AQA GCSE Biology | 8461

SPECIFICATION POINT 4.5.4.1

Control and coordination

Past-paper questions

Tier	**Foundation**
Question groups	**11**
Available paper years	**2012–2025**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

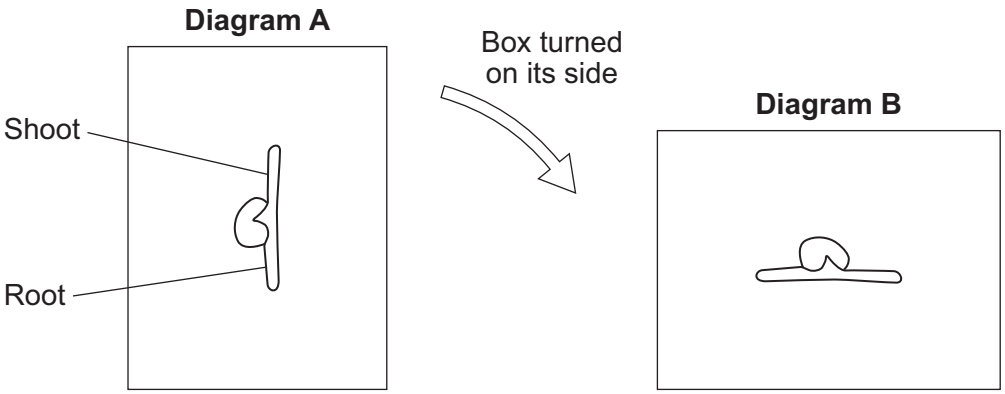
4.5.4.1 Control and coordination

Question 01

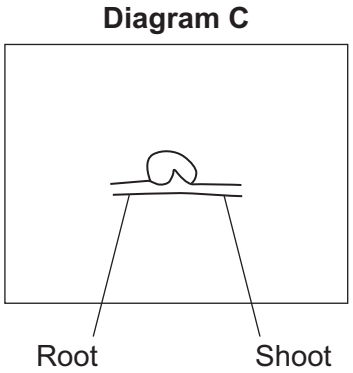
January 2012 | BL1FP | Original Q2 | Legacy

2 A student investigated growth responses in plants.

The student grew a bean seed in a box filled with moist soil, as shown in **Diagram A**. After the seed had started to grow, the box was turned onto its side and placed in a dark room, as shown in **Diagram B**.



2 (a) Complete **Diagram C** to show what the root and shoot will look like three days later.



(2 marks)

2 (b) Draw a ring around the correct answer to complete the sentence.

The results of the investigation show that the root is sensitive to

light.
moisture.
gravity.

(1 mark)

4.5.4.1 Control and coordination

Question 01 · continued

2 (c) A hormone in the plant causes the growth responses.

What is the name of this hormone?

Tick (✓) **one** box.

Auxin ☐

Statin ☐

Steroid ☐

(1 mark)

2 (d) Gardeners can use some plant hormones as weed killers.

2 (d) (i) Give **one different** use of plant hormones by gardeners.

.....

.....

(1 mark)

2 (d) (ii) Selective weed killers only kill some plants in a garden.

Killing weeds in a garden reduces competition between plants.

Give **three** factors that plants compete for.

1 .....

2 .....

3 .....

(3 marks)

8

4.5.4.1 Control and coordination

Question 02

June 2014 | BL1FP | Original Q2 | Legacy

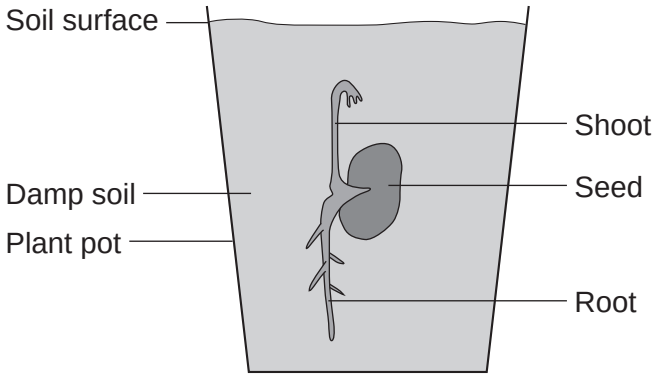
2 A student investigated growth in plants.

The student:

- planted a seed in damp soil in a plant pot
- put the plant pot in a dark cupboard.

Figure 2 shows the result after 5 days.

Figure 2



2 (a) Draw a ring around the correct answer to complete each sentence.

