



## Representing elements and compounds: knowledge check

**1.1** This diagram shows the chemical symbols of the first twenty elements in the periodic table.

Use some of the words to label the diagram with the names of the elements.

neon      argon      aluminium      chlorine      potassium  
calcium      helium      sodium      carbon      oxygen      fluorine

		H															He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra																

**For questions 1.2 to 1.4, complete the sentences.**

**1.2** This model shows a molecule of the element chlorine.



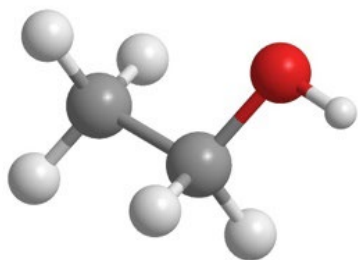
- An element consists of \_\_\_\_\_ type of atom only.
- There are 92 naturally occurring \_\_\_\_\_.
- A chemical symbol represents \_\_\_\_\_ atom of an element. For example, the symbol Ne represents one atom of \_\_\_\_\_.



d) Some elements naturally exist as two or more atoms bonded together to form \_\_\_\_\_ .

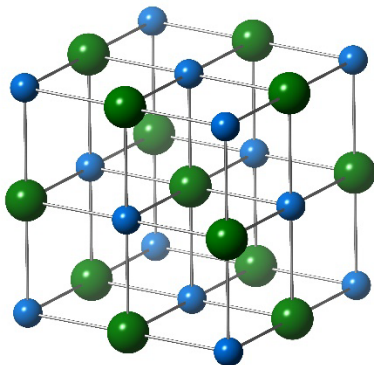
e) A molecule of chlorine gas has the chemical formula  $\text{Cl}_2$ . The subscript '2' shows that there are \_\_\_\_\_ atoms of chlorine bonded together in one molecule.

**1.3** A compound consists of two or \_\_\_\_\_ different types of atoms bonded together. Compounds with \_\_\_\_\_ bonds form molecules. They have a chemical formula showing the numbers and types of atoms in one molecule of the compound. For example, a molecule of  $\text{NH}_3$  contains \_\_\_\_\_ atom of nitrogen and \_\_\_\_\_ atoms of hydrogen. A molecule of  $\text{C}_2\text{H}_5\text{OH}$  contains \_\_\_\_\_ atoms of carbon, six atoms of hydrogen and one atom of oxygen. This model shows a \_\_\_\_\_ of  $\text{C}_2\text{H}_5\text{OH}$ .





- 1.4 Compounds with \_\_\_\_\_ bonding form ionic structures. This model shows part of the ionic structure of sodium chloride:



The ionic structure consists of many \_\_\_\_\_ ions and many \_\_\_\_\_ ions, but its chemical formula is  $\text{NaCl}$ . This shows there is \_\_\_\_\_ sodium ion to every chloride ion. The compound magnesium chloride also has ionic bonding. Its chemical formula is  $\text{MgCl}_2$ . An ionic structure of magnesium chloride contains \_\_\_\_\_ magnesium ion to every \_\_\_\_\_ chloride ions.

## Representing elements and compounds: test myself

- 2.1 The chemical formula for naturally occurring sulfur is  $\text{S}_8$ . Circle the type of particle that is  $\text{S}_8$ .

**an atom**      **a compound**      **a molecule**      **an ion**

- 2.2 Which of these chemical formulas represents an element? Circle the correct answer.

**CaO**      **Ni**      **NO**      **NaOH**      **SO<sub>2</sub>**



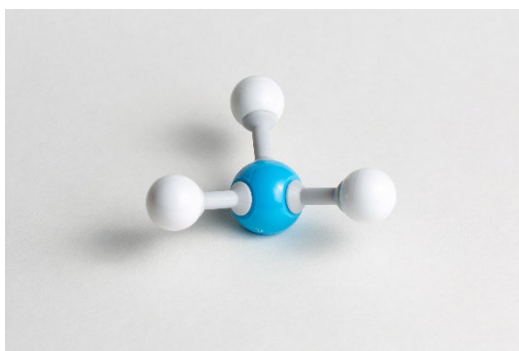
**2.3** Which of these chemical formulas represents an element that exists as single atoms? Circle the correct answer.

