



Sample assessment task

Year level	8
Learning area	Science
Subject	Chemical Sciences
Title of task	States of matter test

Task details

Description of task	Students respond to questions assessing their understanding of the kinetic theory of matter as it applies to states of matter.
Type of assessment	Test
Assessment strategy	Students demonstrate learning through short-answer and open-ended written responses.
Suggested time	50 minutes

Content description

Content from the Western Australian Curriculum	Science understanding The properties of the different states of matter can be explained in terms of the motion and arrangement of particles
Key concepts	Particle model of matter, change of state/phase

Task preparation

Prior learning	Students have learnt about the arrangement of particles in solids, liquids and gases, and how changes in temperature affect the behaviour of particles in each state of matter.
Assessment differentiation	Teachers should differentiate their teaching and assessment to meet the specific learning needs of their students, based on their level of readiness to learn and their need to be challenged. Where appropriate, teachers may either scaffold or extend the scope of the assessment tasks.

Assessment task

Assessment conditions	Test conditions
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Write your answers in the spaces provided on this question paper. Attempt all questions.

1. Complete the table below by choosing the correct word or phrase to match the description.

(5 marks)

Liquid

The particles can move around each other

Solid

The particles are close together

They flow and take the shape of their container

They can be compressed or squashed

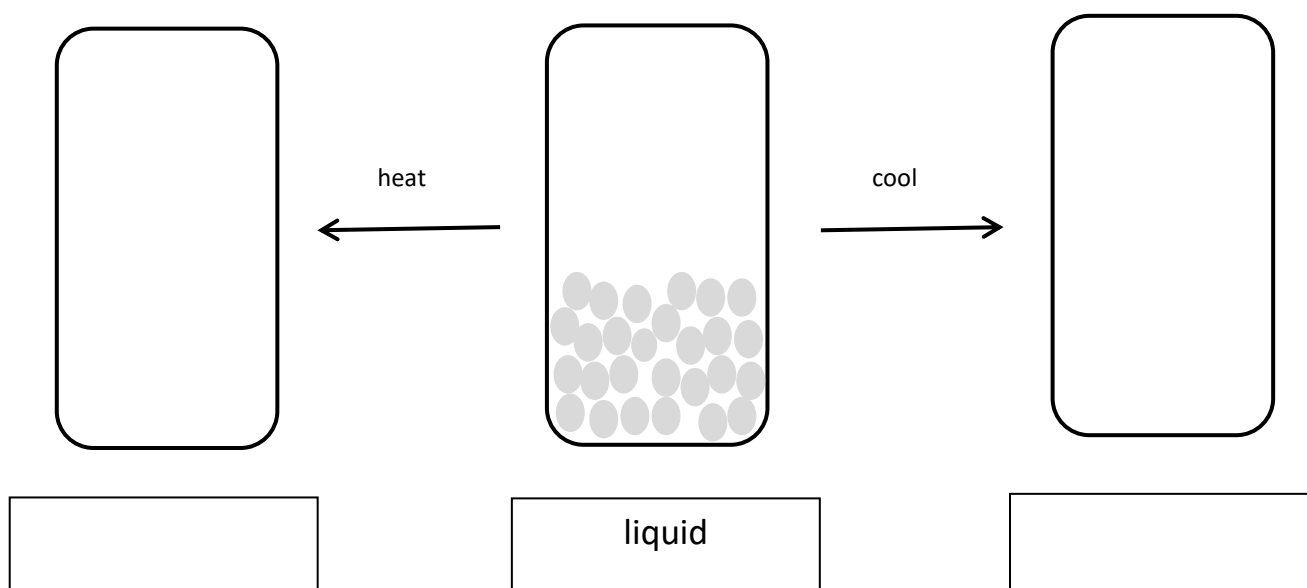
They have a fixed shape and cannot flow

They spread out and fill their container

State of matter	Property	Explanation
		The particles vibrate about a fixed position
Gas		There are large spaces between particles
	They flow and take the shape of their container	

2. The diagram below shows the particles in a liquid. In the spaces provided, draw a labelled diagram to represent the way the particles are behaving when the liquid is heated (left box) and cooled (right box). Name the state of matter that the diagrams show.

(6 marks)



3. Gina blows a balloon up and then places it in the freezer for 15 minutes.
State whether the balloon's volume will be larger or smaller after it has been in the freezer. (3 marks)

Explain your answer.

4. After going for a long ride on his bike Ben notices that the tyres on his bike feel harder and warmer.
This means that the pressure of the air in the tyres is higher than before his ride.
Explain, in terms of the behaviour of the air particles in the tyres, why the tyre pressure is higher after his ride. (4 marks)

5. When a bottle of perfume is opened, it can be smelt a few metres away in a short time. Describe the behaviour of the perfume particles to explain why the perfume can be smelt a few metres away. (3 marks)

6. A glass of liquid water is put into the fridge to cool it.
- a. What is happening to the water particles as the temperature of the water decreases? (2 marks)
- b. What will eventually happen to the liquid water if the particles continue to move more and more slowly? (2 marks)
7. When a candle is burning, the heat from the flame will melt the wax at the top of the candle until it runs down the side of the candle. Describe how the wax particles behave as they are heated from the solid phase and eventually melt to become liquid and run down the side of the candle. You may use diagrams to assist you if you wish. (3 marks)

Sample marking key

Description		Marks
Question 1		
State of matter	Property	Explanation
Solid	They have a fixed shape and cannot flow	The particles vibrate about a fixed position
Gas	They can be compressed or squashed	There are large spaces between particles
Liquid	They flow and take the shape of their container	The particles can move around each other
1 mark for each cell of the table as shown above		1–5
Subtotal		5
Description		Marks
Question 2		
Heat diagram shows particles separated throughout the whole container Movement indicated		1–2
Diagram labelled as gas		1
Cool diagram shows particles in an ordered state in fixed positions Movement indicated		1–2
Diagram labelled as solid		1
Subtotal		6
Description		Marks
Question 3		
Balloon will have a smaller volume As gas cools down particles slow down and get closer together.		1–3
Subtotal		3
Description		Marks
Question 4		
The bike ride will increase the temperature of the air in the tyres		1
At the higher temperature the air particles will be moving at a higher speed than before the ride		1
Higher speed of the particles means they will hit the walls of the tyre tube with more force and more often resulting in higher pressure		1–2
Subtotal		4
Description		Marks
Question 5		
Recognition that perfume vapour particles will leave the liquid perfume		1
The perfume vapour particles move through the air away from the bottle		1
Until they reach the nose		1
Subtotal		3

Description	Marks
Question 6	
a. The amount of energy is decreasing	1
The particles will slow down	1
b. The particles will stop moving past each other and stay in fixed positions	1
The liquid will eventually turn solid (freeze)	1
Subtotal	4
Description	Marks
Question 7	
As the temperature of the wax increases, the particles will vibrate more and more in their fixed positions	1
As heating continues, the vibrations will become so great that the particles break free of their fixed position so the wax is now liquid	1–2
In the liquid phase the particles are free to move within the body of the liquid, sliding over one another so that they run down the side of the candle	1–2
Subtotal	5
Total	30