2 (a) (i) After the 5 days, the root had grown

away from water.

in the direction of the force of gravity.

towards light.

[1 mark]

2 (a) (ii) After the 5 days, the shoot had grown

against the force of gravity.

away from light.

towards water.

[1 mark]

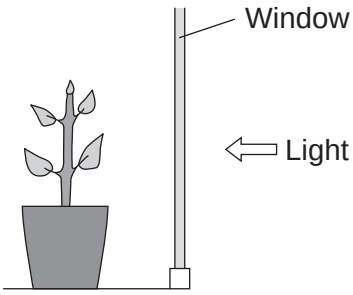
4.5.4.1 Control and coordination

Question 02 · continued

2 (b) After the plant had grown, the student put the plant pot by a window with lots of light.

Figure 3 shows this.

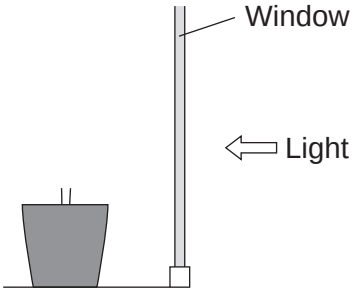
Figure 3



2 (b) (i) Complete **Figure 4** to show the appearance of the student's plant after 20 days by the window.

[1 mark]

Figure 4



2 (b) (ii) Explain the advantage to the plant of growing in the way that you have drawn in part **(b)(i)**.

[2 marks]

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4.5.4.1 Control and coordination

Question 03

June 2015 | BL1FP | Original Q9 | Legacy

9 Gardeners sometimes use weed killers to control the growth of plants.

9 (a) A gardener wanted to get rid of daisy plants growing in a lawn.

The gardener investigated the use of a weed killer.

The gardener:

- recorded the number of daisy plants growing in different 10 m^2 areas of the lawn
- made solutions of the weed killer (each solution had a different concentration)
- put 5 dm^3 of each solution on different 10 m^2 areas of the lawn
- recorded the number of daisy plants growing in each area after 2 weeks.

Table 5 shows the results.

Table 5

Concentration of weed killer in arbitrary units	Number of daisy plants per 10 m^2	
	Before using weed killer	2 weeks after using weed killer
0 (water)	8	8
20	6	8
40	9	6
60	5	2
80	4	0
100	8	0

9 (a) (i) To make the investigation fair, the gardener controlled some variables.

Give **one** variable the gardener controlled in the investigation.

[1 mark]

.....

.....

9 (a) (ii) The gardener decided that the result for a concentration of 20 arbitrary units of weed killer was anomalous.

Suggest why the gardener decided this result was anomalous.

[1 mark]

.....

.....

4.5.4.1 Control and coordination

Question 03 · continued

9 (a) (iii) Why did the gardener put 0 arbitrary units of weed killer on one area of the lawn?

[1 mark]

.....

.....

9 (a) (iv) The gardener concluded that the best concentration of weed killer to use all over a lawn is 100 arbitrary units.

Suggest why the gardener cannot be sure about this conclusion.

[1 mark]

.....

.....

Question 9 continues on the next page

4.5.4.1 Control and coordination

Question 03 · continued

9 (b) **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

Plants respond to different environmental factors.

Describe how different environmental factors affect:

- the direction of growth of roots
- the direction of growth of shoots.

In your answer you should refer to the role of plant hormones.

Do **not** refer to the artificial use of plant hormones by gardeners or scientists.

[6 marks]

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Extra space .....

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10

4.5.4.1 Control and coordination

Question 04

June 2016 | BL1FP | Original Q4 | Legacy

4 Hormones are involved in controlling the menstrual cycle and fertility.

4 (a) (i) Use the correct answer from the box to complete the sentence.

[1 mark]

auxin	**follicle stimulating hormone (FSH)**	**thalidomide**

A hormone produced by the pituitary gland is _____ .

4 (a) (ii) Use the correct answer from the box to complete the sentence.

[1 mark]

luteinising hormone (LH)	**oestrogen**	**statin**

A hormone produced by the ovaries is _____ .

4 (b) (i) Why are fertility drugs given to some women?

[1 mark]

_____

_____

4 (b) (ii) A doctor injects fertility drugs into a woman. After the injection, the hormones travel to the woman's ovaries.

How do the hormones travel to the ovaries?

[1 mark]

Draw a ring around the correct answer.

through the bloodstream **through the neurones** **through the skin**

4 (c) Which **two** hormones are used in contraceptive pills?

