Cambridge Assessment International Education

Science

Stage 9

Paper 2

2024

Cambridge Lower Secondary Progression Test

Name

Class

Date

45 minutes

No additional materials are needed.

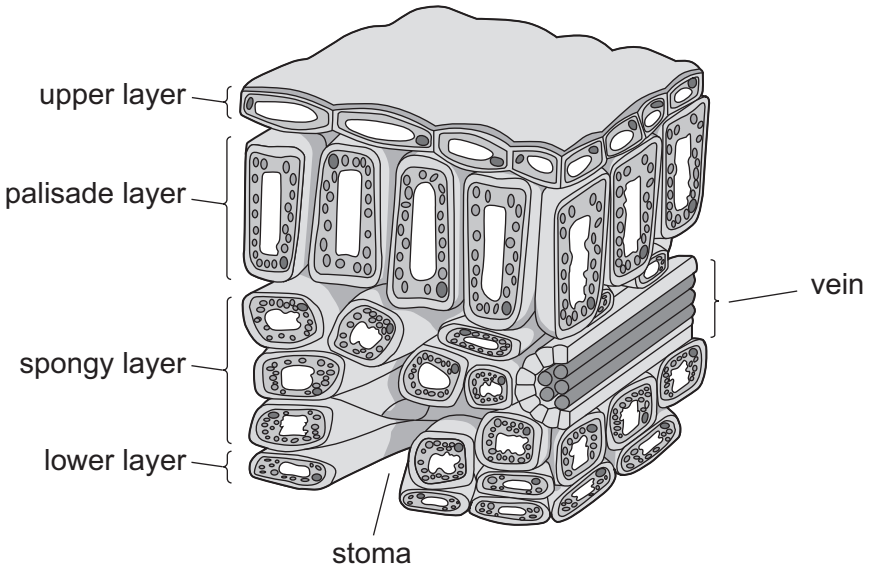
INSTRUCTIONS

- Answer **all** questions.
- Write your answer to each question in the space provided.
- You should show all your working on the question paper.

INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [ ].

1 Look at the diagram of part of the cross-section of a plant leaf.



(a) The palisade layer contains many chloroplasts.

(i) What process happens inside chloroplasts?

.....[1]

(ii) Name **two** gases exchanged through the stoma.

1 .....

2 .....

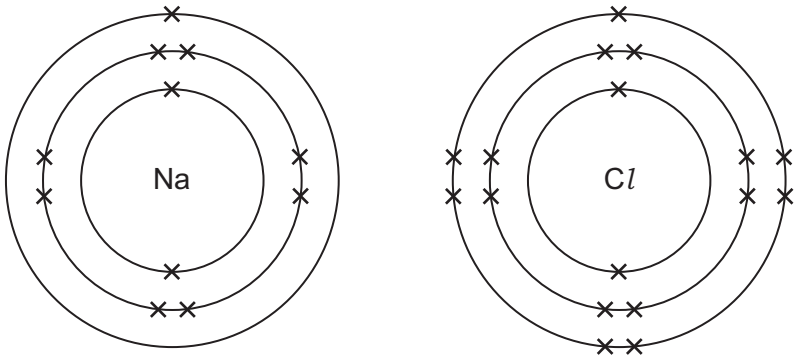
[2]

(b) Chloroplasts contain chlorophyll.

What is the function of chlorophyll?

.....[1]

2 The diagram shows a model of the atomic structure of a sodium atom and a chlorine atom.



A sodium atom and a chlorine atom react together to make a sodium ion, Na^+, and a chloride ion, Cl^-.

(a) Describe how a sodium atom and a chlorine atom become charged ions.

sodium atom .....

.....

chlorine atom .....

.....

[2]

(b) Describe how ions are held together in an ionic compound.

.....

..... [2]

3 This question is about thermal transfer.

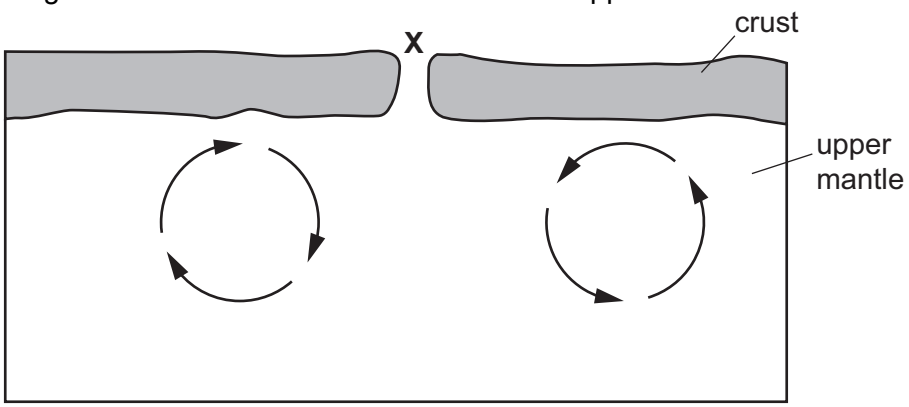
Decide if each sentence is **true** or **false**.

