Name:
Science Class:
Teacher:
Hand in day:

Y7 Science
Term 1 Homework Booklet
Chemistry

	Hand in Date	Parents Signature
Particle Model		
Homework 1		
Homework 2		
Homework 3		
Homework 4		
Homework 5		

Particle Model Homework 1:

Comprehension Task

Everything is made up of **tiny particles**. The **properties** of a substance depend on what its particles are like, how they move and how they are arranged. The particles in a substance are the same whether it's in the solid, liquid or gas state, but their **arrangement and movement** change.

The three states of matter are solid, liquid and gas. The particle model represents particles by small, solid spheres. It describes the arrangement, movement and energy of particles in a substance. The model can be used to explain the properties of solids, liquids and gases.

State	Solid	Liquid	Gas
Closeness of particles	Very close	Close	Far apart
Arrangement of particles	Regular pattern	Randomly arranged	Randomly arranged
Movement of particles	Vibrate around a fixed position	Move around each other	Move quickly in all directions
Energy of particles	Low energy	Greater energy	Highest energy
2D diagram			

Solids

- have a fixed shape and cannot flow, because their particles cannot move from place to place
- cannot be compressed (squashed), because their particles are close together and have no space to move into

Liquids

- flow and take the shape of their container, because their particles can move around each other
- cannot be compressed, because their particles are close together and have no space to move into

Gases

- flow and completely fill their container, because their particles can move quickly in all directions
- can be compressed, because their particles are far apart and have space to move into

Questions

1. What is everything made up from?

2. What are the 3 states of matter?

3. Which state of matter has particles that are very far apart?

4. Which state of matter has particles that are in a regular pattern?

5. What is the movement of particles like in a solid?

6. Which state of matter has particles with the highest energy?

7. Why do solids have a fixed shape and do not flow?

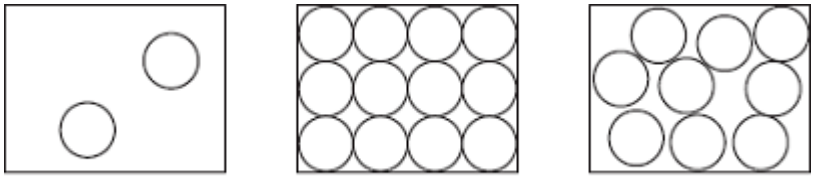
8. Why can solids not be compressed (squashed)?

9. Why do gases completely fill their container?

10. Why can gases be compressed?

Particle Model Homework 2:

(a) The diagrams, **X**, **Y** and **Z**, show how the particles are arranged in the three states of matter.



X Y Z

(i) Which **one** of the diagrams, **X**, **Y** or **Z**, shows the arrangement of particles in a liquid?

Write the correct answer in the box. ☐

(1)

(ii) Which **one** of the diagrams, **X**, **Y** or **Z**, shows the arrangement of particles in a gas?

Write the correct answer in the box. ☐

(1)

(b) Draw a ring around the correct answer in each box to complete each sentence.

(i) In a gas, the particles are

vibrating in fixed positions.
moving randomly.
not moving.

(1)

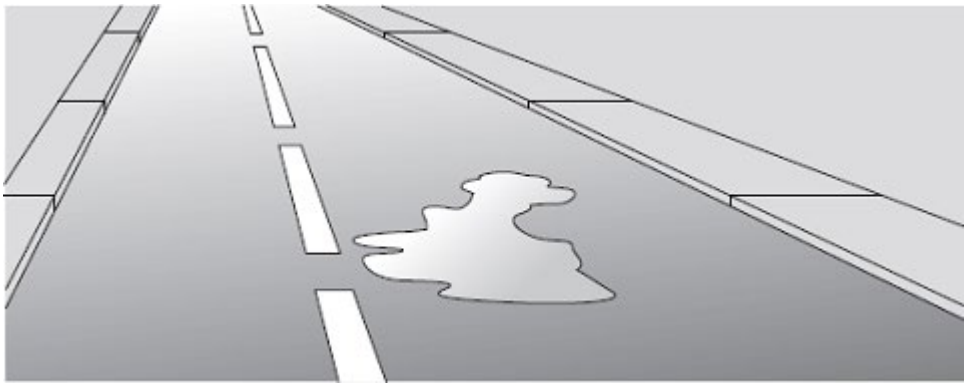
(ii) In a solid, the forces between the particles are

stronger than
equal to
weaker than

the forces between the particles in a liquid.