[2 marks]

Tick (✓) **two** boxes.

FSH	☐	oestrogen	☐
LH	☐	progesterone	☐

6

4.5.4.1 Control and coordination

Question 05

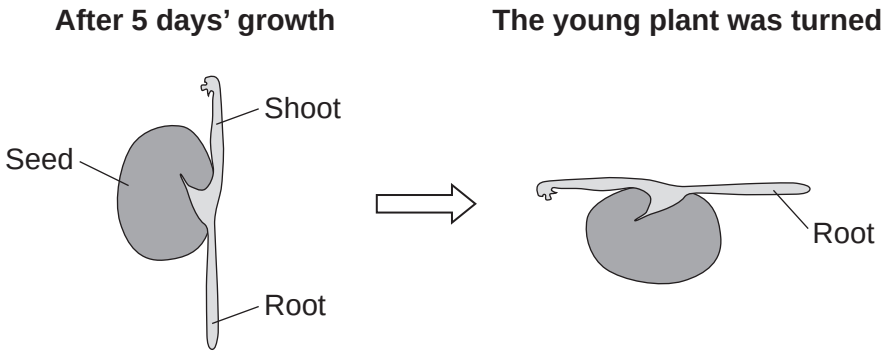
June 2017 | BL1FP | Original Q3 | Legacy

3 A student investigated growth in plants.

The student:

- planted a seed in moist soil
- left the seed to grow for 5 days
- dug up the young plant, turned it round and replanted it, as shown in **Figure 3**.

Figure 3

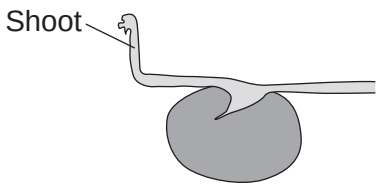


3 (a) (i) Three days later the student dug up the young plant again.

Complete **Figure 4** to show what the root would look like after these 3 days.

[1 mark]

Figure 4



4.5.4.1 Control and coordination

Question 05 · continued

3 (a) (ii) The shoots of plants grow upwards.

Give **two** reasons why shoots grow upwards.

[2 marks]

Tick (✓) **two** boxes.

Shoots grow towards moisture. ☐

Shoots grow towards light. ☐

Shoots grow in the direction of the force of gravity. ☐

Shoots grow against the force of gravity. ☐

Shoots grow away from light. ☐

3 (b) Hormones control the direction of growth in roots and shoots.

3 (b) (i) Name **one** plant hormone.

[1 mark]

Draw a ring around the correct answer.

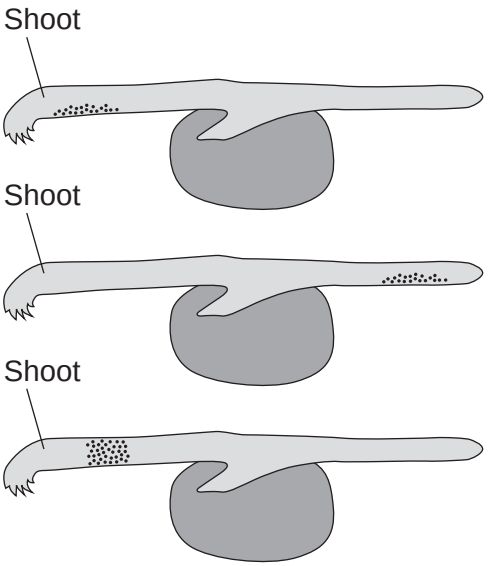
auxin **LH** **statin**

3 (b) (ii) In plant shoots, where there is more plant hormone the cells grow faster.

Which distribution of plant hormone would cause the shoot to grow upwards?

[1 mark]

Tick (✓) **one** box.



