



Science Home Learning Task

Year 7

The chemical world: Particles

Name _____

Tutor Group _____

Teacher _____

Given out: Monday 18 November Hand in: Monday 25 November

Parent/Carer Comment

Staff Comment

Target



Investigating science

Welcome to your Science homework booklet. This booklet is designed to give you some extra practise on the key areas in the “chemical world” section of the course.

You need to carry out all the tasks.

Don't forget to ask a parent/carer to sign the box on the front.

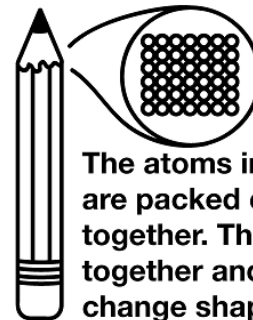
TASK 1- Reading task

Why does matter matter?

What do trees, air and water have in common? They all have matter. That means they take up space. You might be wondering why these living things look so different if they all have matter. Everything found on Earth can be grouped into one of three states of matter: solid, liquid or gas. In order to figure out which state of matter an object fits in, we have to examine its properties. The properties we look at are shape, mass, and volume. Mass is the amount of matter an object has, and volume is the amount of space the matter takes up.

Solids are easy to recognise. They have definite shape, mass and volume. Trees are solids. They are made up of tiny particles called atoms. These atoms are packed closely together, and they hold the solid in a definite shape that does not change. If you look around your house or the classroom, you will see lots of solids – tables, chairs, television, beds, and even the food that you eat.

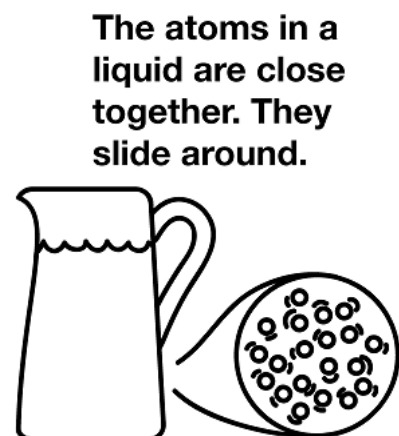
Solid



The atoms in a solid are packed closely together. They bond together and do not change shape.

Liquids do not have definite shape, but they do have definite mass and volume. Liquids are similar to solids because their atoms are close together, but what makes a liquid different is that those atoms can move around. Liquids can change shape by flowing. If you've ever spilled a glass of water, then you know it spreads out across the floor. It does this because the water is taking the shape of the floor. Since liquids do not have a definite shape of their own, they will take the shape of their container. This

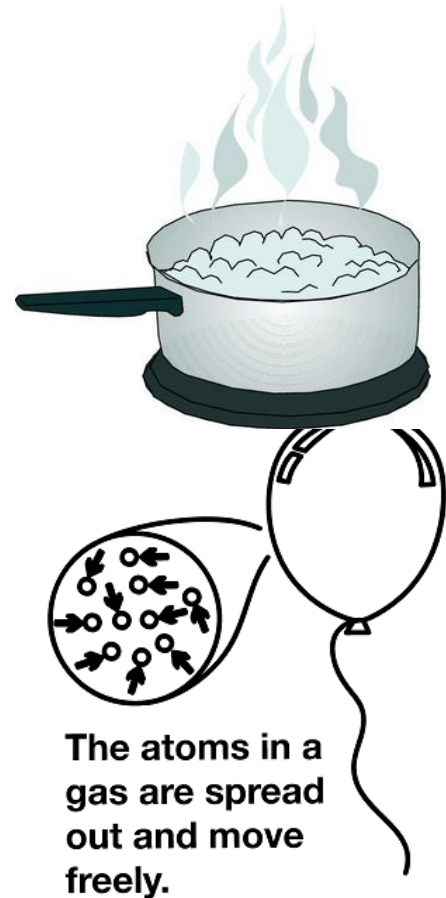
Liquid



The atoms in a liquid are close together. They slide around.

is why the same amount of water can look different in a tall glass, a wide mug, or spread out on the kitchen floor.

Gases do not have definite shape or volume. Like liquids, gases will take the shape of their containers. If a gas is not in a container, it will spread out indefinitely. This is because the atoms in a gas are spaced further apart than in a solid or liquid. Being spread out like this allows them to move around freely. Think about the air you breathe every day. That air is spread across the empty space around the Earth. You've probably also noticed that you usually cannot see the air. This is another property of gases. Even though we cannot see them, you come in contact with them every day. There is air in the tyres of your family car and your bike. There are many different types of gas in the Earth's atmosphere, such as oxygen, carbon dioxide, nitrogen, water vapour and helium.



When trying to remember the three states of matter, think about water. If it freezes, it becomes ice. Its atoms are packed together keeping its shape. Of course, we know water can also be a liquid. It flows in rivers or it can be poured from a glass. When water evaporates it becomes water vapour, a type of gas in the air. Try a little experiment of your own by placing an ice cube in a covered glass or container. You will be able to observe the ice first in its solid form and then watch as it melts into a liquid to become water. Eventually the water will turn to water vapour and your glass or container will be filled with this gas.

