

S2 Chemistry Topic

23/01/2025

In this Unit you will learn about:

1. The Periodic Table
2. Metals
3. Elements, Compounds and Mixtures

The Periodic Table

23/01/2025

GROUPS

1	2
Li	Be
Na	Mg
K	Ca
Rb	Sr
Cs	Ba
Fr	Ra

GROUPS

3	4	5	6	7	0
B	C	N	O	F	He
Al	Si	P	S	Cl	Ar
Ga	Ge	As	Se	Br	Kr
Ag	Cd	In	Sn	Sb	Xe
Pt	Au	Hg	Tl	Pb	At
Ds	Rg	mercury	thallium	lead	Rn

Legend:

- Alkali Metals
- Alkaline Earth Metals
- Transition Metals
- Halogens
- Noble Gases

Hydrogen (H, atomic number 1)

Helium (He, atomic number 2)

Cu and Cl have not been rounded to the nearest whole number

*The lanthanides and actinides (atomic numbers 90-103) have been omitted

[] Denotes radioactive elements

The Periodic Table

23/01/2025

Page 4

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 of Elements

The Periodic Table is a list of all the different elements. The elements are specifically arranged within the table so that they are categorised into groups that have similar properties. The elements are listed in order of their atomic number. This is the number of protons in the nucleus of each atom. The atomic mass of the most abundant isotope of each element is also shown on the table.



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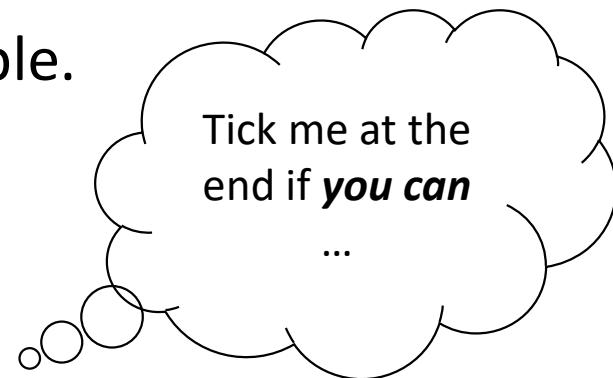
GROUPS		GROUPS																	
1	2	3	4	5	6	7	0												
Li	Be	B	C	N	O	F	He												
Atomic Number 3	Atomic Symbol Be	Atomic Number 5	Atomic Symbol C	Atomic Number 7	Atomic Symbol N	Atomic Number 9	Atomic Symbol F	Atomic Number 2											
Name Lithium	Name Beryllium	Name Boron	Name Carbon	Name Nitrogen	Name Oxygen	Name Fluorine	Name Helium												
Relative Atomic Mass 7	Relative Atomic Mass 12	Relative Atomic Mass 11	Relative Atomic Mass 12	Relative Atomic Mass 14	Relative Atomic Mass 16	Relative Atomic Mass 19	Relative Atomic Mass 4												
Alkali Metals	Alkaline Earth Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Noble Gases	Post-transition Metals	Halogen												
Na	Mg	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr		
Atomic Number 11	Atomic Number 12	Atomic Number 21	Atomic Number 22	Atomic Number 23	Atomic Number 24	Atomic Number 25	Atomic Number 26	Atomic Number 27	Atomic Number 28	Atomic Number 29	Atomic Number 30	Atomic Number 31	Atomic Number 32	Atomic Number 33	Atomic Number 34	Atomic Number 35	Atomic Number 36		
Name Sodium	Name Magnesium	Name Scandium	Name Titanium	Name Vanadium	Name Chromium	Name Manganese	Name Iron	Name Cobalt	Name Nickel	Name Copper	Name Zinc	Name Gallium	Name Germanium	Name Arsenic	Name Selenium	Name Bromine	Name Krypton		
Relative Atomic Mass 23	Relative Atomic Mass 24	Relative Atomic Mass 45	Relative Atomic Mass 48	Relative Atomic Mass 51	Relative Atomic Mass 54	Relative Atomic Mass 56	Relative Atomic Mass 56	Relative Atomic Mass 59	Relative Atomic Mass 60	Relative Atomic Mass 63.5	Relative Atomic Mass 65	Relative Atomic Mass 69	Relative Atomic Mass 70	Relative Atomic Mass 73	Relative Atomic Mass 75	Relative Atomic Mass 79	Relative Atomic Mass 80		
Alkaline Earth Metals	Alkaline Earth Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals		
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr		
Atomic Number 19	Atomic Number 20	Atomic Number 21	Atomic Number 22	Atomic Number 23	Atomic Number 24	Atomic Number 25	Atomic Number 26	Atomic Number 27	Atomic Number 28	Atomic Number 29	Atomic Number 30	Atomic Number 31	Atomic Number 32	Atomic Number 33	Atomic Number 34	Atomic Number 35	Atomic Number 36		
Name Potassium	Name Calcium	Name Scandium	Name Titanium	Name Vanadium	Name Chromium	Name Manganese	Name Iron	Name Cobalt	Name Nickel	Name Copper	Name Zinc	Name Gallium	Name Germanium	Name Arsenic	Name Selenium	Name Bromine	Name Krypton		
Relative Atomic Mass 39	Relative Atomic Mass 40	Relative Atomic Mass 45	Relative Atomic Mass 48	Relative Atomic Mass 51	Relative Atomic Mass 54	Relative Atomic Mass 56	Relative Atomic Mass 56	Relative Atomic Mass 59	Relative Atomic Mass 60	Relative Atomic Mass 63.5	Relative Atomic Mass 65	Relative Atomic Mass 69	Relative Atomic Mass 70	Relative Atomic Mass 73	Relative Atomic Mass 75	Relative Atomic Mass 79	Relative Atomic Mass 80		
Alkaline Earth Metals	Alkaline Earth Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals		
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sh	Sb	Te	I	Xe		
Atomic Number 35	Atomic Number 36	Atomic Number 39	Atomic Number 40	Atomic Number 41	Atomic Number 42	Atomic Number 43	Atomic Number 44	Atomic Number 45	Atomic Number 46	Atomic Number 47	Atomic Number 48	Atomic Number 51	Atomic Number 53	Atomic Number 55	Atomic Number 57	Atomic Number 58	Atomic Number 59		
Name Rubidium	Name Strontium	Name Yttrium	Name Zirconium	Name Niobium	Name Molybdenum	Name Technetium	Name Ruthenium	Name Rhodium	Name Palladium	Name Silver	Name Cadmium	Name Indium	Name Antimony	Name Tellurium	Name Iodine	Name Xenon			
Relative Atomic Mass 85	Relative Atomic Mass 88	Relative Atomic Mass 89	Relative Atomic Mass 91	Relative Atomic Mass 93	Relative Atomic Mass 96	Relative Atomic Mass 98	Relative Atomic Mass 101	Relative Atomic Mass 103	Relative Atomic Mass 105	Relative Atomic Mass 106	Relative Atomic Mass 107	Relative Atomic Mass 115	Relative Atomic Mass 119	Relative Atomic Mass 122	Relative Atomic Mass 128	Relative Atomic Mass 137	Relative Atomic Mass 138		
Alkaline Earth Metals	Alkaline Earth Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals		
Cs	Ba	La ⁺	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn		
Atomic Number 55	Atomic Number 56	Atomic Number 67	Atomic Number 72	Atomic Number 73	Atomic Number 74	Atomic Number 76	Atomic Number 78	Atomic Number 77	Atomic Number 78	Atomic Number 79	Atomic Number 80	Atomic Number 81	Atomic Number 82	Atomic Number 83	Atomic Number 84	Atomic Number 85	Atomic Number 86		
Name Cesium	Name Barium	Name Lanthanum	Name Hafnium	Name Tantalum	Name Tungsten	Name Rhenium	Name Osmium	Name Iridium	Name Platinum	Name Gold	Name Mercury	Name Thallium	Name Lead	Name Bismuth	Name Polonium	Name Astatine	Name Radium		
Relative Atomic Mass 133	Relative Atomic Mass 137	Relative Atomic Mass 139	Relative Atomic Mass 178	Relative Atomic Mass 181	Relative Atomic Mass 184	Relative Atomic Mass 186	Relative Atomic Mass 190	Relative Atomic Mass 192	Relative Atomic Mass 193	Relative Atomic Mass 196	Relative Atomic Mass 197	Relative Atomic Mass 201	Relative Atomic Mass 204	Relative Atomic Mass 207	Relative Atomic Mass 209	Relative Atomic Mass 210	Relative Atomic Mass 223		
Alkaline Earth Metals	Alkaline Earth Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals		
Fr	Ra	Ac [*]	Rf	Df	Sg	Bh	Mt	Ds											
Atomic Number 87	Atomic Number 88	Atomic Number 89	Atomic Number 104	Atomic Number 105	Atomic Number 106	Atomic Number 108	Atomic Number 109	Atomic Number 110	Atomic Number 111	Atomic Number 112	Atomic Number 113	Atomic Number 121	Atomic Number 122	Atomic Number 128	Atomic Number 129	Atomic Number 137	Atomic Number 138		
Name Francium	Name Radium	Name Actinium	Name Rutherfordium	Name Dubnium	Name Seaborgium	Name Berkelium	Name Hassium	Name Meitnerium	Name Darmstadtium	Name Oganesson	Name Nh								
Relative Atomic Mass 223	Relative Atomic Mass 226	Relative Atomic Mass 227	Relative Atomic Mass 261	Relative Atomic Mass 262	Relative Atomic Mass 265	Relative Atomic Mass 264	Relative Atomic Mass 270	Relative Atomic Mass 271	Relative Atomic Mass 272	Relative Atomic Mass 273	Relative Atomic Mass 274	Relative Atomic Mass 275	Relative Atomic Mass 276	Relative Atomic Mass 277	Relative Atomic Mass 278	Relative Atomic Mass 279	Relative Atomic Mass 280		

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 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.



The Periodic Table

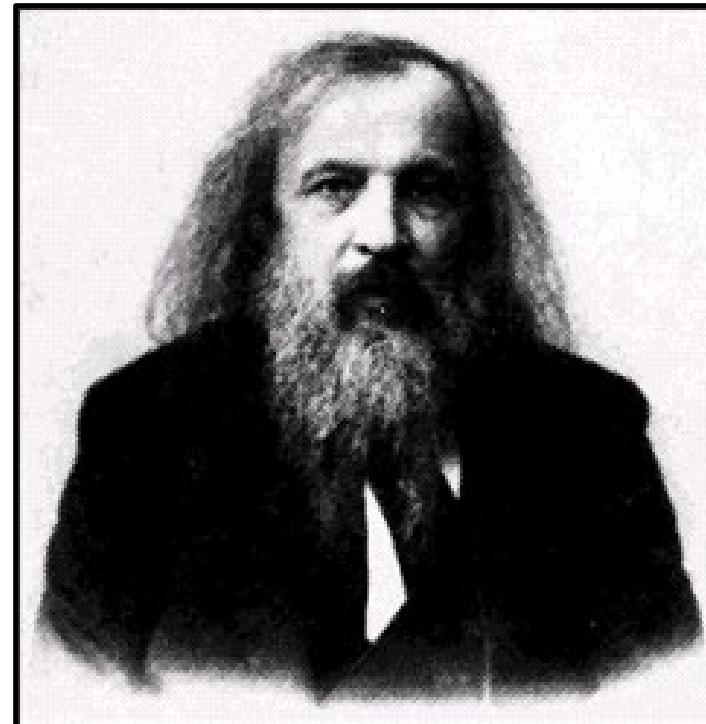
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The Periodic Table was first proposed by the Russian Chemist Dimitri Mendeleev.