Tick (✓) the correct box.

sentence	true	false
Heat is the word used to measure how hot an object is.	☐	☐
Thermal energy is measured in °C.	☐	☐
When thermal energy is transferred, more thermal energy is created.	☐	☐
Thermal energy always transfers from hotter objects to colder objects.	☐	☐
Heat dissipation happens when thermal energy transfers from a hotter region to a colder region.	☐	☐
A liquid is a good thermal energy conductor.	☐	☐
Convection happens in liquids and gases only.	☐	☐
Radiation needs particles to transfer thermal energy.	☐	☐

[4]

4 Look at the diagram of a model of the Earth's crust and upper mantle.



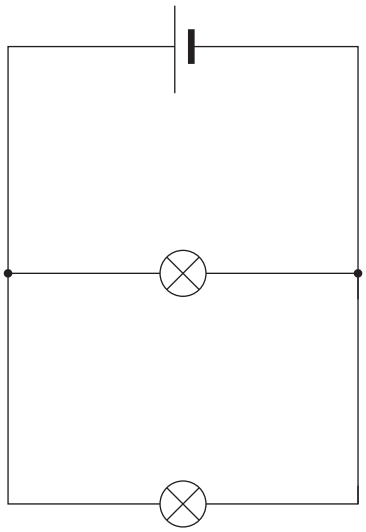
(a) Name **one** event that happens at **X**.

.....[1]

(b) What do the arrows on the diagram represent?

.....[1]

5 The diagram shows a circuit with two lamps.



Complete the circuit diagram to show how to measure the voltage across one of the lamps. [2]

6 Safia is making a salt called copper chloride.

She adds insoluble copper carbonate to dilute hydrochloric acid.

Water and carbon dioxide are also produced.

(a) Write the word equation for this reaction.

.....[2]

(b) Complete the information about the method Safia uses to make copper chloride.

Safia:

- adds excess copper carbonate to dilute hydrochloric acid
- separates the excess copper carbonate from the reaction mixture by

  .....
- pours the filtrate into an evaporating basin
- obtains a saturated solution from the filtrate by .....
- leaves the saturated solution in a warm place to .....

[3]

(c) Suggest **one** piece of safety equipment Safia uses when making copper chloride.

.....[1]

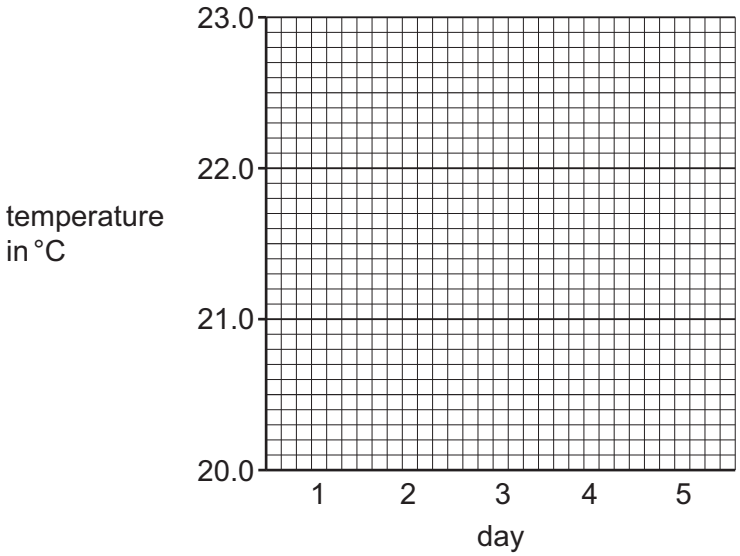
7 Mike investigates the temperature of a classroom every day for five days.

Look at the table of his results.

day	temperature in °C
1	21.0
2	21.5
3	22.3
4	21.8
5	22.4

(a) Mike starts to plot the results in a bar chart.

Complete his bar chart.



[2]

(b) Carlos tells Mike to measure the temperature twice each day at the same time of day.

Explain why this improves the investigation.

.....

