

Questions are for separate science science students only**Q1.**

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

- (a) What name is given to a plant's growth response? **(biology only)**

Tick (✓) **one** box.

Accommodation

☐

Adaptation

☐

Tropism

☐

(1)

- (b) Which substance controls the response to light in plant shoots? **(biology only)**

Tick (✓) **one** box.

Amylase

☐

Auxin

☐

Lactic acid

☐

(1)

- (c) A plant root grows downwards in response to gravity.

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

Tick (✓) **two** boxes.

Carbon dioxide

☐

Glucose

☐

Nitrate ions

☐

Protein

☐

Water

☐

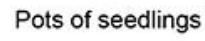
(2)

- (d) 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 below figure and any other laboratory apparatus. **(biology only)**



Cardboard box with
slit cut in one side

[illegible]

(6)

(Total 10 marks)

Q2.

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

- (a) What name is given to the type of response shown by the plant shoot?
(biology only)

Tick (✓) **one** box.

Adaptation

☐

Homeostasis

☐

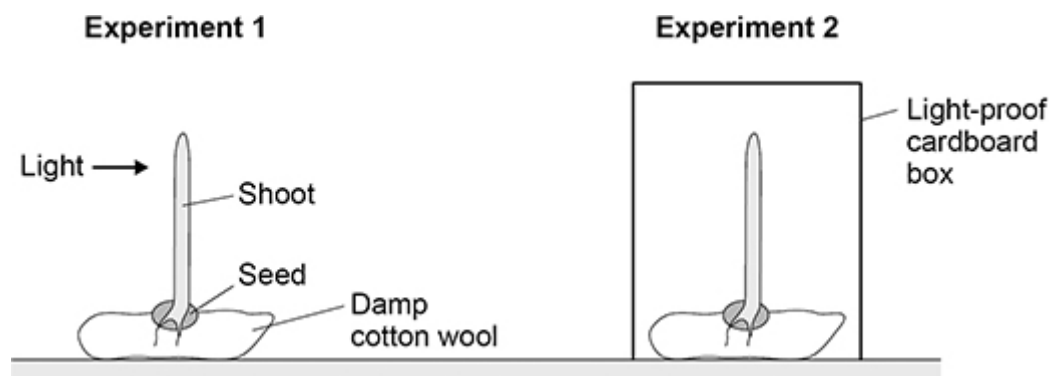
Tropism

☐

(1)

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

The figure below shows how the student set up the investigation.

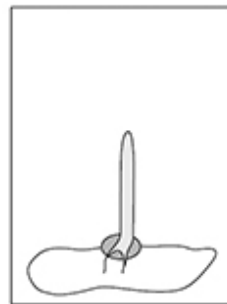
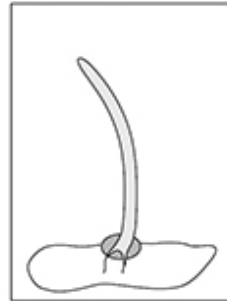


- (b) Draw **one** line from each experiment to what the seedling would look like after 12 hours. **(biology only)**

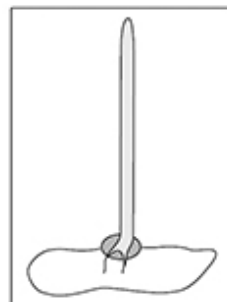
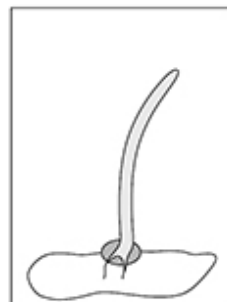
Experiment

What the seedling would look like

1



2



(2)

- (c) Why did the student set up experiment **2** in this investigation? **(biology only)**

(1)

- (d) 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? **(biology only)**

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.

☐

(1)

- (e) What is a suitable control variable for the investigation? **(biology only)**

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.

☐

(1)

- (f) Give **one** stimulus a plant **root** responds to. **(biology only)**

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

(1)

- (g) Scientists often repeat investigations several times. **(biology only)**

Give **two** reasons why.

1 _____

2 _____

(2)

(Total 9 marks)