☐

☐

☐

5

4.5.4.1 Control and coordination

Question 06

June 2018 | 8461/2F | Original Q8

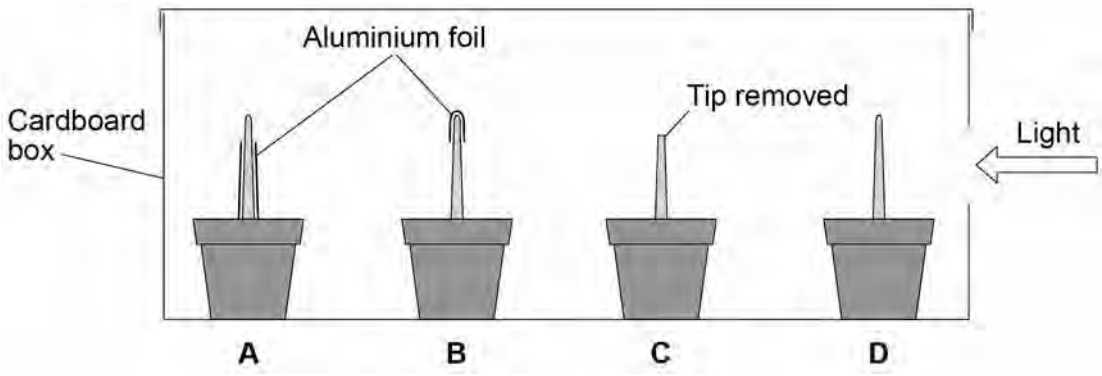
0 8 Some students investigated phototropism in plant seedlings.

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.

Figure 10



4.5.4.1 Control and coordination

Question 06 · continued

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.

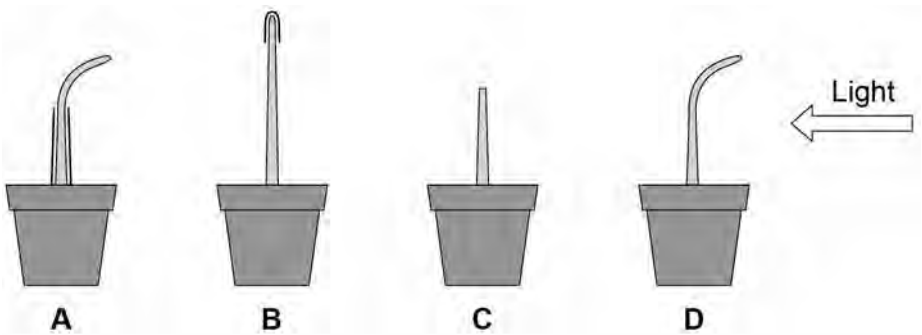
- To hold the shoot straight ☐
- To keep the shoot warm ☐
- To remove the effect of gravity ☐
- To stop light reaching the shoot ☐

Question 8 continues on the next page

Question 06 · continued

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]

4.5.4.1 Control and coordination

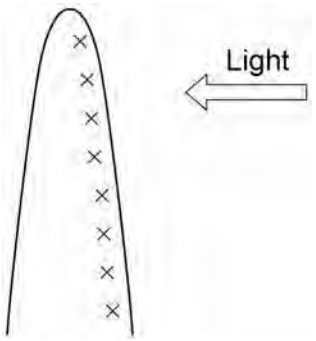
Question 06 · continued

0 8 . 5 A hormone stimulates growth in shoots.

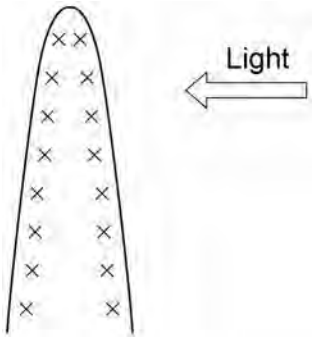
Which distribution of the hormone would cause the results seen in shoot **D**?

[1 mark]

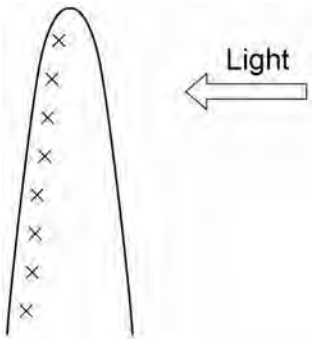
Tick **one** box.



☐



☐



☐

Key:

× ×
× × = Molecules of
× hormone

8

4.5.4.1 Control and coordination

Question 07

June 2019 | 8461/2F | Original Q9

0 9 Phototropism is a growth response by part of a plant to light.

0 9 . 1 Name **one** other tropism.

Give the stimulus the plant responds to in the tropism you have named.

