

- 1 Carbon dioxide is a raw material for photosynthesis.

Describe the pathway taken by a molecule of carbon dioxide, from the air outside a leaf to a spongy mesophyll cell.

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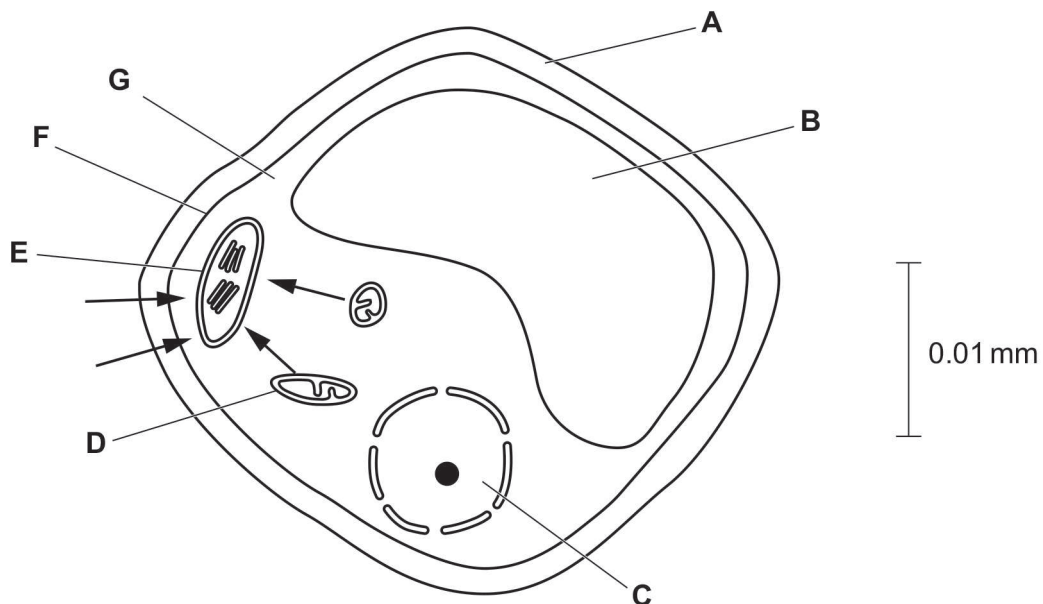
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[Total: 2]

- 2 The diagram shows a spongy mesophyll cell from the leaf of a plant. The arrows show the net direction of movement of carbon dioxide molecules during daylight.



Carbon dioxide is a raw material for photosynthesis.

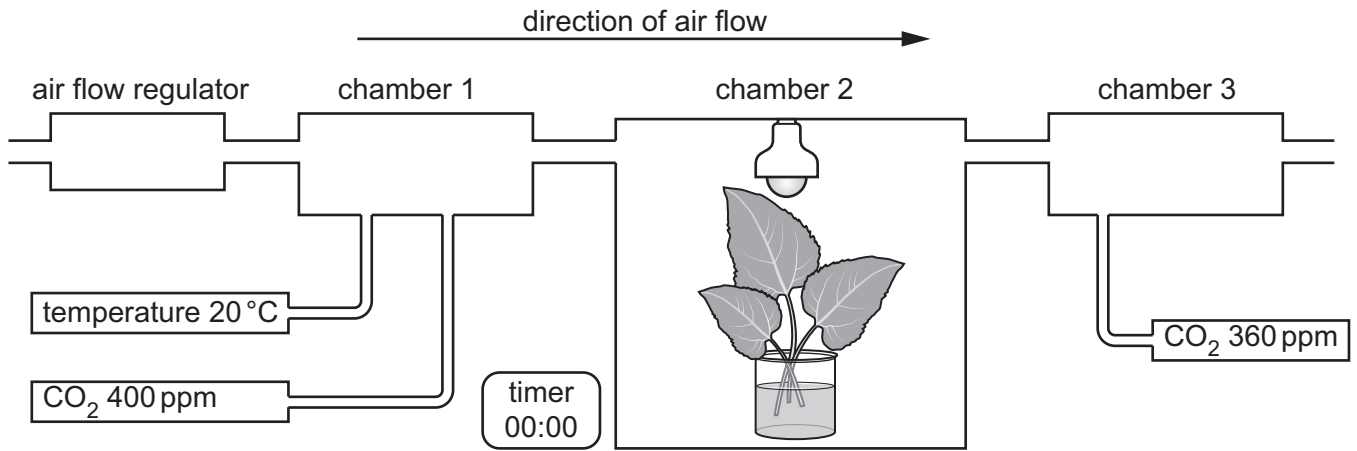
State the process by which carbon dioxide travels into the leaf from the air.

