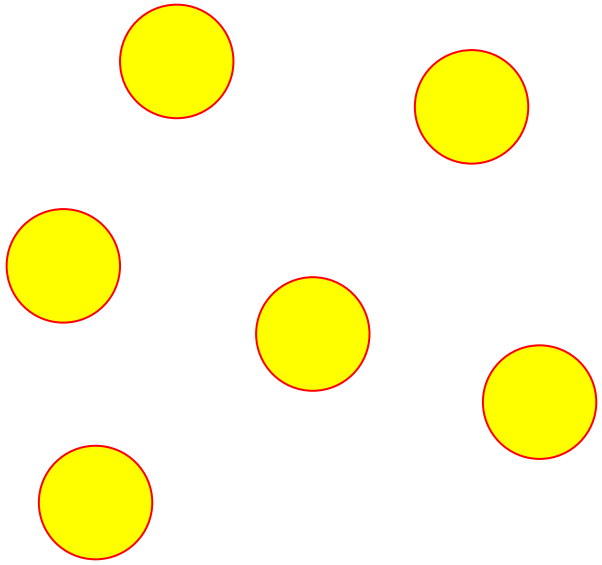
- ❑ I can state that an element is composed of only 1 type of atom.
- ❑ I can state that a mixture is composed of two or more substances that are not chemically linked.

Elements

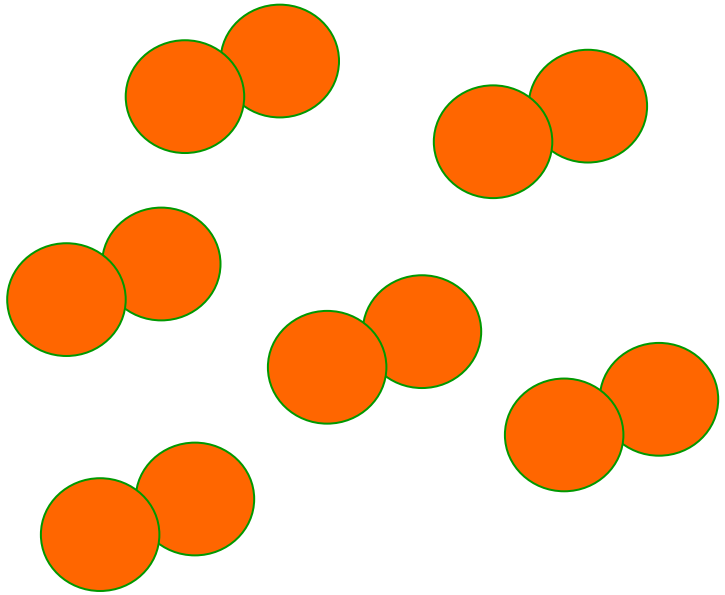
06/10/2026

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

Elements are found in the Periodic Table.



Element 1

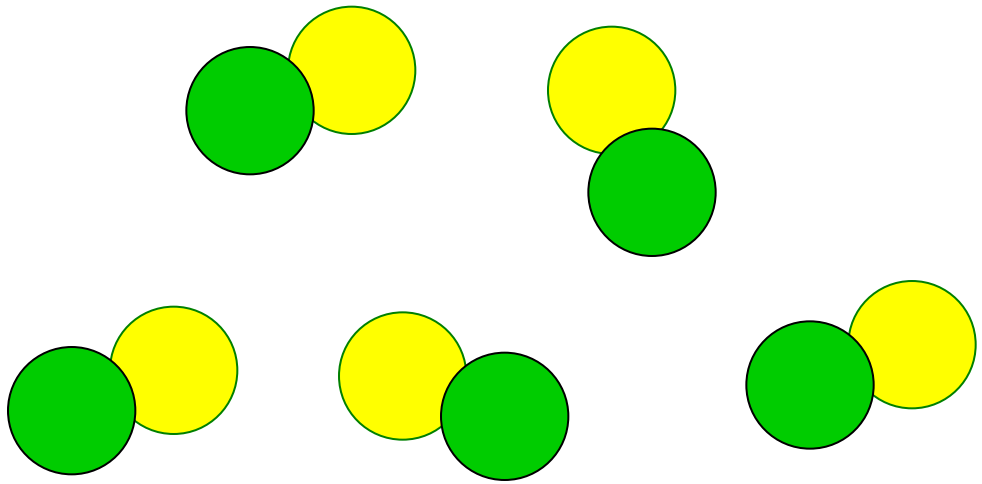


Element 2

Compounds

06/10/2026

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

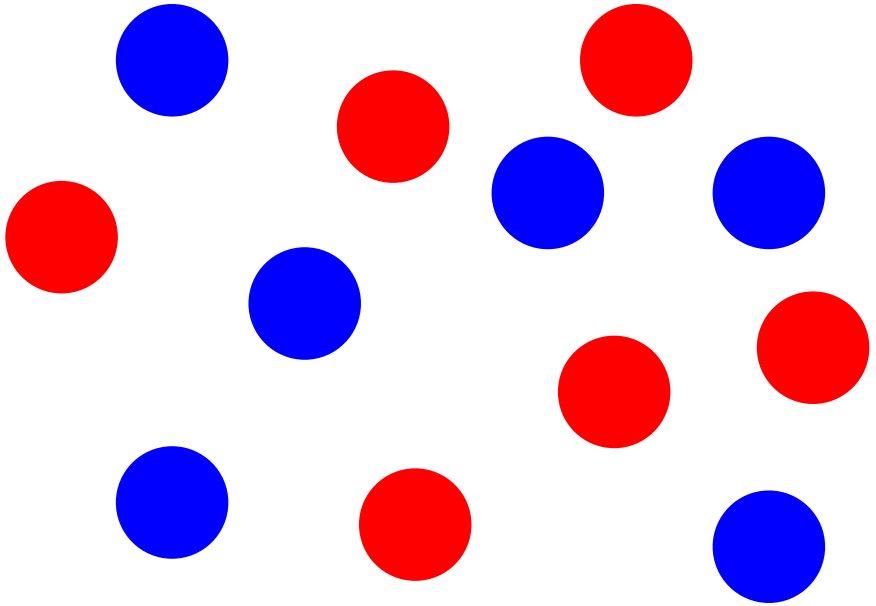


Compound

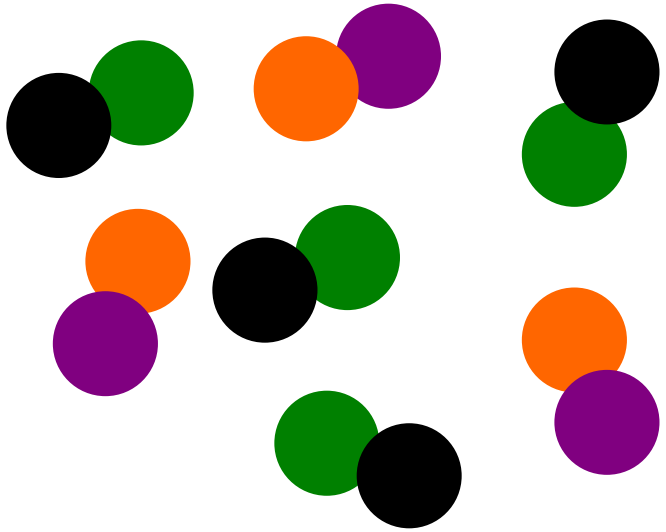
Mixtures

06/10/2026

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



2 elements mixed



2 compounds mixed

Element, Compound or Mixture

06/10/2026

For the following slides, decide if the picture is showing:

An element

A compound

A mixture

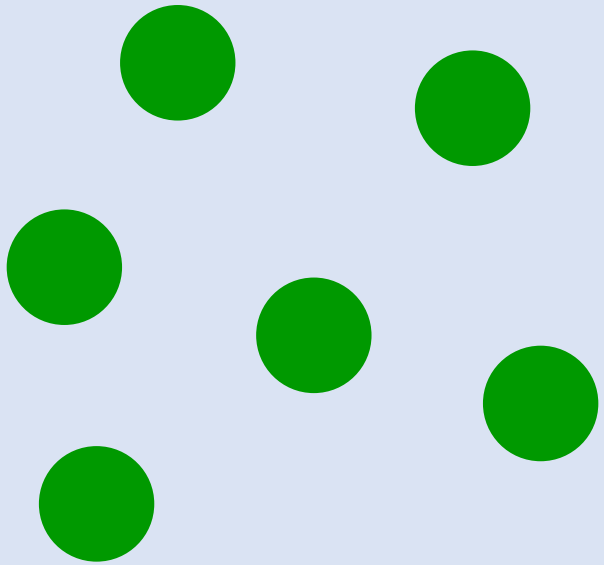
If it is a mixture, what is it a mixture of..?

Complete the table in your booket.

Element, Compound or Mixture

06/10/2026

1



Element, Compound or Mixture

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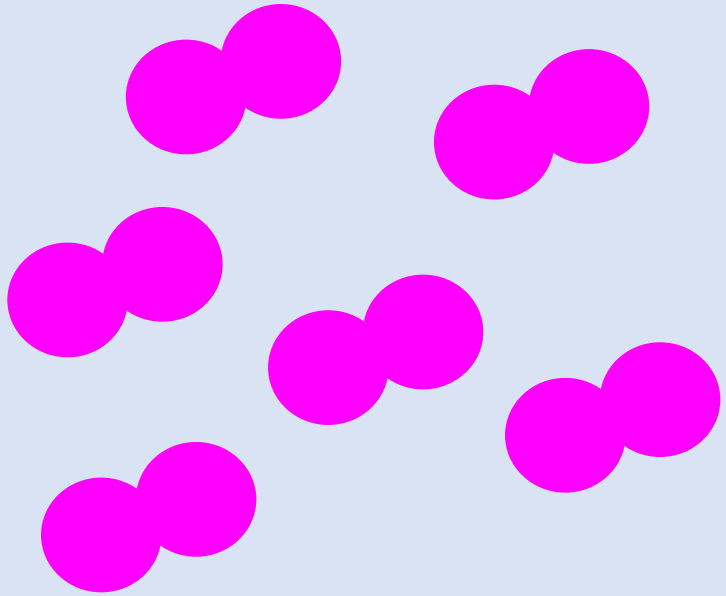
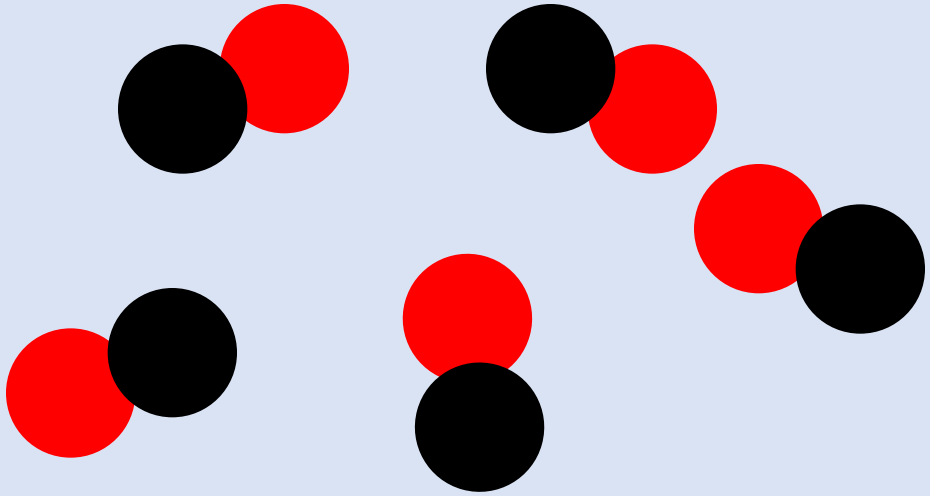
2