[2 marks]

Tropism _____

Stimulus _____

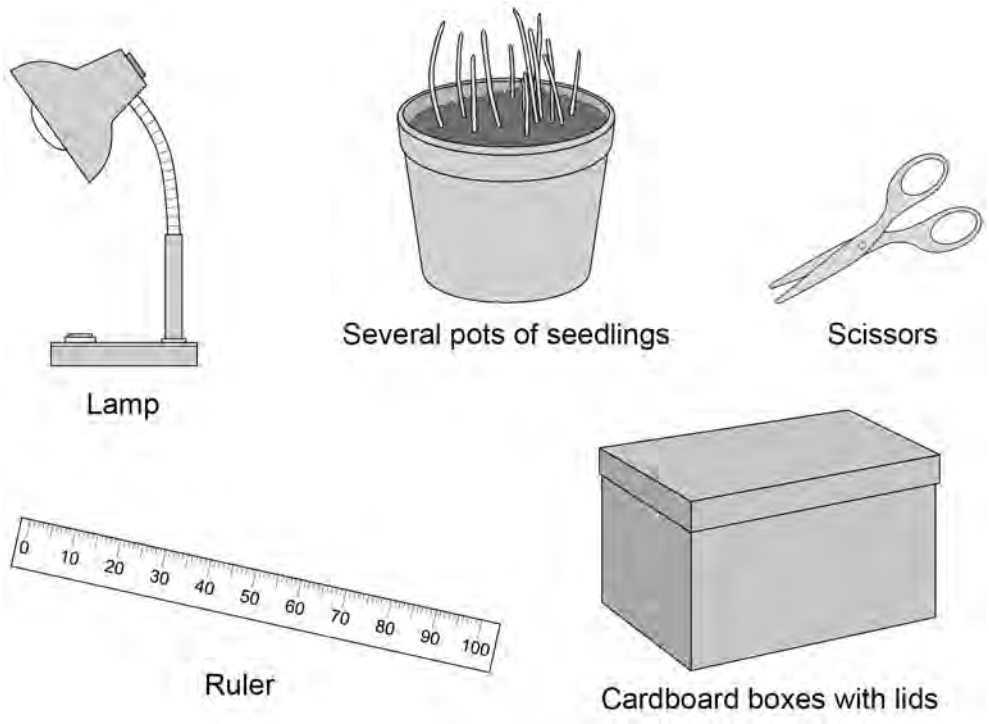
0 9 . 2 Plan an investigation to show the effect of light from one direction on the growth of plant seedlings.

Include details of any controls needed.

You may use some of the equipment shown in **Figure 17** and any other laboratory apparatus.

[6 marks]

Figure 17



4.5.4.1 Control and coordination

Question 07 · continued

0 9 . 3 Explain how phototropism in a plant shoot helps the plant to survive.

[3 marks]

11

4.5.4.1 Control and coordination

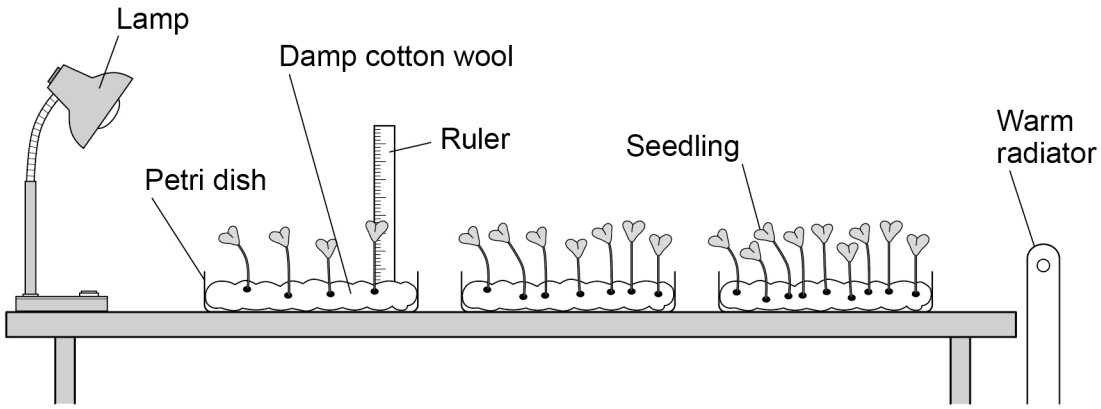
Question 08

November 2020 | 8461/2F | Original Q2

0 2 A student investigated the effect of light intensity on the growth of seedlings.

Figure 2 shows the equipment.

Figure 2



0 2 . 1 Which **two** improvements should the student make to the investigation?

[2 marks]

Tick (✓) **two** boxes.

- Give more water to the seedlings nearest the lamp ☐
- Leave some of the seedlings for a few more days ☐
- Open a window to let more air in ☐
- Put all the dishes the same distance from the radiator ☐
- Use equal numbers of seedlings in each dish ☐

4.5.4.1 Control and coordination

Question 08 · continued

0 2 . 2 What is the dependent variable in the investigation?

