a

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.

b

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

c

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?

_____

_____

d

What are the symbols for the following elements.

Element	Symbol
oxygen	
lithium	
sodium	
potassium	
helium	
carbon	
magnesium	

e

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?

f

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 = sum of (_____)
mass (Ar)

g

Complete and balance the following equations.

$Mg + O_2 \rightarrow$ **MgO**

$Be + S \rightarrow$ **BeS**

$Be + F_2 \rightarrow$

$K + Cl_2 \rightarrow$

h

Mixtures

Write the definition of a mixture. Give two examples.

_____

_____

_____

_____

_____

i

Name the compounds and the elements they contain.

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

MgO - _____

MgS - _____

FeS - _____

j

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

e.g. CaO = 1:1

NaCl =

$MgCl_2$ =

lithium fluoride =

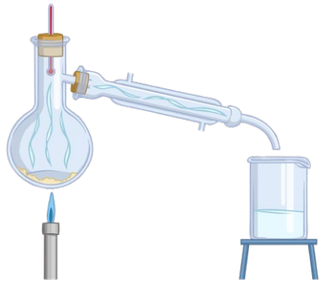
K_2O =

sodium hydroxide =

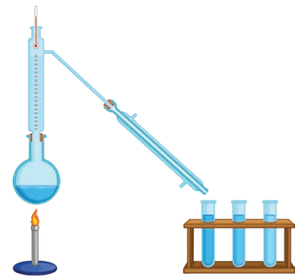
k

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**_____

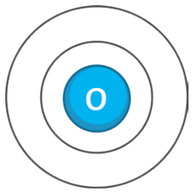
Describe in 4 steps how to collect salt from rock salt.

1. _____
2. _____
3. _____
4. _____

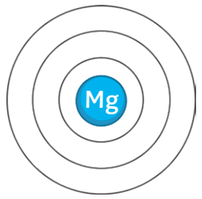
a

Complete the electronic structure diagrams for:

oxygen



magnesium



b

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?

_____

_____

c

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 + _____

d

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

e

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.

f

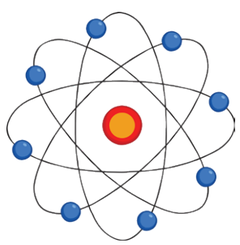
James Chadwick discovered the...

(underline the correct answer)

proton

neutron

electron



g

Complete the following dot and cross diagrams for:

NaCl

MgO

h

Complete word equations for the following reactions:

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

lithium + iodine ➔

potassium + bromine ➔

i

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?

_____

_____

j

Describe the plum pudding model of the atom.

Draw a diagram.

_____

_____

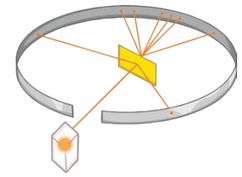
Why did scientists believe this model?

_____

k

Describe what the alpha scattering experiment showed scientists.

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



_____

_____

_____

l

Niels Bohr discovered that

_____

_____

Why did Mendeleev leave gaps in the periodic table?

_____

_____

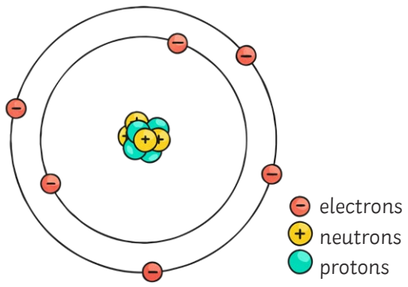
What happened to some of the gaps he left?

_____

_____

a

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. **True**
2. Most of the mass is in the shell of the atom. **False, most of the mass is in the centre**

b

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	1

What is the overall charge of an atom?
No charge

c

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.

d

What are the symbols for the following elements.

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

e

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

f

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.

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

g

Complete and balance the following equations.