Element, Compound or Mixture

06/10/2026

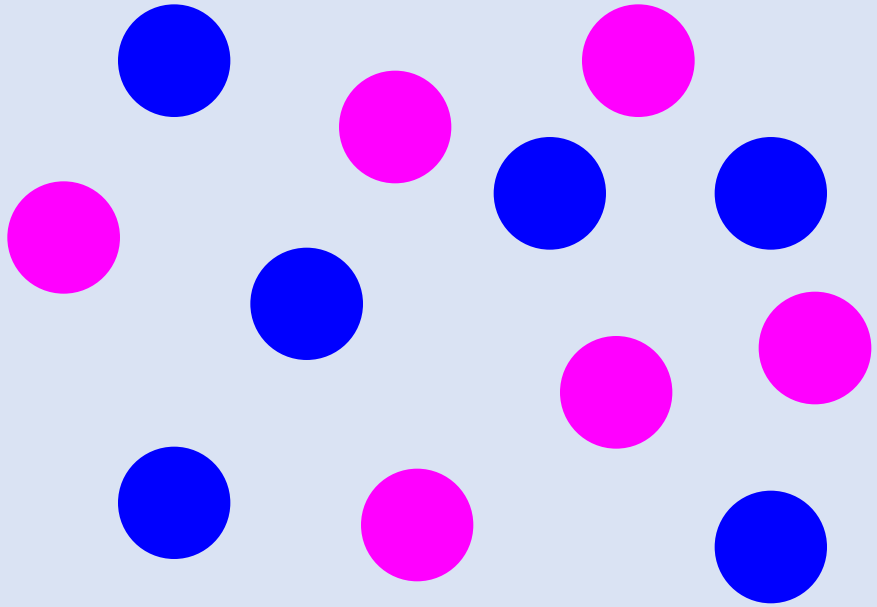
3



Element, Compound or Mixture

06/10/2026

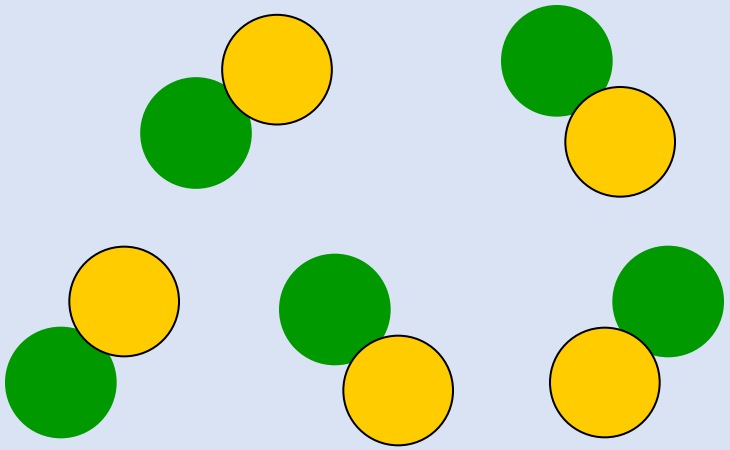
4



Element, Compound or Mixture

06/10/2026

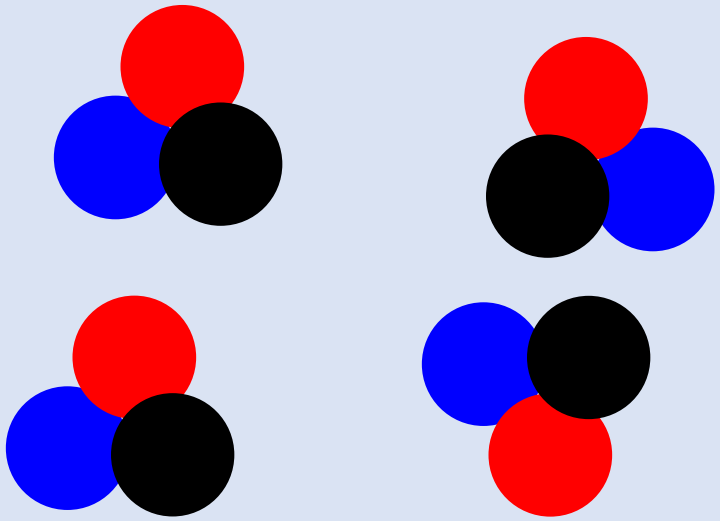
5



Element, Compound or Mixture

06/10/2026

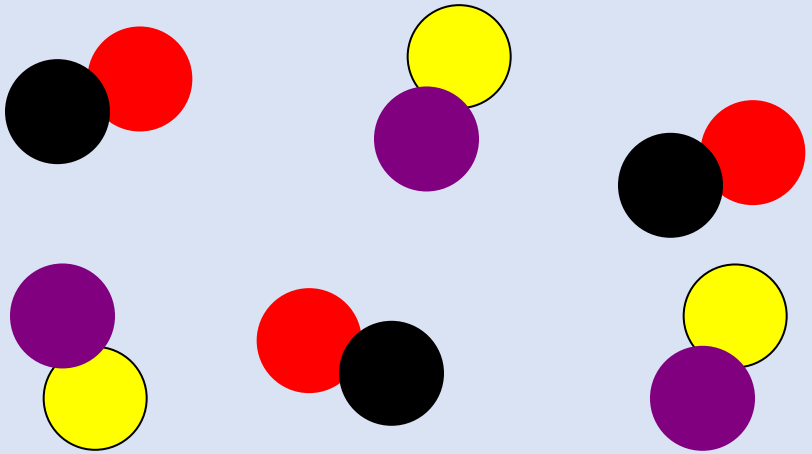
6



Element, Compound or Mixture

06/10/2026

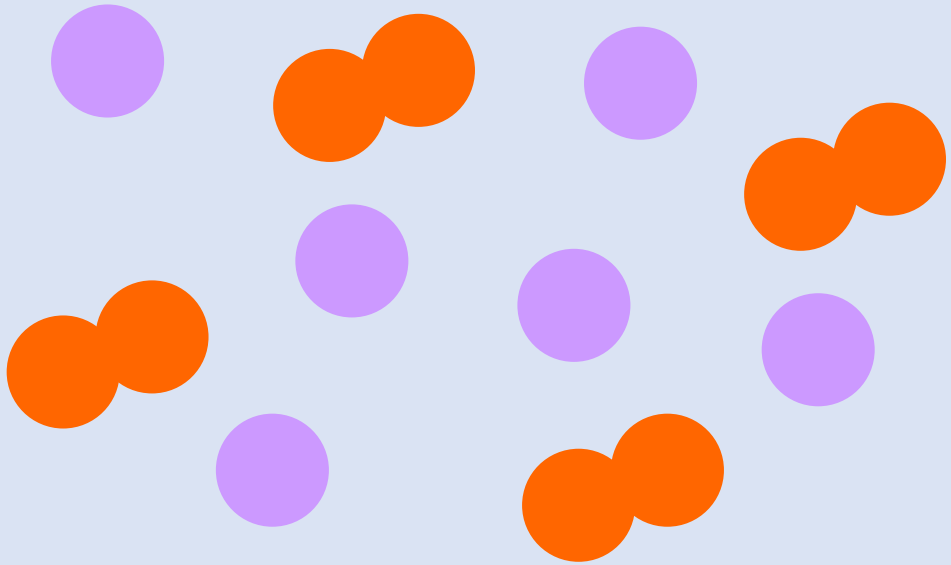
7



Element, Compound or Mixture

06/10/2026

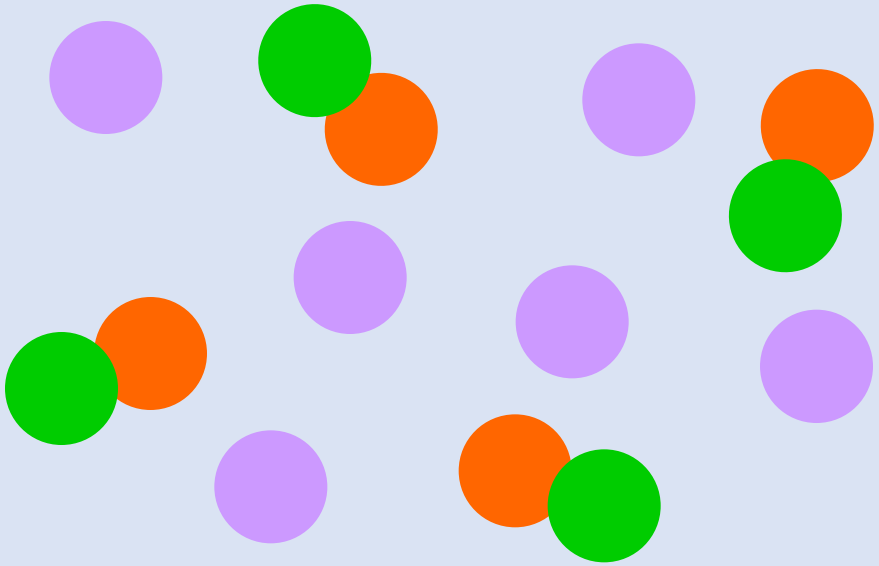
8



Element, Compound or Mixture

06/10/2026

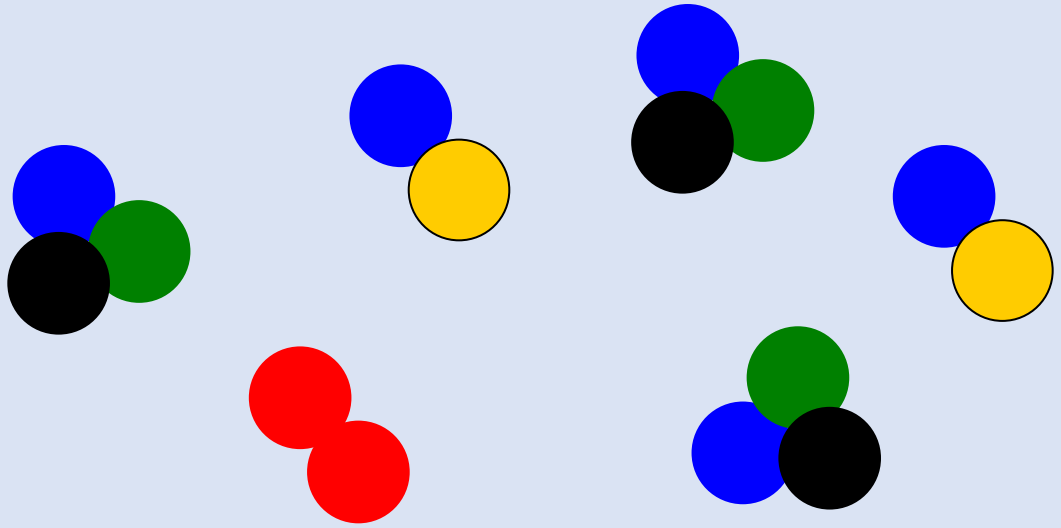
9



Element, Compound or Mixture

06/10/2026

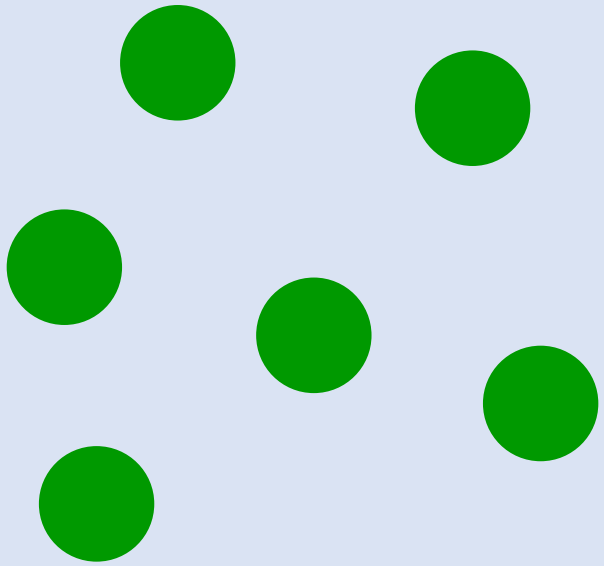
10



Answers – Check your work

06/10/2026

1

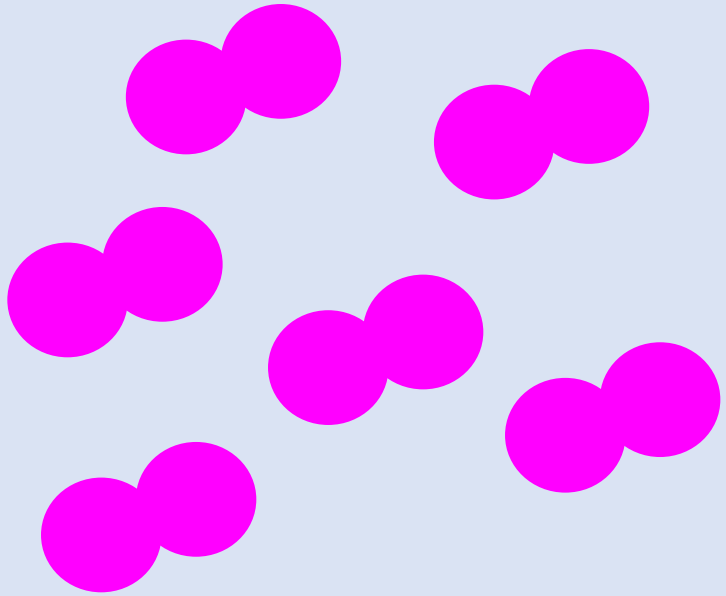


An element

Answers – Check your work

06/10/2026

2

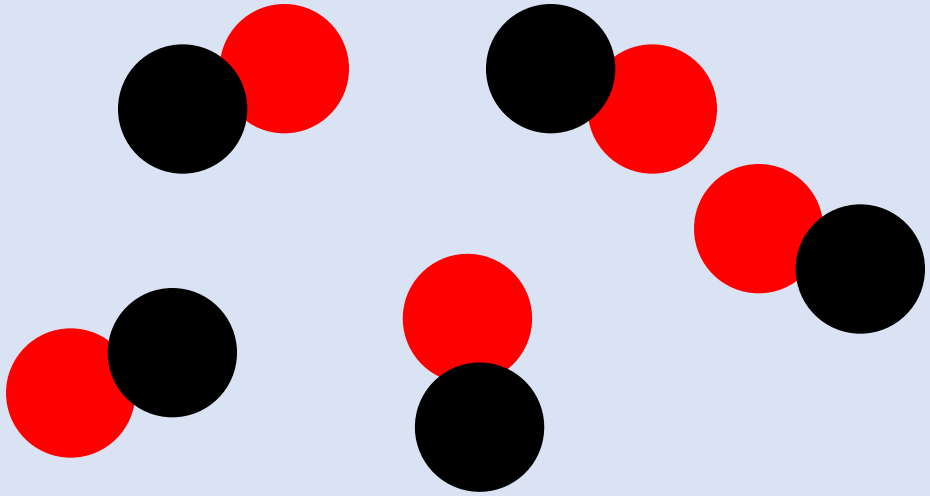


An element

Answers – Check your work

06/10/2026

3

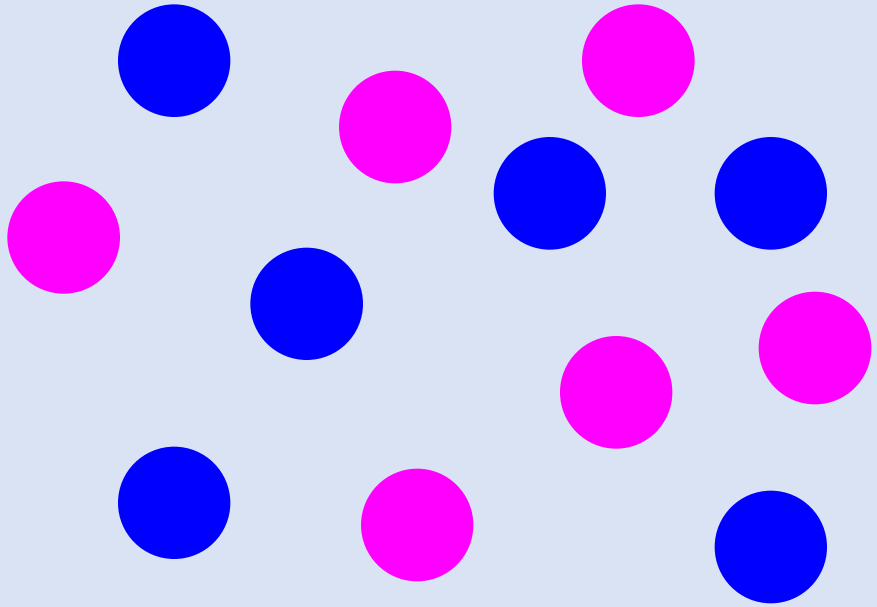


A compound

Answers – Check your work

06/10/2026

4

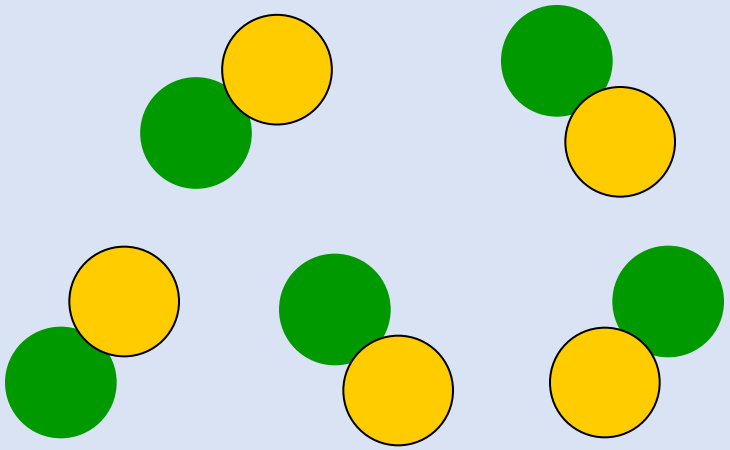


A mixture of two element s

Answers – Check your work

06/10/2026

5

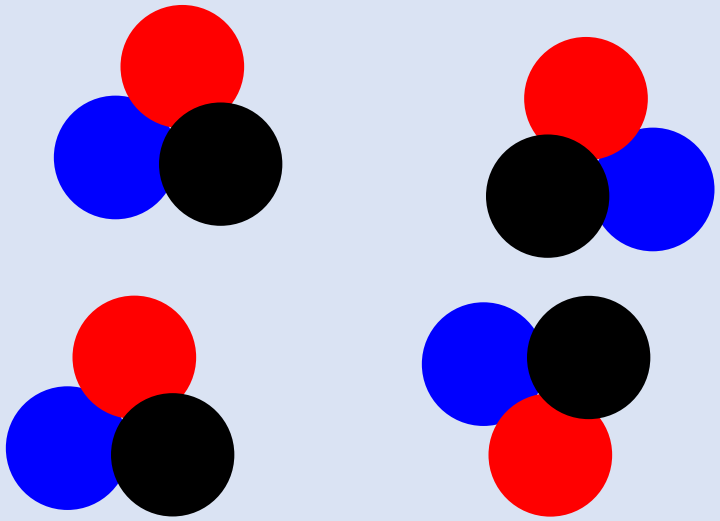


A compound

Answers – Check your work

06/10/2026

6

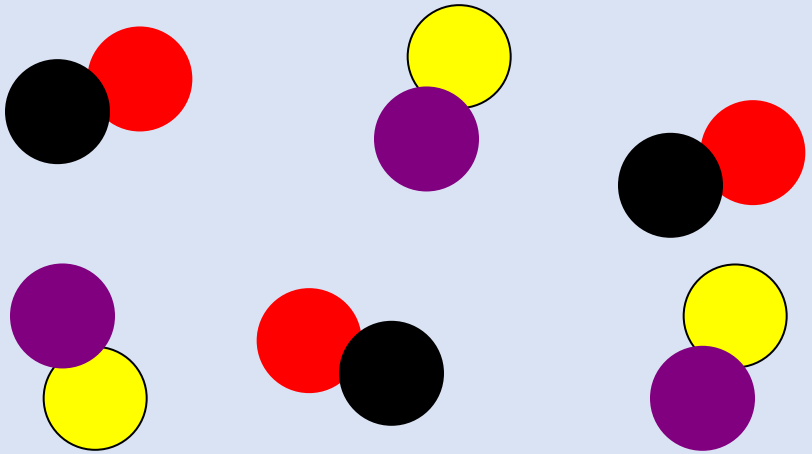


A compound

Answers – Check your work

06/10/2026

7

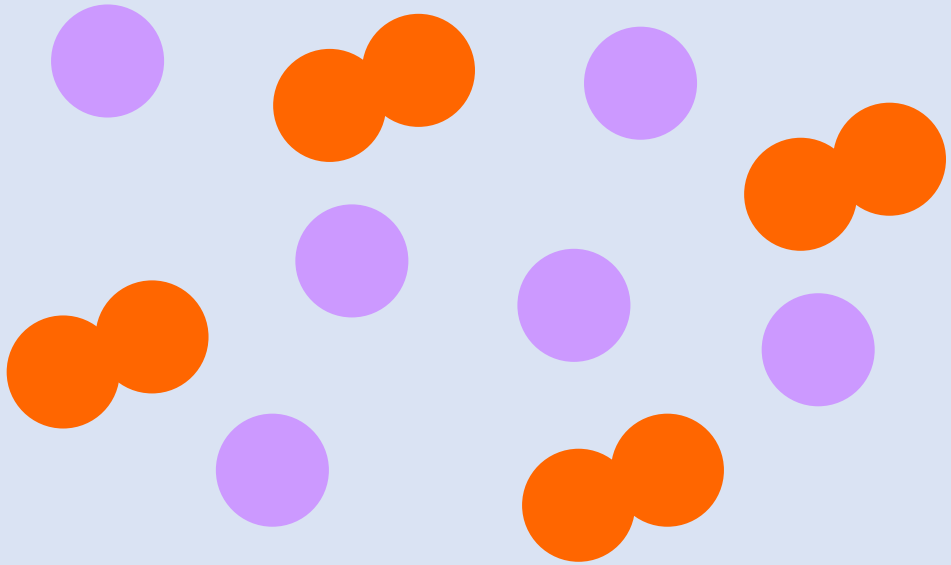


A mixture of two compounds

Answers – Check your work

06/10/2026

8

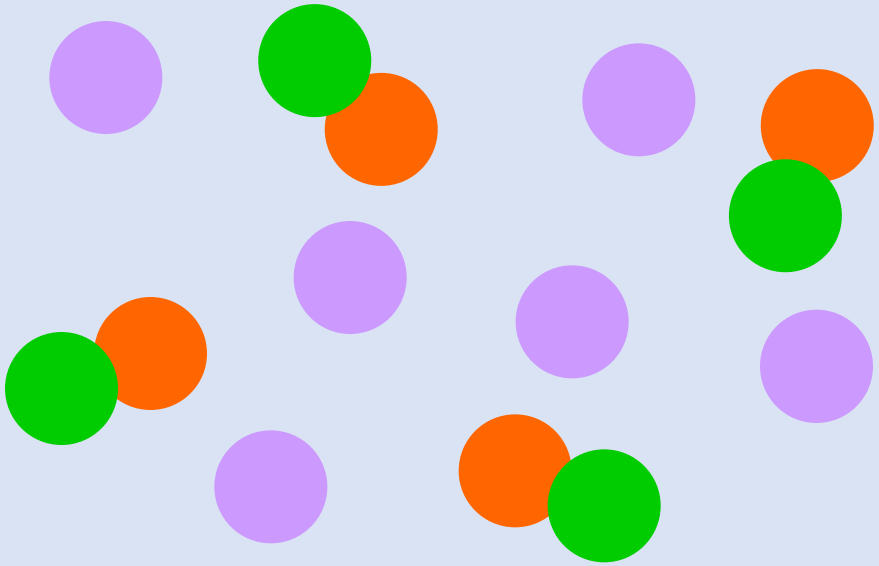