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

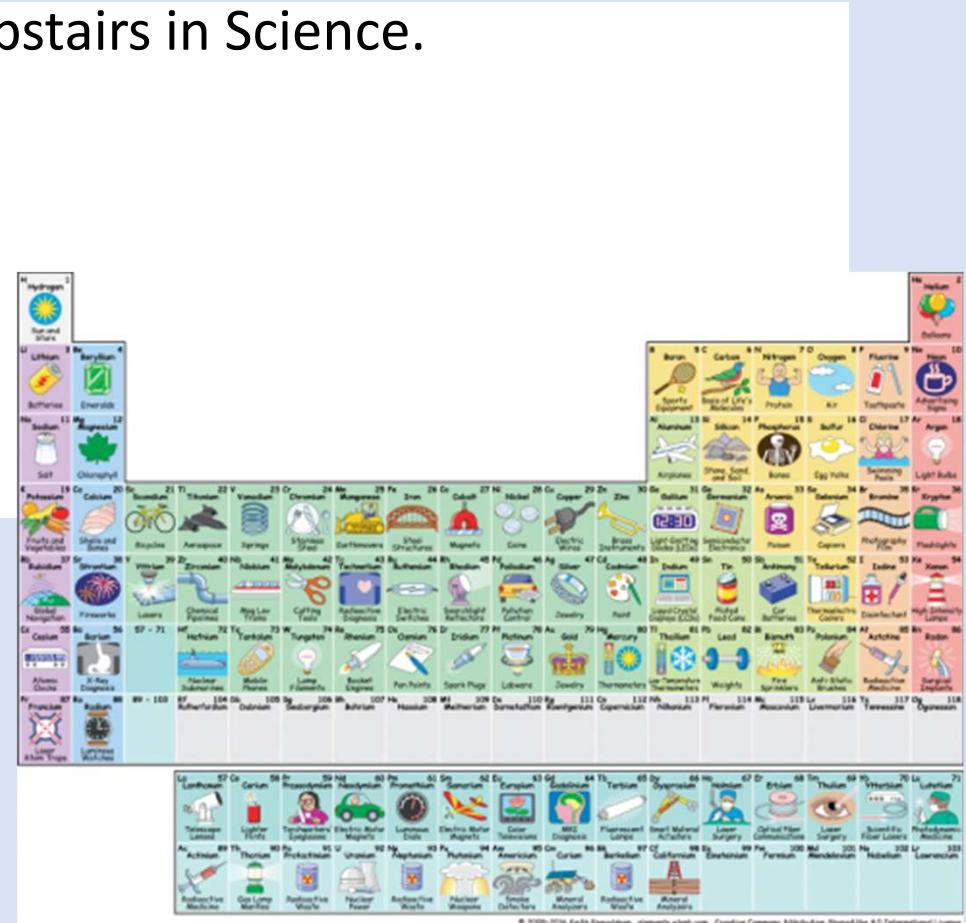
Elements are arranged by atomic number.

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.
- Or use the QR code to access the interactive periodic table to do this.



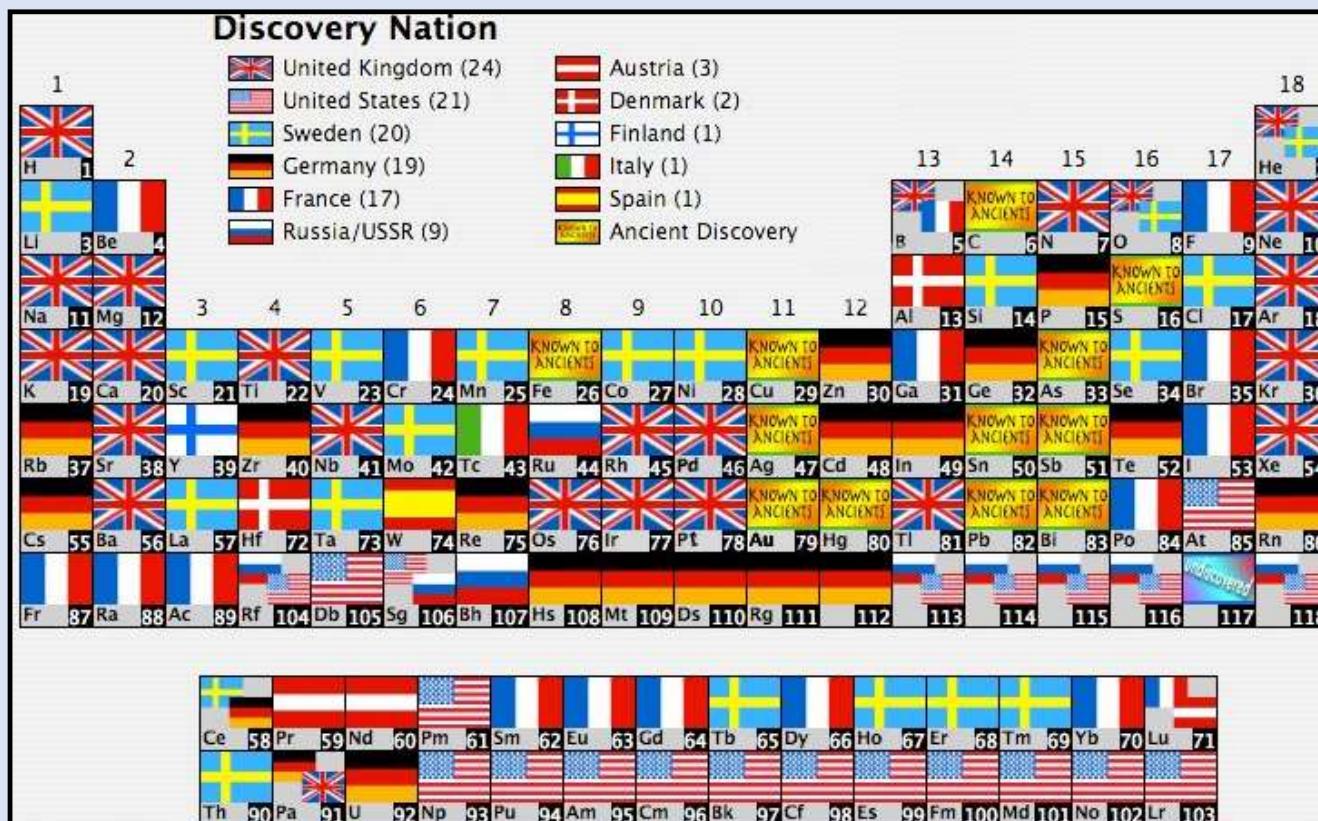
Uses of the Elements

Page 5

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

Page 5

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



Element



Atom

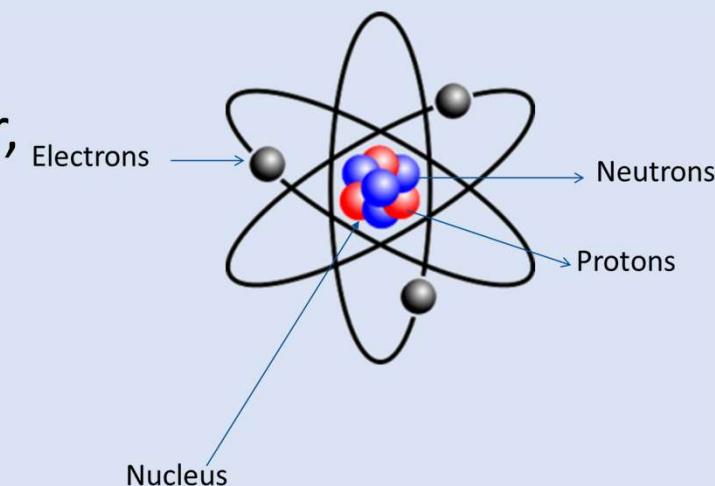
Atoms

Page 5

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 comes a point that it cannot be broken down any further.

An atom was thought to be the smallest unit of matter, 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.

The image shows the periodic table of elements, version 2019, with the following features:

- Color Coding:** Elements are color-coded into groups: Alkali Metals (yellow), Alkali Earth Metals (orange), Other Metals (light green), Other Non-Metals (light blue), Halogens (purple), Noble Gases (light pink), and Unconfirmed (light gray).
- Periodic Number:** The periodic number is indicated in the top-left corner of each element box.
- Atomic Number:** The atomic number is listed above each element symbol.
- Element Name:** The element name is listed below the symbol.
- Atomic Weight:** The atomic weight is listed to the right of the element symbol.
- Chemical Symbol:** The chemical symbol is listed to the right of the element name.
- Block:** The element is categorized into a block based on its electron configuration: S-block (1s and 2s), P-block (3s, 3p, 4s, 4p), D-block (3d, 4d, 5d), and F-block (4f, 5f, 6f).
- Period:** The element is categorized into a period based on the number of atomic shells it contains.
- Group:** The element is categorized into a group based on its chemical properties.
- Electron Configuration:** The electron configuration is listed in brackets to the right of the symbol.
- Block Labels:** The S-block is labeled "Metal", the P-block is labeled "Metalloid", and the D-block is labeled "Metal".
- Periodic Table Labels:** Labels for the periodic table include "Period", "Group", "Periodic Number", "Atomic Number", "Element Name", "Atomic Weight", "Chemical Symbol", "Block", "Period", "Group", and "Electron Configuration".
- Periodic Table Groups:** Groups include Alkali Metals, Alkali Earth Metals, Other Metals, Lanthanides, Actinides, Metalloids, Other Non-Metals, Halogens, Noble Gases, and Unconfirmed.

Element Symbols

Write down the symbol for:

Oxygen

Helium

Magnesium

Lithium

Hydrogen

Page 6



Element Symbols

Page 6

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

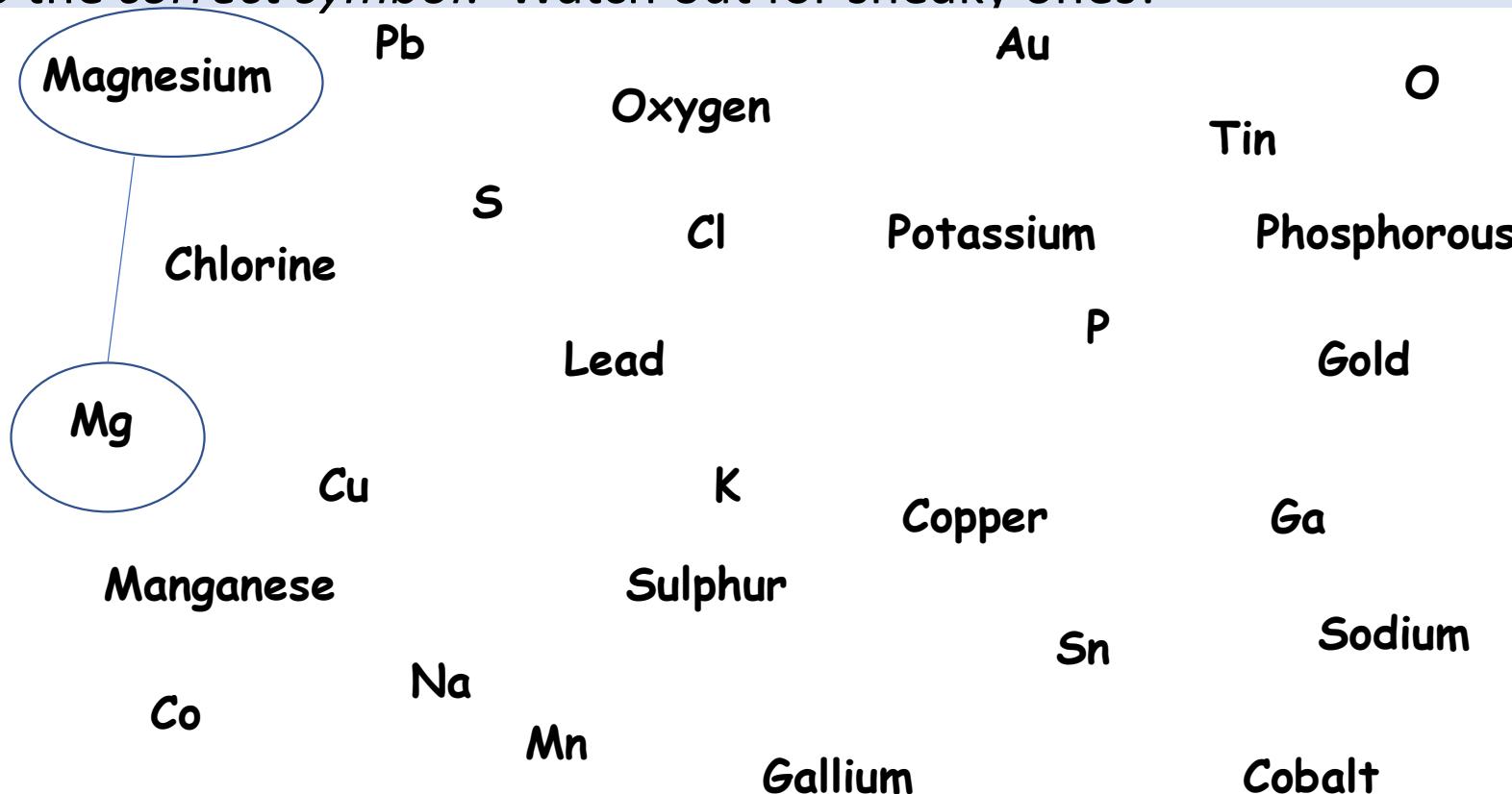
Iron

Element Symbols

Activity – Matching elements to their Symbol

Page 7

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!



