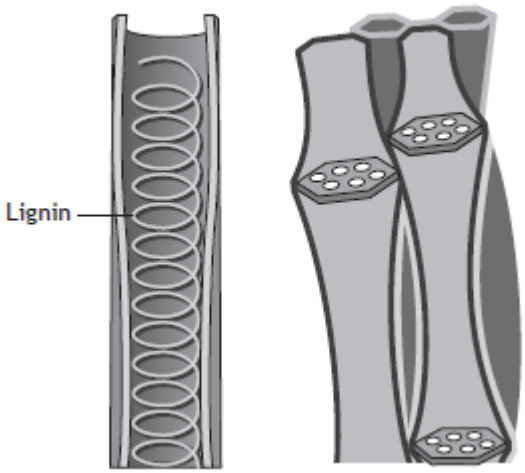
Unit 2 Multicellular Organisms

Key Area 5 Transport Systems Plants

1. The diagram below shows some of the structures involved in transport in plants.



Which line in the table below correctly identifies structures J and K and the substances transported by them?

	Structure J		Structure K	
	Name	*Substance transported*	*Name*	*Substance transported*
A	Xylem	Water	Phloem	Sugar
B	Xylem	Sugar	Phloem	Water
C	Phloem	Water	Xylem	Sugar
D	Phloem	Sugar	Xylem	Water

2. Transpiration occurs from the leaves of a plant.

Which environmental conditions would produce the greatest transpiration rate?

A Warm and still air

B Cold and still air

C Warm and windy

D Cold and windy

3. Which of the following shows the passage of water through the tissues when it enters a plant?

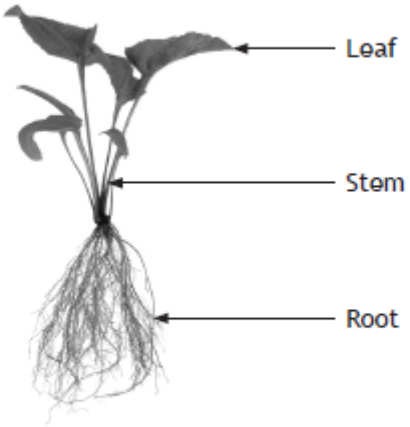
A root hair → xylem → spongy mesophyll
B root hair → spongy mesophyll → xylem
C spongy mesophyll → xylem → root hair
D xylem → spongy mesophyll → root hair

4. An **increase** in which of the following factors would **decrease** the rate of transpiration in plants?

A Wind speed
B Humidity
C Surface area
D Temperature

5.

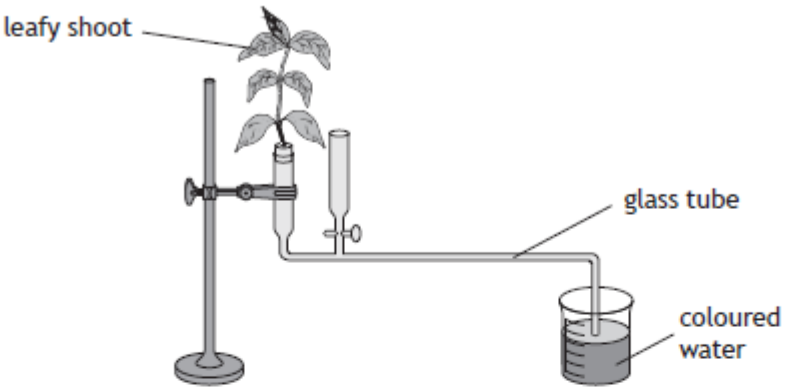
(b) The diagram below shows three parts of a plant.



Describe the structures and processes involved as water moves through the plant from the soil to the air. 3

(a) The rate of transpiration in plants can be measured using the apparatus shown below.

As the plant transpires, coloured water is drawn up the glass tube and its volume measured, over a set period of time, to give the rate of transpiration.



Changes in the surrounding environment can have an effect on the rate of transpiration.

(i) Select one of the environmental changes listed below by circling it.

increase in humidity	increase in temperature	increase in wind speed

State the effect of this change on the rate of transpiration. 1

_____

(ii) Choose any of the environmental changes listed above and describe an addition to the apparatus shown, which would allow an investigation into its effect. 1

Environmental change _____

Description of addition _____

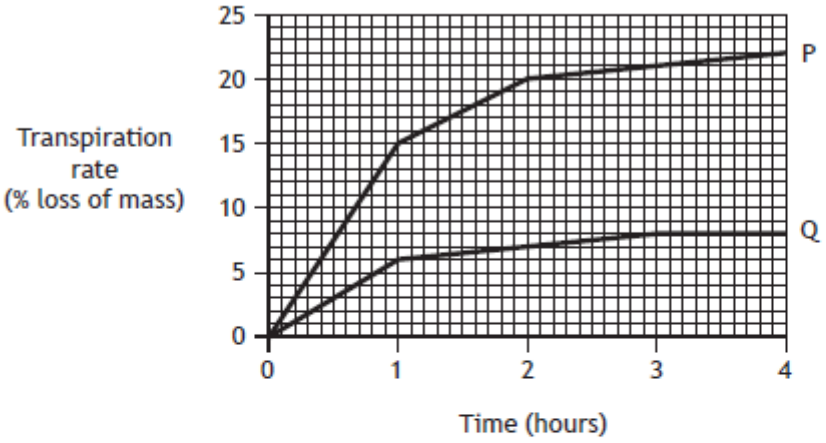
_____

_____

_____

6.