A mixture of two element s

Answers – Check your work

06/10/2026

9

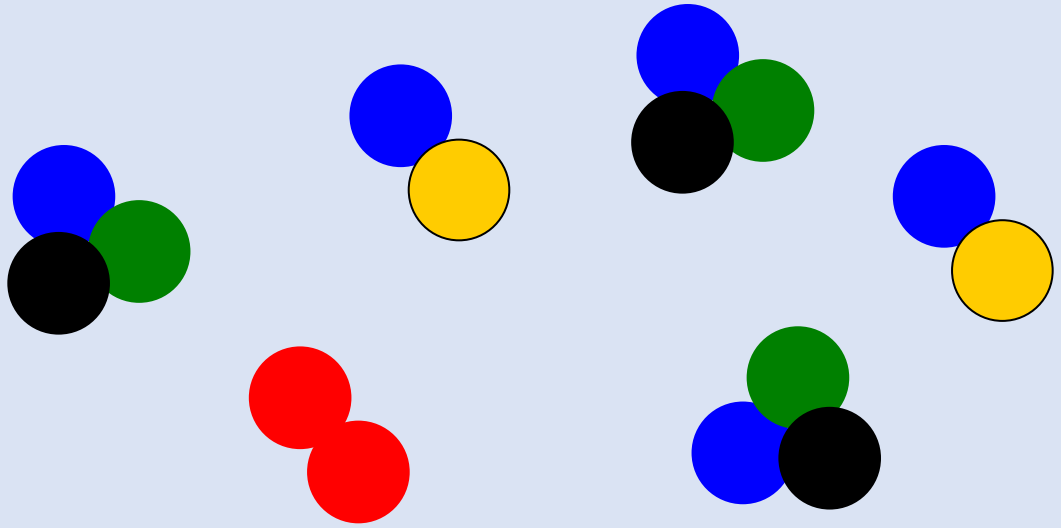


A mixture of an element and a compound

Answers – Check your work

06/10/2026

10



A mixture of an element and two compounds

Mixtures

06/10/2026

Element
Mixture
Compound

You have already learned about Elements of the Periodic Table.

How can we make a mixture?

Separating Mixtures

06/10/2026

- 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.

- Record what happens when the magnet is held close to the container?

Separating Mixtures

06/10/2026

- The mixture of Iron and Sulfur can be separated using a _____.

- Mixtures can be separated when there is a **difference** in **properties** between the two substances.

Plenary

06/10/2026

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Match the word with the meaning!

1. An element is..	a) not chemically joined and can be separated
2. A mixture is..	b) two or more atoms of different elements joined together chemically
3. A compound is..	c) made of only one type of atom

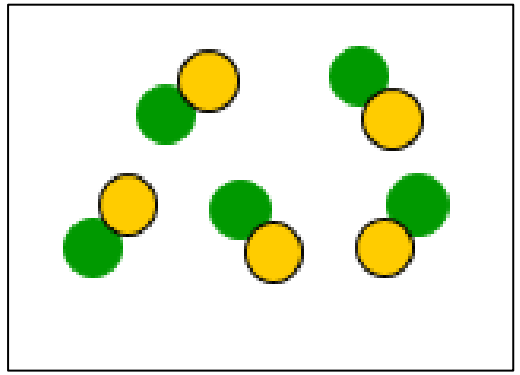
Compounds

06/10/2026

Page 21

Starter:

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



2. Explain your answer to question 1.

Compounds

06/10/2026

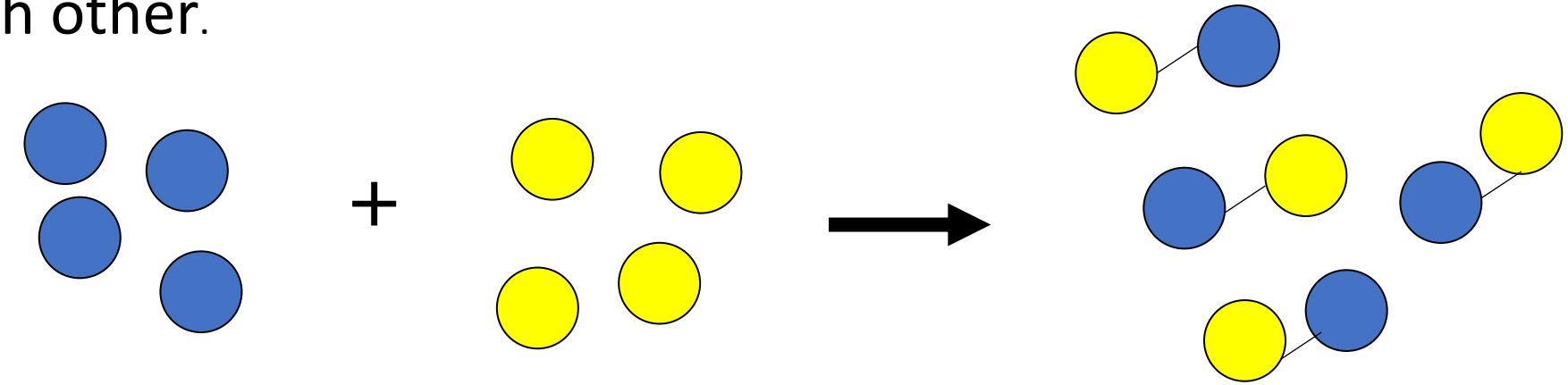
Learning Intentions

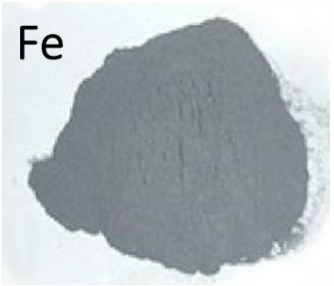
- To learn that compounds are made of elements that are chemically linked to each other.
- Compounds cannot be separated into their parts easily.

