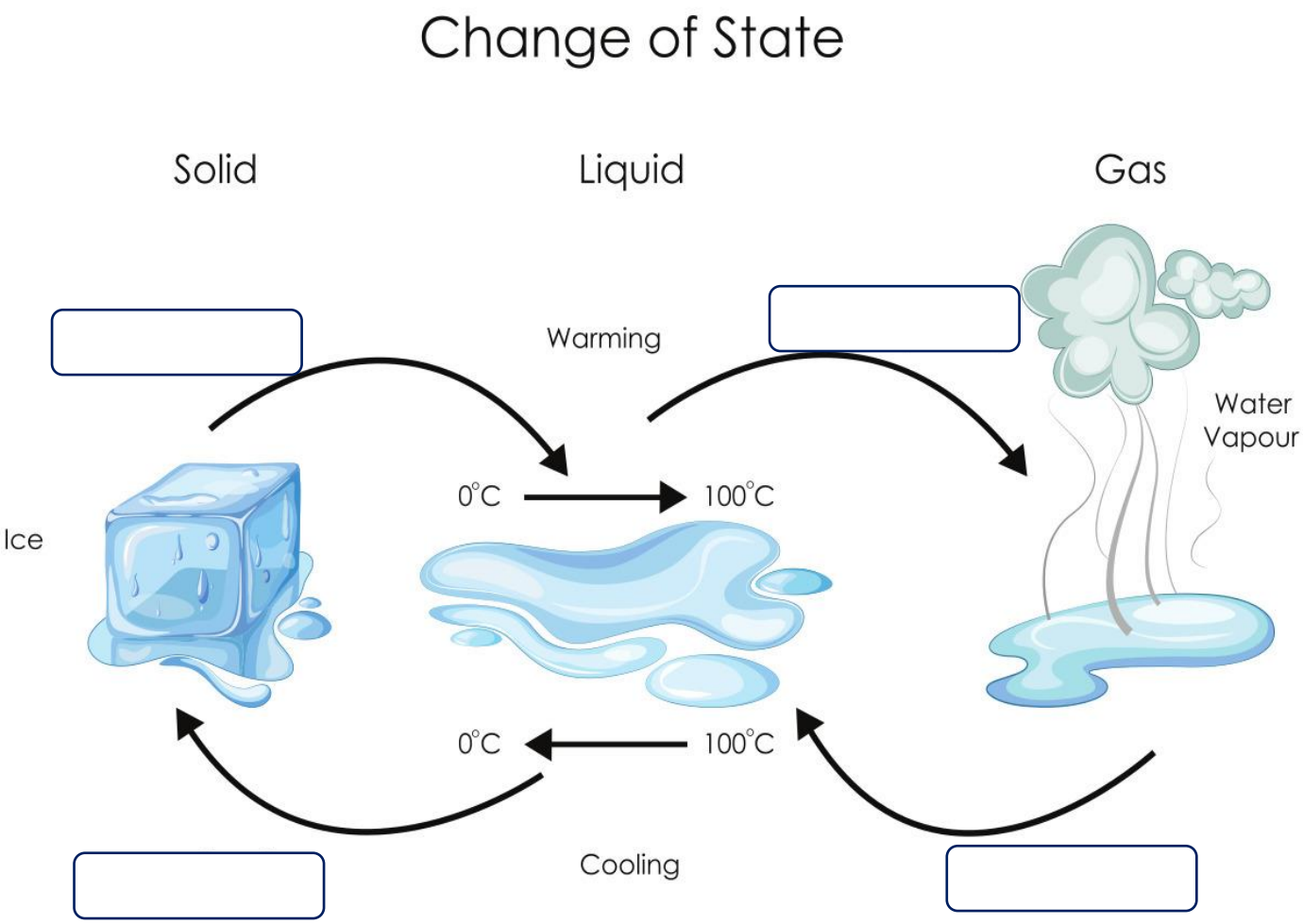
Investigating changes in state

Label the four arrows on the following diagram to show the names for the changes in state.



Mission Assignment: Explain changes of state using a particle model

KS3-02-02

Investigating changes in state

Complete the flow chart. Include descriptions of the energy of the particles during their change of state. In the centre boxes include an appropriate particle diagram.