(1)

(c) The picture shows a puddle of water in a road, after a rain shower.



(i) During the day, the puddle of water dries up and disappears. This happens because the water particles move from the puddle into the air.

What process causes water particles to move from the puddle into the air?

Draw a ring around the correct answer.

condensation **evaporation** **radiation**

(1)

(ii) Describe **one** change in the weather which would cause the puddle of water to dry up faster.

_____

_____

(1)

(d) A substance has a:

- melting point of 98 °C
- boiling point of 883 °C

What is the state of the substance at 20 °C?

Tick **one** box.

Gas ☐ Liquid ☐ Solid ☐

(1)

(e) What type of change is a change of state?

Tick **one** box.

- Chemical ☐
- Kinetic ☐
- Permanent ☐
- Physical ☐

(1)

(f) Which **two** statements are correct about the particles when a liquid turns into a gas?

Tick **two** boxes.

- Particles are bigger ☐
- Particles are lighter ☐
- Particles have more kinetic energy ☐
- Particles move faster ☐

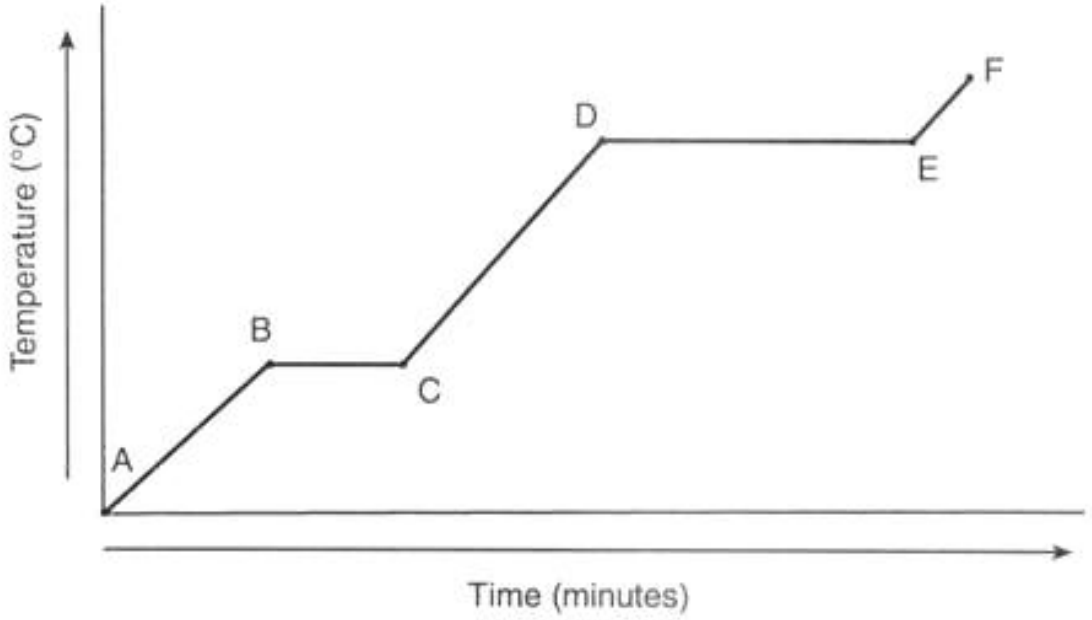
(2)

(Total 10 marks)

Particle Model Homework 3:

Use your knowledge organiser to make sure you know how to interpret heating and cooling curves, and use melting and boiling point data to predict the state of matter at any given temperature.

