keep it simple science

KEEP IT SIMPLE SCIENCE

KISS topic number → Topic 10.8C ← Year level designation in Nat.Curriculum

Science Understanding Strand
B = Biological Sciences
C = Chemical Sciences
E = Earth & Space Sciences
P = Physical Sciences

Elements & Compounds

Year 8 Chemical Sciences

WORKSHEETS

Attention Teachers

INSPECTION COPY for schools only

1.
KISS Worksheets are designed to consolidate students' knowledge & understanding and/or develop or practice a skill, such as graphing, calculating, reporting prac.work, etc. Some are suitable to issue as homework assignments. Some can be used as a "quick quiz".

2.
In both the "PhotoMaster" and "OnScreen" resources, an information box (as shown) indicates the appropriate point for each worksheet to be completed.

Please complete Worksheets 1 & 2 before going on.

3.
KISS Worksheets are formatted for photocopying so that they may be used as in-class paper exercises, quiz tests or homework assignments.

They can also be converted for use as Microsoft Word™ documents, or with software allowing annotations, (eg Microsoft OneNote™) or apps such as "Notability"™ and "iAnnotate PDF"™ in tablets & iPads. This allows KISS Worksheets to be completed by students in their computer, then submitted by email, for example.

Answer Section begins on p8

Suggested answers to the "Discussion / Activity" pages ("OnScreen" resources) are in a separate file in the folder for this topic.

keep it simple science

Make your own "Mind-Map" TITLE PAGE.
Cut out the boxes. Sort them into an appropriate lay-out on a page of your workbook, then glue them down.
Add connecting arrows and colour in.

Elements & Compounds

Compounds v. Mixtures

The Elements

Particles & Atoms

Chemical Compounds

Chemical Reactions

Physical Changes & Chemical Changes

Metals & Non-Metals

Introduction to the Periodic Table

Make your own "Mind-Map" TITLE PAGE.
Cut out the boxes. Sort them into an appropriate lay-out on a page of your workbook, then glue them down. Add connecting arrows and colour in.

Elements & Compounds

Compounds v. Mixtures

The Elements

Particles & Atoms

Chemical Compounds

Chemical Reactions

Physical Changes & Chemical Changes

Metals & Non-Metals

Introduction to the Periodic Table

keep it simple science

Worksheet 1

Student Name.....

The Elements

Fill in the blank spaces.

The ancient Greek, a)..... believed that everything was made of 4 "elements"; earth, air, b)..... and .....

The aim of Alchemy was to turn ordinary metals into c)..... and to find a chemical which could make a person d).....

While searching for these impossible chemicals, the alchemists discovered many new chemicals and invented equipment and processes such as filtration and e).....

By learning to break chemicals down into the simplest parts ("f).....") the true concept of a chemical element was finally discovered.

We now know there are about g)..... naturally occurring elements. These are listed on the h)..... Table. Each element has its own unique i)..... and j)..... number.

An element can be defined as a substance composed of atoms which are k)..... ..... It can also be defined as a substance which cannot be l)..... into anything simpler.

Each element's atoms have the same number of m).....
This number is equal to the n)..... ..... shown on the Periodic Table.

Worksheet 2

Elements & Periodic Table

Student Name.....

Search the Periodic Table and find the information to complete the table

Element Name	Chemical Symbol	Atomic Number	Number of Electrons in each atom
Zinc			
Krypton			
	Ne		
	Ba		
		15	
		74	
			11
			53
Fluorine			
		79	
	Am		

keep it simple science

Worksheet 3

Student Name.....

Names of the Elements

INSPECTION COPY for schools only

1. At least 6 of the elements were named after countries (or places) of the world. Search the Periodic Table and find 2.

Name	Atomic No.
.....	.....
.....	.....

2. About a dozen elements have been named in honour of famous scientists. List 2 of these. (hint: very high atomic numbers)

Name	Atomic No.
.....	.....
.....	.....

3.
Some minerals have been named because they contain a lot of certain elements, or the element was named after being discovered in that mineral.
Can you find them?

Mineral	Element	At. No.
Calcite	.....	.....
Fluorite	.....	.....
Beryl	.....	.....
Zircon	.....	.....

Worksheet 4

Student Name.....

Classifying the Elements

Solid, Liquid or Gas?

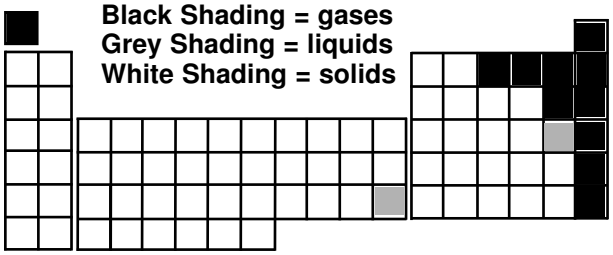
The vast majority of the elements are solid at "room temperature". About a dozen are gases. Only 2 are liquids.
(In Chemistry, "room temperature" is defined to be 25ºC)

1.
Use the information on the right, and refer to a Periodic Table to list all the elements which are liquids at room temperature.