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[Total: 1]

3 Scientists measured the rate of photosynthesis in the leaves of a sunflower plant, *Helianthus annuus*.

The scientists used the apparatus shown in the diagram to measure the rate of photosynthesis.



The apparatus in the diagram maintains a constant temperature and a constant humidity.

Explain why temperature has an effect on the rate of photosynthesis.

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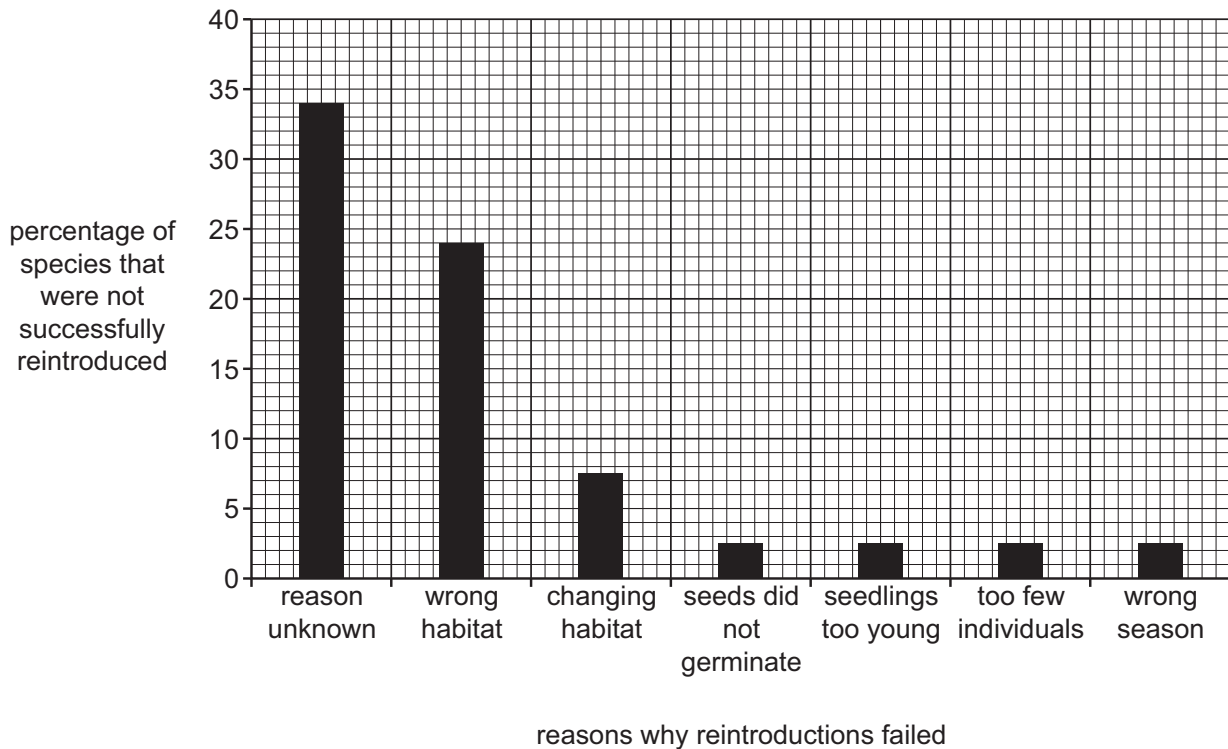
[4]

[Total: 4]

- 4 One purpose of seed banks is to reintroduce plant species into their natural environment.

A survey was done to find out why some reintroduction programmes are not successful.

The graph shows the results of the survey.



Some reintroduction programmes failed because the seedlings were too young. Young seedlings only have a few small roots.

Explain why it would be important to reintroduce plants with many large roots.

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[4]

[Total: 4]

- 5 The movement of sucrose in plants can be modelled using laboratory apparatus.

Diagram A shows the apparatus used to model the movement of sucrose in a plant:

- Partially permeable bags were attached tightly to the ends of tube **Q**.
- The bag representing a **source** was filled with a coloured sucrose solution.
- The bag representing a **sink** was filled with water.
- The containers and tube **Q** and tube **S** were filled with water.