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 often needs energy to make the elements **react** and **join** to each other.





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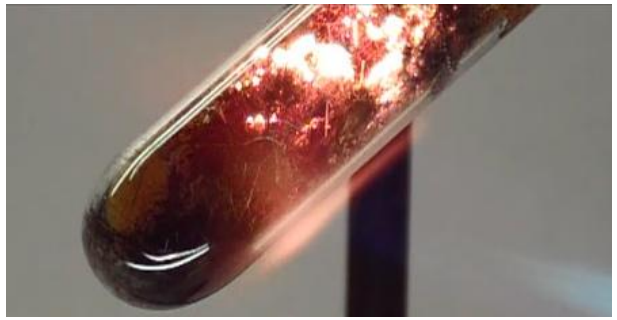


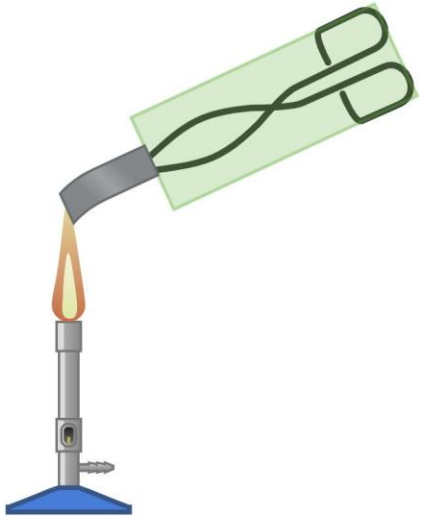
Making a compound

06/10/2026

Aim

To make compounds and write word equations.

Method *Draw method*



1. Light a Bunsen burner on a safety flame.
2. Use a blue flame for burning the magnesium and copper.
3. Using tongs, burn a piece of Magnesium ribbon in oxygen
4. Using tongs, burn a piece of Copper in oxygen

Results

Metal	Starting Colour	End Colour	Compound Formed
Magnesium	Silvery grey	White powder/ash	Magnesium oxide
Copper	Reddish-brown	Black	Copper oxide

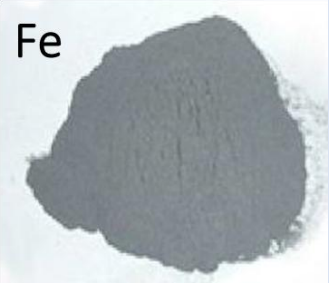
Word Equation

Copper + Oxygen → Copper oxide

Write the word equation for Magnesium reacting with Oxygen

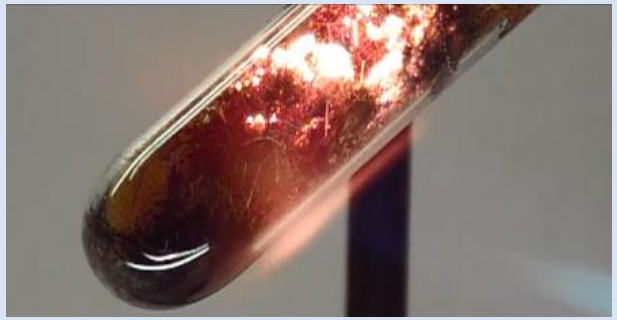
State 2 differences between a compound and a mixture

Element



Mixture

Compound



Starter:

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

   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 with 2 Elements

06/10/2026

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

Naming Compounds with 2 Elements

06/10/2026

Name the following compounds made from the following elements.

Element 1	Element2	Name of compound
iron	sulphur	iron sulphide
magnesium	nitrogen	magnesium nitride
sodium	chlorine	sodium chloride
tin	oxygen	tin oxide
aluminium	bromine	aluminium bromide
nickel	iodine	nickel iodide
zinc	sulphur	zinc sulphide
lithium	nitrogen	lithium nitride

Compounds with 2 Elements

06/10/2026

Identify the elements in the following compounds?

1. Sodium fluoride → sodium + fluorine
2. Lithium bromide → lithium + bromine
3. Calcium oxide → calcium + oxygen
4. Aluminium chloride → aluminium + chlorine
5. Phosphorus sulphide → phosphorus + sulphur
6. Caesium chloride → caesium + chlorine

Naming Compounds with 3 Elements 06/10/2026

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:

Compound	Elements
copper sulfate	copper, sulfur and oxygen
sodium sulfite	sodium, sulfur and oxygen

Naming Compounds with 3 Elements

06/10/2026

Which elements are in the following compounds?

Element 1	Element 2	Element 3	Name of Compound
Potassium	Nitrogen	Oxygen	Potassium nitrate
Sodium	Sulfur	Oxygen	Sodium sulfate
Beryllium	Phosphorus	Oxygen	Beryllium phosphate
Aluminium	Chlorine	Oxygen	Aluminium oxychloride
Phosphorus	Oxygen	Sulfur	Thiophosphate
Caesium	Nitrogen	Oxygen	Cesium nitrate
Oxygen	Copper	Sulfur	Copper oxysulfide

Compounds with 3 Elements

06/10/2026

Which elements are in the following compounds?

1. Sodium nitrate
2. Lithium sulphate
3. Calcium phosphate
4. Aluminium chlorate
5. Phosphorus sulfite
6. Caesium nitrite

Compounds with 3 Elements

06/10/2026

Which elements are in the following compounds?

Sodium nitrate ($NaNO_3$) → Sodium (Na), Nitrogen (N), Oxygen (O)

Lithium sulfate (Li_2SO_4) → Lithium (Li), Sulfur (S), Oxygen (O)

Calcium phosphate ($Ca_3(PO_4)_2$) → Calcium (Ca), Phosphorus (P), Oxygen (O)

Aluminium chlorate ($Al(ClO_3)_3$) → Aluminium (Al), Chlorine (Cl), Oxygen (O)

Phosphorus sulfite (Na_3PSO_3) → Phosphorus (P), Sulfur (S), Oxygen (O)

Caesium nitrite ($CsNO_2$) → Caesium (Cs), Nitrogen (N), Oxygen (O)

Fill in the blanks in the tables below – to check your understanding

Elements in the compound	Compound Name
Sodium, chlorine	Sodium chloride (NaCl)
Beryllium, oxygen	Beryllium oxide (BeO)
Potassium, Nitrogen, oxygen	Potassium nitrate (KNO_3)

Elements in the compound	Compound Name
Magnesium, Fluoride	Magnesium fluoride
Zinc, Oxygen	Zinc oxide
Copper, Sulfur, Oxygen	Copper sulfate

Plenary

06/10/2026

Fill in the blanks in the tables below – to check your understanding

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

Starter

Name the compound made from the following elements?

1. Sodium and chlorine — Sodium chloride (NaCl)
2. Iron and nitrogen — Iron nitride (FeN)
3. Magnesium, sulfur and oxygen — Magnesium sulfate ($MgSO_4$)
4. Copper, nitrogen and oxygen — Copper nitrate ($Cu(NO_3)_2$)

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

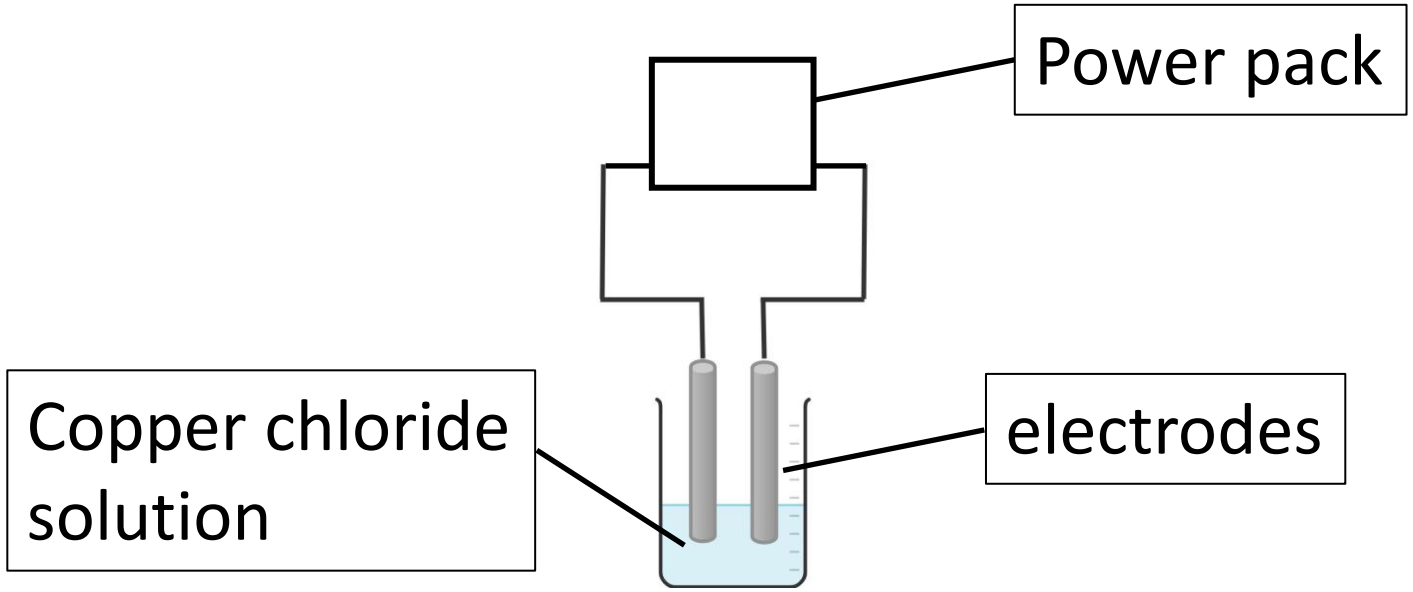
06/10/2026

- 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 *Draw and label method.*



1. Connect the cables to D.C Supply Power.
2. Apply a voltage of 6 V across the circuit.
3. Observe what happens at either carbon electrode.

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.

Results

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

Conclusion

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

Plenary

06/10/2026

Page 28

1. Complete the word equation:

Copper chloride → Copper + Chlorine

2. Identify the compound in the word equation.

Copper chloride ($CuCl_2$) is the compound.

3. Identify the elements.

Copper (Cu) and Chlorine (Cl_2) are the elements

4. Is it easy to break apart compounds?

No, compounds are chemically bonded. It usually requires energy (like electrolysis or heating) to separate them into their elements.

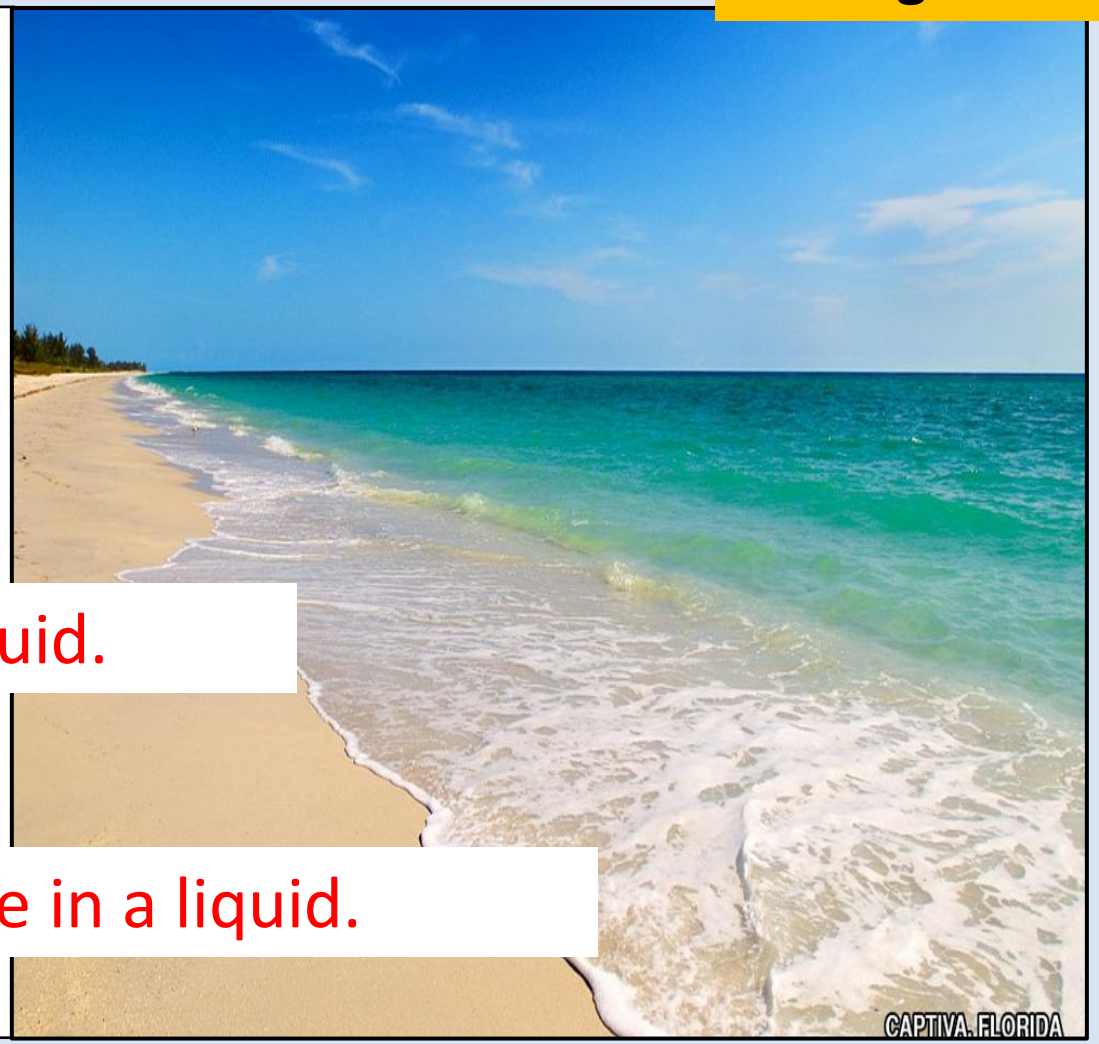
Separation Techniques – over 2 lessons 06/10/2026

Page 29

Starter

1. How would you separate salt from sea water? Evaporation
2. How would you separate sand from sea water? Filtration
3. Describe the meaning of the word soluble. it dissolves in a liquid.
4. Describe the meaning of the word insoluble.

it does not dissolve in a liquid.



