

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

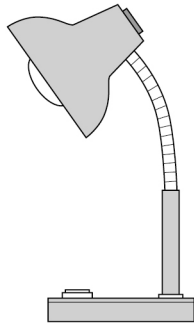
Plan an investigation to show the effect of light from one direction on the growth of plant seedlings.

Include details of any controls needed.

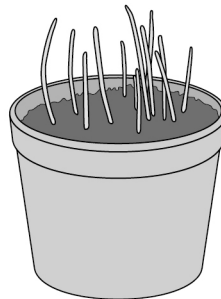
You may use some of the equipment shown in **Figure 17** and any other laboratory apparatus.

[6 marks]

**Figure 17**



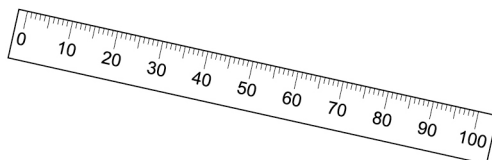
Lamp



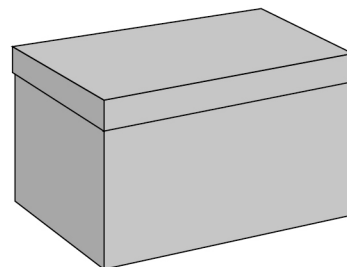
Several pots of seedlings



Scissors



Ruler



Cardboard boxes with lids



*Do not write  
outside the  
box*

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**0 9 . 3**

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

**[3 marks]**

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**11**

**END OF QUESTIONS**



| Question | Answers  | Extra information   | Mark | AO / Spec.            |
|----------|--|---|------|-----------------------|
| 09.1     | named example of tropism – eg geotropism / gravitropism  | allow hydrotropism <b>or</b> chemotropism <b>or</b> thermotropism | 1    | AO1<br>4.5.4.1        |
|          | correct corresponding stimulus – eg gravity  | allow water <b>or</b> chemical <b>or</b> 'heat'                   | 1    |                       |
| 09.2     | <b>Level 3:</b> The method would lead to the production of a valid outcome. All key steps are identified and logically sequenced.  |   | 5–6  | AO1<br>AO2<br>4.5.4.1 |
|          | <b>Level 2:</b> The method would not necessarily lead to a valid outcome. Most steps are identified, but the plan is not fully logically sequenced.  |   | 3–4  |                       |
|          | <b>Level 1:</b> The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.  |   | 1–2  |                       |
|          | <b>No relevant content</b>   |   | 0    |                       |
|          | <b>Indicative content</b> <ul style="list-style-type: none"> <li>• several seedlings in each batch <b>or</b> one pot of seedlings in each batch</li> <li>• measure heights of shoots</li> <li>• leave some in dark with light from one side / direction in box with hole</li> <li>• control(s) with all-round light <b>or</b> rotating on clinostat <b>or</b> in dark</li> <li>• control variable(s) eg same temperature / water / soil type</li> <li>• after suitable time (at least several hours)</li> <li>• record appearance of seedlings re. light direction</li> <li>• re-measure heights of shoots</li> <li>• detail of how bent shoots were measured – eg use thread or straighten them out</li> <li>• calculate mean height increase for each group</li> <li>• use ruler / protractor to estimate angle of bending</li> </ul> <p>for level 3 a reference to comparing the growth of plants with light from one direction with plants either in darkness or in full light along with a control variable is required</p> |   |      |                       |

| Question     | Answers  | Extra information   | Mark                | AO / Spec. Ref.                                    |
|--------------|--|---|---------------------|--|
| <b>09.3</b>  | leaves / plant receive(s) / absorb(s) more light<br><br>(so) more photosynthesis<br><br>(so plant) produces more glucose | allow starch / carbohydrate / sugar / organic material / other named organic substance<br><br>if no other mark awarded allow <b>1</b> mark for any two of the mark points with no reference to 'more' | 1<br><br>1<br><br>1 | AO2<br>4.5.4.1<br>4.7.2.1<br>4.4<br>4.4.1.2<br>AO1 |
| <b>Total</b> |  |   | <b>11</b>           |  |