The energy of the particles

_____

_____

This causes the particles to

_____

_____

The energy of the particles

_____

_____

This causes the particles to

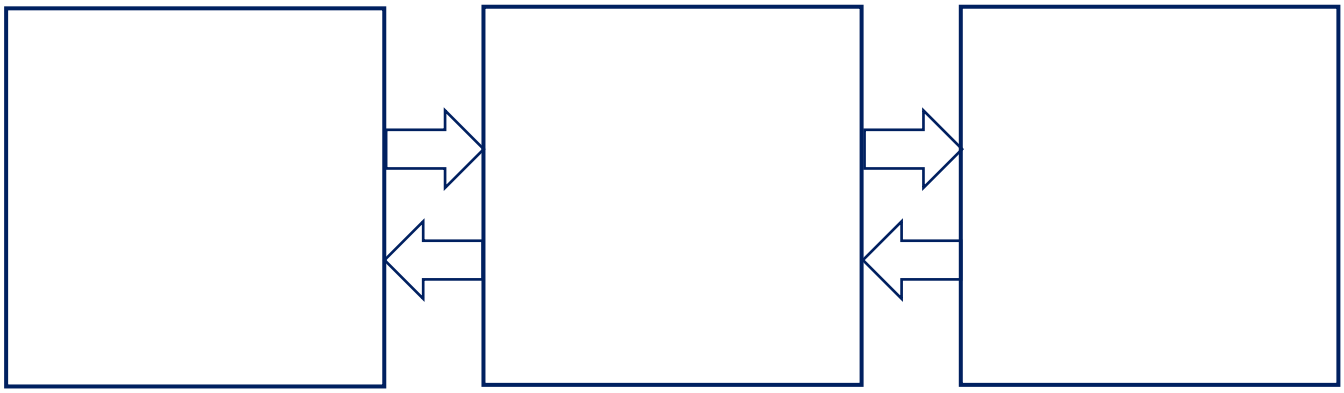
_____

_____

Ice is a _____

Water is a _____

Steam is a _____



The energy of the particles

_____

_____

_____

This causes the particles to

_____

_____

_____

_____

The energy of the particles

_____

_____

_____

This causes the particles to

_____

_____

_____

_____

Challenge

Look at the diagrams that you have drawn. Can you use these diagrams to explain the observations made during these transitions? Can you explain why the physical properties of the material changes?

Investigating changes in state

Cooling curve for stearic acid as it changes from a liquid to a solid

Method :

1. Put about 150 cm^3 of water into a beaker
2. Place in the water a boiling tube a quarter filled with stearic acid.
3. Place the beaker on a tripod and gauze.
4. Heat the water using a Bunsen burner until the stearic acid melts.
5. Use test tube holder to remove the boiling tube from the beaker to a rack and put in a thermometer.
6. Record the temperature every minute until it reaches 50 °C.
7. Record the temperature at which you see the stearic acid solidify here:

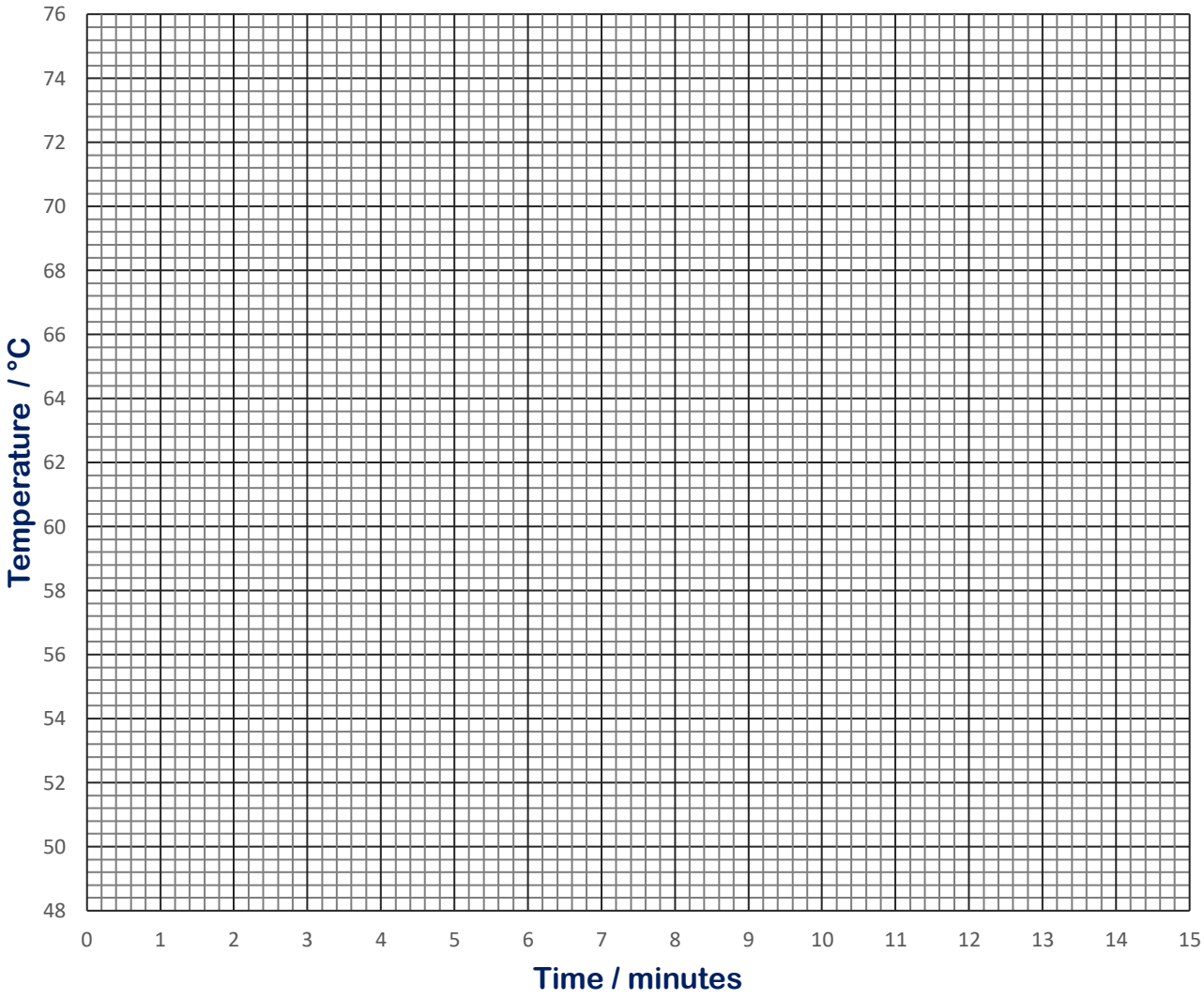
Time (minutes)	Temperature °C	Time (minutes)	Temperature °C
0		8	
1		9	
2		10	
3		11	
4		12	
5		13	
6		14	
7		15	