diagram A

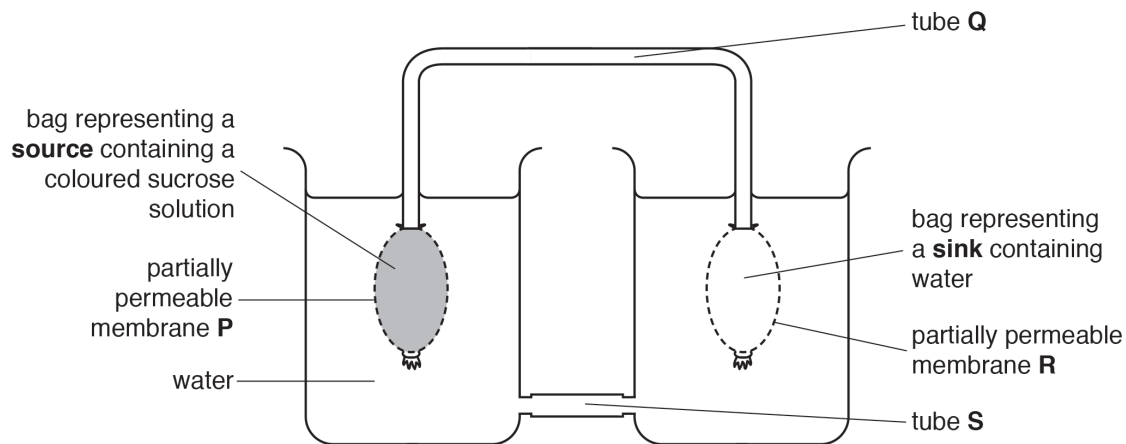
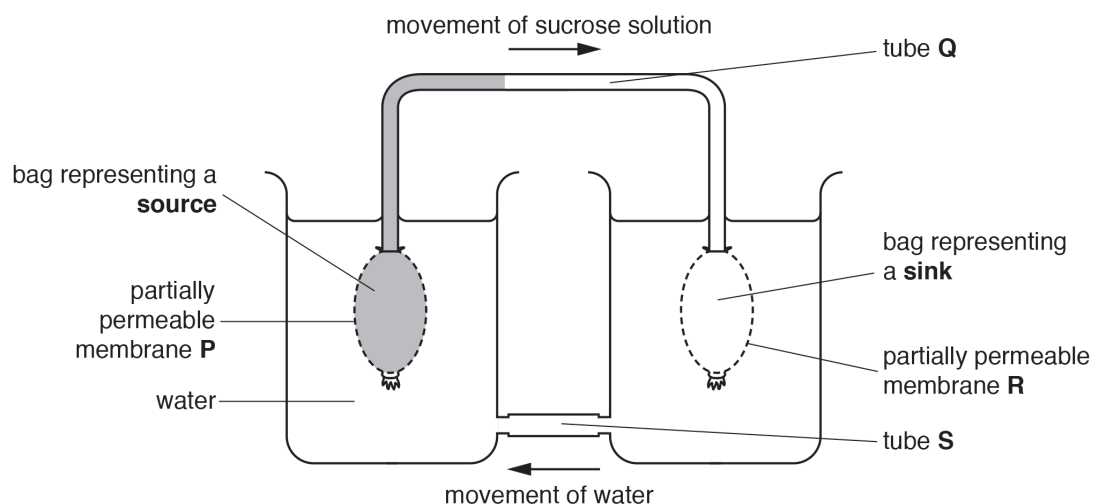


Diagram B shows the position of the coloured sucrose solution 30 minutes after the apparatus was set up.

The arrows show the direction of the movement of the liquids.

diagram B



State the name of the tissue represented by tube **Q** and the name of the tissue represented by tube **S** in **diagram B**.

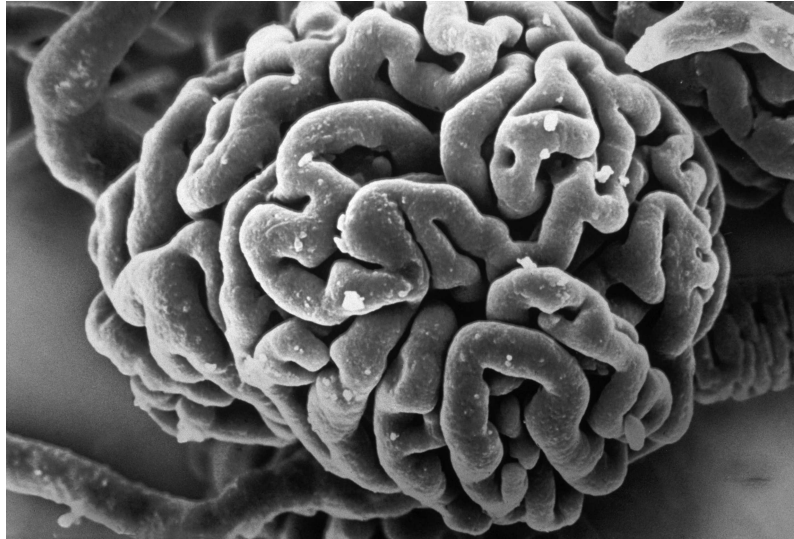
Q

S

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[Total: 2]

- 6 The photomicrograph is of a glomerulus in a kidney.