(b) The graph below shows transpiration rates of two plants, P and Q.



(i) With reference to the number of stomata, suggest a reason for the different transpiration rates of plants P and Q. **1**

_____

_____

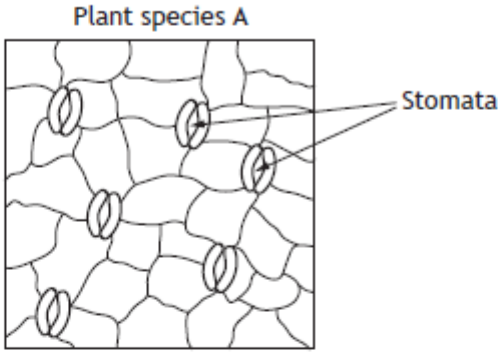
(ii) Name the type of cells which control the opening and closing of stomata. **1**

_____

7.

A student investigated the link between transpiration rate and the number of leaf stomata.

A microscope was used to look at the number of stomata on a leaf surface of plant species A as shown.



The area shown on the diagram above measures 0·04 mm^2.

(a) Calculate the expected number of stomata present in 1 mm^2 on this leaf surface. **1**

Space for calculation

_____

(b) A leaf from another plant, species B, had fewer stomata per mm^2 of leaf surface and a different rate of transpiration.

It was concluded that the number of stomata present affects the rate of transpiration.

(i) Suggest an advantage to plant species B of having fewer stomata. **1**

_____

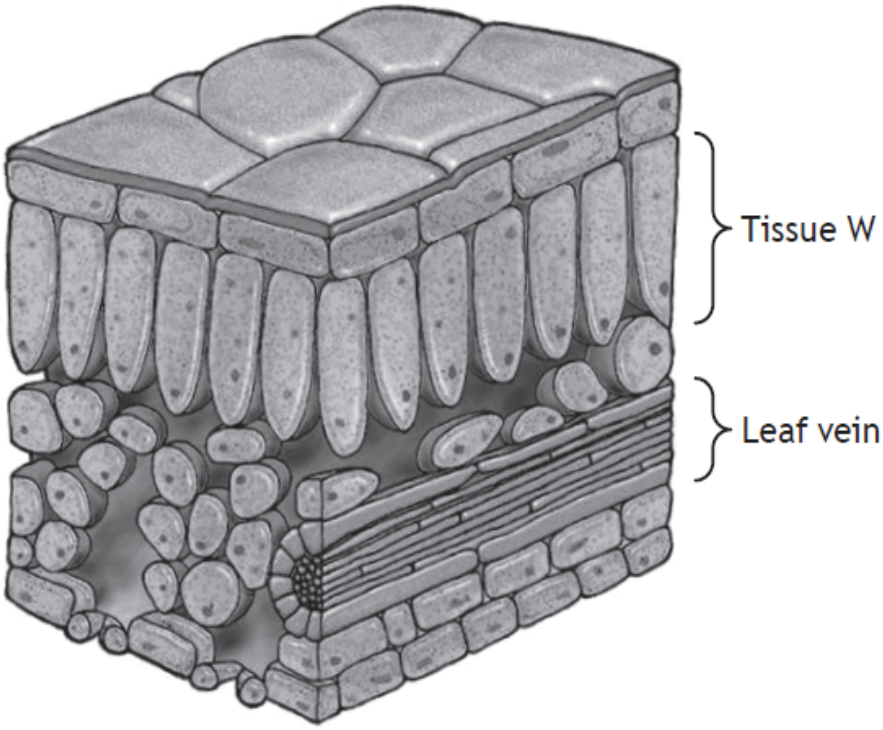
_____

(ii) Tick (✓) one box below to show the environmental condition to which this plant has become best adapted. **1**

Dry ☐ Cool ☐ Moist ☐

8.

The diagram represents a section through a leaf.



(a) (i) Name tissue W. 1

_____

(ii) The cells in tissue W have a greater number of chloroplasts than other leaf cells.

Suggest the advantage of these cells being located near the upper surface of the leaf. 1

_____

_____

(b) The leaf vein consists of xylem and phloem tissues.

Choose either xylem or phloem, by ticking one box, and describe one structural feature of that tissue. 1

Xylem ☐ Phloem ☐

Feature of tissue _____

_____