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

Woodu

Pinnochio



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

Re Pt ar



Rhenium, platinum, argon

Shrek

Sulphur, hydrogen, rhenium, potassium

Arlet

Argon, iodine, aluminium

Shrek

Tin, oxygen, oxygen, phosphorus, yttrium

Sn D Oopy

Carbon, hydrogen, iodine, phosphorus

Chip

Fluorine, lithium, potassium



Samarium, iodine, thorium, erbium, sulphur

Plenary – Element Bingo

Page 7

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

The Periodic Table

23/01/2025

Starter:

Page 8

- 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 of Elements

The Periodic Table is a list of all the different elements. The elements are specifically arranged within the table so that they are categorised into groups that have similar properties. The elements are listed in order of their atomic number. This is the number of protons in the nucleus of each atom.

The atomic mass of the most abundant isotope of each element is also shown on the table.

GROUPS		PERIODIC TABLE OF ELEMENTS																																																																																																																																																																																																																																																																																																																																																																																																													
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Li	Be	H	He	B	C	N	O	F	Ne	Na	Mg	Al	P	S	Cl	Ar	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	I	Xe	At	Rn																																																																																																																																																																																																																																																																																																																																																																									
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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

Page 8

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

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

Metals and Non-metals

- 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

Page 9

Periodic Table of the Elements

TRANSITION METALS

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 0										
1 Hydrogen H		5 Boron B	6 Carbon C	7 Nitrogen N	8 Oxygen O	9 Fluorine F	2 Helium He										
3 Lithium Li	4 Beryllium Be	13 Aluminium Al	14 Silicon Si	15 Phosphorus P	16 Sulfur S	17 Chlorine Cl	10 Neon Ne										
11 Sodium Na	12 Magnesium Mg	31 Gallium Ga	32 Germanium Ge	33 Arsenic As	34 Selenium Se	35 Bromine Br	36 Krypton Kr										
19 Potassium K	20 Calcium Ca	49 Indium In	50 Tin Sn	51 Antimony Sb	52 Tellurium Te	53 Iodine I	54 Xenon Xe										
37 Rubidium Rb	38 Strontium Sr	81 Thallium Tl	82 Lead Pb	83 Bismuth Bi	84 Polonium Po	85 Astatine At	86 Radon Rn										
55 Caesium Cs	56 Barium Ba	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 Roentgenium Rg	112 Copernicium Cn	113 Nihonium Nh	114 Flerovium Fl	115 Moscovium Mc	116 Livermorium Lv	117 Tennessee Ts	118 Oganesson Og
87 Francium Fr	88 Radium Ra	●	58 Cerium Ce	59 Praseodymium Pr	60 Neodymium Nd	61 Promethium Pm	62 Samarium Sm	63 Europium Eu	64 Gadolinium Gd	65 Terbium Tb	66 Dysprosium Dy	67 Holmium Ho	68 Erbium Er	69 Thulium Tm	70 Ytterbium Yb	71 Lutetium Lu	
●	●	■	90 Thorium Th	91 Protactinium Pa	92 Uranium U	93 Neptunium Np	94 Plutonium Pu	95 Americium Am	96 Curium Cm	97 Berkelium Bk	98 Californium Cf	99 Einsteinium Es	100 Fermium Fm	101 Mendelevium Md	102 Nobelium No	103 Lawrencium Lr	

Key

Metal Non-metal

Solids, liquids and gases

- 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

Page 9

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

Page 9

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

Key

Atomic Number	Name of Element	Symbol
1	Hydrogen	H
3	Lithium	Li
4	Beryllium	Be
11	Sodium	Na
12	Magnesium	Mg
19	Potassium	K
20	Calcium	Ca
21	Scandium	Sc
37	Rubidium	Rb
38	Strontium	Sr
55	Caesium	Cs
56	Barium	Ba
57	Lanthanum	La
58-71	Hafnium	Hf
72	Titanium	Ti
73	Vanadium	V
74	Chromium	Cr
75	Manganese	Mn
76	Iron	Fe
77	Cobalt	Co
78	Nickel	Ni
79	Copper	Cu
80	Zinc	Zn
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	Rutherfordium	Rf
91	Dubnium	Db
92	Seaborgium	Sg
93	Bh	Bh
94	Hassium	Hs
95	Bohrium	Mt
96	Hassium	Ds
97	Meitnerium	Rg
98	Darmstadtium	Cn
99	Roentgenium	
100	Copernicium	
101		
102		
103		
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

TRANSITION METALS

Groups in the Periodic table

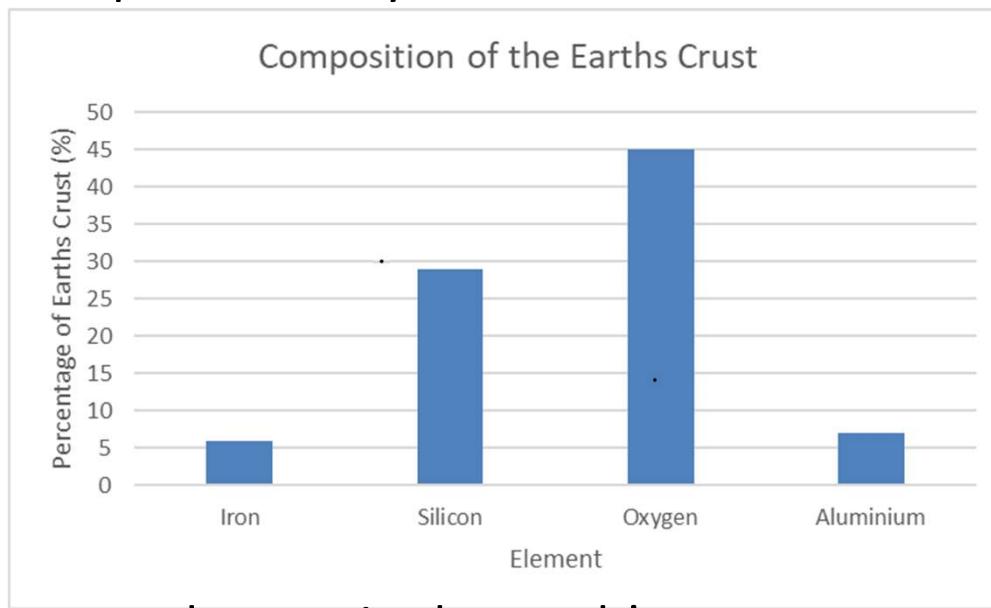
Page 9

		TRANSITION METALS																						
		Key																						
		Atomic Number Name of Element Symbol																						
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	
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	
55	Caesium Cs	56	Barium Ba	57	Lanthanum La	58–71	Hafnium Hf	72	Tantalum Ta	73	Tungsten W	74	Rhenium Re	75	Osmium Os	76	Iridium Ir	77	Platinum Pt	78	Gold Au	79	Mercury Hg	80
87	Francium Fr	88	Radium Ra	89	Actinium Ac	90–103	Rutherfordium Rf	104	Dubnium Db	105	Seaborgium Sg	106	Bohrium Bh	107	Hassium Hs	108	Meitnerium Mt	109	Darmstadtium Ds	110	Roentgenium Rg	111	Copernicium Cn	112

Skills – Interpreting a graph

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

Page ?



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?

Plenary – Spot the errors

Page 10

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 ^Hh 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

23/01/2025

Page 11

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

The Periodic Table of Elements

The Periodic Table is a list of all the different elements. The elements are specifically arranged within the table so that they are categorised into groups that have similar properties. The elements are listed in order of their atomic number. This is the number of protons in the nucleus of each atom. The atomic mass of the most abundant isotope of each element is also shown on the table.



GROUPS		GROUPS																	
1	2	3	4	5	6	7	0												
Li	Be	B	C	N	O	F	He												
Atomic Number																			
Atomic Symbol																			
Name																			
Relative Atomic Mass																			
Alkali Metals																			
Alkaline Earth Metals																			
Transition Metals																			
Post-transition Metals																			
Hydrogen																			
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr		
Atomic Number																			
Atomic Symbol																			
Name																			
Relative Atomic Mass																			
Alkali Metals	Alkaline Earth Metals	Transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sh	Sb	Te	I	Xe		
Atomic Number																			
Atomic Symbol																			
Name																			
Relative Atomic Mass																			
Alkali Metals	Alkaline Earth Metals	Transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	
Cs	Ba	La ⁺	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn		
Atomic Number																			
Atomic Symbol																			
Name																			
Relative Atomic Mass																			
Alkali Metals	Alkaline Earth Metals	Transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	Post-transition Metals	
Fr	Ra	Ac [*]	Rb	Df	Sg	Bh	Mt	Ds											
Atomic Number																			
Atomic Symbol																			
Name																			
Relative Atomic Mass																			

Learning Intentions:

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

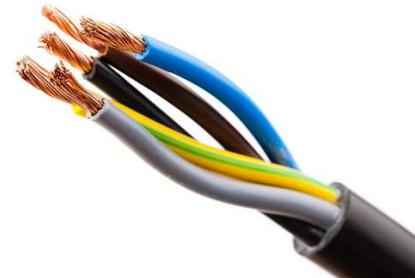
Success Criteria

- 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

23/01/2025

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.

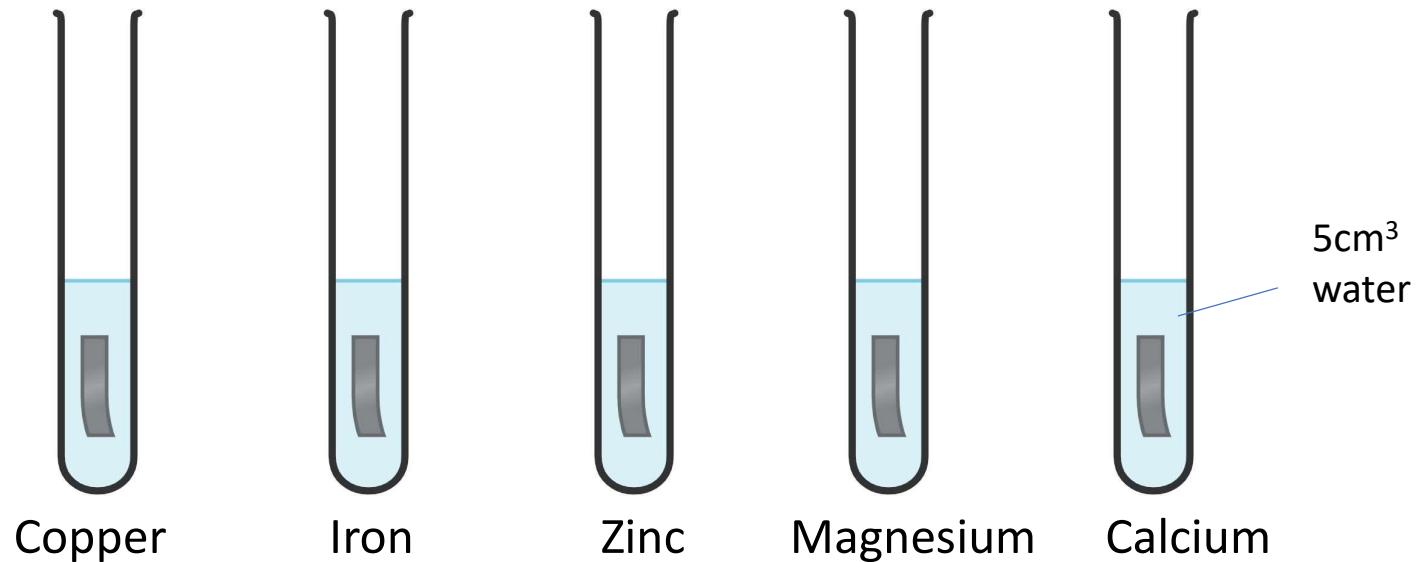
Think about the metals you use at home that come into contact with water. Do you see them react?

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.

Starter:

1 State 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.

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.

Conclusion: *Answer your aim*

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

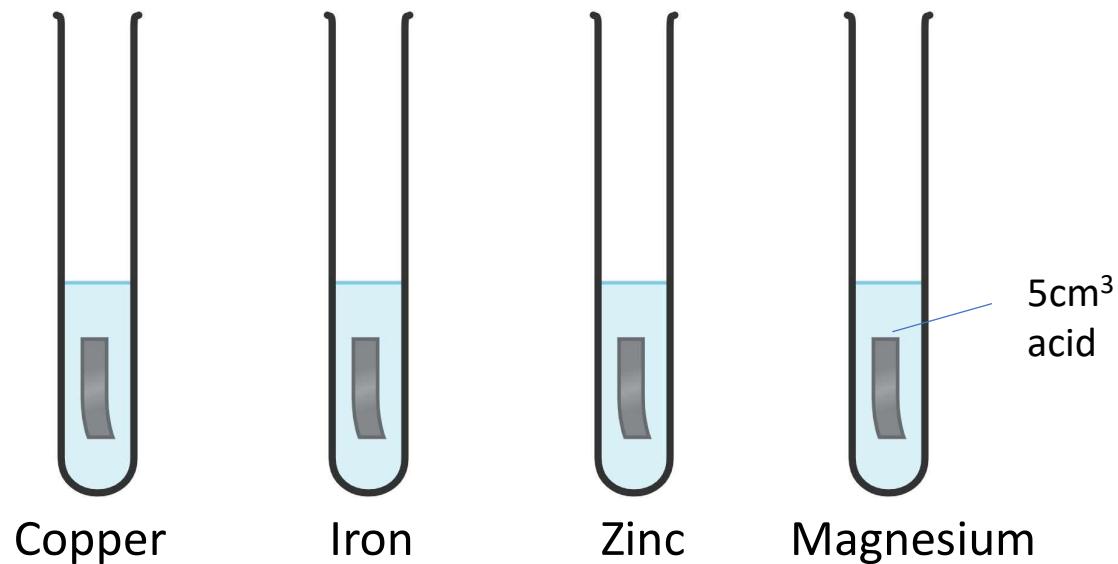
By reacting metals with an acid, we can compare the reactivity of the metal.