Atomic Number	Name	Symbol
.....	.....	.....
.....	.....	.....

2. List all the elements which are gases at room temperature.

.....	.....	.....
.....	.....	.....



Q2 (cont)

Atomic Number	Name	Symbol
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

keep it simple science

Worksheet 5

Student Name.....

Metals & Non-Metals

Most of the elements are metals.
They typically have these properties:

They are a)..... in appearance.

They are good b)..... of both electricity and c).....

They are d)....., which means they can be flattened into sheets.

They are e)....., which means they can be drawn out into wires.

At room temperature, they are all f)....., except the liquid metal g).....

In contrast, the non metals are generally:
h)..... in appearance.

poor i)..... of electricity.

j)....., which means they will shatter or snap if hammered or stretched.

Many are solids, but there are also many k)..... and 1 liquid.

In the l)..... Table, the non-metals are clustered in the
m)..... (top or bottom)
n)..... (left or right)

Worksheet 6
Useful Elements

Student Name.....

1. We use the element <u>copper</u> for electrical wires. Which 2 typical properties of a metal make it suitable for this use?

2. Aluminium is familiar to you in the form of <u>aluminium foil</u>. Which property of metals allows thin sheets of aluminium to be made like this?

3. Pure <u>iodine</u> is a solid non-metal, in the form of shiny, purple crystals. What do you expect to happen if you were to tap it with a hammer? Explain.

4. Silicon is an element used to make "silicon chips" for computer circuits. Silicon is <u>shiny</u>, <u>brittle</u> and a "<u>semi-conductor</u>" of electricity. On balance, should we classify silicon as metal or non-metal? Explain.

5. <u>Helium</u> is a gas with such low density that it can make balloons rise into the air.
a) Why do you think it has such a low density?

b) There is one other element which can also lift balloons. Name it.

c) Of these 2, helium is preferred.
Find out why.

keep it simple science

Worksheet 7

Student Name.....

Compounds & Reactions.

Fill in the blank spaces.

A compound is formed when 2 or more a)..... combine. The atoms are not just mixed but are chemically b)..... together to form a new particle called a c).....

The elements always combine in a fixed d)..... which is described by the chemical e)..... for that compound. For example, H_2O means that there are 2 atoms of f)..... and 1 atom of g)..... in each molecule of h).....

The properties of a compound are usually i)..... compared to the properties of the elements in the compound.

When a chemical reaction occurs, the atoms remain the same, but are j)..... to form new substances. The signs of a chemical change are that:

- original substance(s) k).....
- new substance(s) l)..... This may show as a change of m)....., or n)..... of a gas.
- the o)..... changes.

Compounds are p)..... substances and cannot be separated by any q)..... process. They can be chemically split into r)..... by the process of s).....

Worksheet 8

Student Name.....

Chemical Formulas. Physical & Chemical Changes

1. For each compound below, state which elements are present, and how many atoms of each are in 1 molecule.
The first one is done for you.

a) Water, H_2O contains:

2 atoms of hydrogen & 1 atom of oxygen

b) carbon dioxide, CO_2 contains:

.....

c) aluminium chloride. $AlCl_3$ contains

.....

d) ethane, C_2H_6 contains

.....

e) copper sulfate, $CuSO_4$ contains

.....

2. For each change described, state if it is a physical change, or a chemical change.

a) melting ice .....

b) burning paper .....

c) grinding sugar to a powder .....

d) collecting clear water by filtering mud .....

e) decomposing salt to sodium and chlorine .....

f) mixing two solutions which change colour and form a sediment .....

g) water is heated so that bubbles of steam form .....

h) water is zapped with electricity so that bubbles of hydrogen and oxygen form .....

keep it simple science

Topic Test

Student Name.....

Elements & Compounds

Score / 22

Answer all questions in the spaces provided.

1. (8 marks)

True or False?	(T or F?)
a) Alchemy was mainly concerned with making gold.	.....
b) There are about 20-30 chemical elements.	.....
c) The atoms of an element are all the same as each other.	.....
d) An element can be chemically decomposed into simpler things.	.....
e) Every metal is a solid at room temperature.	.....
f) Non-metals are found on the left side of the Periodic Table.	.....
g) A compound contains elements chemically bonded together.	.....
h) Compounds can be decomposed into elements.	.....

2. (6 marks)

a) The ancient Greek, Aristotle, believed that everything was composed of just 4 basic substances, or "elements". Name 2 of Aristotle's elements.

..... and .....

b) If the atoms of 2 different elements are represented by these symbols, ○ ● use a sketch to show:

i) a mixture of these elements.

ii) a compound of these elements.

c) List 2 things you might observe or measure which indicate that a chemical reaction has occurred.

3. (5 marks)

Give one word for:

a) a substance which cannot be separated by any physical processes, but can be decomposed chemically into simpler substances.