..... [1]

8 Scientists think the Moon was formed during a collision between the Earth and another small planet.

This is called the collision theory for the formation of the Moon.

Describe **three** reasons why rocks collected from the Moon support this collision theory.

1 .....

.....

2 .....

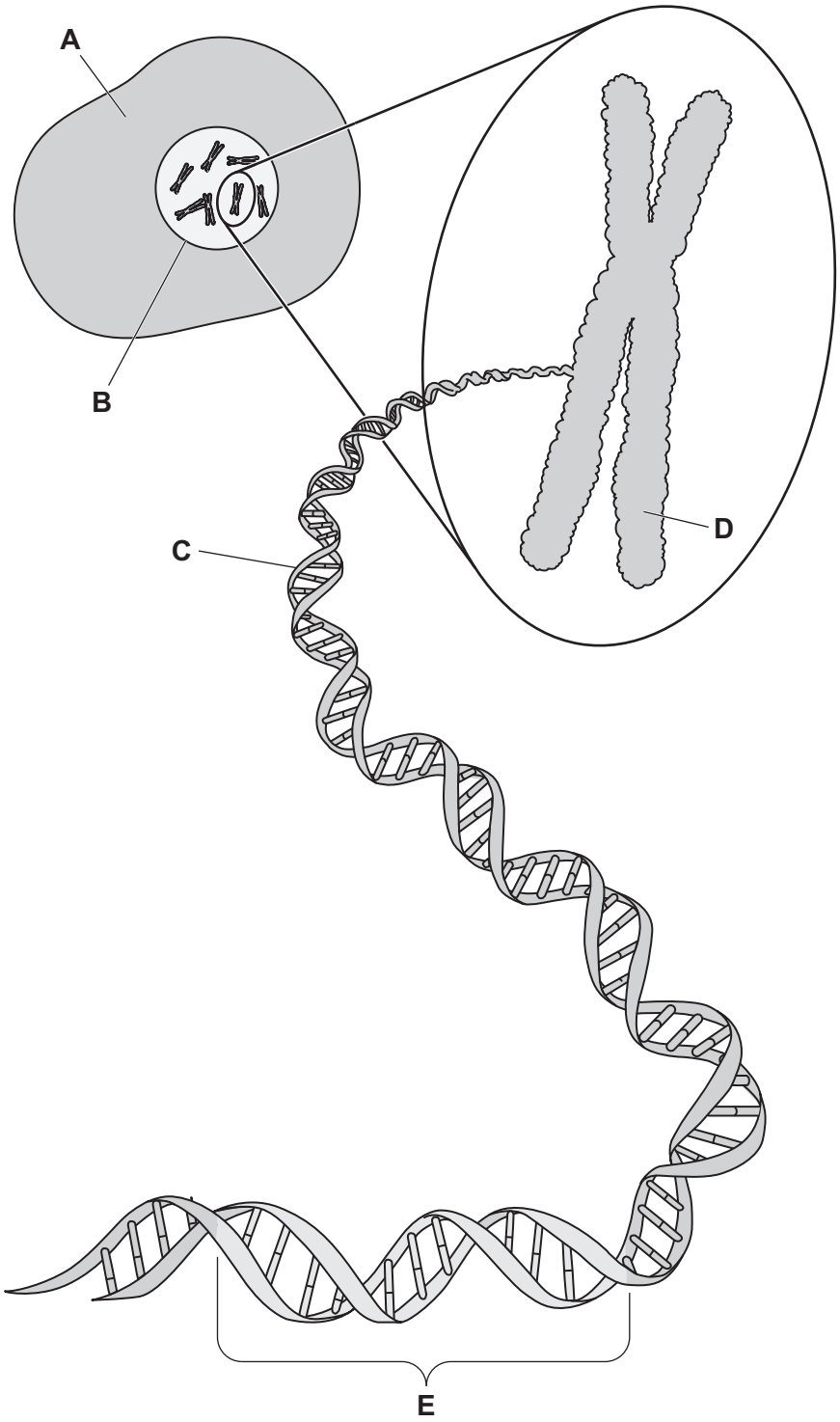
.....

3 .....

.....

[3]

9 The diagram shows the genetic material inside an animal cell.



Look at parts **A**, **B**, **C**, **D** and **E**.

(a) Circle the letter that shows a chromosome.

A **B** **C** **D** **E**

[1]

(b) Circle the letter that controls a single characteristic such as eye colour.

A **B** **C** **D** **E**

[1]

(c) Write down the name of the chemical that is in a chromosome.

