

## Elements

Scientists have found more than 100 different types of atoms. A substance made of only one type of atom is called an *element*. Each element has its own name. For example, carbon, oxygen and gold are all elements. Each element is given its own special symbol. This symbol has one or two letters, starting with a capital letter and usually derived from its name. For example, oxygen has the chemical symbol 'O' and magnesium has the chemical symbol 'Mg'.

Scientists have arranged all the known elements into a table called 'The Periodic Table of Elements'.

1 H Hydrogen 1.0																	18 He Helium 4.0
3 Li Lithium 6.9	4 Be Beryllium 9.0											13 B Boron 10.8	14 C Carbon 12.0	15 N Nitrogen 14.0	16 O Oxygen 16.0	17 F Fluorine 19.0	10 Ne Neon 20.2
11 Na Sodium 23.0	12 Mg Magnesium 24.3											13 Al Aluminium 27.0	14 Si Silicon 28.1	15 P Phosphorus 31.0	16 S Sulfur 32.1	17 Cl Chlorine 35.5	18 Ar Argon 40.0
19 K Potassium 39.1	20 Ca Calcium 40.1	21 Sc Scandium 45.0	22 Ti Titanium 47.9	23 V Vanadium 50.9	24 Cr Chromium 52.0	25 Mn Manganese 54.9	26 Fe Iron 55.9	27 Co Cobalt 58.9	28 Ni Nickel 58.7	29 Cu Copper 63.5	30 Zn Zinc 65.4	31 Ga Gallium 69.7	32 Ge Germanium 72.6	33 As Arsenic 74.9	34 Se Selenium 79.0	35 Br Bromine 79.9	36 Kr Krypton 83.8
37 Rb Rubidium 85.5	38 Sr Strontium 87.6	39 Y Yttrium 88.9	40 Zr Zirconium 91.2	41 Nb Niobium 92.9	42 Mo Molybdenum 95.9	43 Tc Technetium 98.9	44 Ru Ruthenium 101	45 Rh Rhodium 103	46 Pd Palladium 106	47 Ag Silver 108	48 Cd Cadmium 112	49 In Indium 115	50 Sn Tin 119	51 Sb Antimony 122	52 Te Tellurium 128	53 I Iodine 127	54 Xe Xenon 131
55 Cs Cesium 133	56 Ba Barium 137	71 Lu Lanthanum 175	72 Hf Hafnium 179	73 Ta Tantalum 181	74 W Tungsten 184	75 Re Rhenium 186	76 Os Osmium 190	77 Ir Iridium 192	78 Pt Platinum 195	79 Au Gold 197	80 Hg Mercury 201	81 Tl Thallium 204	82 Pb Lead 207	83 Bi Bismuth 209	84 Po Polonium 210	85 At Astatine 210	86 Rn Radon 222

1. Write down the symbols of the following elements.

- |                   |                    |
|-------------------|--------------------|
| (a) Lithium _____ | (f) Nitrogen _____ |
| (b) Boron _____   | (g) Fluorine _____ |
| (c) Carbon _____  | (h) Hydrogen _____ |
| (d) Calcium _____ | (i) Helium _____   |
| (e) Zinc _____    | (j) Oxygen _____   |

Some elements retain the symbol based on their old Latin name, even though the name of the element has now changed into a more English one. For example, if someone asked you to guess the chemical symbol for sodium you'd probably say 'S' or 'So'. However, sodium's Latin name is 'natrium'. The chemical symbol for sodium is 'Na' and comes from its Latin name.