Separation Techniques

06/10/2026

Learning Intentions

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

Separation Techniques

06/10/2026

Success Criteria

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

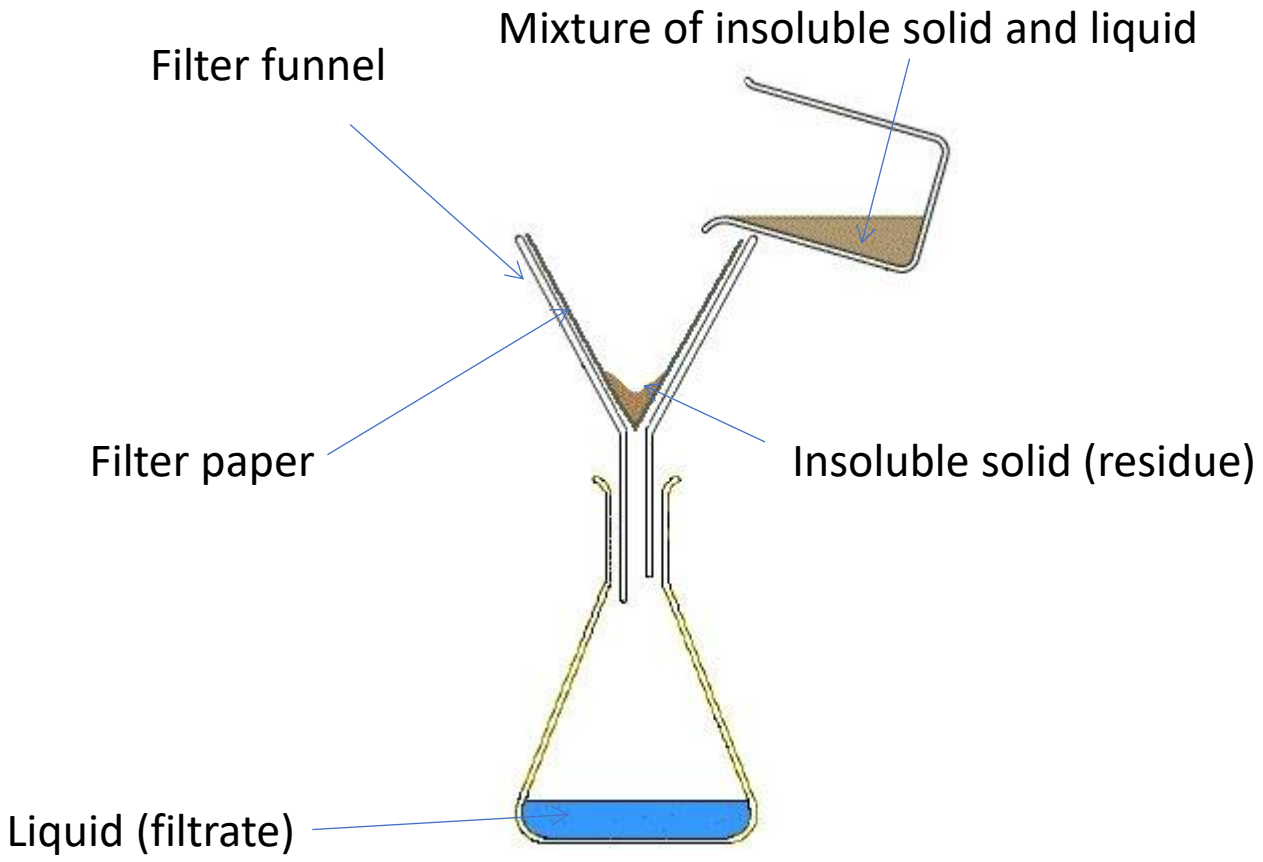
Purification

- 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.

Filtration

06/10/2026

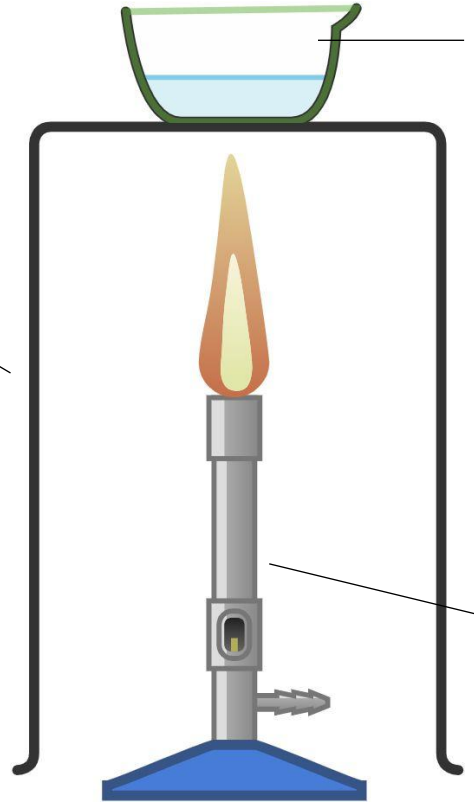
Filtration is used to separate an insoluble solid from a liquid. Solid is collected in the filter paper and the liquid is collected in the flask.



Evaporation

06/10/2026

Evaporation is used to remove a liquid from a soluble solid.



Investigation

06/10/2026

Page 31

Aim

To investigate how to make pure salt from rock salt (solid that contains sand, salt).

You will investigate the best way to make a pure sample of salt.

Purification of Salt from

06/10/2026

Aim

To investigate how to make pure salt

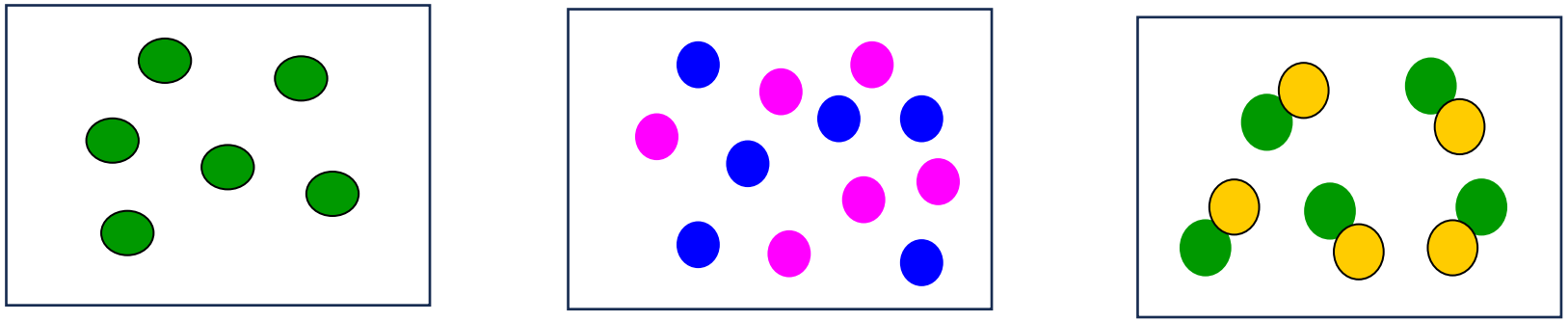
Method

Results

Conclusion: *How can you make pure salt (use the word soluble or insoluble)? What techniques did you use?*

Starter – on a whiteboard

1. Identify the particle diagram for a pure compound

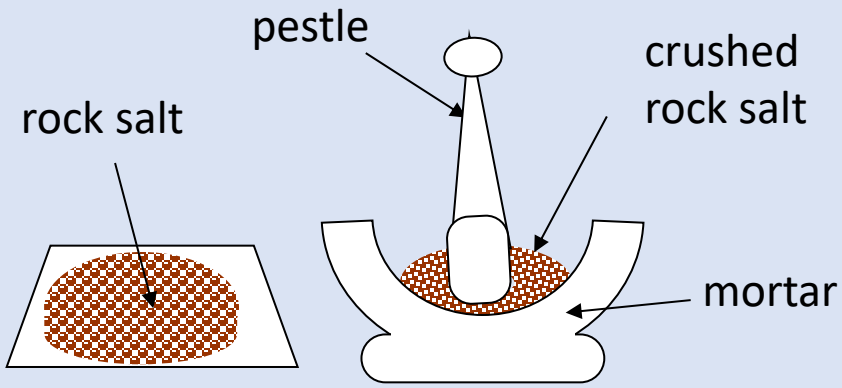


A B C

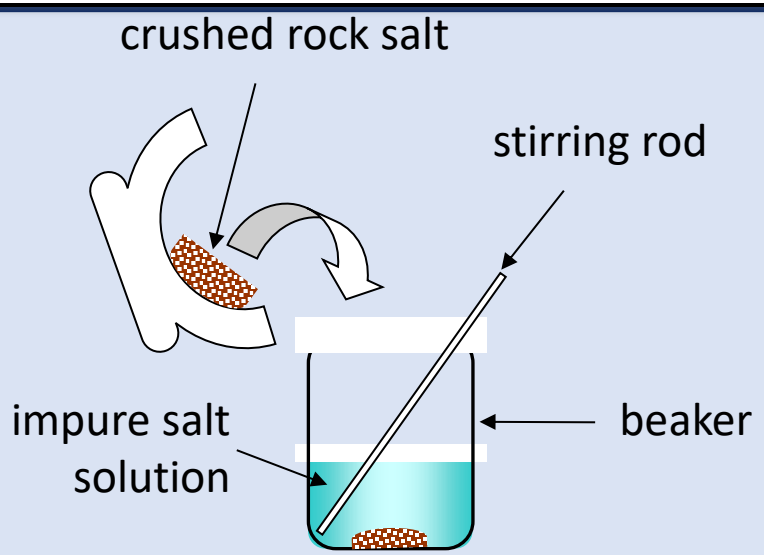
2. Name the technique to remove a solid from a liquid.

Method

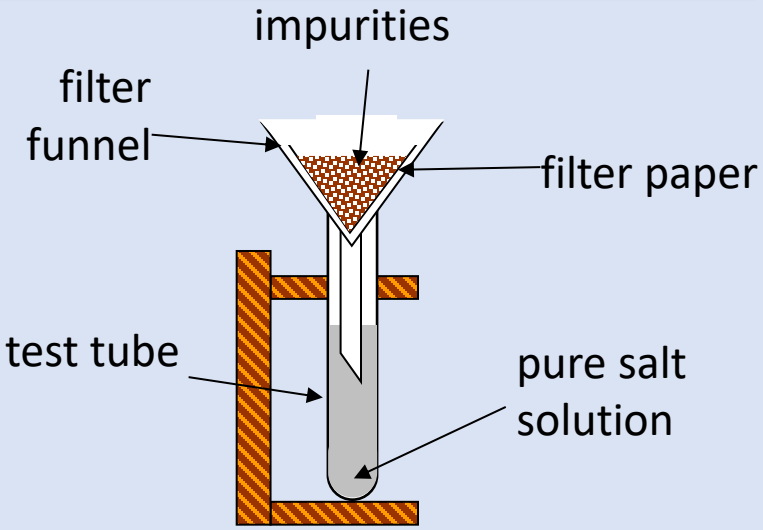
Step 1: Collect and crush a small amount of rock salt



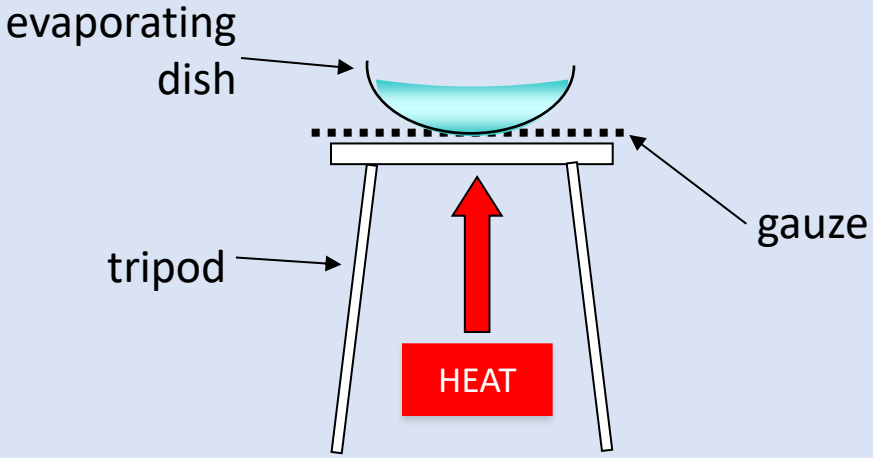
Step 2: Dissolve the salt in 50ml of water



Step 3: Filter the impure salt solution.