[1 mark]

Tick (✓) **one** box.

The height of the seedlings ☐

The mass of cotton wool ☐

The temperature of the room ☐

0 2 . 3 In each dish the seedlings compete with each other.

Give **two** factors the seedlings compete for.

[2 marks]

1 _____

_____

2 _____

_____

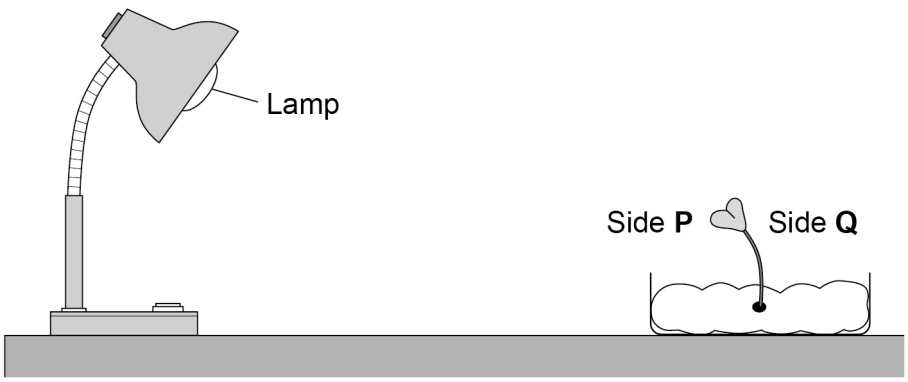
Question 2 continues on the next page

4.5.4.1 Control and coordination

Question 08 · continued

Figure 3 shows a seedling growing towards a lamp.

Figure 3



0 2 . 4 What happened to the growth of the seedling on side **P** compared with the growth on side **Q**?

[1 mark]

Tick (✓) **one** box.

Side **P** has grown less than side **Q** ☐

Side **P** has grown more than side **Q** ☐

Side **P** has grown the same as side **Q** ☐

4.5.4.1 Control and coordination

Question 08 · continued

0 2 . 5 Plant responses are called tropisms.

Which tropism causes the seedling to grow towards light?

[1 mark]

Tick (✓) **one** box.

- Geotropism ☐
- Gravitropism ☐
- Phototropism ☐

0 2 . 6 Which hormone causes the seedling to grow towards the light?

[1 mark]

Tick (✓) **one** box.

- Auxin ☐
- Insulin ☐
- Testosterone ☐

8

4.5.4.1 Control and coordination

Question 09

0 3 A plant shoot responds to the stimulus of light shining on it from one side.

0 3 . 1 What name is given to the type of response shown by the plant shoot?

[1 mark]

Tick (✓) **one** box.

Adaptation ☐

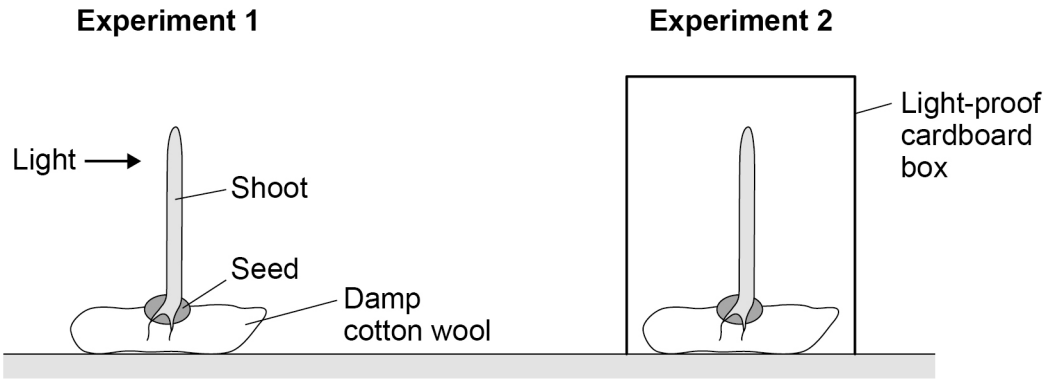
Homeostasis ☐

Tropism ☐

A student investigated the effect of one-sided light on the growth of plant seedlings.

Figure 5 shows how the student set up the investigation.

