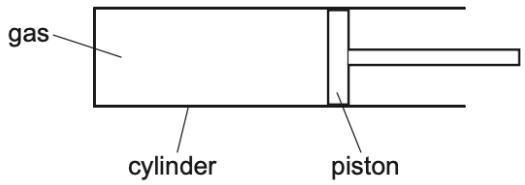
13 A gas is contained in a cylinder by a movable piston.



The gas is heated so that it expands at **constant pressure**.

How is the force of each collision of a gas particle with the piston affected and how does the frequency of collisions between the gas particles and the piston change?

	force	frequency
A	increases	decreases
B	increases	increases
C	stays the same	decreases
D	stays the same	increases

12 Brownian motion is the random motion of particles.

In which states of matter is Brownian motion observed?

A gases, liquids and solids

B gases and liquids only

C gases and solids only

D liquids and solids only

14 Brownian motion is observed when using a microscope to look at smoke particles in air.

What causes the smoke particles to move at random?

A Smoke particles are hit by air molecules.

B Smoke particles are moved by convection currents in the air.

C Smoke particles have different weights and fall at different speeds.

D Smoke particles hit the walls of the container.

14 Four students describe the phrase ‘absolute zero’ during a lesson on the particle model.

Which student is correct?

A This is the lowest possible temperature.

B Particles in a solid start vibrating.

C Particles do not have any weight.

D Particles have the least gravitational potential energy.

15 Four students are asked to state and explain the relative magnitudes of the thermal expansion of solids and gases.

Which student is correct?

A Gases expand more than solids because the molecules in a gas are in random motion.

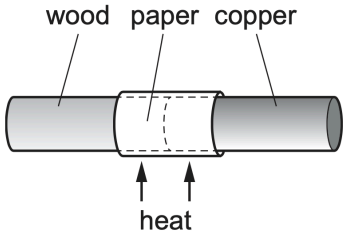
B Gases expand more than solids because the attractive forces between molecules are much weaker in gases.

C Solids expand more than gases because the molecules are closer together in solids.

D Solids expand more than gases because the molecules in a solid are in a regular pattern.

18 A copper bar and a wooden bar are joined. A piece of paper is wrapped tightly around the join.

The bar is heated strongly at the centre for a short time, and the paper goes brown on one side only.



Which side goes brown, and what does this show about wood and copper?

	brown side	wood	copper
A	copper	conductor	insulator
B	copper	insulator	conductor
C	wood	conductor	insulator
D	wood	insulator	conductor

19 Why is the heating coil of a domestic immersion heater placed at the bottom of the tank?

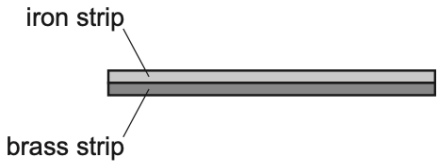
A Cold water is less dense than hot water and therefore sinks.

B Cold water is more dense than hot water and therefore rises.

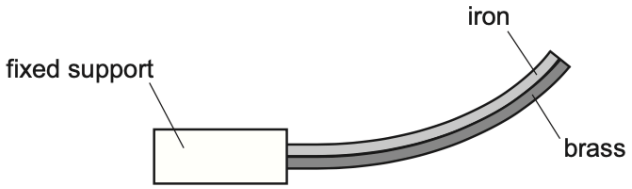
C Hot water is less dense than cold water and therefore rises.

D Hot water is more dense than cold water and therefore sinks.

17 A strip of iron and a strip of brass are firmly attached to each other along their entire length. This combination is a bimetallic strip.



This bimetallic strip is heated and it bends as shown.



The bimetallic strip is now cooled and becomes straight again.

What causes the bimetallic strip to become straight again?

A The brass contracts more than the iron.

B The brass expands more than the iron.

C The iron contracts more than the brass.

D The iron expands more than the brass.

14 A student uses a microscope to observe pollen moving on the surface of water.

Which statement describes the reason for this movement?

A Water molecules are moved by microscopic pollen particles.

B Water molecules are moved by pollen molecules.

C Microscopic pollen particles are moved by water molecules.

D Pollen molecules are moved by water molecules.

16 Some hot water is sealed inside a metal can. The can is in a vacuum in outer space. The hot water slowly cools down.

How does the thermal energy escape into space?

A by conduction then convection

B by conduction then radiation

C by evaporation then convection

D by evaporation then radiation

15 A chef heats some water in a pan on a hotplate.

The temperature of the water rises by 10 °C in time *t*.

She then puts the same volume of oil in an identical pan on the same hotplate.

The specific heat capacity of water is 2.5 times that of oil and water is 1.1 times denser than oil.

What is the time for the temperature of the oil to rise by 10 °C?

A 0.36*t* **B** 0.44*t* **C** 2.3*t* **D** 2.8*t*