Use the graph answer the questions below



Between which **2 letters** on the graph…

Example - the substance is a liquid which is getting warmer between… C and D

1. The substance is melting between…

2. The substance is a gas which is getting warmer between…

3. The substance is a solid which is getting warmer between…

4. The substance is boiling between…

5. What name is given to the heat or energy being supplied to a substance to separate the particles as it changes state (You may need to research this!!)

Use the table below to help you answer the following questions

Element	Melting point (°C)	Boiling point (°C)
Copper	1083	2567
Magnesium	650	1107
Oxygen	-218.4	-183
Carbon	3500	4827
Helium	-272	-268.6
Sulphur	112.8	444.6

Which substance has:

6. The highest melting point

7. The lowest boiling point

8. The largest temperature range between its melting and boiling points

9. Which substances would be solids at room temperature (25 °C)

10. Which substance would be a liquid at 200 °C

Particle Model Homework 4:

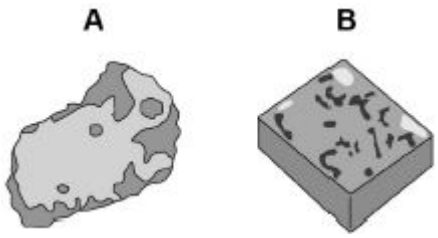
Two large semi-precious stones are discovered.

A student is asked to find out what material each of the two stones is made of.

The student does this by determining the density of the material of each stone.

Figure 1 shows the two stones.

Figure 1



(a) The student wants to measure the volume of stone **A**. Stone **A** cannot be measured using a ruler as the stone is an irregular shape.

Describe how the student could determine the volume of stone **A** by putting it into water.

_____

_____

_____

_____

_____

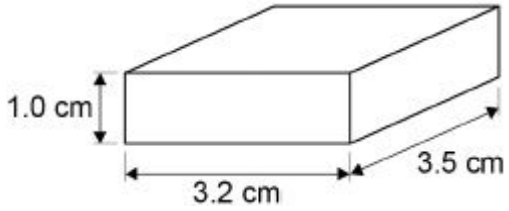
_____

(3)

The student makes measurements of stone **B** using a ruler.

The measurements of stone **B** are shown **in Figure 2**.

Figure 2



(b) Which piece of equipment could the student use to get an accurate measurement of the mass of stone **B**?

Tick **one** box.

Electronic balance ☐

Microscope ☐

Newton meter ☐

Measuring cylinder ☐

(1)

(c) Use the following equation to calculate the volume of stone **B** on the previous page in cm^3

volume = length × width × height

_____

_____

Volume = _____ cm^3

(1)

(d) The mass of stone **B** is 56 grams.

Use your answer from part **(c)** to calculate the density of stone **B** in g/cm^3

Use the following equation.

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

_____

_____

_____

_____

Density = _____ g/cm^3

(2)

(e) The student calculates the density of the material stone **A** is made of as 5.2 g/cm^3

The student looks up the density of some materials in a text book.

Figure 3 shows this information.

Figure 3

Material	Density in g/cm^3
Amber	1.1 – 1.2
Cubic Zirconia	5.5 – 5.9
Garnet	3.8 – 3.9
Haematite	5.1 – 5.3

What material is stone **A** made of?

Tick **one** box.

Amber ☐

Cubic Zirconia ☐

Garnet ☐

Haematite ☐

(1)

(Total 8 marks)

Particle Model Homework 5:

Answer the following question in as much detail as you can.

The information in the box is about the properties of solids and gases.

Solids: • have a fixed shape • are difficult to compress (to squash). Gases: • will spread and fill the entire container • are easy to compress (to squash).

Use your knowledge of particle theory to explain the information given in the box.

You should consider:

- the spacing between the particles
- the movement of individual particles
- the forces between the particles.

……

……

……

……

……

……

……

……

……

……

……

……

……

……

……

……

(6 marks)