

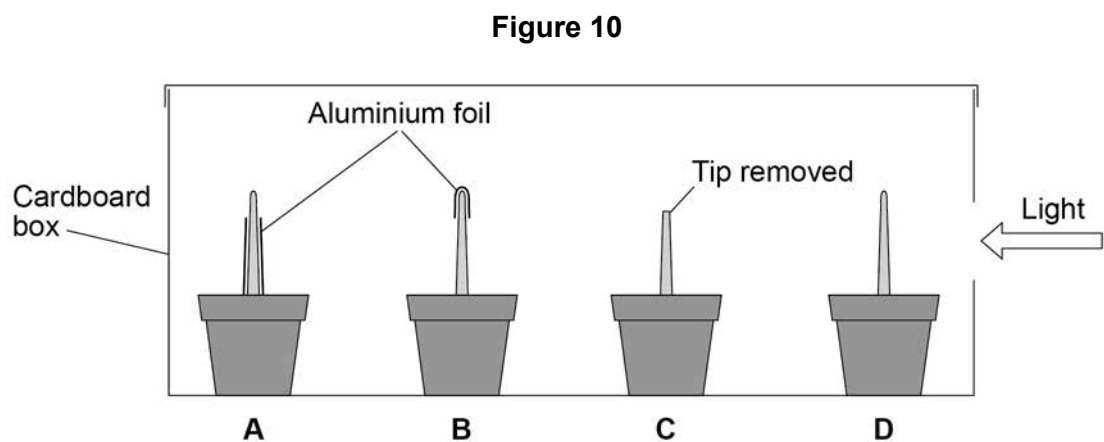
0 8

Some students investigated phototropism in plant seedlings.

This is the method used.

1. Measure the lengths of the shoots of 20 seedlings.
2. Set up four groups of seedlings as follows:
 - **A** – bottom of shoot covered in aluminium foil
 - **B** – tip covered in aluminium foil
 - **C** – tip removed
 - **D** – no changes.
3. Put the seedlings in a cardboard box.
4. Use a lamp to shine a light into the box through a hole in one side.
5. After one day, re-measure the lengths of the shoots.
6. Make a drawing of the appearance of one seedling from each group.

Figure 10 shows the appearance of one seedling in each group at the start of the investigation.



0 8 . 1 Which **two** conditions should the students have kept constant for each group of seedlings?

[2 marks]

Tick **two** boxes.

The length of the roots

The number of seedlings in each group

The temperature

The thickness of the aluminium foil

The volume of water added to the soil

0 8 . 2 What is the purpose of the aluminium foil?

[1 mark]

Tick **one** box.

To hold the shoot straight

To keep the shoot warm

To remove the effect of gravity

To stop light reaching the shoot

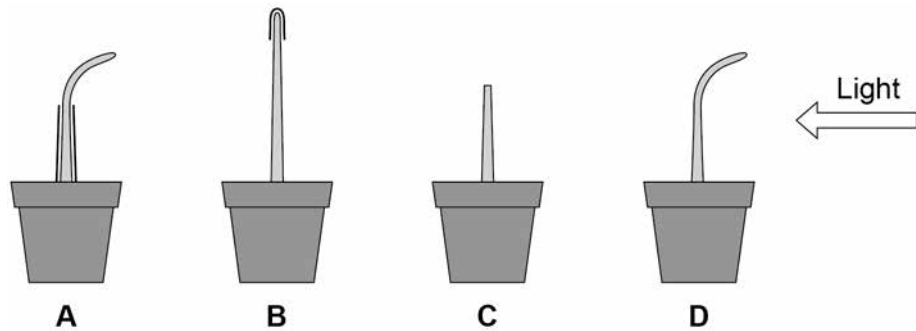
Question 8 continues on the next page

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Figure 11 shows the students' results.

Figure 11



	A	B	C	D
Mean length of shoot at start in mm	23	24	21	25
Mean length of shoot after 1 day in mm	28	30	23	30
Mean change in length of shoot in mm	5	6	2	5

0 8 . 3

Suggest how the students measured the lengths of the curved shoots of seedlings **A** and **D** at the end of the investigation.

[2 marks]

0 8 . 4

The students concluded that the **tip** of the shoot is needed for the plant to respond to light.

Give evidence for this conclusion from **Figure 11**.

[2 marks]

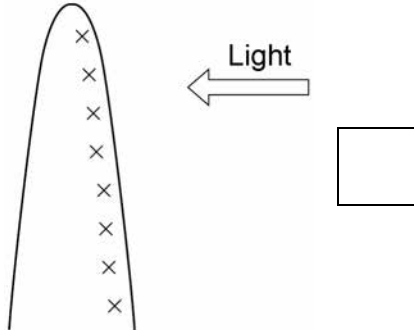


0 8 . 5 A hormone stimulates growth in shoots.

Which distribution of the hormone would cause the results seen in shoot **D**?

[1 mark]

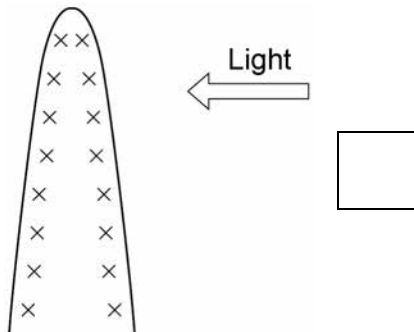
Tick **one** box.

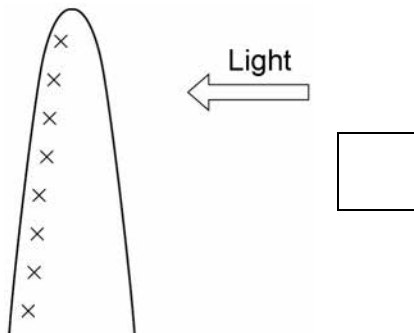


Key:

x x

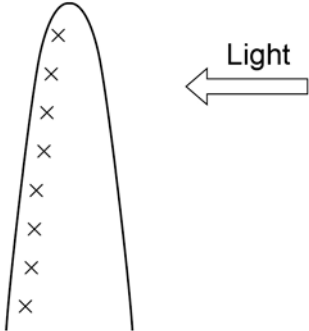
x x = Molecules of
hormone





Turn over for the next question



Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	the temperature		1	AO3 4.5.4.1
	the volume of water added to the soil		1	
08.2	to stop light reaching the shoot		1	AO2 4.5.4.1
08.3	piece of thread (along shoot and mark length)	allow straighten the shoot	1	AO3 4.5.4.1
	transfer to ruler / mm-scale	allow use of (flexible) tape measure for 2 marks	1	
08.4	tip covered / B / removed / C grows straight up or does not bend (towards light)	allow tip covered / B / removed / C does not respond (to light)	1	AO3 4.5.4.1
	tip exposed / A / not covered / D bends (towards light)	tip exposed / A / not covered / D does respond (to light) allow only the ones with exposed tips or only A and D bend towards the light for 2 marks	1	
08.5			1	AO2 4.5.4.1
Total			8	