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

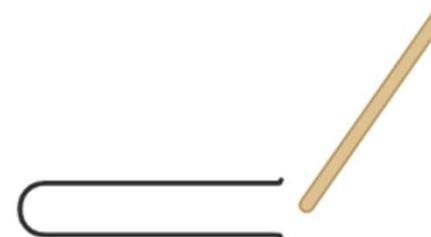
Testing for Hydrogen (optional)

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 squeaky pop.

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



2. Test the gas with a lit splint



Plenary

Page 14

Predict what would happen if sodium reacted with acid.

Extension – Word equations

Word equation:

reactive metal + acid \longrightarrow metal salt + hydrogen

Hydrochloric acid + copper \longrightarrow copper chloride + hydrogen

Hydrochloric acid + zinc \longrightarrow _____ + hydrogen

Hydrochloric acid + magnesium \longrightarrow _____ + _____

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 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

Page 15

Conductivity is a property that some elements have. It is another way that we can categorise elements in the periodic table.

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

Substances that do not conduct electricity are known as insulators.

Conductors

Page 15

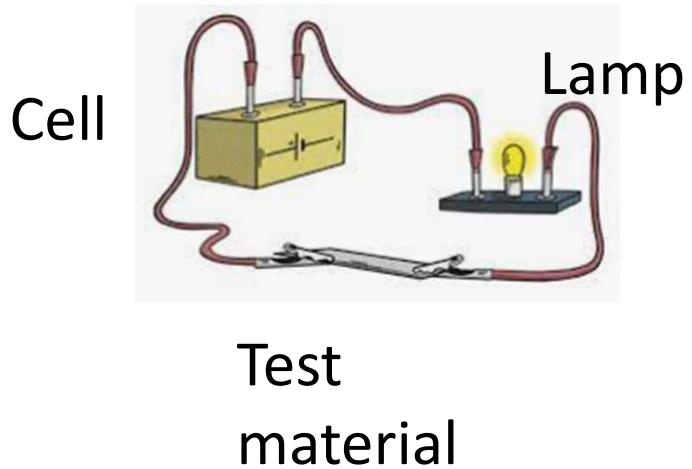
Aim

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

Conductors

Page 15

Method



Draw a circuit diagram for your method

Conductors

Page 16

Results

Conductors	Insulators

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

Conductors

Page 16

Conclusion

Conductors	Insulators

Plenary

Page 16

Complete the passage using word from the word bank

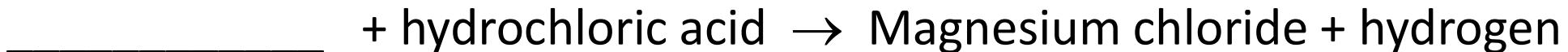
_____ are good conductors of electricity. Metals can be found on the _____ side of the periodic table. _____ are not conductors of electricity, these are described as _____. These are found on the _____ side of the periodic table. The exception to this is _____ which is a conductor.

Word bank

Left Right graphite Non-metal Metals Insulator

Starter

1. Put these metals in order of reactivity: Copper, Potassium, Magnesium
2. Complete the word equation:



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

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

Page 18

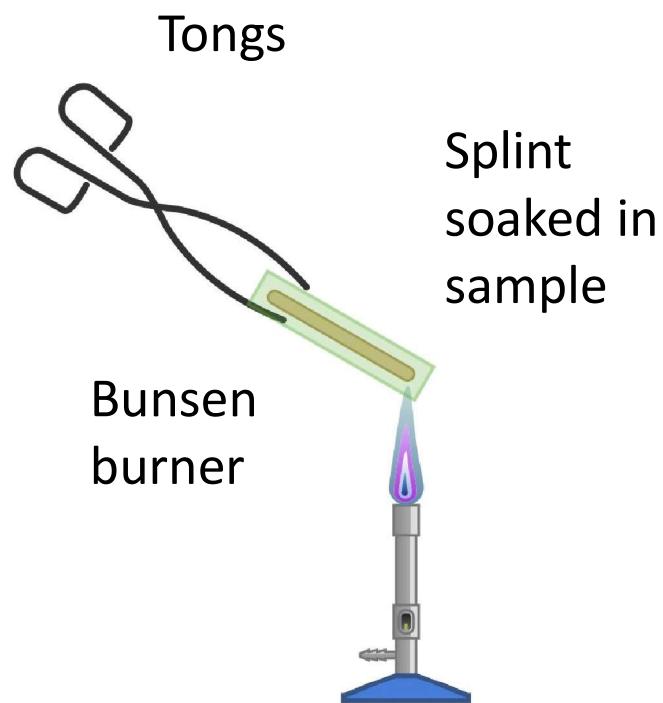
Aim

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

Identifying Elements

Page 18

Method



Identifying Elements

Page 18

Results	Metal	Colour
Unknown 1		
Unknown 2		

Identifying Elements

Page 18

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 23/01/2025

Learning Intentions

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

Success Criteria

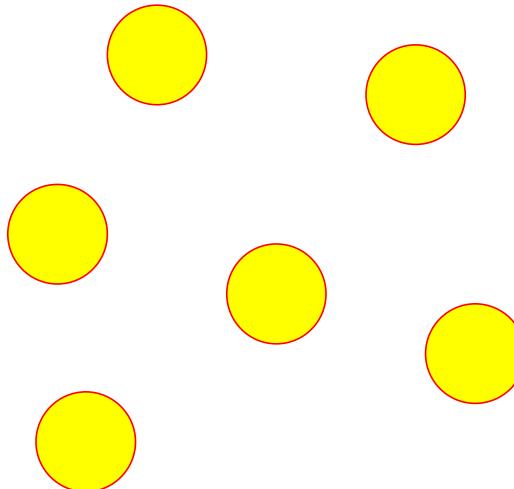
- I can state that an element is composed of only 1 type of atom.
- I can state that a mixture is composed of two or more substances that are not chemically linked.

Elements

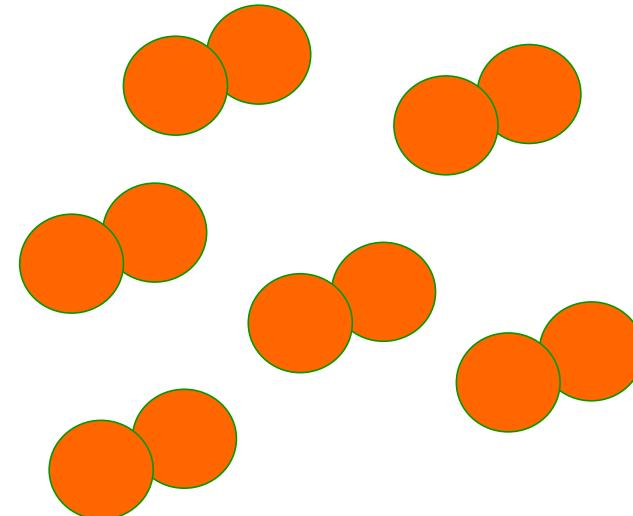
23/01/2025

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

Elements are found in the Periodic Table.



Element 1

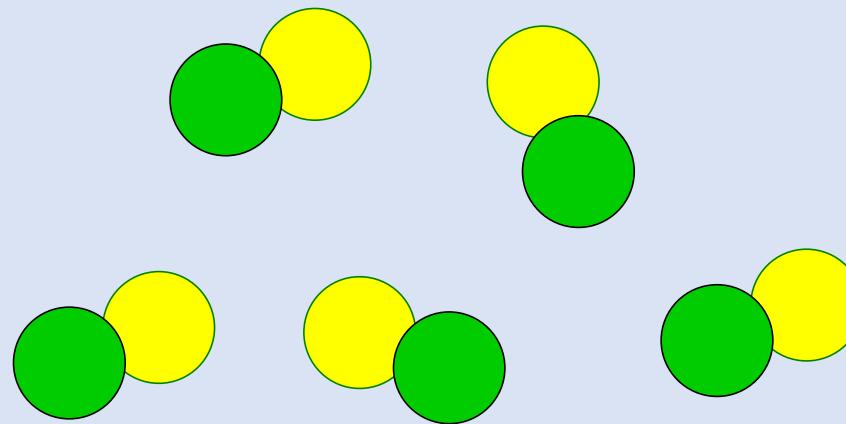


Element 2

Compounds

23/01/2025

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

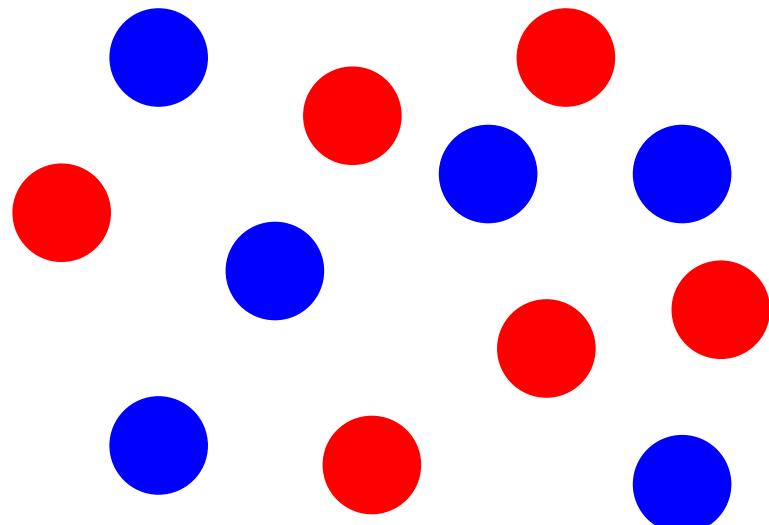


Compound

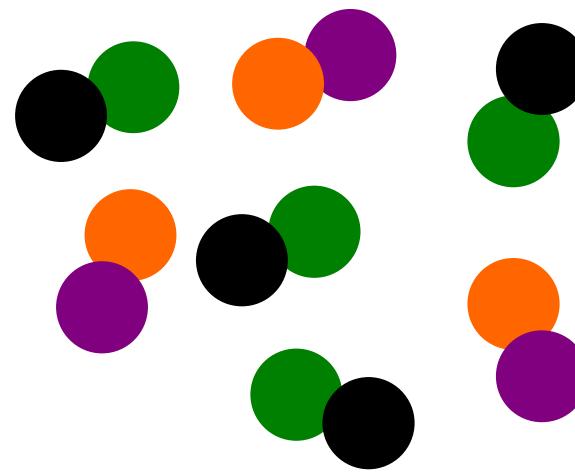
Mixtures

23/01/2025

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



2 elements mixed



2 compounds mixed

Element, Compound or Mixture

23/01/2025

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..?

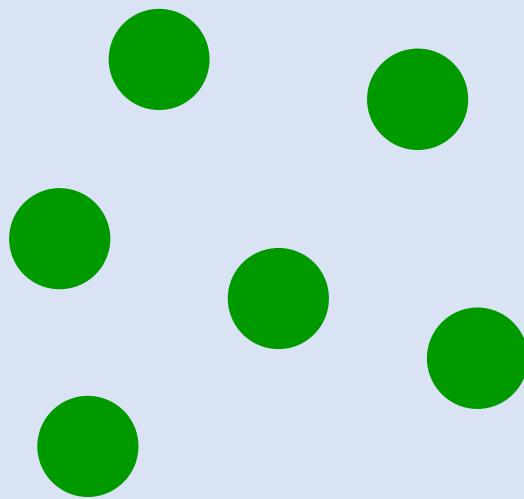
Complete the table in your booket.



