1 A cup contains hot liquid.

Some of the liquid evaporates.

What happens to the mass and what happens to the weight of the liquid in the cup?

	mass	weight
A	decreases	decreases
B	decreases	stays the same
C	stays the same	decreases
D	stays the same	stays the same

2 Which statement about evaporation is correct?

A Evaporation causes the temperature of the remaining liquid to decrease.

B Evaporation does not occur from a cold liquid near its freezing point.

C Evaporation does not occur from a dense liquid, such as mercury.

D Evaporation occurs from all parts of a liquid.

3 A gas is stored in a sealed container of constant volume. The temperature of the gas increases. This causes the pressure of the gas to increase.

What happens to the gas molecules during this pressure increase?

A The average kinetic energy of the molecules increases.

B The average separation of the molecules decreases.

C The average separation of the molecules increases.

D The volume of each molecule increases.

4 A liquid is evaporating. The liquid is not boiling.

Which statement about the liquid is correct?

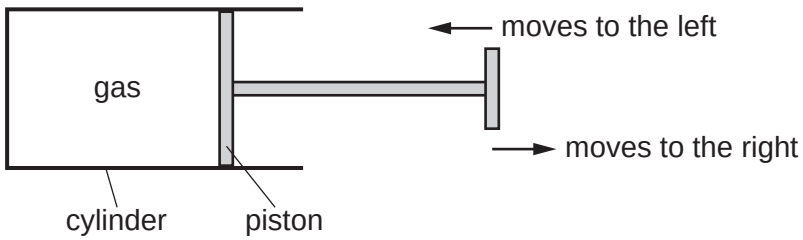
A Any molecule can escape, and from any part of the liquid.

B Any molecule can escape, but only from the liquid surface.

C Only molecules with enough energy can escape, and only from the liquid surface.

D Only molecules with enough energy can escape, but from any part of the liquid.

5 The diagram shows a quantity of gas enclosed in a cylinder by a piston.



The piston is moved to the left or to the right. The temperature of the gas is kept constant.

Which row describes the effect of moving the piston slowly in the direction shown in the table?

	movement of piston	speed of gas molecules	pressure of gas
A	to the left	increases	decreases
B	to the left	no change	increases
C	to the right	increases	decreases
D	to the right	no change	increases

6 What causes the random, zig-zag movement (Brownian motion) of smoke particles suspended in air?

A air molecules colliding with smoke particles

B convection currents as the hot smoke rises

C smoke particles colliding with each other

D smoke particles reacting with oxygen molecules in the air

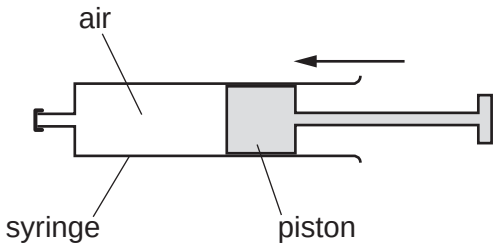
7 A sealed bottle of constant volume contains air.

The air in the bottle is heated by the Sun.

What is the effect on the average speed of the air molecules in the bottle, and the average distance between them?

	average speed of air molecules	average distance between air molecules
A	decreases	decreases
B	decreases	stays the same
C	increases	increases
D	increases	stays the same

8 Air in a sealed syringe is slowly compressed by moving the piston. The temperature of the air stays the same.



Which statement about the air is correct?

A The pressure of the air decreases because its molecules now travel more slowly.

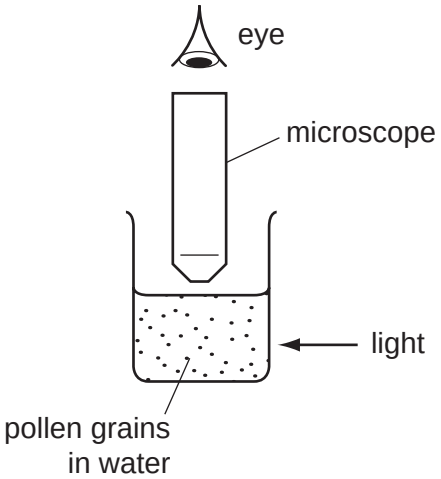
B The pressure of the air decreases because the area of the syringe walls is now smaller.