.....

b) the general name for a shiny, malleable element which conducts electricity.

.....

c) a substance which can be separated into parts by physical processes.

.....

d) the property of being able to stretch a substance to form wires.

.....

e) a substance which cannot be decomposed into any simpler substances.

.....

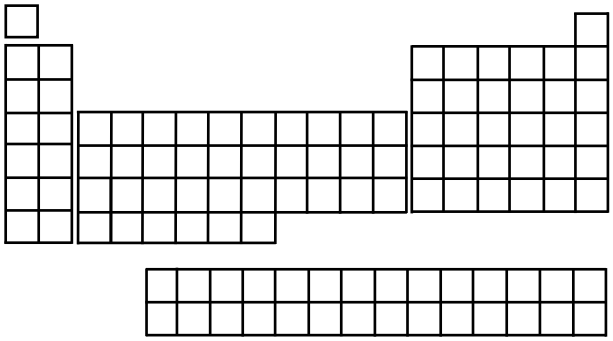
4. (3 marks)

Answer each part by clearly marking the blank Periodic Table as instructed.

a) Write "a" where you would find an element which is a gas at room temperature.

b) Rule a straight line to show the approximate dividing line between the "metals" and the "non-metals". Indicate on which side of the dividing line the "metals" are located.

c) Write "c" to show the location of the element with Atomic Number = 11.



keep it simple science

Answer Section

Worksheet 1

a) Aristotle
b) fire and water
c) gold
d) immortal
e) distillation / crystalisation, etc
f) decomposition
g) 90
h) Periodic
i) symbol
j) Atomic
k) identical
l) decomposed
m) electrons
n) Atomic Number

Worksheet 2

Zinc	Zn	30	30
Krypton	Kr	36	36
Neon	Ne	10	10
Barium	Ba	56	56
Phosphorus	P	15	15
Tungsten	W	74	74
Sodium	Na	11	11
Iodine	I	53	53
Fluorine	F	9	9
Gold	Au	79	79
Americium	Am	95	95

Worksheet 3

1.
Any 2 of Germanium (32), Francium (87), Polonium (84), Europium (63), Americium (95), Californium (98)

2.
Curium (96) and Einsteinium (99) are best known, but also elements 100 - 109.

3.

Calcium	20
Fluorine	9
Beryllium	4
Zirconium	40

Worksheet 4

1.

35	Bromine	Br
80	Mercury	Hg

2.

1	Hydrogen	H
2	Helium	He
7	Nitrogen	N
8	Oxygen	O
9	Fluorine	F
10	Neon	Ne
17	Chlorine	Cl
18	Argon	Ar
36	Krypton	Kr
54	Xenon	Xe
86	Radon	Rn

Worksheet 5

a) shiny
b) conductors
c) heat
d) malleable
e) ductile
f) solids
g) mercury
h) dull (not shiny)
i) conductors
j) brittle
k) gases
l) Periodic
m) top
n) right

Worksheet 6

1. ductile & electrical conductor

2. malleable

3. It would shatter. Being a non-metal it is brittle, not malleable.

4. non-metal. Although it is shiny like a metal, it is brittle and not a good conductor.

5.
a) Its atoms are very small & light weight.
b) Hydrogen
c) Hydrogen is explosively inflammable, so helium is much safer to use.

keep it simple science

Answer Section (cont.)

Worksheet 7

a) elements
b) bonded
c) molecule
d) ratio
e) formula
f) hydrogen
g) oxygen
h) water
i) totally different
j) re-arranged
k) disappear
l) appear
m) colour
n) bubbles
o) temperature
p) pure
q) physical
r) elements
s) decomposition

Worksheet 8

1.

a) 2 atoms of hydrogen & 1 atom of oxygen
b) 1 atom of carbon & 2 atoms of oxygen
c) 1 atom of aluminium & 3 atoms of chlorine
d) 2 atoms of carbon & 6 atoms of hydrogen
e) 1 atom of copper, 1 atom of sulfur & 4 atoms of oxygen

2.

a) physical
b) chemical
c) physical
d) physical
e) chemical
f) chemical
g) physical
h) chemical

Topic Test

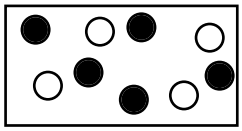
1.

a) T b) F c) T d) F e) F f) F
g) T h) T

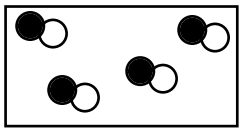
2.

a) earth, air, fire, water (any 2)

b) i) (separate, different particles)



ii) (identical molecules, each one made of different atoms bonded together)



c) (any 2)
• Original substance(s) disappear.
• New substance(s) appear.
• Temperature changes (as energy is released or absorbed)

3.

a) compound
b) metal
c) mixture
d) ductility, or substance is ductile
e) element

4.

a) "a" at any one of the positions shown
b) aprox. as shown. metals to <u>left</u> of line.
c) as shown