Plot a graph with time on the x-axis and temperature on the y axis.

Use the graph to determine the melting point of stearic acid.

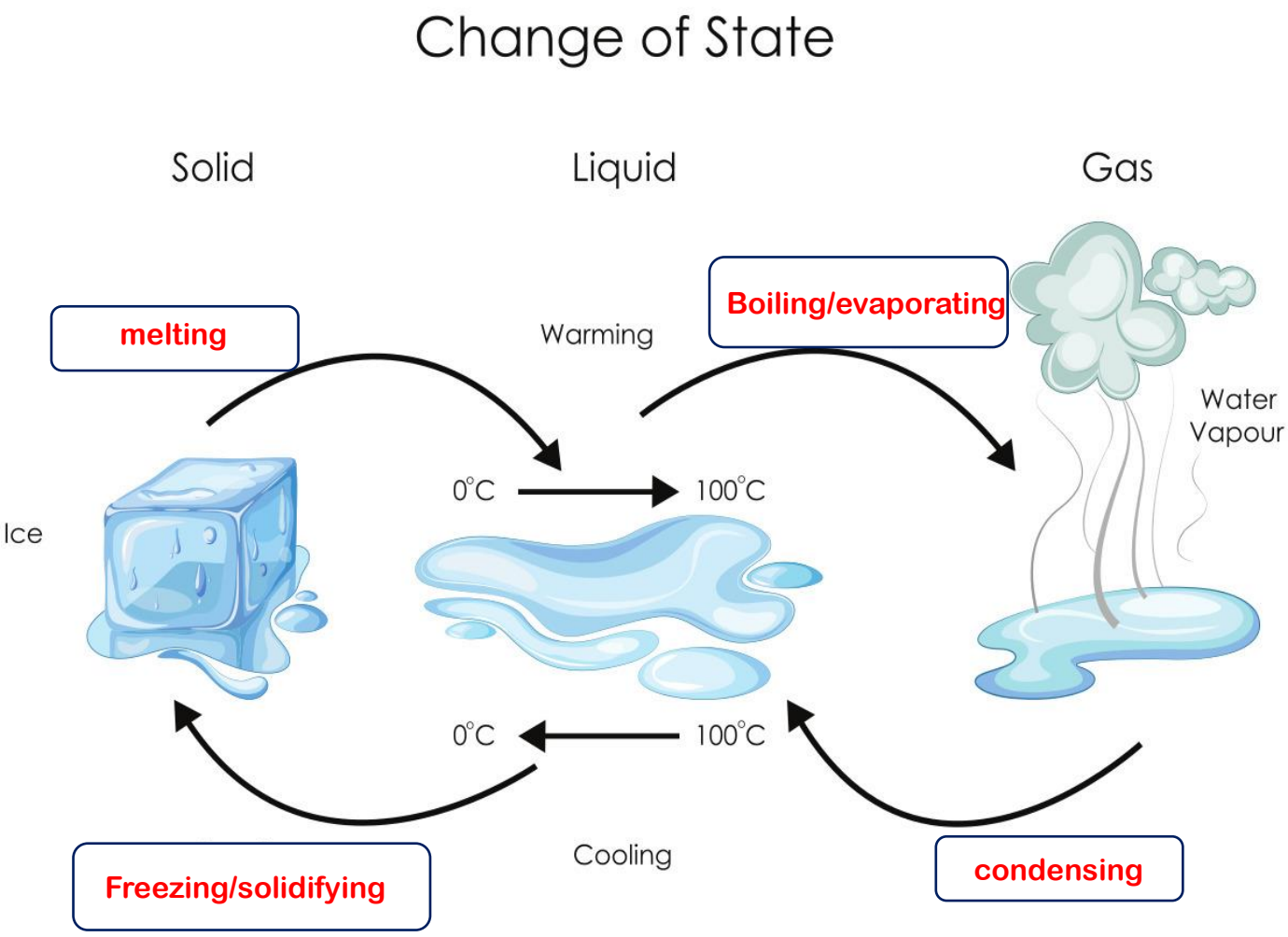
Investigating changes in state

Cooling curve for stearic acid as it changes from a liquid to a solid



Investigating changes in state

Label the four arrows on the following diagram to show the names for the changes in state.



Mission Assignment: Explain changes of state using a particle model

ANSWERS

KS3-02-02

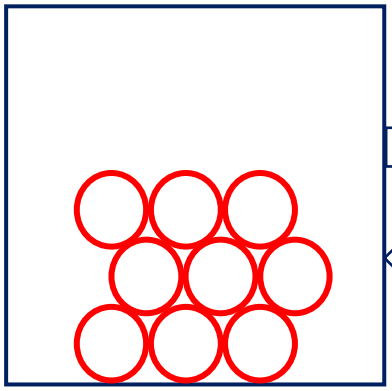
Investigating changes in state

Complete the flow chart. Include descriptions of the energy of the particles during their change of state. In the centre boxes include an appropriate particle diagram.

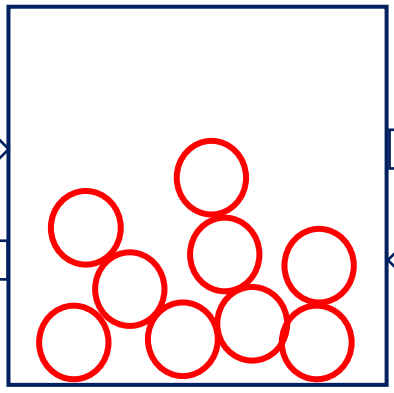
The energy of the particles increases

This causes the particles to vibrate more and break apart

Ice is a solid



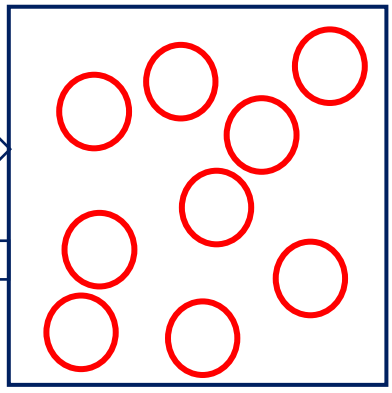
Water is a liquid



The energy of the particles increases

This causes the particles to Move faster over each other breaking free

Steam is a gas



The energy of the particles decreases

This causes the particles to Move slower and closer together moving over each other

The energy of the particles decreases

This causes the particles to Move slower until fixed in position and can only vibrate

Challenge

Look at the diagrams that you have drawn. Can you use these diagrams to explain the observations made during these transitions? Can you explain why the physical properties of the material changes?

Investigating changes in state

Cooling curve for stearic acid as it changes from a liquid to a solid

Method :

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6. Record the temperature every minute until it reaches 50 °C.
7. Record the temperature at which you see the stearic acid solidify here:

Students' own results

Time (minutes)	Temperature °C	Time (minutes)	Temperature °C
0		8	
1		9	
2		10	
3		11	
4		12	
5		13	
6		14	
7		15	

Plot a graph with time on the x-axis and temperature on the y axis.

Use the graph to determine the melting point of stearic acid.

Expected to be in range of 55-57 °C. See how calculated on next page

Investigating changes in state

Cooling curve for stearic acid as it changes from a liquid to a solid