Element, Compound or Mixture

23/01/2025

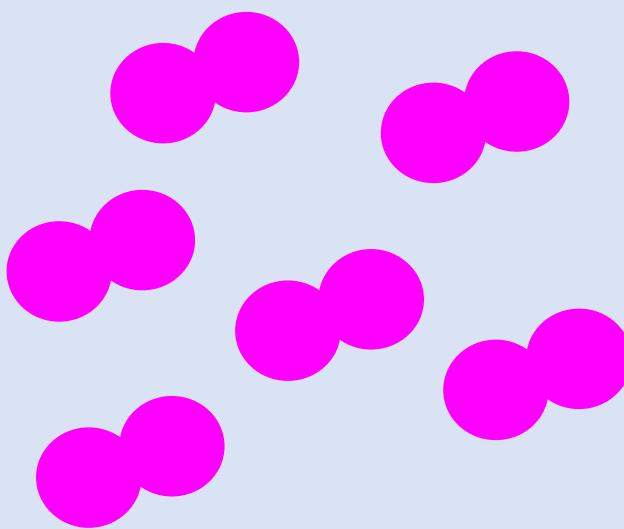
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Element, Compound or Mixture

23/01/2025

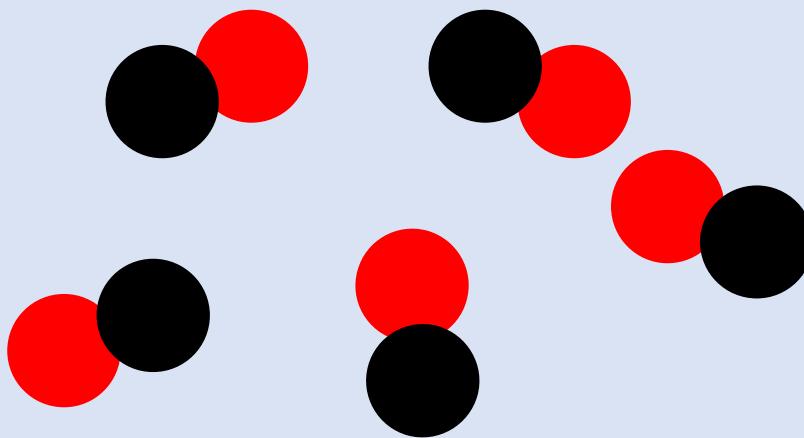
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Element, Compound or Mixture

23/01/2025

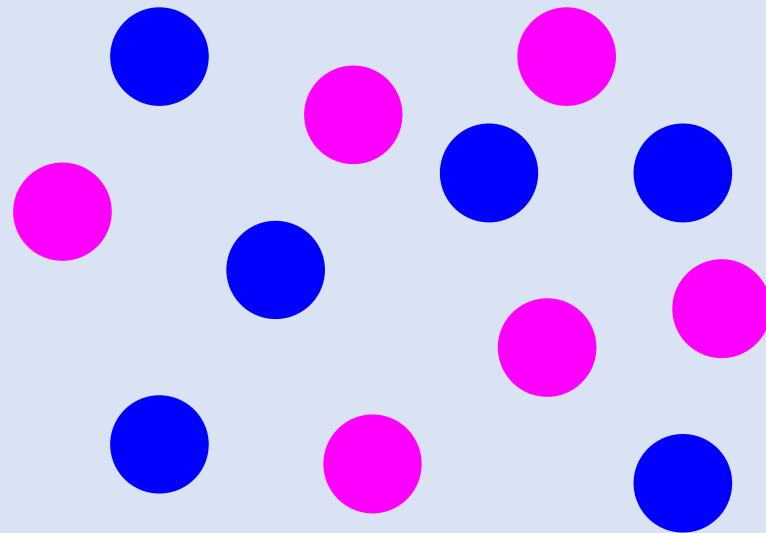
3



Element, Compound or Mixture

23/01/2025

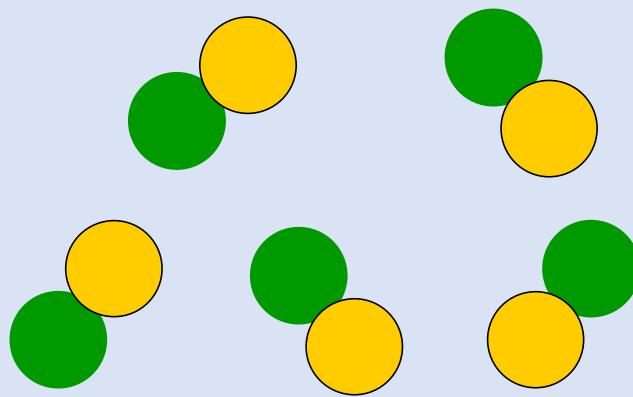
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Element, Compound or Mixture

23/01/2025

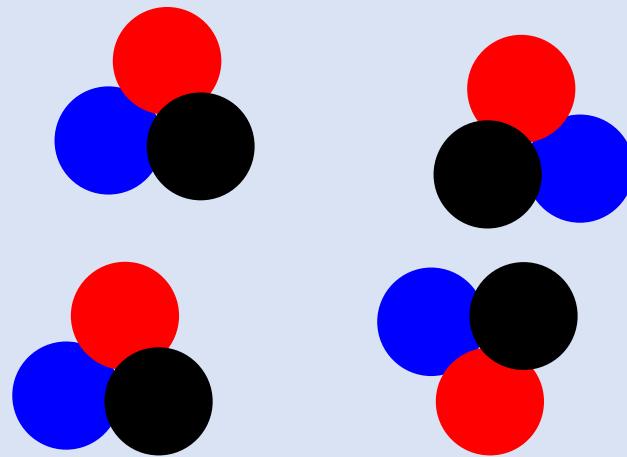
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Element, Compound or Mixture

23/01/2025

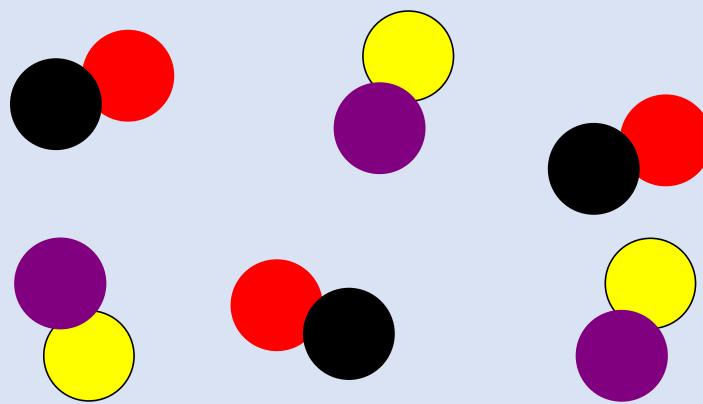
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Element, Compound or Mixture

23/01/2025

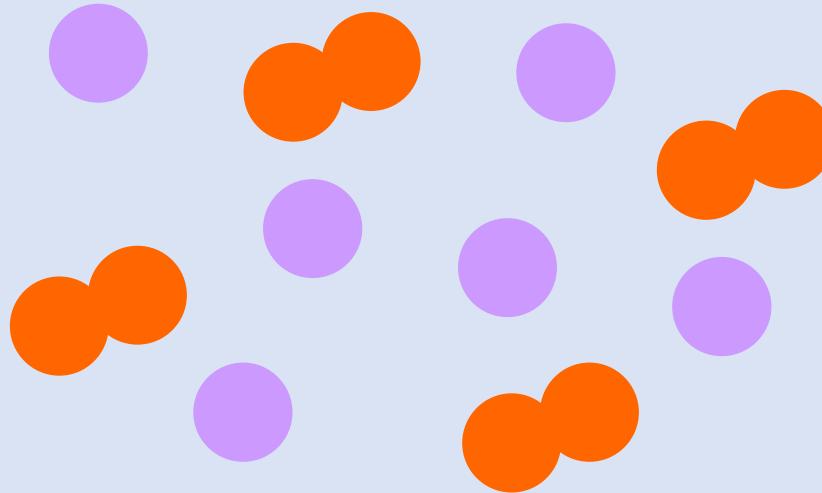
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Element, Compound or Mixture

23/01/2025

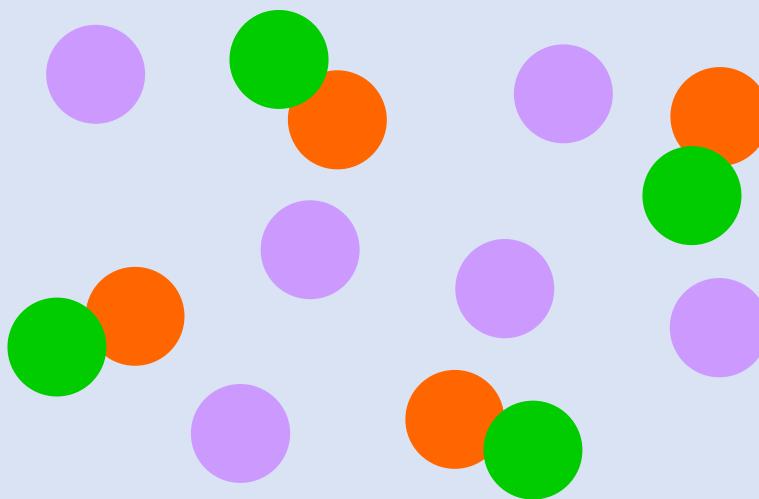
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Element, Compound or Mixture

23/01/2025

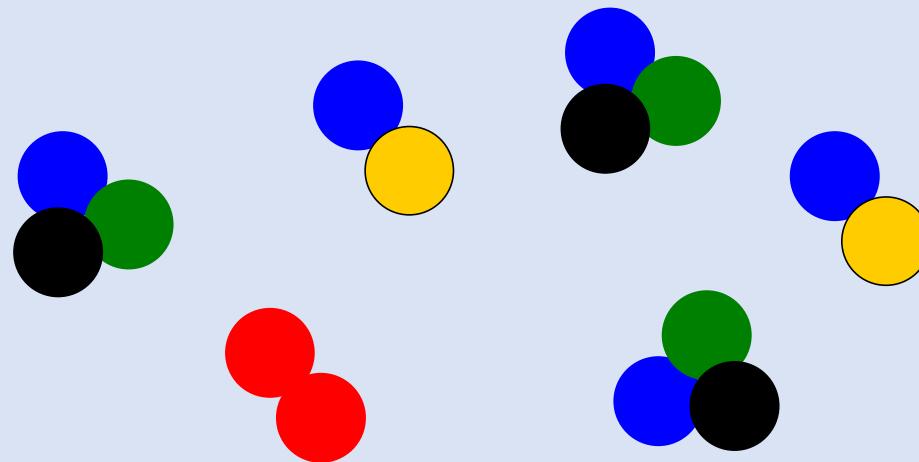
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Element, Compound or Mixture