..... [1]

10 Ahmed wants to find the density of dry sand.

The dry sand has a mass of 150 g and a volume of 100 cm^3.

Calculate the density of the dry sand.

Include the unit of density in your answer.

density = ... unit .....

[3]

11 Mia investigates an electrical circuit.

(a) She makes this prediction,

'Adding more lamps into a series circuit does not change the current in the circuit.'

Tick (✓) to show if Mia's prediction is correct.

yes ☐ no ☐

Give a reason for your answer.

.....

.....

[1]

(b) The current flowing through a lamp is 4.5 A.

The voltage across the lamp is 1.5 V.

Calculate the resistance of the lamp.

resistance = ... Ω [2]

12 **(a)** A scientist develops a model about climate change.

The scientist makes this prediction in 2013.

'By the year 2100 the average temperature at the Earth's surface will rise by 1.5 °C.'

The same scientist changes the prediction in 2023.

'By the year 2100 the average temperature at the Earth's surface will rise by 2.5 °C.'

Suggest **two** reasons why the scientist changes the prediction.

1 .....

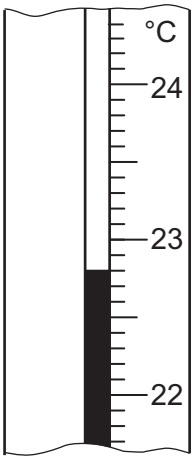
2 .....

[2]

(b) The scientist plans an investigation to monitor air temperature during a period of one year.

(i) The scientist uses a thermometer to measure air temperature.

Look at the diagram showing part of the thermometer.



What is the temperature reading on the thermometer?

..... °C [1]

(ii) Tick (✓) which plan gives the most appropriate evidence for the investigation.

Measure the air temperature every day for one year. ☐

Measure the air temperature once a month for one year. ☐

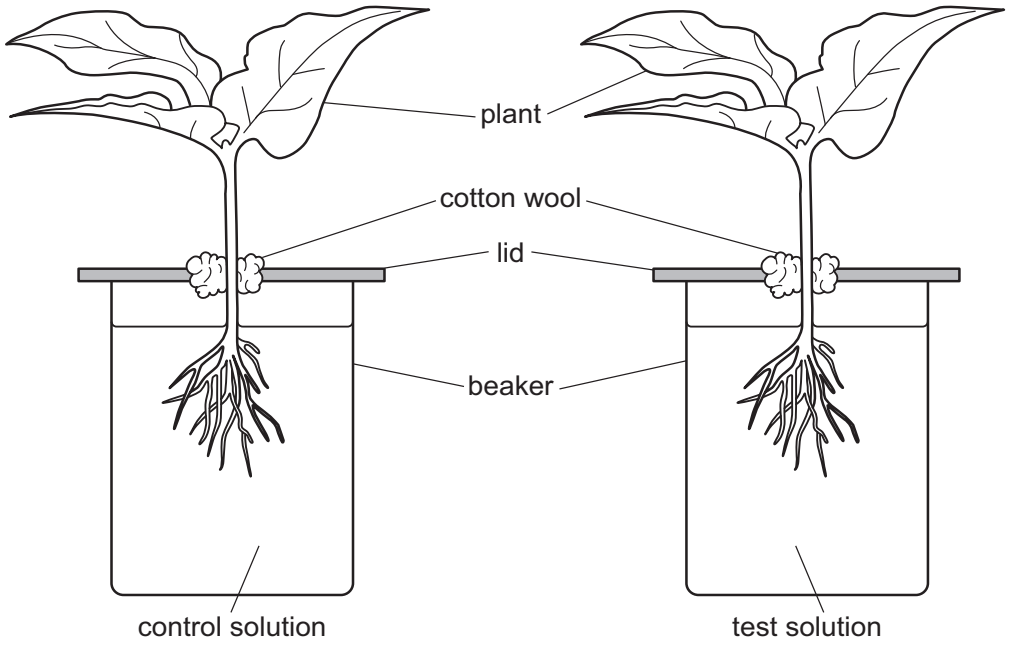
Measure the air temperature once a week for one year. ☐

Measure the air temperature twice a day for one year. ☐

[1]

13 Pierre investigates how a lack of magnesium affects plants.

(a) The diagram shows the equipment he uses.



control solution contains all the dissolved minerals a plant needs

test solution contains all the dissolved minerals a plant needs but **not** magnesium

Pierre measures the chlorophyll content in the leaves of both plants every day.

(i) Pierre uses pure water to make the control solution and the test solution.