Step 4: Evaporate half the water from the pure salt solution



Purification of Salt from

06/10/2026

Results

Purification step	Observations

Conclusion

Purification of Salt from

06/10/2026

Results

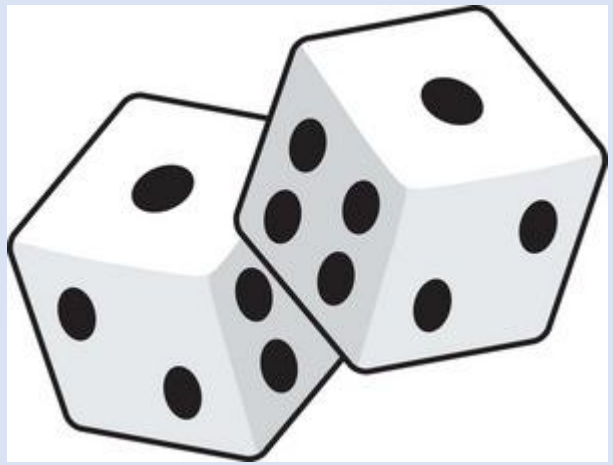
Purification Step	Observations
1. Crush the rock salt	Large grains become smaller; mixture looks more uniform.
2. Dissolve in water	Salt dissolves; sand remains undissolved at the bottom.
3. Filter the mixture	Sand stays on the filter paper; clear salt solution passes through.
4. Evaporate the water	Water disappears; pure salt crystals are left behind.

Conclusion

By crushing, dissolving, filtering, and evaporating, we were able to separate the salt from the sand and obtain pure salt crystals.

This shows that rock salt is a mixture, and its components can be separated using physical methods because salt is soluble in water and sand is insoluble.

The Plenary Dice



1. Write down everything that you can remember from this lesson.

2. Write down two things you want to know more about

3. You will be given a key word, you must write everything you know about this word.

4. Write a question regarding today's lesson, then you may get to choose someone to answer your question.

5. Describe this lesson in 5 words

6. Name a skill that you have used in this lesson.

Put the picture cards in order

Plenary:

List 3 things you found out/learnt today

List 3 things your neighbour has learnt today

60 second challenge – sum up knowledge of text, or write down all the words you can think of to describe…

The answer is XYZ – now write the question. N.B. the question must begin with the words ‘What is…’

Spot missing words in cloze summary of learning

True or false – hold up card/whiteboard to show whether statement on OHT is true or false

Change role – student as teacher. What questions would you ask the class and why?

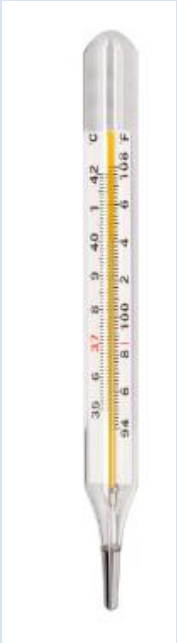
Getting to know you

Spin the colour generator and answer **one** question about yourself from the table below.

Colour	Choose a question		
Purple	What is one of your hobbies?	When is your birthday?	What was your favourite part of today?
Blue	What is your favourite book?	Do you have any brothers and/or sisters?	What is your favourite subject in school?
Green	What's you favourite TV show/movie?	Do you have any pets? What kind?	What job would you like to do in the future?
Yellow	What's your favourite colour?	If you could have a super power what would it be?	What is your favourite memory from last school year?
Red	What's one of your favourite foods?	If you could travel anywhere, where would it be?	What did you enjoy doing this summer?

http://thewessens.net/ClassroomApps/Main/spin.html?topic=utilities&id=4

Name the Equipment Extension



Skills Practice

Element	**Percentage of earths crust (%)**
Iron	5
Silicon	28
Oxygen	45
Aluminium	7

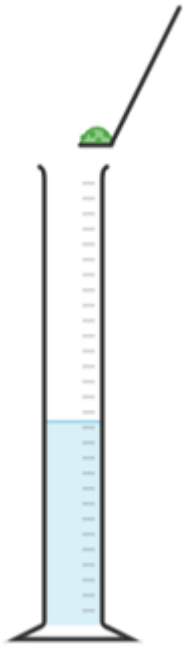
Learning outcome 1

Starter

1. State which headings are required in a lab report in order.

Conclusion Method Aim Results Evaluation

2. What is the problem with the following diagram?



Learning Outcome 1

Learning Intentions:

- To independently investigation and write up a scientific report.

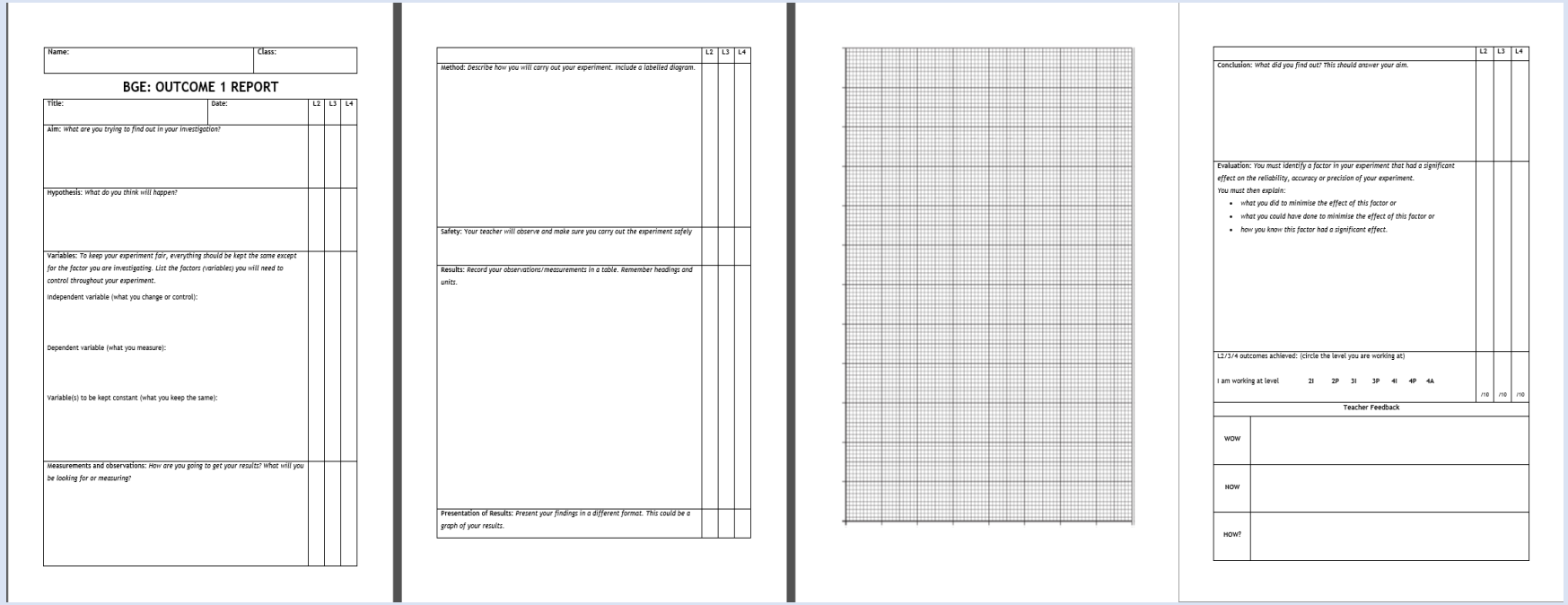
Success Criteria

- ☐ I can safely take part in a practical investigation
- ☐ I can record my findings accurately
- ☐ I can clearly report my investigation.
- ☐ I can draw a line/bar/scatter graph

Tick me at the end if ***you can*** …

Learning Outcome 1

- You will be using a template to write your outcome 1 report.



Name:	Class:

BGE: OUTCOME 1 REPORT

Title:	Date:	L2	L3	L4
Aim: *What are you trying to find out in your investigation?*				
Hypothesis: *What do you think will happen?*				
Variables: *To keep your experiment fair, everything should be kept the same except for the factor you are investigating. List the factors (variables) you will need to control throughout your experiment.* Independent variable (what you change or control): Dependent variable (what you measure): Variable(s) to be kept constant (what you keep the same):				
Measurements and observations: *How are you going to get your results? What will you be looking for or measuring?*				

	L2	L3	L4
Method: *Describe how you will carry out your experiment. Include a labelled diagram.*			
Safety: *Your teacher will observe and make sure you carry out the experiment safely*			
Results: *Record your observations/measurements in a table. Remember headings and units.*			
Presentation of Results: *Present your findings in a different format. This could be a graph of your results.*			

	L2	L3	L4
Conclusion: *What did you find out? This should answer your aim.*			
Evaluation: *You must identify a factor in your experiment that had a significant effect on the reliability, accuracy or precision of your experiment.* *You must then explain:* • *what you did to minimise the effect of this factor or* • *what you could have done to minimise the effect of this factor or* • *how you know this factor had a significant effect.*			
L2/3/4 outcomes achieved: (circle the level you are working at) I am working at level 2I 2P 3I 3P 4I 4P 4A	/10	/10	/10

Teacher Feedback	
WOW	
NOW	
HOW?	

Investigating the Volume of gas formed

Name: Your name	Class: Your class

BGE: OUTCOME 1 REPORT

Title: Investigating the volume of gas formed in a chemical reaction	Date: 5/10/26 ~~09/03/2026~~	L2	L3	L4
Aim: *What are you trying to find out in your investigation?*				

CHALLENGE YOURSELF!!!

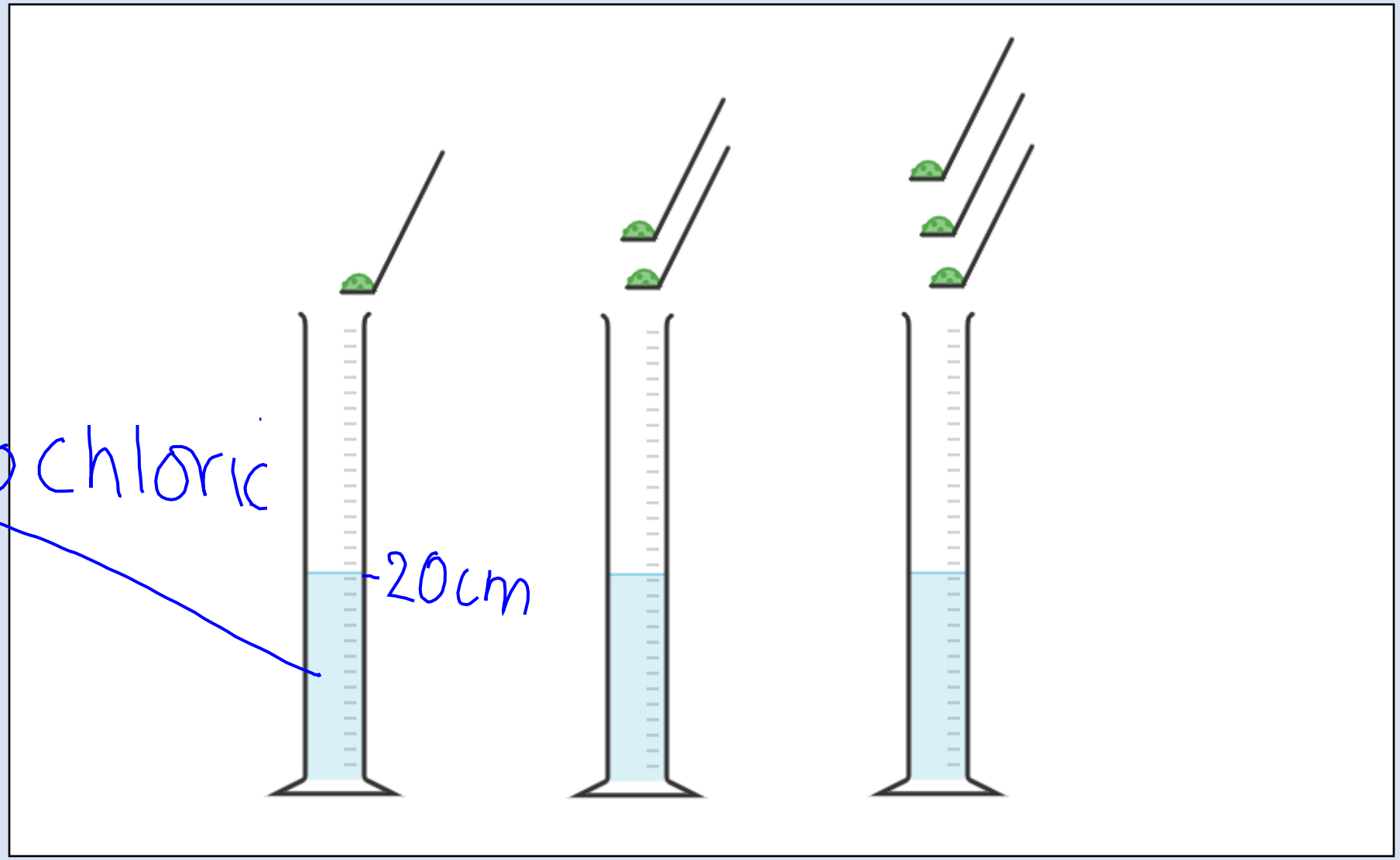
Learning Outcome 1

You will be undertaking a practical investigation and doing a formal scientific report write-up which must include:

- Title
- Date
- Aim
- Hypothesis (what do you think will happen?)
- Variables
  - Independent (what you change or control)
  - Dependant (what you measure)
- Measurements and observations
- Method (a labelled diagram)
- Safety
- Results (in a table with headings and units)
- Graph
- Conclusion (what did you find out)
- Evaluation (How could you improve the experiment)

YOUR TEACHER WILL GIVE YOU AN OUTCOME 1 REPORT HANDOUT!

