

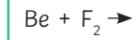
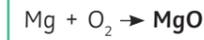
Draw and label an atom. Include labels for the following:
neutron, proton, electron.

True or false?
1. The radius of an atom is 0.1nm.
2. Most of the mass is in the shell of the atom.

What are the symbols for the following elements.

Element	Symbol
oxygen	
lithium	
sodium	
potassium	
helium	
carbon	
magnesium	

Complete and balance the following equations.



Mixtures

Write the definition of a mixture. Give two examples.

Fill in the table to show the charges and mass of the components of an atom.

Name	Charge	Relative Mass
proton		
neutron		
electron		

What is the overall charge of an atom?
positive
negative
no charge

Complete the following diagram for sodium, include the atomic number and the atomic mass number.

Na

What is the mass number?

How do you calculate neutron number?

Name the compounds and the elements they contain.

NaCl - **sodium chloride, sodium and chlorine**

MgO - _____

MgS - _____

FeS - _____

A compound is 2 or more **e**_____, chemically **j**_____.

Which of the following are compounds?
Put a ring round them.

oxygen, salt water, magnesium oxide, sodium chloride, nitrogen

Why have you circled the ones you have?

Isotopes are elements with a different number of **n**_____ but the same number of **p**_____, e.g. carbon 12 and carbon 14.

How can you use isotopes to calculate the relative atomic mass? Write down the equation.

Relative atomic mass (Ar) = $\frac{\text{sum of (_____)}}{\text{mass (Ar)}}$

What is the ratio of the elements in the following compounds?

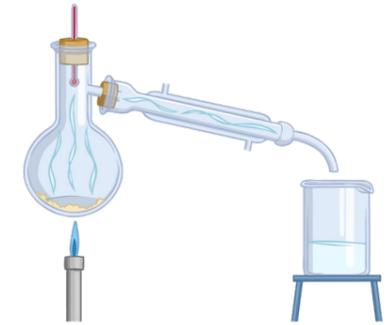
e.g. CaO = 1:1 NaCl =

MgCl₂ = lithium fluoride =

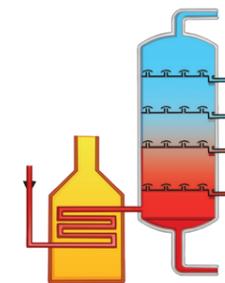
K₂O = sodium hydroxide =

Separating Mixtures

What are the following separation techniques?



D _____



F _____ D _____

What separation technique would you use to separate out different inks in pens?

C _____

How can salt be collected using the process of crystallisation?

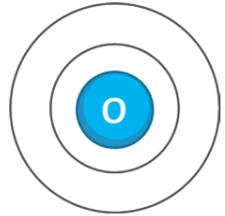
Sand and water can be separated by using a process called

F _____

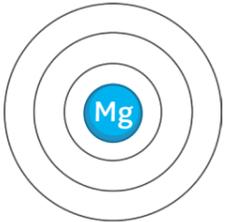
Describe in 4 steps how to collect salt from rock salt.

- _____
- _____
- _____
- _____

Complete the electronic structure diagrams for:
oxygen



magnesium



a

List 3 halogens

c _____, f _____, i _____,

How many electrons do they have in their outer shell?
Circle the correct answer.

a) 1 b) 7 c) 8

Describe how the reactivity changes as you go down the group.
Keywords: reactive, nucleus, distance, less

Write balanced symbol equations for the following reactions:

bromine + potassium iodide

chlorine + sodium iodide

fluorine + potassium chloride

d

Complete the following dot and cross diagrams for:

NaCl

MgO

g

Describe the plum pudding model of the atom.

Draw a diagram.

Why did scientists believe this model?

j

What are the following gases?

A _ _ _ n, N _ _ n, X _ _ _ n, R _ _ _ n

Describe why the noble gases are so unreactive.

Keywords: full, electrons, shell.

The boiling points of the noble gases **increase/decrease** as you go down the group. (delete the wrong answer).

Can you explain your answer?

b

Underline the properties of metals and circle the properties of non-metals:

strong, low density, malleable, dull, good conductors of heat and electricity, high melting and boiling point, brittle, not good conductors of electricity.

e

Complete word equations for the following reactions:

e.g. sodium + chlorine → **sodium chloride**

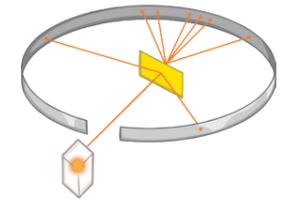
lithium + iodine →

potassium + bromine →

h

Describe what the alpha scattering experiment showed scientists.

Keywords: alpha, gold, positive, gold, scattered particles



k

Describe what happens to the reactivity of the alkali metals as you go down the group.

Why?