23/01/2025

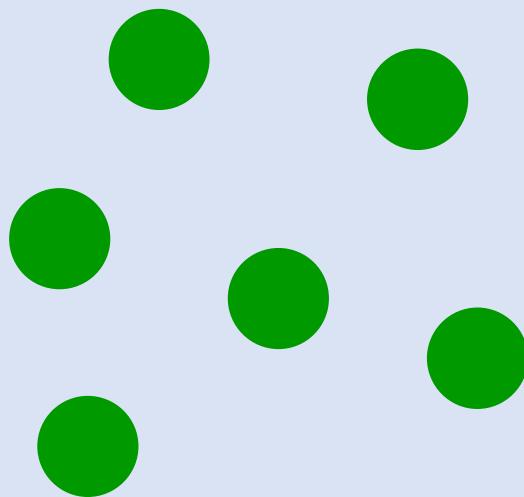
10



Answers – Check your work

23/01/2025

1

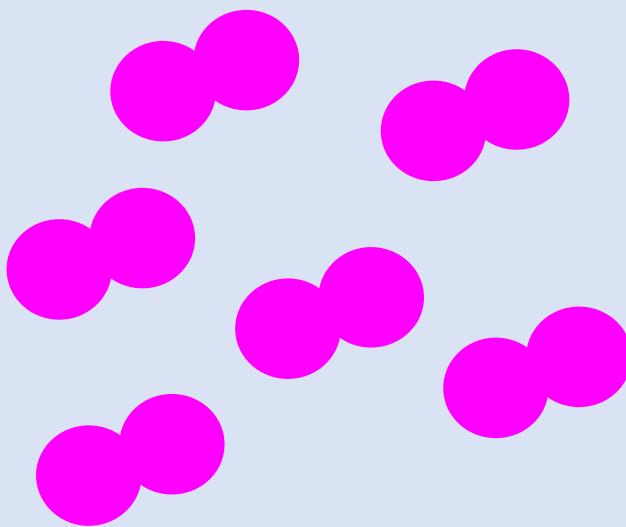


An element

Answers – Check your work

23/01/2025

2

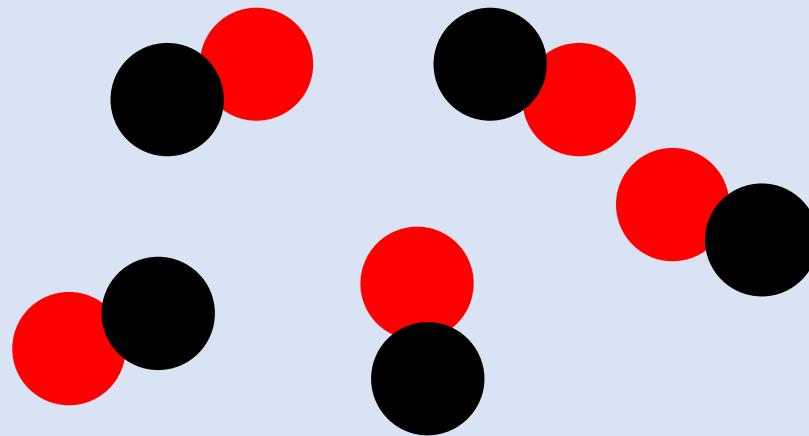


An element

Answers – Check your work

23/01/2025

3

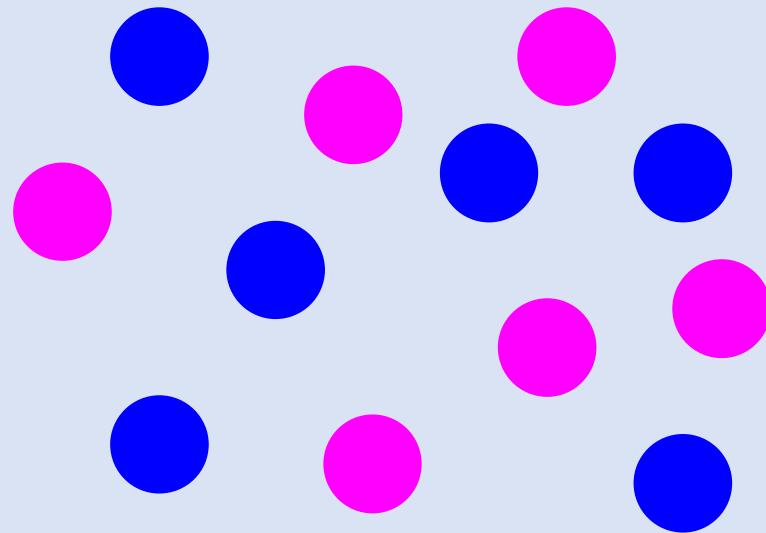


A compound

Answers – Check your work

23/01/2025

4



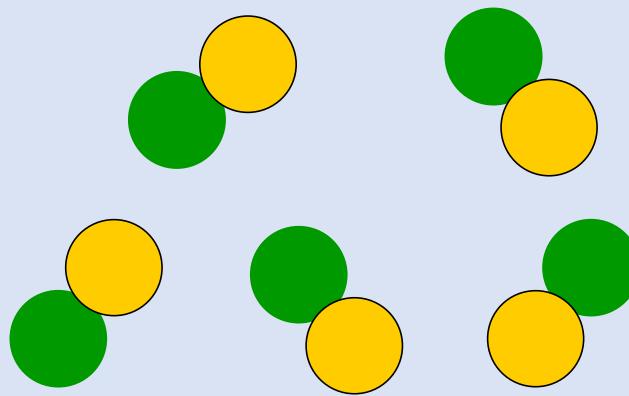
A mixture of two elements

s

Answers – Check your work

23/01/2025

5

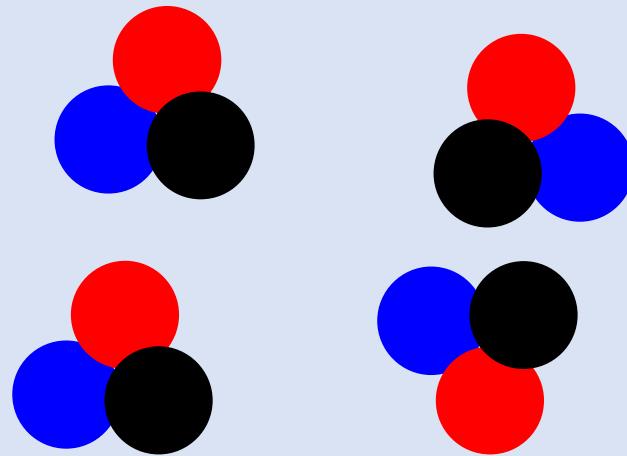


A compound

Answers – Check your work

23/01/2025

6

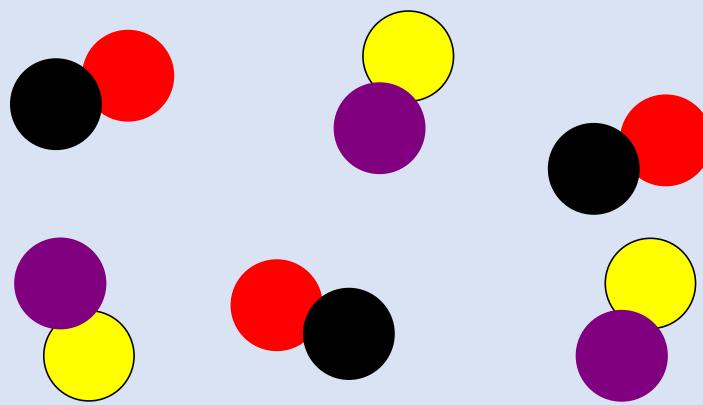


A compound

Answers – Check your work

23/01/2025

7

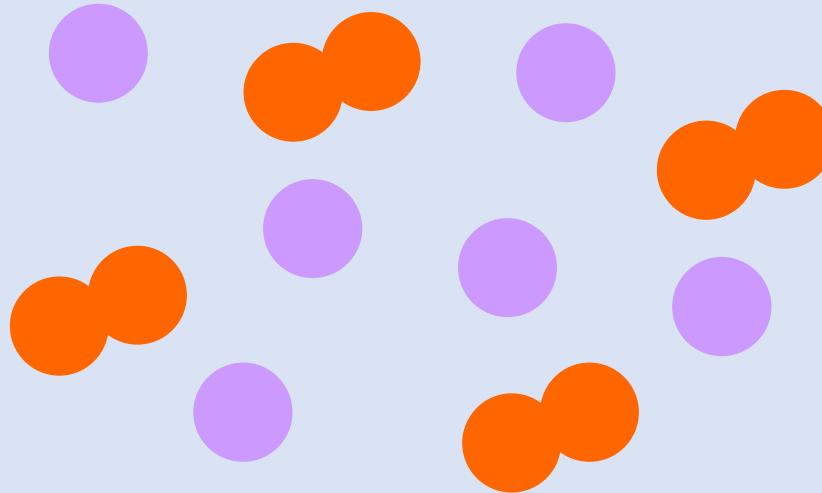


A mixture of two compounds

Answers – Check your work

23/01/2025

8



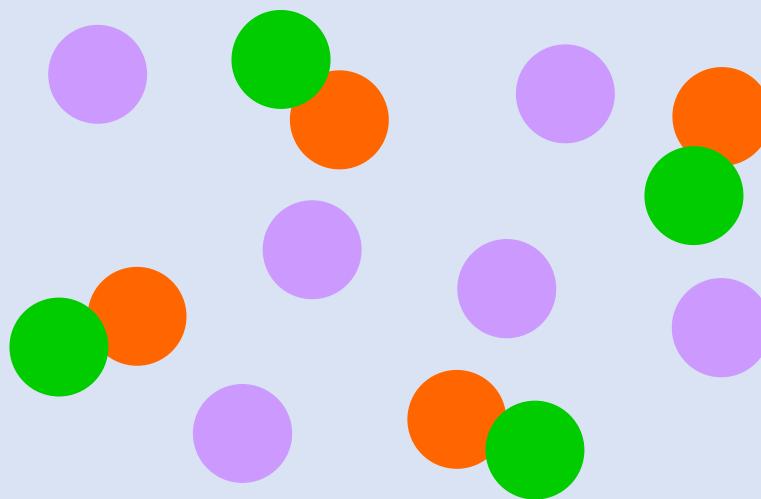
A mixture of two elements

s

Answers – Check your work

23/01/2025

9

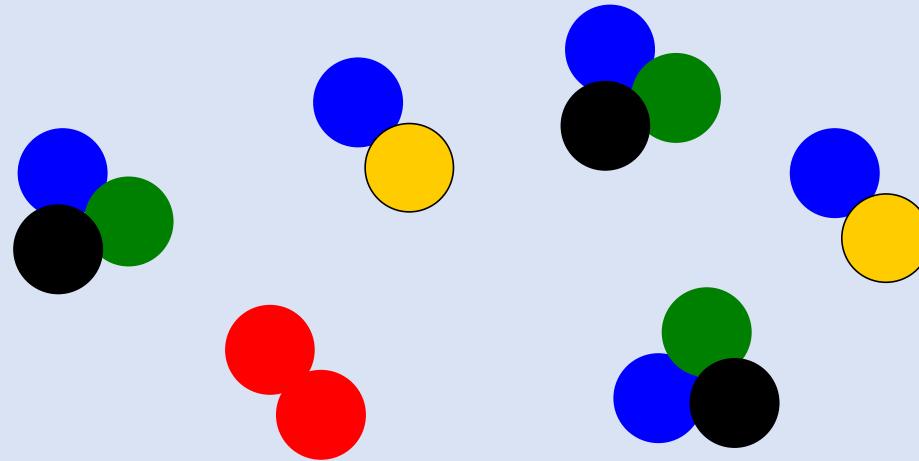


A mixture of an element and a compound

Answers – Check your work

23/01/2025

10



A mixture of an element and two compounds

Mixtures

23/01/2025



You have already learned about Elements of the Periodic Table.

How can we make a mixture?

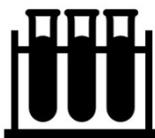


Separating Mixtures

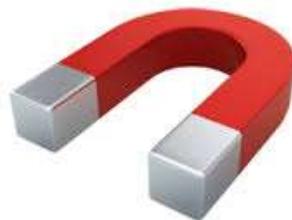
23/01/2025

Page 20

- 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

23/01/2025

Page 20

- 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.

Match the word with the meaning!

1. An element is..

a) not chemically joined and can be separated

2. A mixture is..

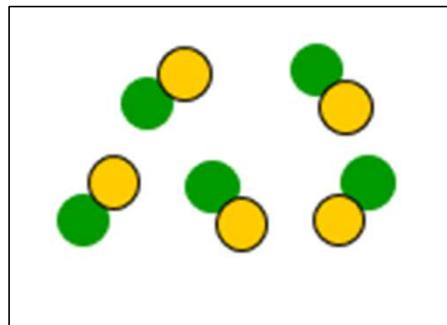
b) two or more atoms of different elements joined together chemically

3. A compound is..

c) made of only one type of atom

Starter:

1. Does this particle diagram show an 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

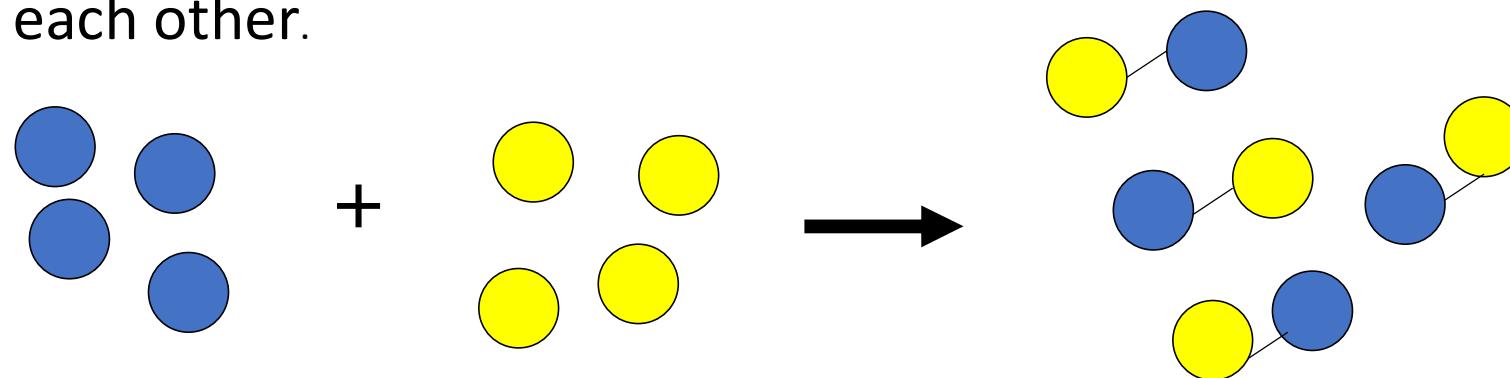
- I can state that a compound is made of two or more elements that are chemically connected to each other.
- I can state that compounds are not easily separated in their parts.