Figure 5

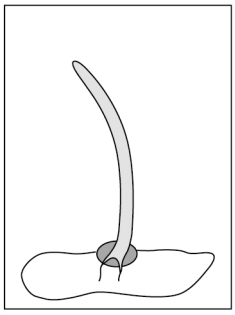
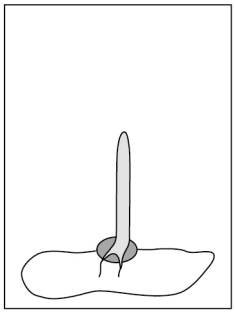
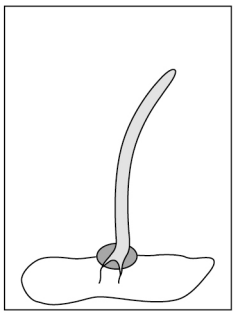
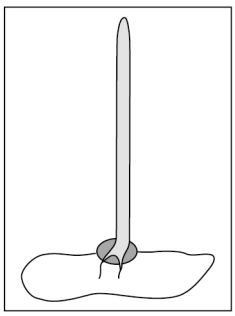


4.5.4.1 Control and coordination

Question 09 · continued

0 3 . 2 Draw **one** line from each experiment to what the seedling would look like after 12 hours.

[2 marks]

Experiment	What the seedling would look like
1	
2	
	
	

0 3 . 3 Why did the student set up experiment **2** in this investigation?

[1 mark]

4.5.4.1 Control and coordination

Question 09 · continued

0 3 . 4 The student wanted to make the investigation of the effect of one-sided light more valid.

The student decided to set up a third experiment.

How should the student set up the third experiment?

[1 mark]

Tick (✓) **one** box.

Give no water to the third seedling. ☐

Shine light from all sides on the third seedling. ☐

Turn the third seedling so it is upside-down. ☐

0 3 . 5 What is a suitable control variable for the investigation?

[1 mark]

Tick (✓) **one** box.

Keep each seedling at the same temperature. ☐

Keep each seedling the same height above the floor. ☐

Use the same size cardboard box for each seedling. ☐

0 3 . 6 Give **one** stimulus a plant **root** responds to.

Do **not** refer to light in your answer.

[1 mark]

_____

4.5.4.1 Control and coordination

Question 09 · continued

0 3 . 7 Scientists often repeat investigations several times.

Give **two** reasons why.

[2 marks]

1 _____

_____

2 _____

_____

9

Turn over for the next question

4.5.4.1 Control and coordination

Question 10

June 2024 | 8461/2F | Original Q6

0 6 Plants grow in response to the direction of light and to gravity.

0 6 . 1 What name is given to a plant's growth response?

[1 mark]

Tick (✓) **one** box.

- Accommodation ☐
- Adaptation ☐
- Tropism ☐

0 6 . 2 Which substance controls the response to light in plant shoots?

[1 mark]

Tick (✓) **one** box.

- Amylase ☐
- Auxin ☐
- Lactic acid ☐

4.5.4.1 Control and coordination

Question 10 · continued

0 6 . 3 A plant root grows downwards in response to gravity.

Which **two** substances can the root absorb in larger amounts when it grows downwards?

[2 marks]

Tick (✓) **two** boxes.

- Carbon dioxide ☐
- Glucose ☐
- Nitrate ions ☐
- Protein ☐
- Water ☐

Question 6 continues on the next page

Question 10 · continued

0 6 . 4 Plan an investigation to show the effect of light from one direction on the growth of plant seedlings.