**N<sub>2</sub>**      **HCl**      **Ar**      **NO**      **I<sub>2</sub>**

**2.4** Which two of these chemical formulas represent compounds? Circle the correct answers.

**NO**      **N<sub>2</sub>**      **NH<sub>3</sub>**      **He**      **Br<sub>2</sub>**

**2.5** If the blue sphere in this image represents a nitrogen atom and the white spheres represent hydrogen atoms, what is the formula?



The formula is

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**2.6** How many atoms of hydrogen are contained in one molecule of CH<sub>3</sub>COOH?  
[Hint: Circle all the hydrogen atoms in the formula.]

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**2.7** Magnesium oxide has ionic bonding. Its chemical formula is  $\text{MgO}$ . What is the ratio of magnesium ions to oxide ions in a magnesium oxide particle?

[Hint: Think about how many ions of magnesium and oxide are represented in the formula.]

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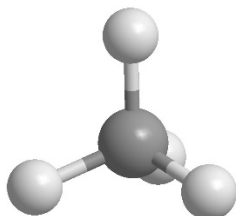
**2.8** Sodium oxide also has ionic bonding. Its chemical formula is  $\text{Na}_2\text{O}$ . What is the ratio of sodium ions to oxide ions in a particle of sodium oxide?

[Hint: Think about how many ions of sodium and oxide are represented in the formula]

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**2.9** Which of these images shows a model of an element? Circle the correct answer.

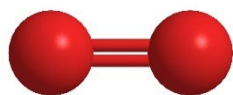
**A**



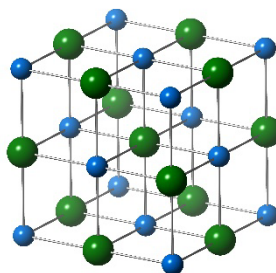
**B**



**C**



**D**



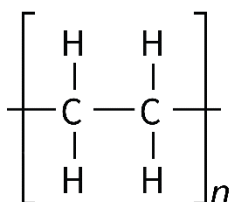


**2.10** Look at the models in **question 2.9** again. Which image shows an ionic compound?

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## Representing elements and compounds: feeling confident?

**3.1** Polymers, like poly(ethene), consist of large molecules. These are chains of atoms with repeating units. The formula for polyethene is written as:



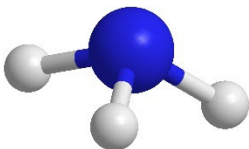
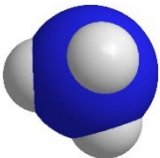
where  $n$  stands for a large number.

Draw a length of poly(ethene) chain six carbon atoms long.



**3.2** The table shows four different ways of representing a molecule of the compound ammonia,  $\text{NH}_3$ . The blue spheres represent nitrogen atoms and the white spheres represent hydrogen atoms.

Complete the table by adding a ✓ or a ✗. Some are done for you.

	$\text{NH}_3$	$\begin{array}{c} \text{H} - \ddot{\text{N}} - \text{H} \\   \\ \text{H} \end{array}$		
Does it show the different types of atoms?			✓	
Does it show how the atoms are arranged?	✗			✓
Does it show the molecule in three dimensions?				
Does it show the chemical bonds?				



## Representing elements and compounds: what do I understand?

Think about your answers and confidence level for each mini-topic. Decide whether you understand it well, are unsure or need more help. Tick the appropriate column.

Mini-topic	I understand this well	I think I understand this	I need more help
I can write names of the elements from their chemical symbols.			
I can write chemical formulas of elements.			
I can write chemical formulas of simple molecular compounds.			
I can write chemical formulas of ionic compounds.			
I can use models to represent elements and compounds.			
Feeling confident? topics	I understand this well	I think I understand this	I need more help
I can write the chemical formula of a polymer.			
I can compare different types of representation.			