Making a Compounds

23/01/2025

Page 21

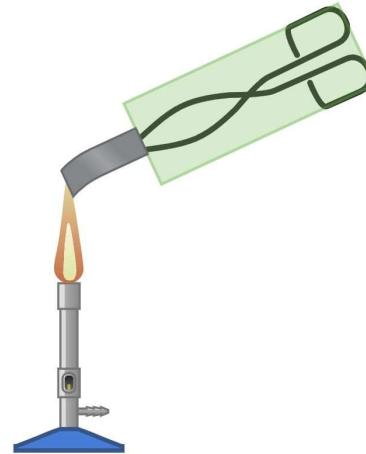
Making a compound often needs energy to make the elements **react** and **connect** to each other.



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

Element	Starting Colour	End Colour	Compound Formed
Magnesium			
Copper			

Word Equation



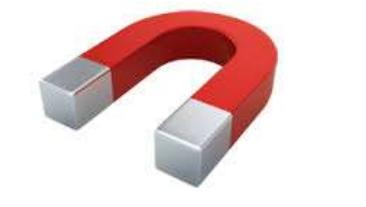
Write the word equation for Magnesium reacting with Oxygen

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 23/01/2025

Compounds containing two elements end with **-ide**

Page 23

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

Example:

Compound

lithium chloride

magnesium oxide

Elements

lithium and chlorine

magnesium and oxygen

Naming Compounds with 2 Elements 23/01/2025

Page 24

Name the following compounds made from the following elements.

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?

Page 24

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

Naming Compounds with 3 Elements 23/01/2025

Page 25

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

copper sulfate

sodium sulfite

Elements

copper, sulfur and oxygen

sodium, sulfur and oxygen

Naming Compounds with 3 Elements 23/01/2025

Which elements are in the following compounds?

Page 25

Element 1	Element 2	Element 3	Name of Compound
Potassium	Nitrogen	Oxygen	
Sodium	Sulfur	Oxygen	
Beryllium	Phosphate	Oxygen	
Aluminium	Chloring	Oxygen	
Phoshporus	Oxygen	Sulfur	
Caesium	Nitrogen	Oxygen	
Oxygen	Copper	Sulfur	

Which elements are in the following compounds?

Page 25

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

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

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

23/01/2025

Page 27

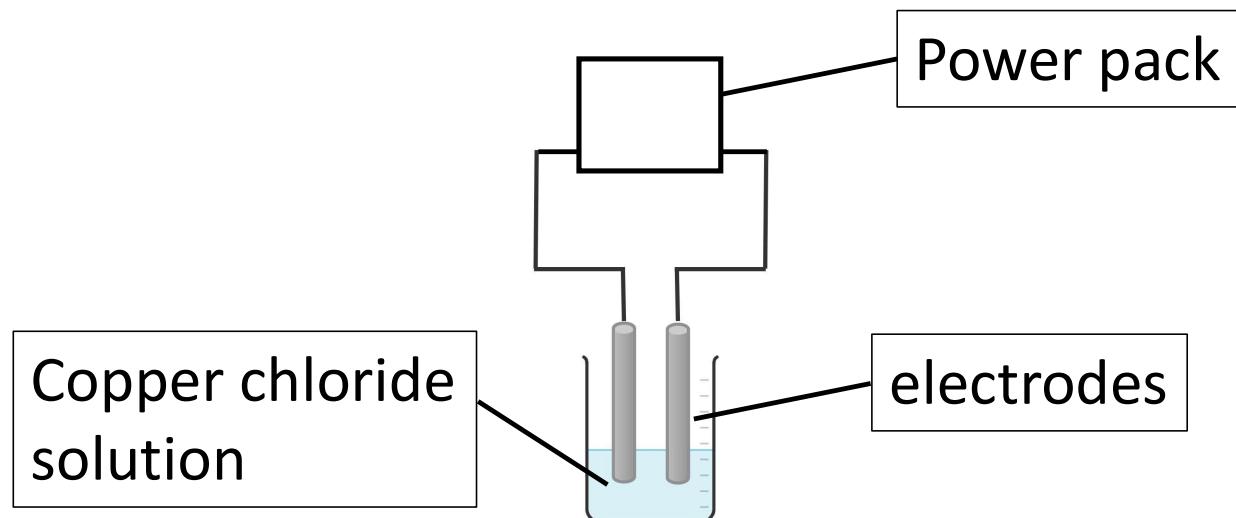
- The connections between elements in a compound are called chemical bonds.
- These are strong and often require energy to be used to break these connections.
- The energy can be supplied as heat, light or electricity.



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.

Separating Compounds

23/01/2025

Page 28

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.

1. Complete the word equation:

Page 28



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

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.



CAPTIVA, FLORIDA

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.

Success Criteria

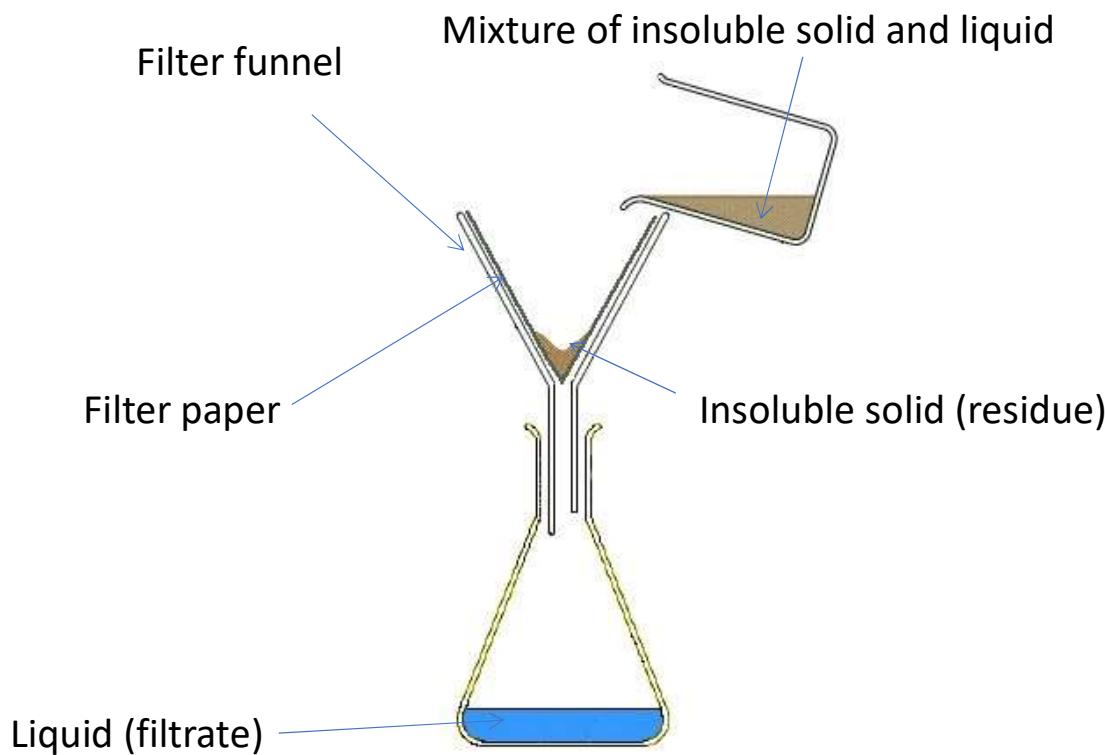
- I can plan my experiment.
- I can safely perform a filtration experiment.
- I can safely perform an evaporation experiment.

- 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

23/01/2025

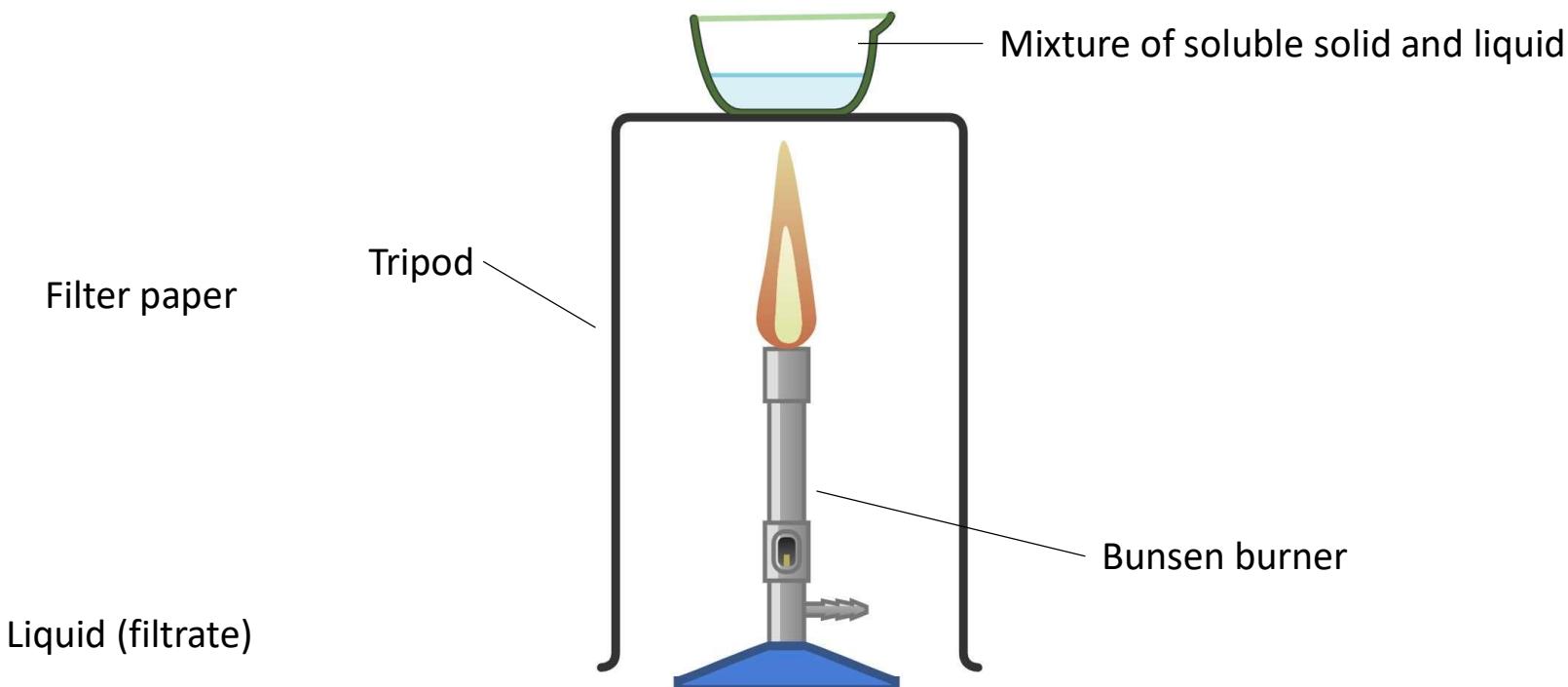
Filtration is used to separate an insoluble solid from a liquid. Solid is collected in the filter paper and the liquid is collected in the flask.



Evaporation

23/01/2025

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



Aim

Page 31

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.