2. Use the Periodic Table to find the chemical symbol and name for the elements described below.

- (a) *Plumbum* is a Latin word. Historically, water pipes were made from this soft, easily worked metal, so the people who had the job of building and maintaining water pipes were called *plumbers*.  
Name of Element \_\_\_\_\_ Chemical symbol \_\_\_\_\_
- (b) *Hydrargyrum* is a Latin word meaning "liquid silver". This element is the only metal which is a liquid at room temperature. It was historically used in thermometers.  
Name of Element \_\_\_\_\_ Chemical symbol \_\_\_\_\_
- (c) *Aurum* has been highly prized for thousands of years. This shiny, yellow metal is often used to make jewellery.  
Name of Element \_\_\_\_\_ Chemical symbol \_\_\_\_\_
- (d) *Ferrum* is Latin and is used to describe one of the world's most widely used metals. When the name of this element is used as a verb, it means to "press clothes".  
Name of Element \_\_\_\_\_ Chemical symbol \_\_\_\_\_
- (e) *Kalium* is an old Latin word. Its modern name is derived from a Dutch word "potaschen" meaning "pot ashes".  
Name of Element \_\_\_\_\_ Chemical symbol \_\_\_\_\_

## Mixtures & Compounds

Compounds are substances made of two or more elements chemically combined. The properties of a compound are completely different from the elements that combined in a chemical reaction to make it.

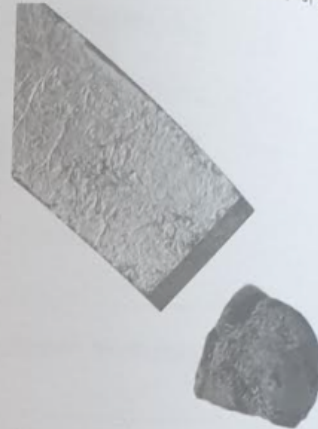
Mixtures are anything that isn't an element or compound. The properties of mixtures are just the same as the properties of the substances put in them.



1 A mixture of iron and sulfur can easily be separated by using a magnet.



2 When the mixture is heated a chemical reaction occurs, forming a compound (iron sulfide).



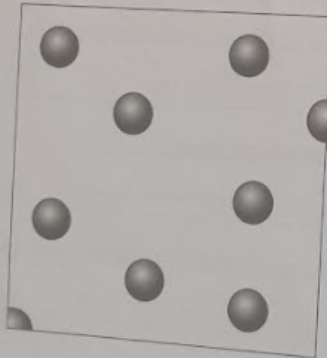
3 Iron sulfide is no longer magnetic, showing that it has formed a compound.

1. Outline two pieces of evidence from the photographs that show a chemical reaction has occurred. \_\_\_\_\_

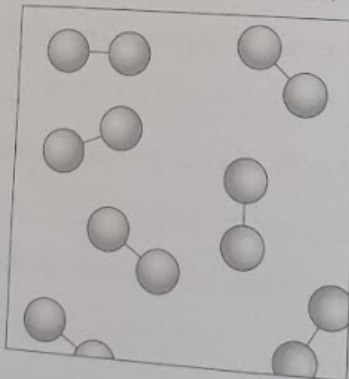
2. Complete the word equation for the reaction shown in the photographs.



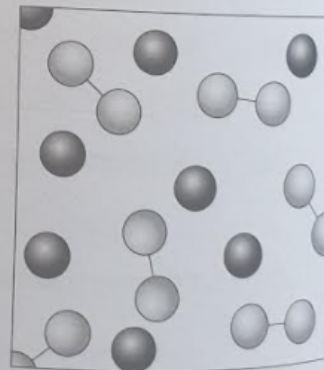
3. Label the diagrams below as either an element, a compound or a mixture.