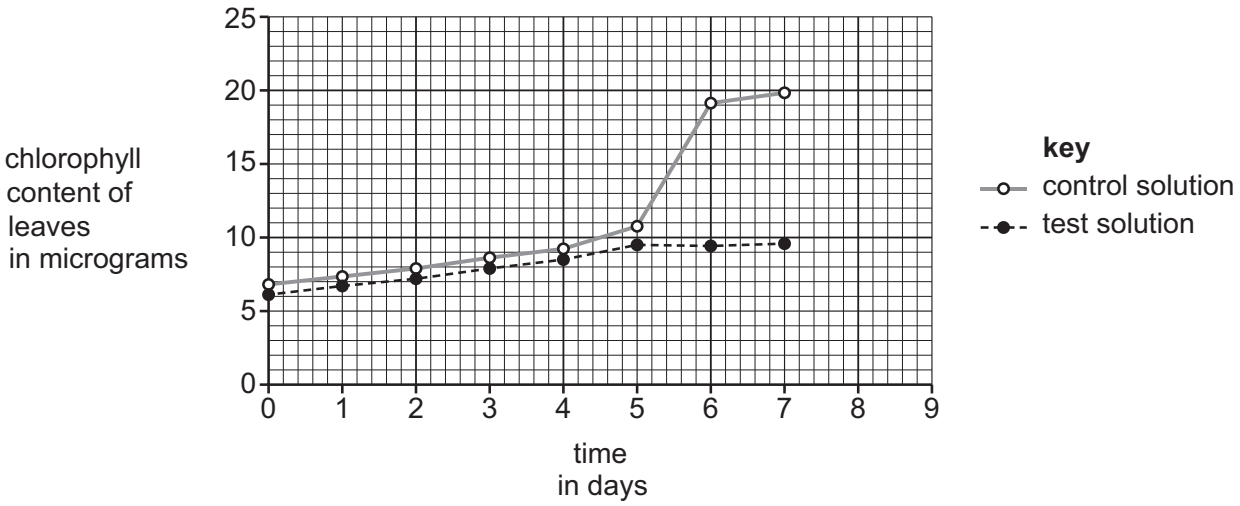
Explain why Pierre uses pure water and **not** water from a tap.

.....

.....

[1]

(ii) Look at a graph of his results.



Write down **two** conclusions about how magnesium affects the chlorophyll content of leaves.

1 .....

.....

2 .....

.....

[2]

(b) Three solutions contain different percentages of minerals.

solution A		**solution B**		**solution C**	
nitrates	2.0%	nitrates	6.0%	nitrates	4.0%
magnesium	1.0%	magnesium	0.2%	magnesium	1.2%

Which solution increases photosynthesis the most?

.....

Explain why.

.....

.....

[1]

14 Angelique makes an electrical circuit with a buzzer and a lamp.

(a) Draw the standard electrical symbol for a buzzer.

[1]

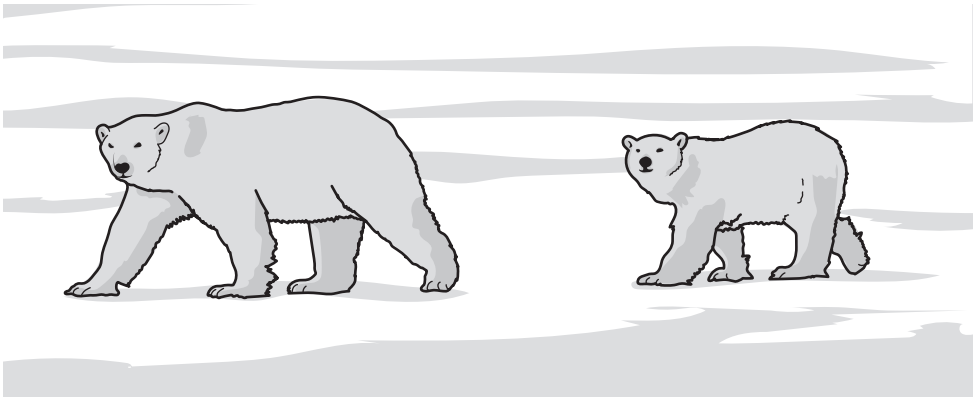
(b) She uses an electrical component to control the brightness of the lamp.

Draw the standard electrical symbol for this component.

[1]

15 Polar bears live in the Arctic.

Their main habitat is sea ice.



Polar bears use the sea ice when they are hunting for food.

This sea ice is melting.

Suggest how sea ice melting affects the polar bear population.

Give **two** reasons for your answer.

polar bear population .....

reason 1 .....

.....

reason 2 .....

.....

[3]