Learning Outcome 1



Learning Outcome 1

Investigation outline

- You will be investigating how the number of spatula's of sodium bicarbonate affects the volume of gas produced.

Procedure

1. Place 20 cm^3 of 0.5M Hydrochloric acid in a ~~250~~ 100 cm^3 measuring cylinder
2. Add a drop of washing up liquid
3. Measure 1 level spatula of calcium carbonate powder into test tube 1 and start the timer immediately.
4. Record the time it takes for the bubbles (effervescence) to stop.
5. Record the volume
6. Repeat experiment for 2 and 3 spatulas of calcium carbonate

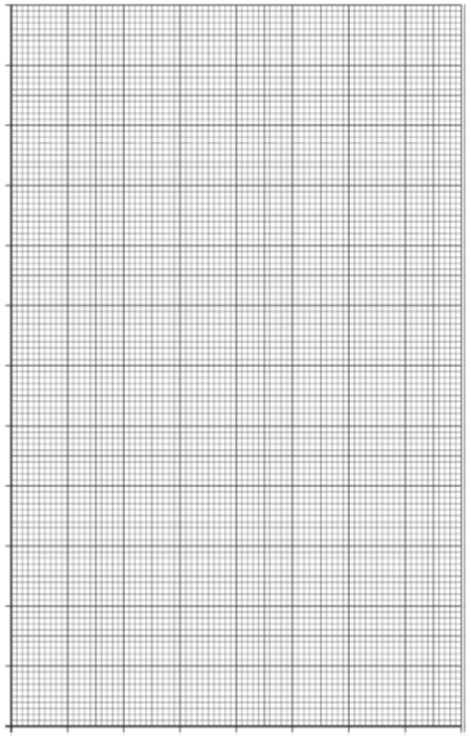
Investigating the Volume of gas formed

Name:	Class:

BGE: OUTCOME 1 REPORT

Title:	Date:	L2	L3	L4
Aim: *What are you trying to find out in your investigation?*				
Hypothesis: *What do you think will happen?*				
Variables: *To keep your experiment fair, everything should be kept the same except for the factor you are investigating. List the factors (variables) you will need to control throughout your experiment.* Independent variable (what you change or control): Dependent variable (what you measure): Variable(s) to be kept constant (what you keep the same):				
Measurements and observations: *How are you going to get your results? What will you be looking for or measuring?*				

	L2	L3	L4
Method: *Describe how you will carry out your experiment. Include a labelled diagram.*			
Safety: *Your teacher will observe and make sure you carry out the experiment safely*			
Results: *Record your observations/measurements in a table. Remember headings and units.*			
Presentation of Results: *Present your findings in a different format. This could be a graph of your results.*			



	L2	L3	L4
Conclusion: *What did you find out? This should answer your aim.*			
Evaluation: *You must identify a factor in your experiment that had a significant effect on the reliability, accuracy or precision of your experiment.* *You must then explain:* • *what you did to minimise the effect of this factor or* • *what you could have done to minimise the effect of this factor or* • *how you know this factor had a significant effect.*			
L2/3/4 outcomes achieved: (circle the level you are working at) I am working at level 2I 2P 3I 3P 4I 4P 4A	/10	/10	/10

Teacher Feedback	
WOW	
NOW	
HOW?	

Investigating the Volume of gas formed

Aim: *What are you trying to find out in your investigation?* *To investigate how the amount of calcium carbonate (number of spatulas) affects the volume of gas produced.*			
Hypothesis: *What do you think will happen?*			

CHALLENGE YOURSELF!!!

Investigating the Volume of gas formed

Hypothesis: *What do you think will happen?*

If the amount of calcium carbonate increases, then the volume of gas produced will increase because there are more particles available to react with the acid.

Variables: *To keep your experiment fair, everything should be kept the same except*

CHALLENGE YOURSELF!!!

Investigating the Volume of gas formed

Variables: *To keep your experiment fair, everything should be kept the same except for the factor you are investigating. List the factors (variables) you will need to control throughout your experiment.*

Independent variable (what you change or control):

Number of spatulas of calcium carbonate

Dependent variable (what you measure):

Volume of gas produced

Variable(s) to be kept constant (what you keep the same):

CHALLENGE YOURSELF!!!

Volume of hydrochloric acid (20 cm^3)
Concentration of hydrochloric acid (0.5 M)
Temperature
Amount of washing-up liquid
Size of measuring cylinder
Same method each time

Investigating the Volume of gas formed

Measurements and observations: *How are you going to get your results? What will you be looking for or measuring?*

I will measure the volume of gas produced using measuring cylinder.
I will also observe how much foam/gas is produced.

CHALLENGE YOURSELF!!!

Investigating the Volume of gas formed

	E2	E3	E4
Method: *Describe how you will carry out your experiment. Include a labelled diagram.*			
Safety: *Your teacher will observe and make sure you carry out the experiment safely*			

CHALLENGE YOURSELF!!!

Learning Outcome 1

Investigation outline

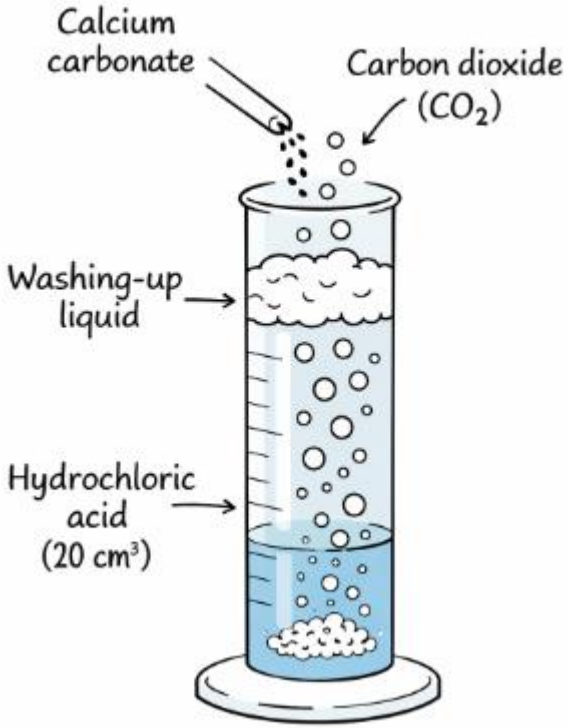
- You will be investigating how the number of spatula's of sodium bicarbonate affects the volume of gas produced.

Procedure

1. Measure 20 cm^3 of 0.5 M hydrochloric acid into a 250 cm^3 measuring cylinder.
2. Add one drop of washing-up liquid.
3. Note the starting level of the liquid (cm^3).
4. Add 1 spatula of calcium carbonate into the cylinder.
5. Start the reaction and observe the foam forming.
6. When the reaction finishes, measure the finish level of the foam (cm^3).
7. Record the result.
8. Repeat the experiment with 2 and 3 spatulas of calcium carbonate.
9. Record all results in a table.

Investigating the Volume of gas formed

	E2	E3	E4
Method: *Describe how you will carry out your experiment. Include a labelled diagram.*			
Safety: *Your teacher will observe and make sure you carry out the experiment safely*			



CHALLENGE YOURSELF!!!

Investigating the Volume of gas formed

Safety: *Your teacher will observe and make sure you carry out the experiment safely*

Wear safety goggles
Handle acid carefully
Clean spills immediately
Do not inhale powder

CHALLENGE YOURSELF!!!

Investigating the Volume of gas formed

Results: *Record your observations/measurements in a table. Remember headings and units.*

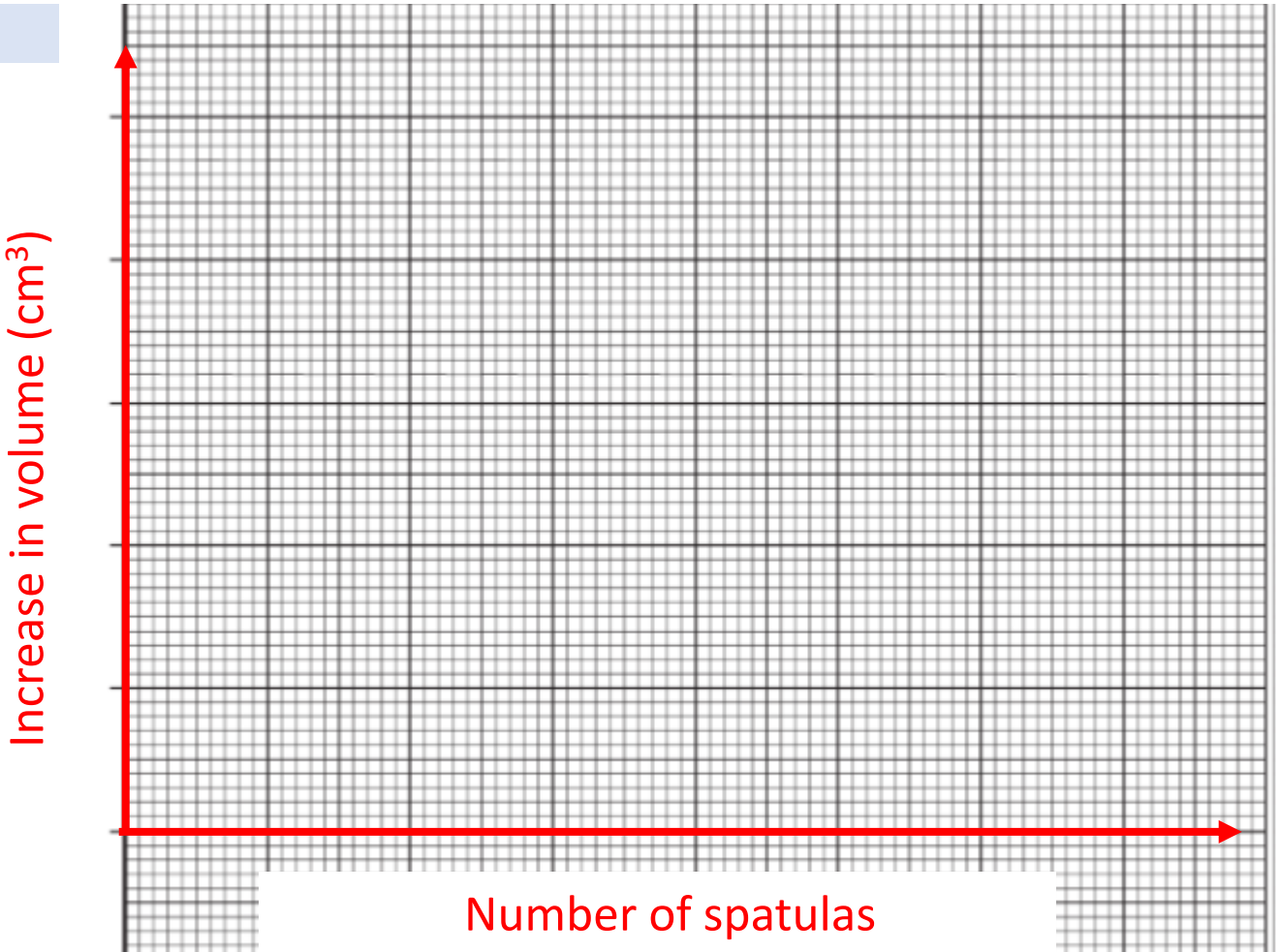
Number of spatulas of calcium carbonate	Starting liquid level (cm^3)	Maximum foam height (cm^3)	Increase in volume (cm^3)
1			
2			
3			

CHALLENGE YOURSELF!!!

Investigating the Volume of gas formed

Presentation of Results: *Present your findings in a different format. This could be a graph of your results.*			

Number of spatulas	Increase in volume (cm^3)
1	
2	
3	



Investigating the Volume of gas formed

Conclusion: *What did you find out? This should answer your aim.*

As the number of spatulas increased, the height of the foam increased. This shows that more calcium carbonate produces more gas, which creates more foam. Therefore, increasing the amount of calcium carbonate increases the amount of gas produced in the reaction.

CHALLENGE YOURSELF!!!

Investigating the Volume of gas formed

Evaluation: *You must identify a factor in your experiment that had a significant effect on the reliability, accuracy or precision of your experiment.*

You must then explain:

- *what you did to minimise the effect of this factor or*
- *what you could have done to minimise the effect of this factor or*
- *how you know this factor had a significant effect.*

CHALLENGE YOURSELF!!!