C The pressure of the air increases because its molecules now hit the syringe walls more frequently.

D The pressure of the air increases because its molecules now travel more quickly.

9 Very small pollen grains are suspended in a beaker of water. A bright light shines from the side.

Small, bright dots of light are seen through a microscope. The dots move in rapidly changing, random directions.



What are the bright dots?

A pollen grains being hit by other pollen grains

B pollen grains being hit by water molecules

C water molecules being hit by other water molecules

D water molecules being hit by pollen grains

10 A sealed gas cylinder is left outside on a hot, sunny day.

What happens to the average speed of the gas molecules and to the pressure of the gas in the cylinder as the temperature of the gas rises?

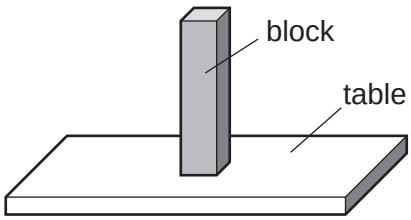
	average speed of gas molecules	pressure of gas in cylinder
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

11 A pool of water evaporates. As molecules escape, the temperature of the water left in the pool changes.

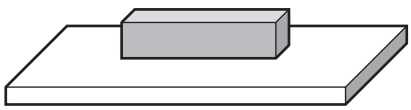
From where do the molecules escape and what is the effect on the temperature of the water in the pool?

	molecules escape from	temperature of water in the pool
A	all parts of the liquid	decreases
B	all parts of the liquid	increases
C	only the liquid surface	decreases
D	only the liquid surface	increases

12 A block with flat, rectangular sides rests on a table.



The block is now turned so that it rests with its largest side on the table.



How has this change affected the force and the pressure exerted by the block on the table?

	force	pressure
A	decreased	decreased
B	decreased	unchanged
C	unchanged	decreased
D	unchanged	unchanged

13 Two states of matter are described as follows.

In state 1, the molecules are very far apart. They move about very quickly at random in straight lines until they hit something.

In state 2, the molecules are quite closely packed together. They move about at random. They do not have fixed positions.

What is state 1 and what is state 2?

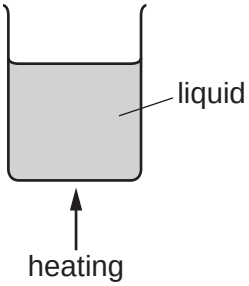
	state 1	state 2
A	gas	liquid
B	gas	solid
C	liquid	gas
D	solid	liquid

14 Puddles of rain water remain after a storm. The water in the puddles gradually evaporates.

How does the evaporation affect the temperature of the water remaining in the puddle, and how does it affect the average speed of the remaining water molecules in the puddle?

	temperature of water in puddle	average speed of water molecules in puddle
A	decreases	decreases
B	decreases	decreases
C	increases	increases
D	increases	increases

1 A liquid is heated in a beaker.



The density of the liquid changes as its temperature increases. This causes energy to be transferred throughout the liquid.

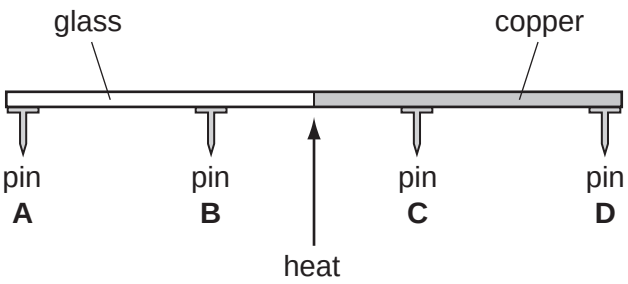
How does the density change and what is this energy transfer process?

	density	energy transfer process
A	decreases	conduction
B	decreases	convection
C	increases	conduction
D	increases	convection

2 A rod is made half of glass and half of copper. Four pins **A**, **B**, **C** and **D** are attached to the rod by wax. The rod is heated in the centre as shown.

The pins fall off when the wax melts.

Which pin falls off first?