Complete the word and symbol equation for sodium reacting with water:

sodium + water → sodium hydroxide + _____

Na + _____ → NaOH + _____

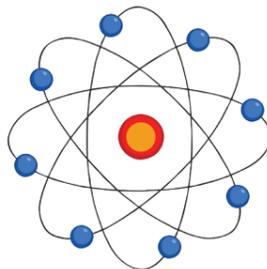
c

James Chadwick discovered the... (underline the correct answer)

proton

neutron

electron



f

How are the groups arranged in the periodic table?

How can you tell that the alkali metals are very reactive?

Hint: Think about the number of electrons in the outer shell.

How can you tell the noble gases are unreactive?

i

Niels Bohr discovered that

Why did Mendeleev leave gaps in the periodic table?

What happened to some of the gaps he left?

l



The **transition** elements are a group of metals with similar properties which are different to the metals in group 1. Shade in the transition metals on the periodic table below.

Circle the transition metals.

Cu Mg Cr Mn Fe Ni Li O N

Complete the sentences below using the keywords to describe the properties of transition metals.

less high conductors coloured

They form _____ compounds when reacting. They are _____ of heat and electricity.

They are malleable. They have _____ densities.

Compared to the alkali metals, they are _____ reactive.

Complete the table to show the ions and colours formed by iron compounds.

Compound Name	Ion	Colour
iron (II) hydroxide	Fe ²⁺	pale green
iron (_____) hydroxide	Fe ³⁺	
iron (III) oxide		



Draw and label an atom. Include labels for the following: neutron, proton, electron.

True or false?

- The radius of an atom is 0.1nm. **True**
- Most of the mass is in the shell of the atom. **False, most of the mass is in the centre**

What are the symbols for the following elements.

Element	Symbol
oxygen	O
lithium	Li
sodium	Na
potassium	K
helium	He
carbon	C
magnesium	Mg

Complete and balance the following equations.

$$\text{Mg} + \text{O}_2 \rightarrow \text{MgO}$$

$$\text{Be} + \text{S} \rightarrow \text{BeS}$$

$$\text{Be} + \text{F}_2 \rightarrow \text{BeF}_2$$

$$\text{K} + \text{Cl}_2 \rightarrow 2\text{KCl}$$

Separating Mixtures
What are the following separation techniques?

Fill in the table to show the charges and mass of the components of an atom.

Name	Charge	Relative Mass
proton	+1	1
neutron	0	1
electron	-1	very small

What is the overall charge of an atom?
No charge

Complete the following diagram for sodium, include the atomic number and the atomic mass number.

23 mass number

Na

11 atomic number

What is the mass number?
Total number of protons and neutrons.

How do you calculate neutron number?
Atomic mass - proton number

Mixtures
Write the definition of a mixture. Give two examples.
Two or more elements together, not chemically joined and can be easily separated.

Salt water, sand and water

Distillation

Fractional distillation

A compound is 2 or more **elements**, chemically **joined**.

Which of the following are compounds?
Put a ring round them.

oxygen, salt water, **magnesium oxide**, **sodium chloride**, nitrogen

Why have you circled the ones you have?
They have 2 or more elements in the word equation.

Isotopes are elements with a different number of **neutrons** but the same number of **protons**, e.g. carbon 12 and carbon 14.

How can you use isotopes to calculate the relative atomic mass? Write down the equation.

$$A_r = \frac{\text{sum of (isotope abundance} \times \text{isotope mass number)}}{\text{sum of abundances of all the isotopes.}}$$

Name the compounds and the elements they contain.

NaCl - **sodium chloride, sodium and chlorine**

MgO - **magnesium oxide, magnesium and oxygen**

MgS - **magnesium sulfide, magnesium and sulfur**

FeS - **iron sulfide, iron and sulfur**

What is the ratio of the elements in the following compounds?

e.g. CaO = 1:1 NaCl = 1:1

MgCl₂ = 1:2 lithium fluoride = 1:1

K₂O = 2:1 sodium hydroxide = 1:1:1

What separation technique would you use to separate out different inks in pens?
Chromatography

How can salt be collected using the process of crystallisation?
By heating up a mixture of salt and water, the water will evaporate and leave the salt in the bowl.

Sand and water can be separated by using a process called **filtration**.

Describe in 4 steps how to collect salt from rock salt.

- Grind the mixture;**
- Add water and stir;**
- Filter the mixture;**
- Evaporate the salt water and salt is left over.**

Complete the electronic structure diagrams for:

oxygen

magnesium

What are the following gases?
argon, neon, xenon, radon

Describe why the noble gases are so unreactive.
Their outer shell is full of electrons.

The boiling points of the noble gases **increase** as you go down the group.
This is because there are more forces to bond the atoms together, therefore more energy is required to break the bonds.