- *One factor that affected accuracy was measuring the calcium carbonate using a spatula, as the amount may not be exactly the same each time. To improve this, I could:Use a balance to measure the mass of calcium carbonate more accurately.*
- *Another factor was measuring the height of the foam, as it can be difficult to judge the exact top of the foam. To improve this, I could: Use a ruler at eye level and take repeated measurements to get an average.*
- *Another factor was that some gas could escape before measuring, affecting the foam height. To improve this, I could: Set up the experiment more quickly and carefully to reduce gas loss.*

Separation Techniques

06/10/2026

Learning Intentions

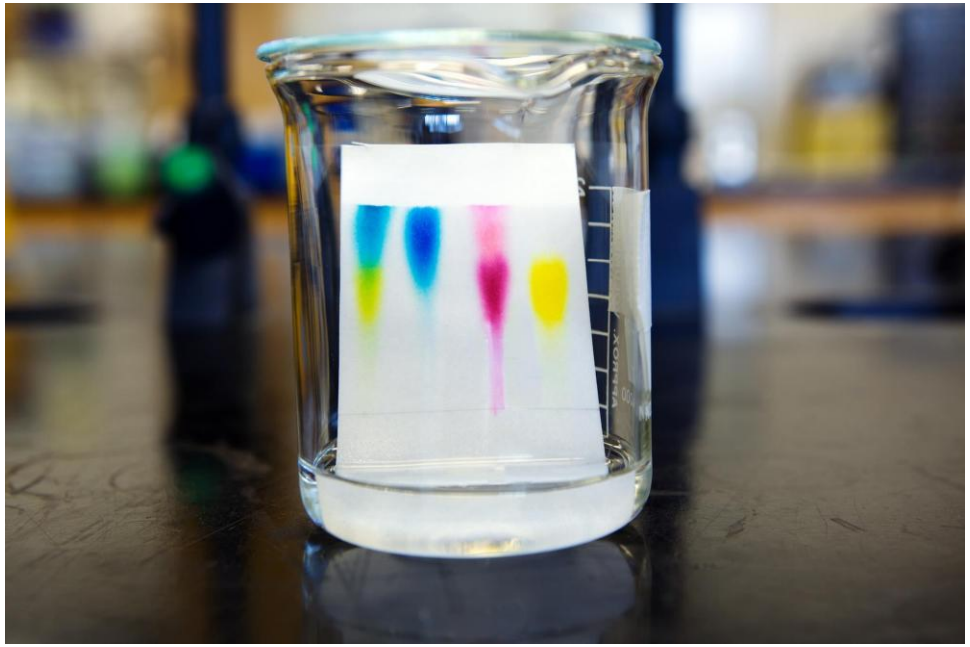
- To learn about Chromatography as a separation technique.

Chromatography

06/10/2026

Chromatography means colour writing!

It is used to separate a mixture of coloured or non-coloured substances that are soluble in the same solvent.

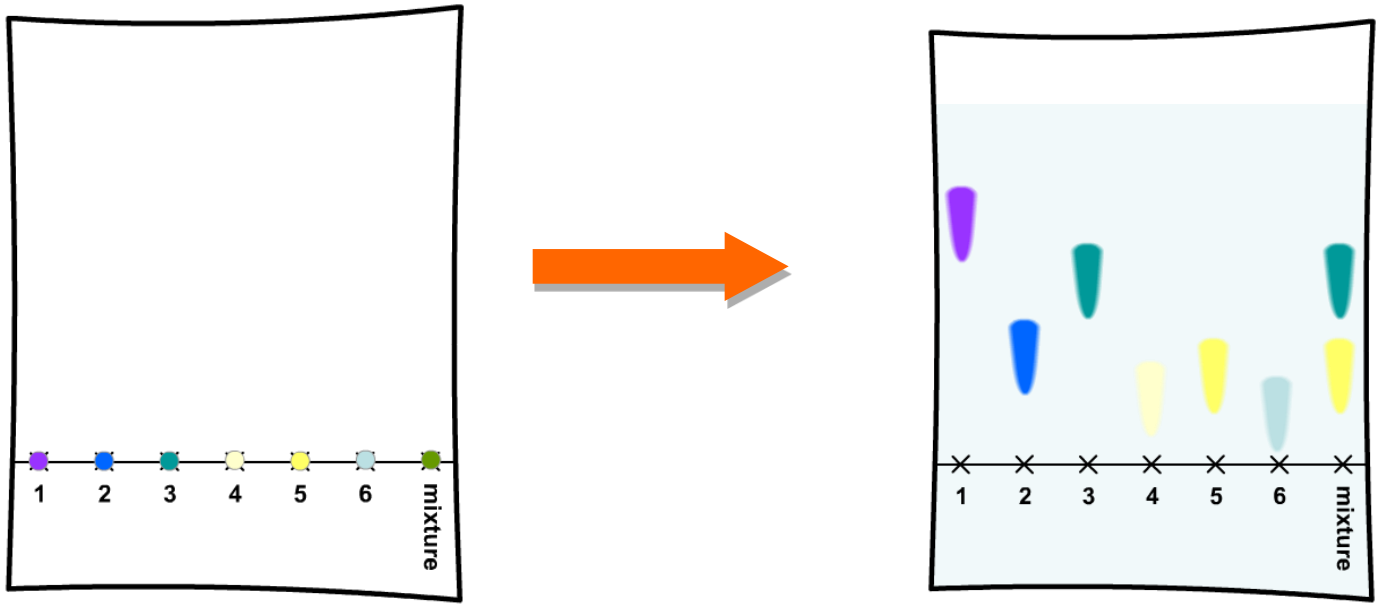


Chromatography

06/10/2026

Chromatography means colour writing!

It is used to separate a mixture of substances that are soluble in the same solvent.

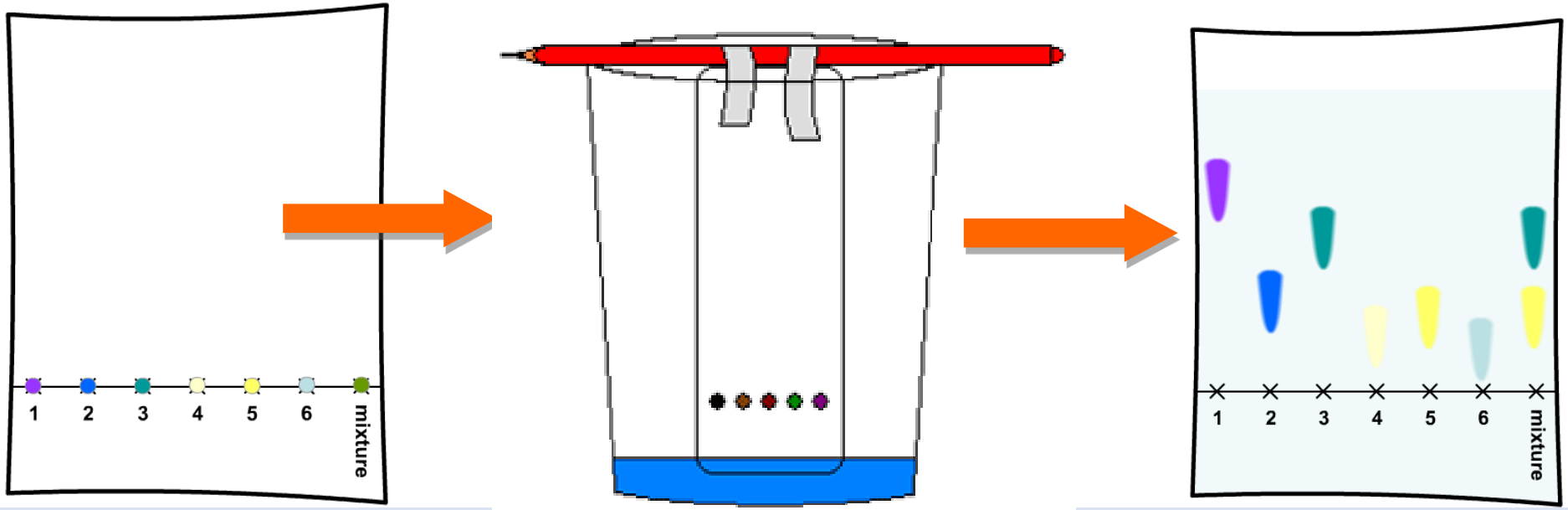


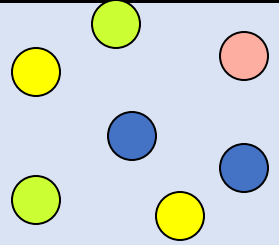
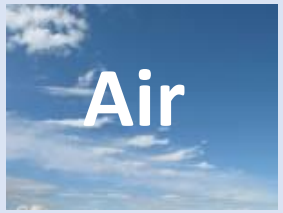
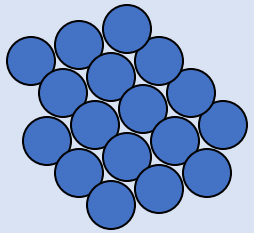
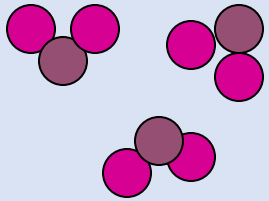
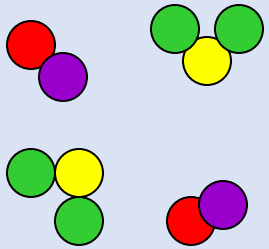
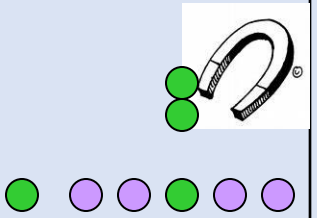
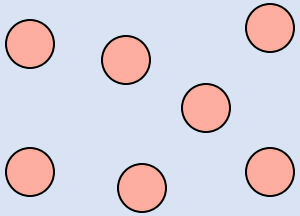
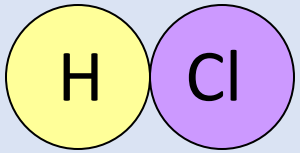
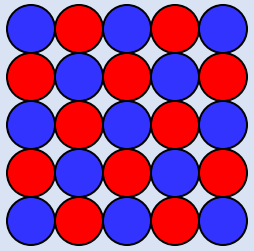
Chromatography

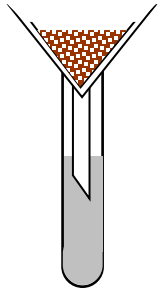
06/10/2026

You have two investigations to carry out:

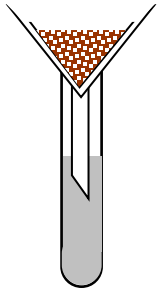
1. Identify the mixture of dye in pens. Which pen contains the most dyes?



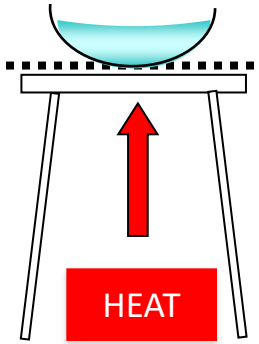
Na		salt	Carbon dioxide		
	Contains only 1 type of atom		2 or more elements chemically combined	Components not combined together	
Has a symbol		$CuSO_4$	Has a formulae		Iron and sulphur in test tube
O_2			Magnesium chloride		Can be easily separated
Cannot be broken down	iron				



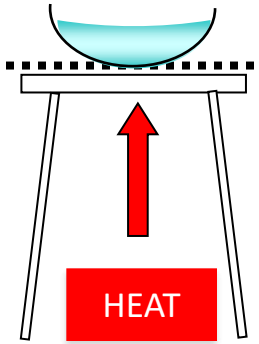
Filtration – used to separate s_____ from a s_____ . The solid gets stuck in the f_____ p_____, and the s_____ passes through.



Filtration – used to separate s_____ from a s_____ . The solid gets stuck in the f_____ p_____, and the s_____ passes through.

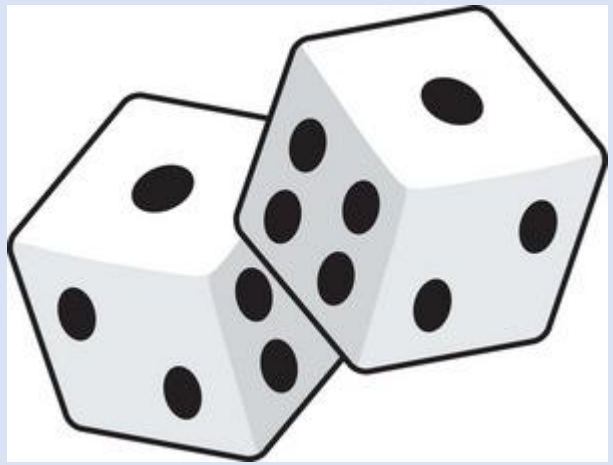


Evaporation – used to separate the solute The liquid e_____ and leaves the s_____ behind.



Evaporation – used to remove l_____ from a m_____ of liquid and d_____ s_____. The liquid e_____ and leaves the s_____ behind.

The Plenary Dice



1. Write down everything that you can remember from this lesson.

2. Write down two things you want to know more about

3. You will be given a key word, you must write everything you know about this word.

4. Write a question regarding today's lesson, then you may get to choose someone to answer your question.

5. Describe this lesson in 5 words

6. Name a skill that you have used in this lesson.