3 Which process involves convection?

A bread toasting under a grill

B energy from the Sun warming a road surface

C hot air rising to the top of a cool room

D thermal energy transfer through a copper bar

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4 A student suggests some uses for containers made from good thermal conductors and for containers made from poor thermal conductors.

In which row are both suggested uses correct?

	good thermal conductor	poor thermal conductor
A	keeping a cold liquid at a low temperature	transferring thermal energy quickly from a hot liquid
B	keeping a hot liquid at a high temperature	keeping a cold liquid at a low temperature
C	transferring thermal energy quickly from a hot liquid	transferring thermal energy quickly to a cold liquid
D	transferring thermal energy quickly to a cold liquid	keeping a hot liquid at a high temperature

5 A cotton sheet is ironed with a hot electric iron.

How is energy transferred through the metal base of the iron to the sheet?

A by conduction only

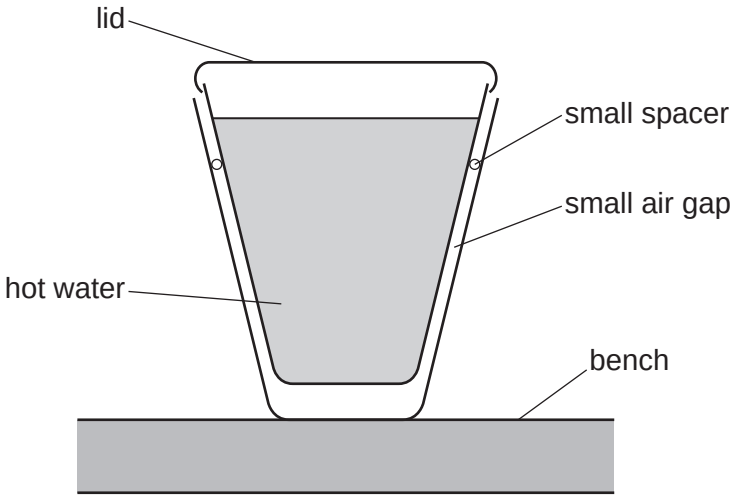
B by convection only

C by radiation only

D by convection and radiation only

6 Two plastic cups are placed one inside the other. A small spacer keeps the two cups separated.

Hot water is poured into the inner cup and a lid is put on top, as shown.



Which statement is correct?

A The bench is heated by convection from the bottom of the outer cup.

B The lid reduces the energy lost by convection.

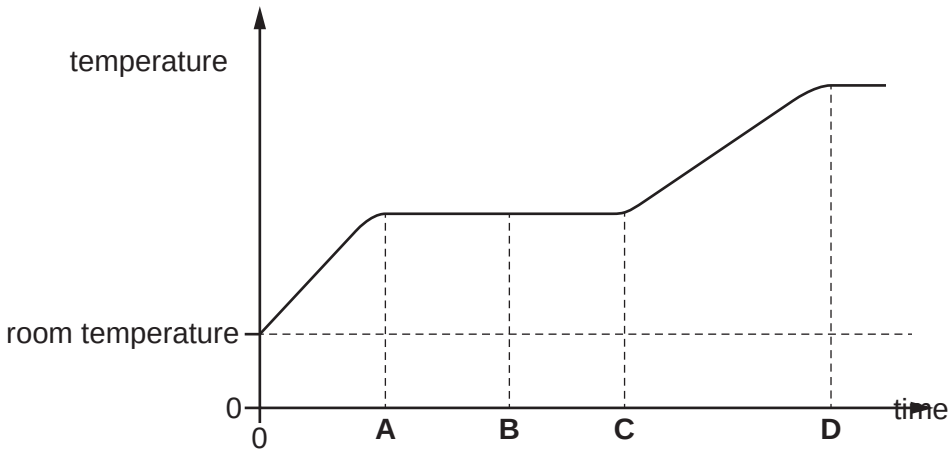
C There is no thermal conduction through the sides of either cup.

D Thermal radiation is prevented by the small air gap.

7 A solid is heated from room temperature.

The graph shows how its temperature changes with time as it is heated constantly.

At which time has it just become **completely** liquid?