Describe the structure of a glomerulus.

You may refer to the photomicrograph in your answer.

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[Total: 2]

- 7 The liver is involved in the processing of amino acids.

Describe how excess amino acids are broken down.

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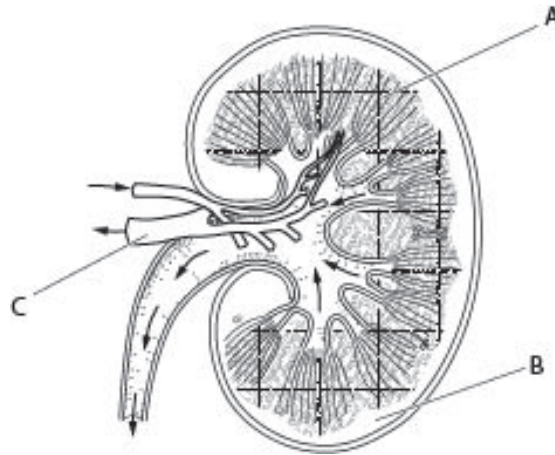
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[Total: 2]

- 8 One of the roles of the kidney is to filter the blood.

The diagram shows a section of a kidney.



State the name of the parts labelled **A**, **B** and **C** on the diagram.

A

B

C [3]

[Total: 3]

- 9 The endocrine system in mammals produces hormones.

Define the term *hormone*.

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[Total: 2]

- 10 Plants make hormones.

State the name of **one** hormone made by plants.

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[Total: 1]

- 11** Explain the advantages of coordinating the response to a dangerous situation using both the nervous system and the endocrine system.

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[Total: 4]

- 12** Explain the mechanism that increases blood flow through the skin.

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[Total: 3]

- 13** Reflex actions allow the body to respond rapidly to changes in the external environment.

Outline the pathway in a reflex arc in response to shining a bright light into the eye.

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[Total: 3]

- 14** Impulses travel along neurones.

Describe how impulses pass from one neurone to another neurone across a synapse.

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[Total: 4]

- 15** Pollen grains grow tubes, which contain haploid male gamete nuclei.

One of these male gamete nuclei fuses with the female gamete.

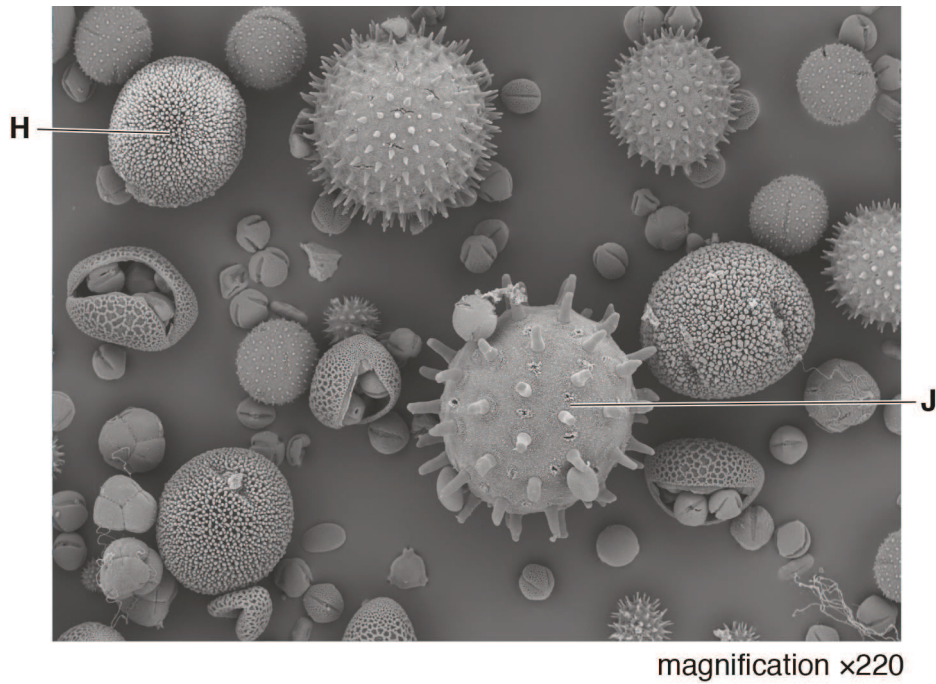
State the part of the flower that contains the female gamete.

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[1]

[Total: 1]

- 16 The photograph below is a scanning electron micrograph of some pollen grains from wind-pollinated flowers and insect-pollinated flowers.



Explain how the pollen grain labelled **J** is adapted for insect pollination.

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[Total: 2]