Aim

Page 31

To investigate how to make pure salt

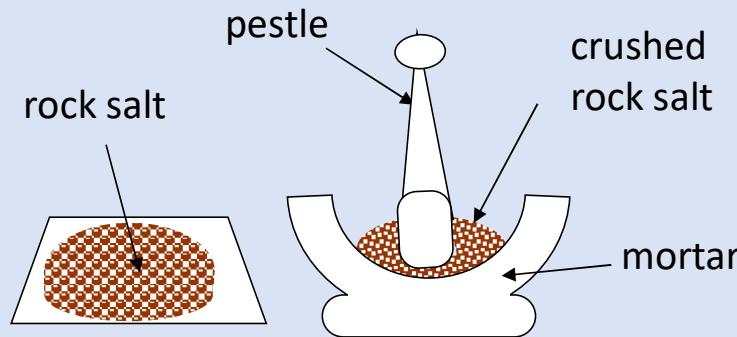
Method

Results

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

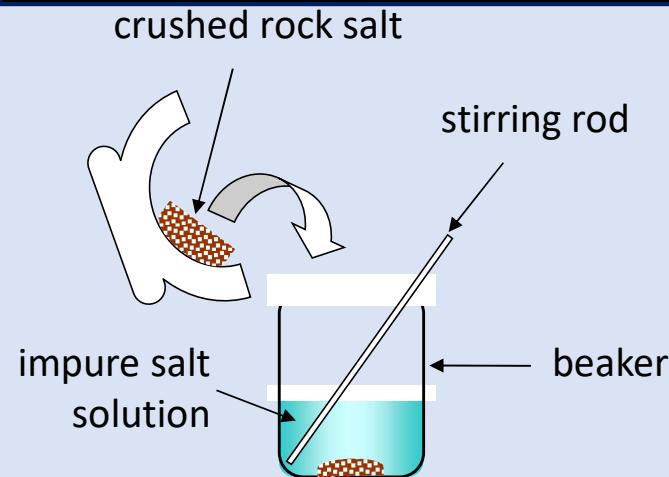
Method

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

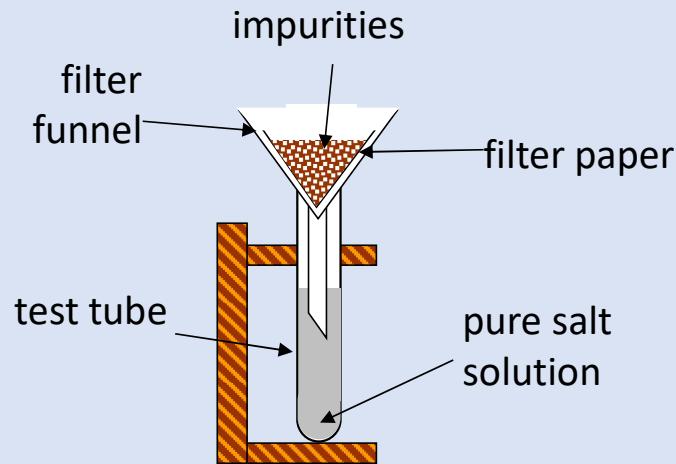


Step 2: Dissolve the salt in 50ml of water

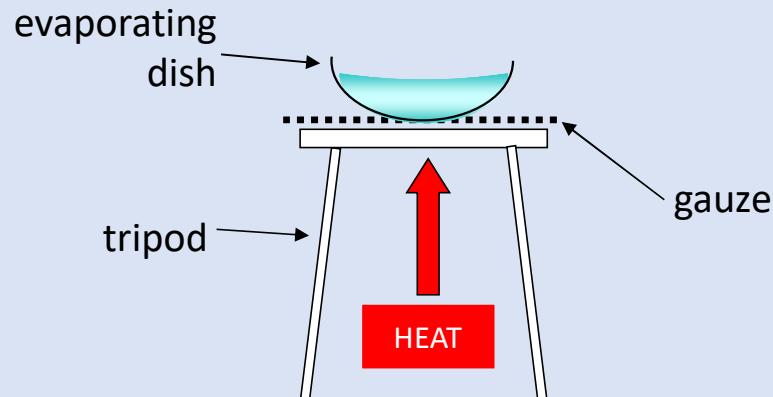
Step 2: Dissolve the salt in 50ml of water



Step 3: Filter the impure salt solution.



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



Purification of Salt from

23/01/2025

Results

Purification step	Observations

Conclusion

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

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

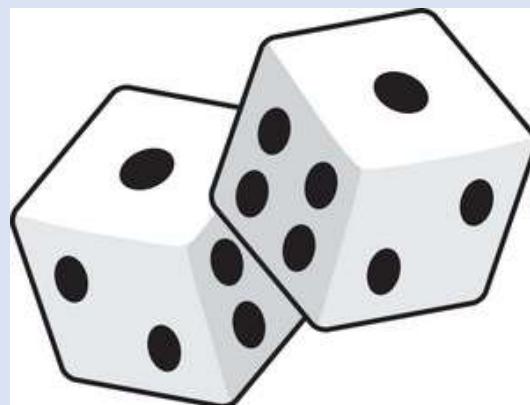
3. You will be given a key word, you must write everything you know about this word.

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.

The Plenary Dice



Put the picture cards in order

Separation Techniques

23/01/2025

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.



CAPTIVA, FLORIDA

Learning Intentions

- To learn about Chromatography as a separation technique.

Success Criteria

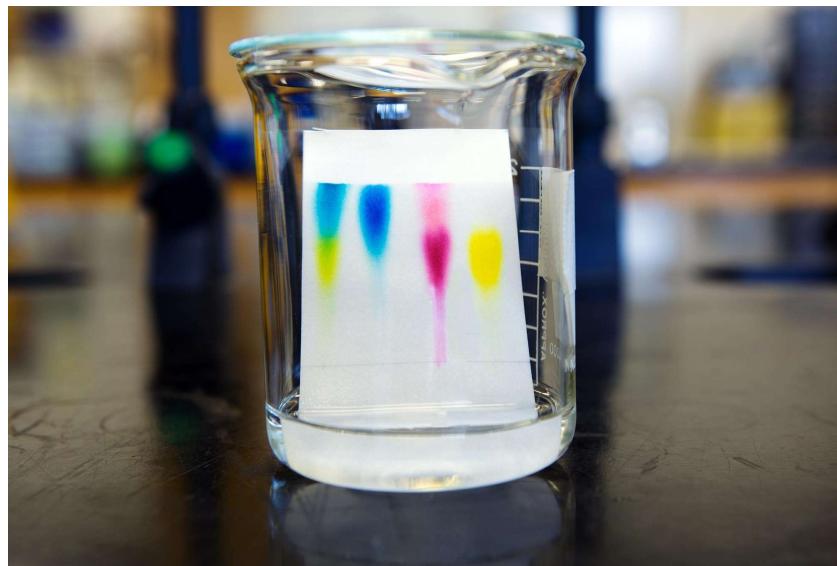
- I can perform a chromatography experiment.
- I can state that chromatography can be used to separate mixture in solution.

Chromatography

23/01/2025

Chromatography means colour writing!

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

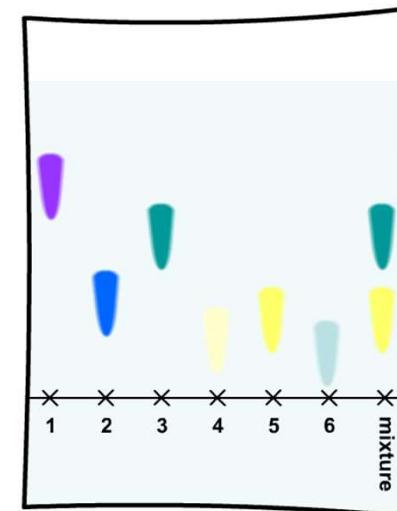
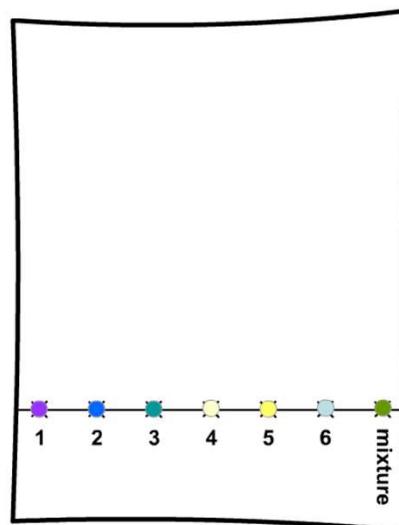


Chromatography

23/01/2025

Chromatography means colour writing!

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

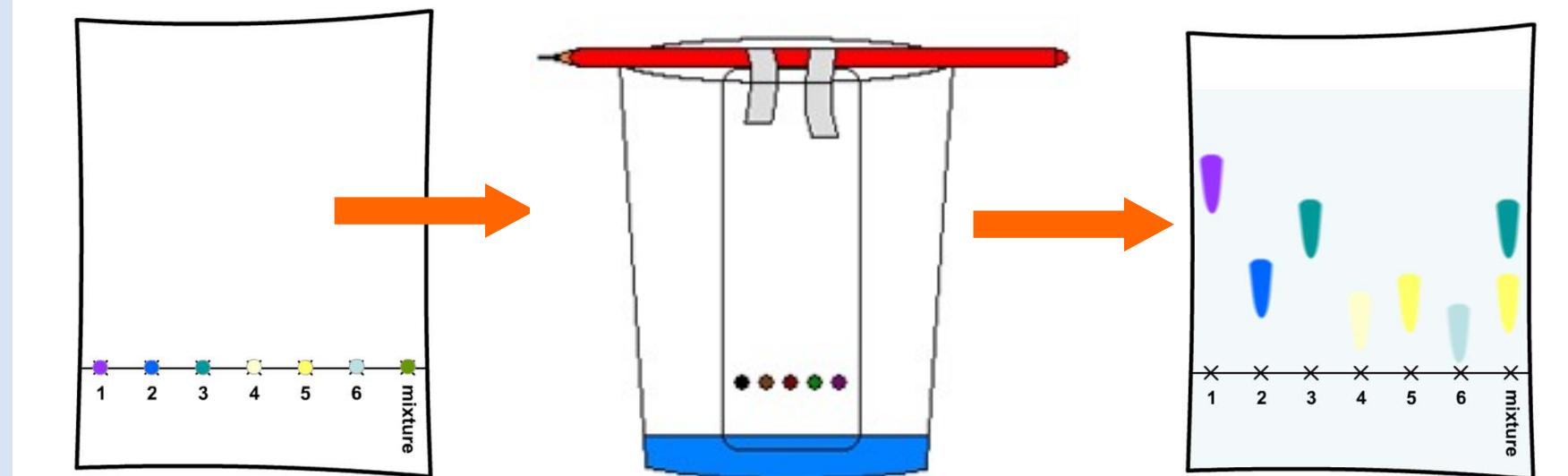


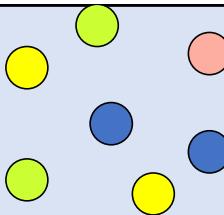
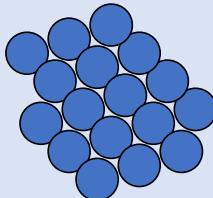
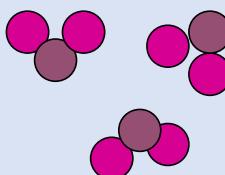
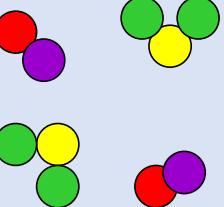
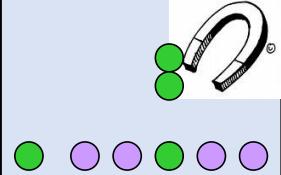
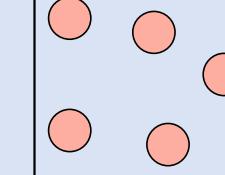
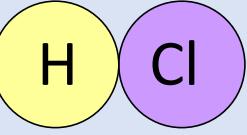
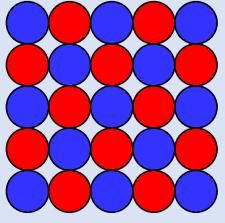
Chromatography

23/01/2025

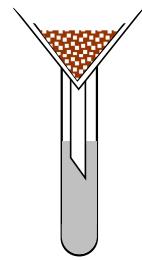
You have two investigations to carry out:

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

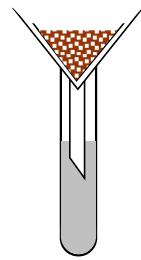


Na	 HELIUM	 salt	Carbon dioxide		 Air
	Contains only 1 type of atom		2 or more elements chemically combined	Components not combined together	
Has a symbol	 Mg MAGNESIUM 12 ²⁴	CuSO_4	Has a formulae		Iron and sulphur in test tube
O_2		 H Cl	Magnesium chloride		Can be easily separated
Cannot be broken down	iron 		 water	 Sea water	 oil water

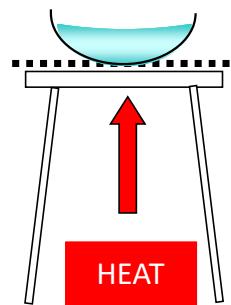
Element	Compound	Mixture



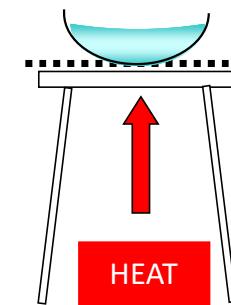
Filtration – used to separate s _____ from a s _____. The solid gets stuck in the f _____ p_____, and the s_____ passes through.



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 solutThe 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.

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

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

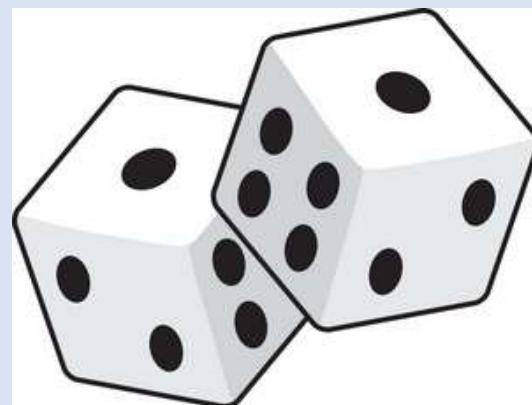
3. You will be given a key word, you must write everything you know about this word.

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.

The Plenary Dice



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 your 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?

Name the Equipment Extension