8 Thermal energy travels through space from the Sun to the Earth. Space is a vacuum.

How is thermal energy transferred from the Sun to the Earth?

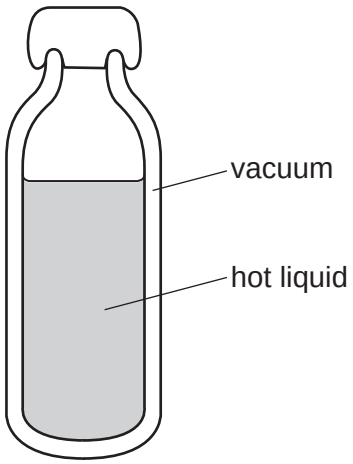
A by conduction only

B by convection only

C by radiation only

D by convection and radiation

9 The diagram shows a vacuum flask used to keep liquid hot.



How does thermal energy pass through the vacuum?

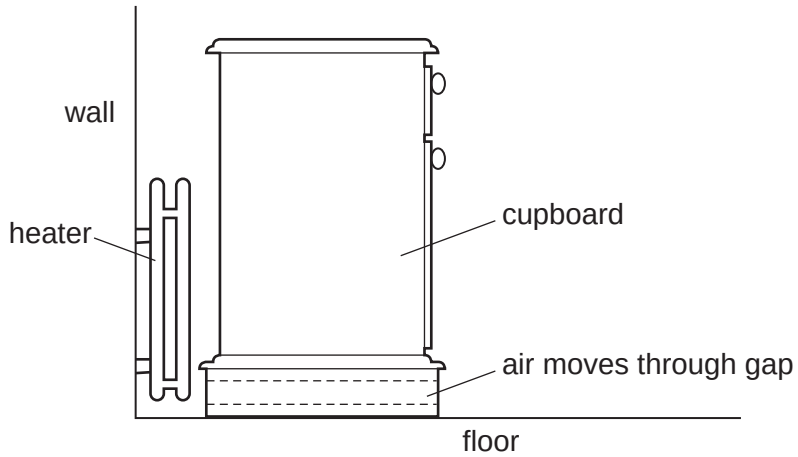
A conduction only

B convection only

C radiation

D conduction and convection

10 A cupboard is placed in front of a heater. Air can move through a gap under the cupboard.

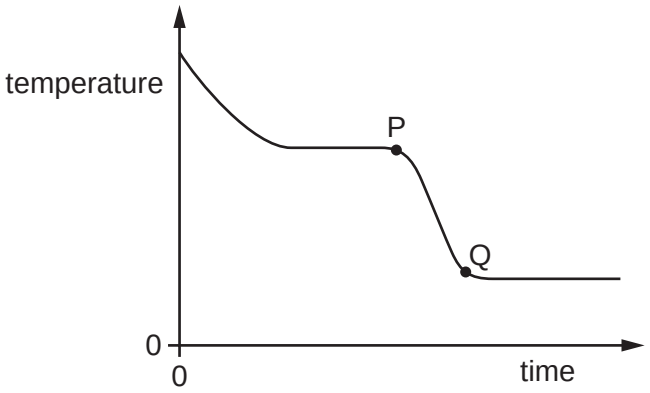


Which row describes the temperature, and the direction of movement, of the air in the gap?

	air temperature	air direction
A	cool	away from the heater
B	cool	towards the heater
C	warm	away from the heater
D	warm	towards the heater

1 A substance loses thermal energy (heat) to the surroundings at a steady rate.

The graph shows how the temperature of the substance changes with time.



What could the portion PQ of the graph represent?

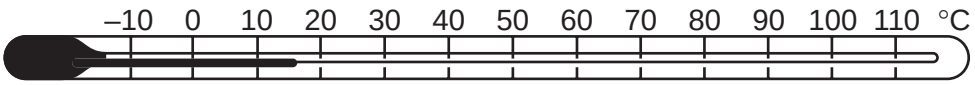
A gas condensing

B gas cooling

C liquid cooling

D liquid solidifying

2 A student wishes to check the upper and the lower fixed points on a Celsius scale thermometer.



She has four beakers P, Q, R and S.

