1.1

Sort the substances

Name _____ Class _____ Mark _____ / 20

What you are practising

I can sort any sample of matter into one of five groups by asking what its particles are made of.

Worked example: carbon dioxide, CO_2
One substance, so not a mixture. Each particle is one carbon atom joined to two oxygen atoms: two different types of atom joined, so **compound substance.**

More than one substance mixed, not joined? Mixture. Looks the same throughout: homogeneous. Separate parts you can see: heterogeneous.
One substance? Different atoms joined: compound. One type of atom, single atoms: simple elemental. One type, two or more joined: molecular elemental.

Sort the substances

Put one tick in each row. A mixture has no formula, because the amounts can be anything. **[10]**

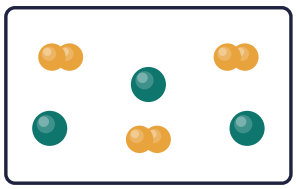
Substance	Simple elemental	Molecular elemental	Compound	Homo-geneous mixture	Hetero-geneous mixture
1 salt solution					
2 water H_2O					
3 copper Cu					
4 oil and water					
5 oxygen gas O_2					
6 carbon dioxide CO_2					
7 air					
8 iodine I_2					
9 sand and water					
10 argon gas Ar					

Page done? Tick it off

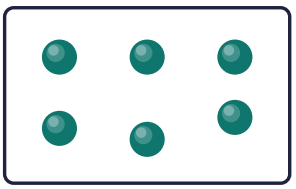
Sort the pictures

One circle = one atom. Colour and size show the type of atom. Overlapping atoms are joined. **[6]**

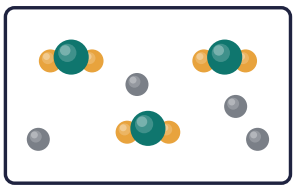
Picture 1



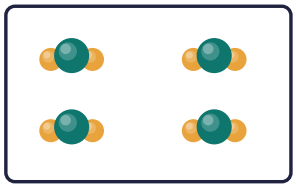
Picture 2



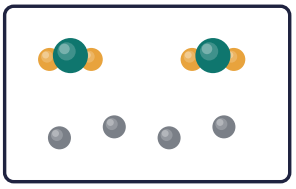
Picture 3



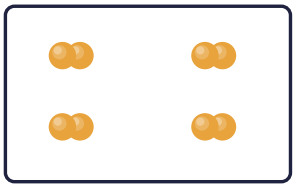
Picture 4



Picture 5



Picture 6



Explain

A Air contains oxygen and nitrogen. Why is air a mixture, not a compound? **[2]**

Who is right?

B **Lina:** "Salt solution is a compound." **Theo:** "It is a homogeneous mixture." Who is right, and why? **[2]**

Year 9 · Unit 1 · 1.1 Modelling matter · Worksheet A

Answers

Sort the substances [10]

Substance	Simple el.	Molecular el.	Compound	Homogeneous	Heterogeneous
1 salt solution				✓	
2 water H_2O			✓		
3 copper Cu	✓				
4 oil and water					✓
5 oxygen gas O_2		✓			
6 carbon dioxide CO_2			✓		
7 air				✓	
8 iodine I_2		✓			
9 sand and water					✓
10 argon gas Ar	✓				

One mark per row. O_2 and I_2 are two atoms of the same element joined, so molecular elemental, not compound.

Sort the pictures [6]

1 homogeneous mixture — single atoms and pairs of identical atoms, spread evenly
2 simple elemental — one type of atom, all single
3 homogeneous mixture — compound molecules and single grey atoms, spread evenly
4 compound — every particle has two different types of atom joined
5 heterogeneous mixture — the same particles as picture 3, but in two separate parts
6 molecular elemental — every particle is two identical atoms joined

Explain [2]

The oxygen and nitrogen are mixed, not chemically joined **(1)**. There is no fixed ratio: the amounts can change **(1)**.

Who is right? [2]

Theo **(1)**. The sodium chloride and water are not joined to each other and can be in any amounts, so it is a mixture of two substances. Each one on its own is a compound, but the solution is not **(1)**.

How to revise this

Look at the five groups and the questions to ask. Cover them. Write them out from memory. Check against page 1. Repeat only the ones you missed.