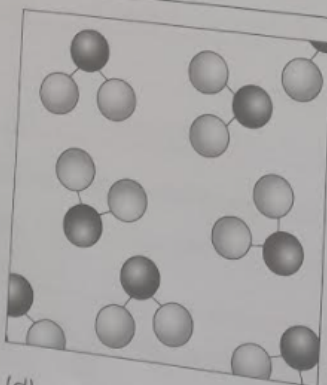
(a) \_\_\_\_\_



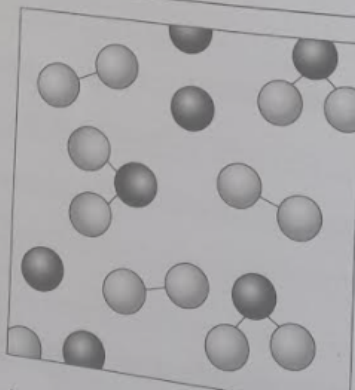
(b) \_\_\_\_\_



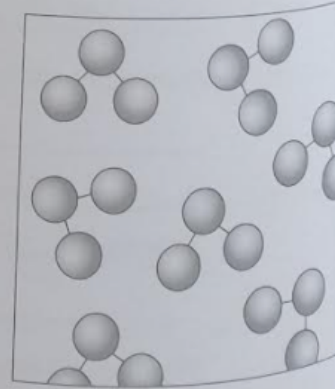
(c) \_\_\_\_\_

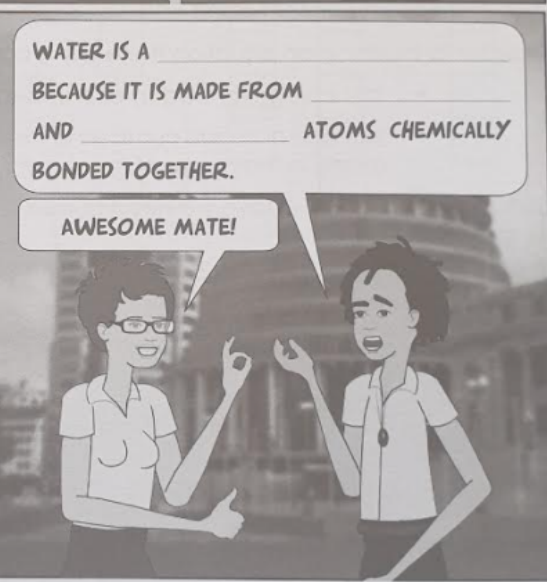
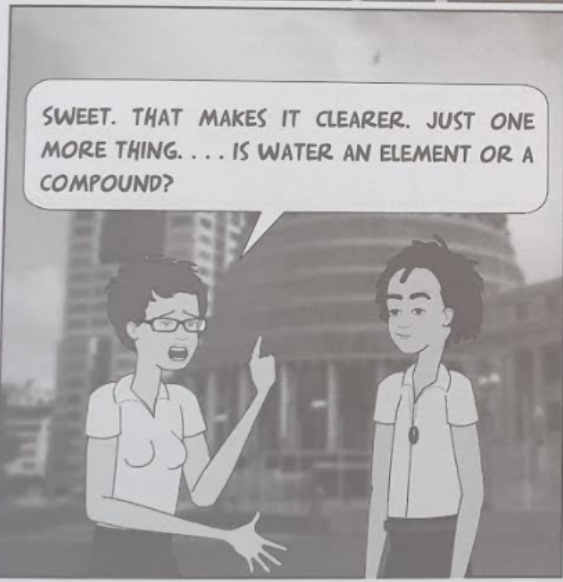
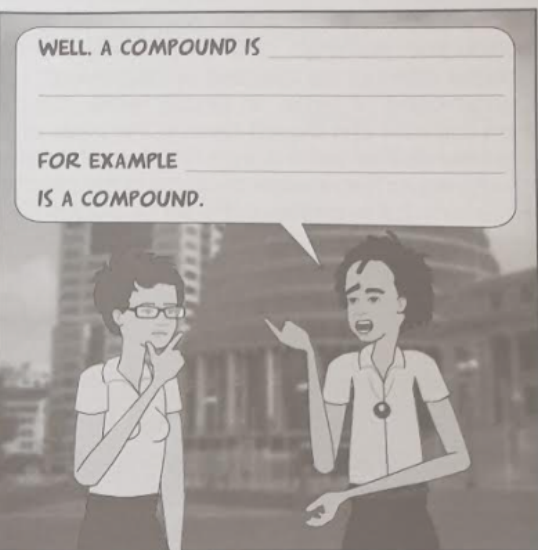
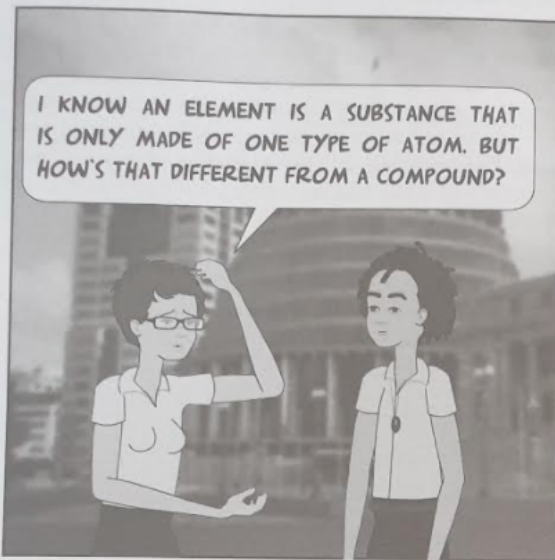