$2Mg + O_2 \rightarrow$ **$2MgO$**

$Be + S \rightarrow$ **BeS**

$Be + F_2 \rightarrow$ **BeF_2**

$2K + Cl_2 \rightarrow$ **$2KCl$**

h

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

i

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 sufide, iron and sulfur**

j

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

e.g. CaO = 1:1

$MgCl_2$ = **1:2**

K_2O = **2:1**

NaCl = **1:1**

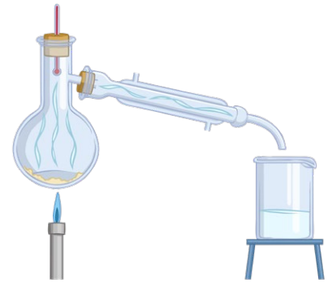
lithium fluoride = **1:1**

sodium hydroxide = **1:1:1**

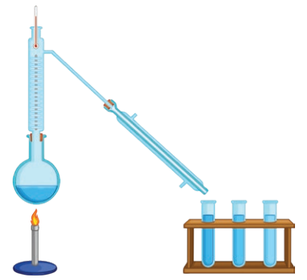
k

Separating Mixtures

What are the following separation techniques?



Distillation



Fractional distillation

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.**

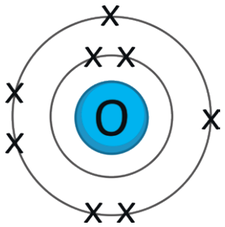
Describe in 4 steps how to collect salt from rock salt.

1. **Grind the mixture;**
2. **Add water and stir;**
3. **Filter the mixture;**
4. **Evaporate the salt water and salt is left over.**

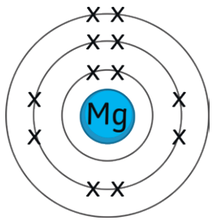
a

Complete the electronic structure diagrams for:

oxygen



magnesium



b

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.

c

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 loose an electron.

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

sodium + water → sodium hydroxide + **hydrogen**

2Na + **2H_2O** → **2**NaOH + **H_2**

d

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

Br_2 + 2KI → 2KBr + I_2

chlorine + sodium iodide

Cl_2+ 2NaI → 2NaCl + I_2

fluorine + potassium chloride

F_2 + KCl → 2KF + Cl_2

e

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

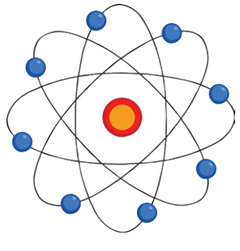
f

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

proton

neutron

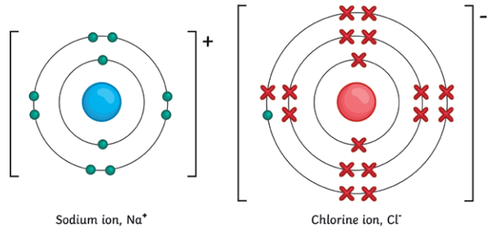
electron



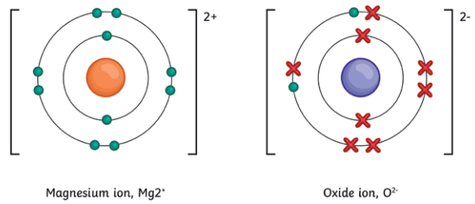
g

Complete the following dot and cross diagrams for:

NaCl



MgO



h

Complete word equations for the following reactions:

sodium + chlorine → **sodium chloride**

lithium + iodine → **lithium iodide**

potassium + bromine → **potassium bromide**

i

How are the groups arranged in the periodic table?

According to their properties.

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

They only have 1 electron in their outer shell.

How can you tell the noble gases are unreactive?

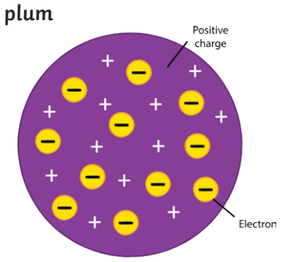
Full shell of outer electrons.

j

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.



Plum pudding model

Why did scientists believe this model?

Lack of experimental evidence.

k

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.

l

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.