You can see three different states of matter in this picture. The pot is made of solid matter. The water inside the pot is liquid. When the liquid is heated it becomes water vapour, which is a gas. Matter is everywhere! Can you find solids,



liquids and gases around you right now?

Questions

Solids	volume	container	matter	ice
Gases	mass	atoms	chair	oxygen
Liquids	shape	space	milk	helium
melting	juice			

Choose a word from the box to complete each sentence.

1. The three basic properties of matter are _____, _____ and _____.
2. All matter is made up of tiny particles particles called _____.
3. Volume is the amount of _____ that matter takes up.
4. Mass is the amount of _____ an object has.
5. Liquids take the shape of their _____.
6. _____ do not have a definite shape or volume.
7. _____ do not have a definite shape, but they do have a definite volume.
8. _____ have a definite shape and volume.
9. A _____ and _____ are examples of solids.

10. _____ and _____ are examples of liquids.

11. _____ and _____ are examples of gas.

12. Solid ice is _____ when it is changing into a liquid.

TASK 1- Particle models

The arrangement of particles in solids, liquids and gases is different. This difference explains why they behave differently. Answer the questions below about particles and their behaviour.

- a) Complete the boxes below to show how the particles are arranged in solids, liquids and gases. **Hint: - remember particles are drawn as circles**

Solid	Liquid	Gas

- b) Complete the sentences below using the keywords provided in the box. Each word can be used more than once.

far	touch	poured	fast	fixed	fill
past	compressed	volume	shape		

i) Solids

The particles in a solid are in _____ positions.

Solids cannot be _____.

Solids have a fixed _____ and _____.

ii) Liquids

The particles in a liquid can move _____ one another but cannot _____.

Liquids cannot be _____.

Liquids have a fixed volume but not a fixed _____ and can be _____.

iii) Gases

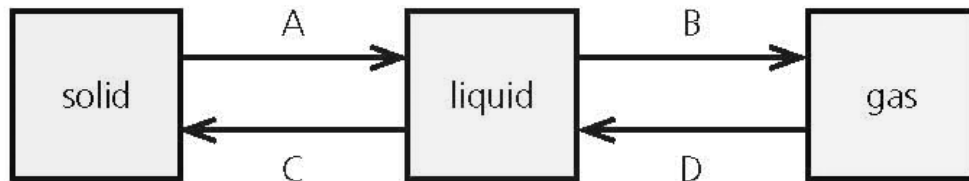
The particles in a gas are very _____ apart and do not _____ one another.

The particles move very _____ and can be _____.

Gases do not have a fixed _____ or a fixed _____ and can _____ any space.

TASK 2 – Changing state

Solids, liquids and gases can change their state. In the diagram below, each arrow represents a change of state. Answer the questions below.



a) Which letter represents melting? _____.

b) What is the name of the process represented by the letter B?

_____.

c) What happens to the particles in a liquid when they become a gas?

d) What is the name of the process represented by the letter C?

_____.

e) What happens to the particles in a liquid when they become a solid?

_____.

TASK 3 – Melting and boiling points

Substances that change state between a solid, liquid or gas have a melting point and a boiling point.

1. What happens when a substance melts in terms of change of state?

2. What happens when a substance boils in terms of change of state?

3. The next questions are about the table below.

Substance	Melting point (°C)	Boiling point (°C)
Bromine	-7	59
Oxygen	-218	-183
Mercury	-39	357
Neon	-249	-246
Platinum	1769	4530
Silver	961	2210
Helium	-272	-268

a) Which substance has the highest boiling point?

b) Which substance has the lowest melting point?

c) Write down the names of the substances in order of increasing melting point, starting with the lowest.

_____	Lowest

_____	Highest

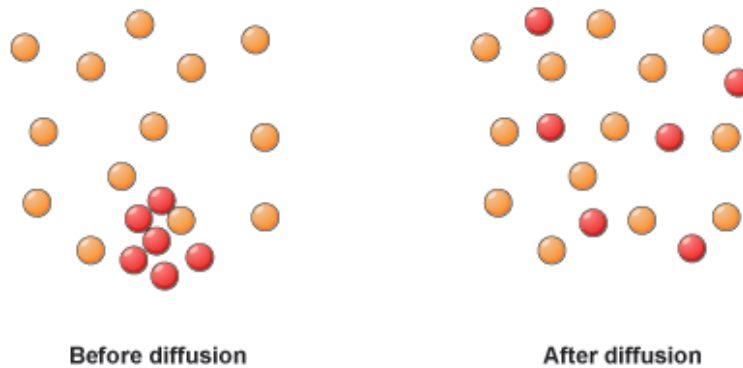
d) Name **one** substance in the table that is a gas at 20°C.

e) Name **two** substances in the table that are liquids at 20°C.

f) Name **one** substance that is a solid at 20°C.

TASK 4 – Diffusion

The diagram below shows the process of **diffusion** – particles moving randomly through gases or liquids.



1. Using the diagram above, describe what happens to particles of sugar when you add them to a cup of tea.

2. Some factors such as temperature can affect how fast **diffusion** happens. Would particles of sugar move faster in a hot drink than a cold drink? Explain your answer.