(d) \_\_\_\_\_



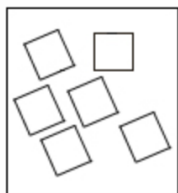
(e) \_\_\_\_\_



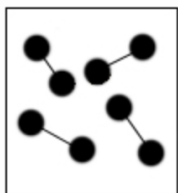


5. Decide if the following chemical formulae represent *elements* or *compounds*.
- |                             |  |
|-----------------------------|--|
| (a) NaCl _____              | (f) Cl <sub>2</sub> _____                |
| (b) H <sub>2</sub> _____    | (g) CO <sub>2</sub> _____                |
| (c) H <sub>2</sub> O _____  | (h) Al <sub>2</sub> O <sub>3</sub> _____ |
| (d) S <sub>8</sub> _____    | (i) Ag _____                             |
| (e) Li <sub>2</sub> O _____ | (j) KI _____                             |
6. Calculate the *number of atoms* in the following compounds. The first one has been done for you.
- |                               |  |
|-------------------------------|--|
| (a) NaCl <u>2 atoms</u> _____ | (e) CO <sub>2</sub> _____                |
| (b) SO <sub>2</sub> _____     | (f) Al <sub>2</sub> O <sub>3</sub> _____ |
| (c) H <sub>2</sub> O _____    | (g) HNO <sub>3</sub> _____               |
| (d) Li <sub>2</sub> O _____   | (h) HCl _____                            |

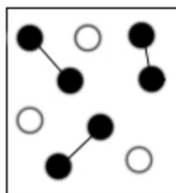
This task is about atoms, elements, compounds, and mixtures.



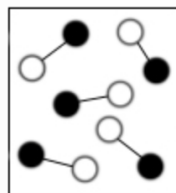
A



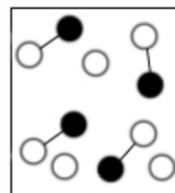
B






C



D



E

**Key:** , , and  represent atoms.  
A molecule is made up of atoms joined together.

a) Use the boxes above to answer these questions.

- i) Name a box that contains an element.      A B C D E (*Circle one*)
- ii) Which box contains a compound?      A B C D E (*Circle one*)
- iii) Which box contains a mixture of elements?      A B C D E (*Circle one*)

Four words that can be used when describing substances are written in the box below.

**elements      compounds      atoms      molecules**

b) Use these words to explain the difference between

i) box B and box D.

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ii) box A and box B.

c) Using symbols like those in boxes A to E, draw a diagram below to show a box containing two different types of compounds.

### Answers/responses:

a)	i) ii) iii)	A or B D C
b)	i) ii)	Box B has elements, while box D has compounds. or Box B has molecules of elements, while box D has compounds. Box A has atoms, while box B has (molecules of) elements.
c)		e.g., 