Beaker P contains a mixture of ice and salt.

Beaker Q contains a mixture of ice and water.

Beaker R contains boiling salt solution.

Beaker S contains boiling water.

Which two beakers should she use to check the fixed points?

A P and R **B** P and S **C** Q and R **D** Q and S

3 The same quantity of thermal energy is supplied to two solid objects X and Y. The temperature increase of object X is greater than the temperature increase of object Y.

Which statement explains this?

A X has a lower melting point than Y.

B X has a lower density than Y.

C X has a lower thermal capacity than Y.

D X is a better thermal conductor than Y.

4 Which statement describes what happens as ice at 0 °C starts to melt to become water?

A Energy is absorbed and the temperature remains constant.

B Energy is absorbed and the temperature rises.

C Energy is released and the temperature remains constant.

D Energy is released and the temperature rises.

5 What is meant by the *fixed points* of the scale of a liquid-in-glass thermometer?

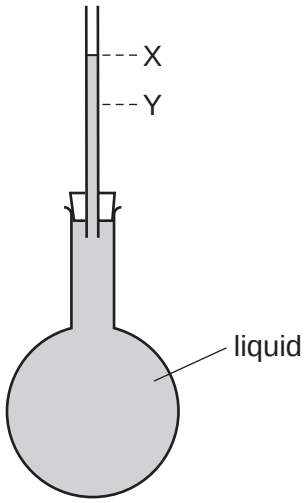
A the distance between one scale division and the next

B the highest and lowest temperatures that the thermometer can record

C the maximum and minimum depth to which the thermometer should be submerged in a liquid

D the two agreed temperatures used for marking the temperature scale

6 A liquid at room temperature fills a flask and a glass tube to level X.



The flask is now placed in ice, and the liquid level in the tube falls to level Y.

Why does the level fall?

A The flask contracts.

B The flask expands.

C The liquid contracts.

D The liquid expands.

7 The melting points of ethanol and mercury are shown.

	melting point / °C
ethanol	–114
mercury	–39

Which of these two liquids is / are suitable to use in a liquid-in-glass thermometer to measure temperatures of –50 °C and –120 °C?

A ethanol only

B ethanol and mercury

C mercury only

D neither ethanol nor mercury

8 Which quantity gives the *thermal capacity* of a beaker?

A the thermal energy required to change the state of the beaker at constant temperature

B the thermal energy required to raise the temperature of the beaker by 1 °C

C the total mass of hot liquid that the beaker can hold

D the total volume of hot liquid that the beaker can hold

9 A jug of water is at room temperature.

Several ice cubes at a temperature of 0 °C are dropped into the water and they begin to melt immediately.

What happens to the temperature of the water and what happens to the temperature of the ice cubes while they are melting?

	temperature of the water	temperature of the ice cubes
A	decreases	increases
B	decreases	stays constant
C	stays constant	increases
D	stays constant	stays constant

10 Which quantity gives the *thermal capacity* of a beaker?

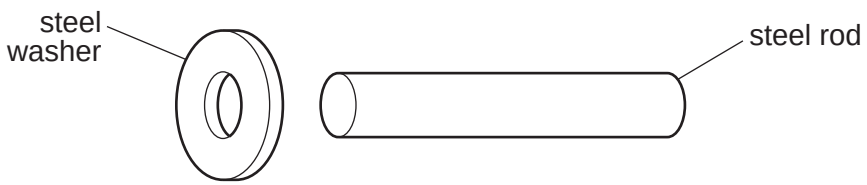
A the thermal energy required to change the state of the beaker at constant temperature

B the thermal energy required to raise the temperature of the beaker by 1 °C

C the total mass of hot liquid that the beaker can hold

D the total volume of hot liquid that the beaker can hold

11 An engineer wants to fix a steel washer on to a steel rod. The rod is just too big to fit into the hole of the washer.



How can the engineer fit the washer on to the rod?

A Cool the washer and then place it over the rod.

B Cool the washer and rod to the same temperature and then push them together.

C Heat the rod and then place it in the hole in the washer.

D Heat the washer and then place it over the rod.