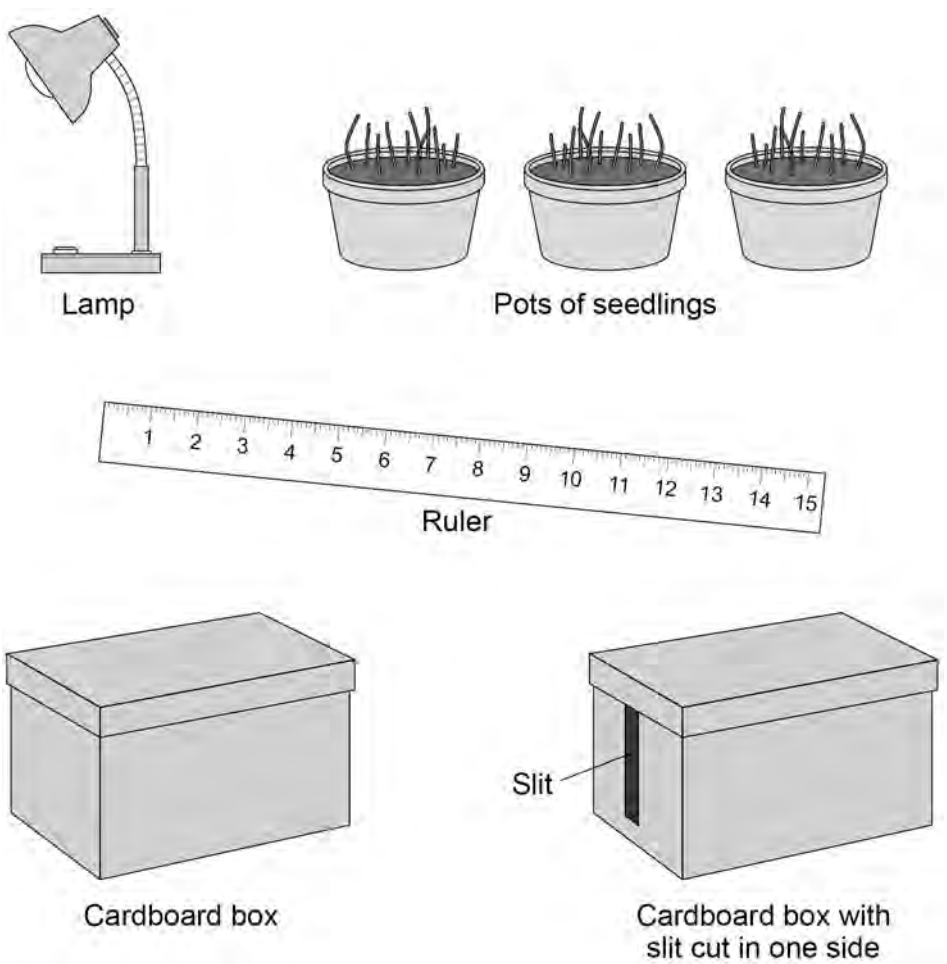
You should include:

- a control
- the measurements you would record
- any other observations you would make.

You may use the equipment shown in **Figure 7** and any other laboratory apparatus.

[6 marks]

Figure 7



4.5.4.1 Control and coordination

Question 10 · continued

10

4.5.4.1 Control and coordination

Question 11

June 2025 | 8461/2F | Original Q10

1 0 Tropisms help plants survive.

1 0 . 1 What is geotropism?

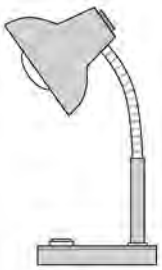
[2 marks]

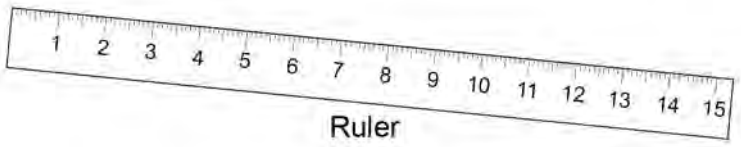
1 0 . 2 Plan an investigation to find the effect of the direction of light on the growth of plant seedlings.

You may use the equipment shown in **Figure 15** and any other laboratory equipment.

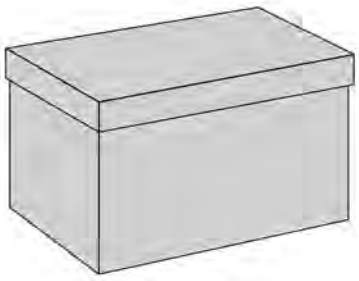
[6 marks]

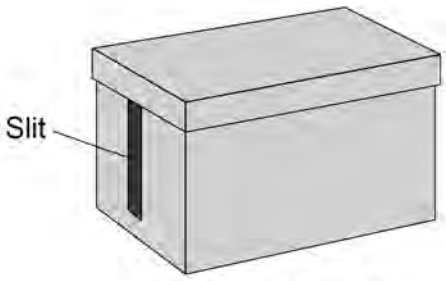
Figure 15


Lamp



Ruler


Cardboard box



Cardboard box with slit cut in one side

4.5.4.1 Control and coordination

Question 11 · continued

Extra space

Question 10 continues on the next page

4.5.4.1 Control and coordination

Question 11 · continued

Plant responses are controlled by hormones.

10.3 Which hormone controls a plant's response to the direction of light?

[1 mark]

10.4 How does the hormone you named in Question **10.3** control the plant's response to the direction of light?

[1 mark]

Tick (✓) **one** box.

- All parts of the plant have the same concentration of hormone. ☐
- The hormone has an effect when it breaks down. ☐
- There is an uneven distribution of the hormone. ☐

10.5 Explain how a plant's response to light helps the plant survive.

[3 marks]

13