Describe what happens to the reactivity of the alkali metals as you go down the group.
It increases

Why?
The number of electrons increases. They are further away from the nucleus. There is less pull on the outer electrons so the atom is more likely to lose an electron.

Complete the word and symbol equation for sodium reacting with water:
sodium + water → sodium hydroxide + hydrogen

$$2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$$

List 3 halogens
chlorine, fluorine, iodine, astatine

How many electrons do they have in their outer shell?
7 electrons

Describe how the reactivity changes as you go down the group.
They become less reactive, the atom becomes larger because there are more electron shells, further from the nucleus so the pull of the nucleus is less. So the electron is less likely to be gained as there is less of a positive pull.

Write balanced symbol equations for the following reactions:

bromine + potassium iodide
 $\text{Br}_2 + 2\text{KI} \rightarrow 2\text{KBr} + \text{I}_2$

chlorine + sodium iodide
 $\text{Cl}_2 + 2\text{NaI} \rightarrow 2\text{NaCl} + \text{I}_2$

fluorine + potassium chloride
 $\text{F}_2 + 2\text{KCl} \rightarrow 2\text{KF} + \text{Cl}_2$

Underline the properties of metals and circle the properties of non-metals:

strong, low density, malleable, dull, good conductors of heat and electricity, high melting and boiling point, brittle, not good conductors of electricity

James Chadwick discovered the...
(underline the correct answer)

proton

neutron

electron

Complete the following dot and cross diagrams for:

NaCl

MgO

Complete word equations for the following reactions:

sodium + chlorine → **sodium chloride**

lithium + iodine → **lithium iodide**

potassium + bromine → **potassium bromide**

How are the groups arranged in the periodic table?
According to their properties.

How can you tell that the alkali metals are very reactive?
According to their properties.

How can you tell the noble gases are unreactive?
Full shell of outer electrons.

Describe the plum pudding model of the atom.
Draw a diagram.
A sphere of positive charge with electrons dotted about; looking like a plum pudding.

Why did scientists believe this model?
Lack of experimental evidence.

Describe what the alpha scattering experiment showed scientists.
Most alpha particles go straight through, some are scattered, some rebound off the gold foil. This shows that the nucleus of an atom has a very small radius. Most of the mass is concentrated in the nucleus.

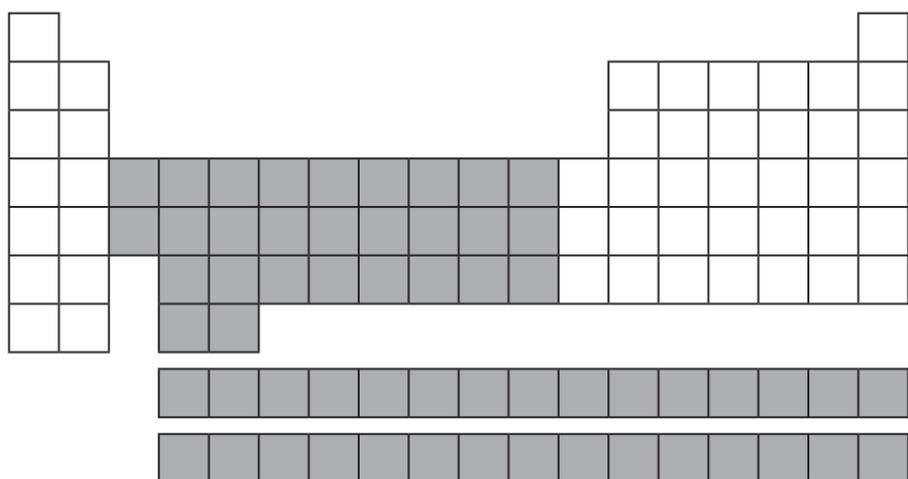
Niels Bohr discovered that
electrons orbit the nucleus in shells.

Why did Mendeleev leave gaps in the periodic table?
He knew that the elements existed but they hadn't been found, based on their mass.

What happened to some of the gaps he left?
They have been filled. Scientists have found some of the elements.



The **transition** elements are a group of metals with similar properties which are different to the metals in group 1. Shade in the transition metals on the periodic table below.



Circle the transition metals.

Cu Mg **Cr** **Mn** **Fe** **Ni** Li O N

Complete the sentences below using the keywords to describe the properties of transition metals.

less high conductors coloured

They form **coloured** compounds when reacting. They are **conductors** of heat and electricity.

They are malleable. They have **high** densities.

Compared to the alkali metals, they are **less** reactive.

Complete the table to show the ions and colours formed by iron compounds.

Compound Name	Ion	Colour
iron (II) hydroxide	Fe ²⁺	pale green
iron (III) hydroxide	Fe ³⁺	orange-brown
iron (III) oxide	Fe ³⁺	red-brown

