

Transport in plants (transpiration, translocation, required practical)

Q1. (2019)

0 4

Water is lost from the leaves of a plant through stomata.

0 4 . 1

What is the process by which water is lost from the leaves of a plant?

[1 mark]

Tick (✓) **one** box.

Osmosis

☐

Photosynthesis

☐

Transpiration

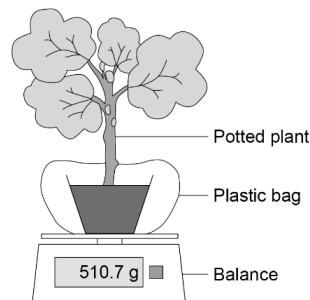
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Q2. (2019)

A student measured the mass of water lost from some similar plants.
The plants were at different temperatures.

Figure 8 shows the apparatus used.

Figure 8



This is the method used.

1. Seal a plastic bag around the pot of a potted plant.
2. Place the potted plant with the bag on a balance in a room at 20 °C
3. Record the mass.
4. After 3 hours record the mass again.
5. Calculate the mass of water lost from the plant.
6. Repeat steps 1–5 at 25 °C and at 30 °C with other similar plants.

A)

0 4 . 4

What was the independent variable in this investigation?

[1 mark]

Tick (✓) **one** box.

Initial mass of the plant

☐

Length of time the plant was left

☐

Mass of water lost

☐

Temperature of the room

☐

B)

0 4 . 5

Suggest why the student sealed a plastic bag around the pot.

[1 mark]

C)

Table 1 shows the student's results.

Table 1

Temperature in °C	Mass at the start in g	Mass after 3 hours in g	Mass of water lost in 3 hours in g
20	510.7	508.6	2.1
25	510.4	507.1	3.3
30	X	506.3	4.9

0 4 . 6 What is the resolution of the balance used in this investigation?

[1 mark]

Tick **one** box.

0.1 g ☐

1.0 g ☐

100 g ☐

500 g ☐

D)

0 4 . 7 Calculate value X in Table 1.

[1 mark]

X = _____ g

E)

0 4 . 8 Give **one** conclusion that can be made from the results in Table 1.

[1 mark]

F)

0 4 . 9 Give **two** factors that might affect the rate of water loss from the leaves.

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

[2 marks]

1 _____

2 _____

Q3. (2020)

0 3 Water is lost from the leaves of plants through pores called stomata.

0 3 . 1 What is the loss of water from a leaf called?

[1 mark]

Tick (✓) **one** box.

Osmosis

☐

Respiration

☐

Transpiration

☐

Q4. (2020)

A student investigated the water loss when different surfaces of leaves were covered in grease.

The grease blocks the stomata.

This is the method used.

1. Remove four similar leaves from one plant.
2. Put grease on different surfaces of the leaves as shown in **Figure 4**.
3. Record the mass of each leaf and attach the four leaves to a string.
4. After 24 hours record the mass of each leaf again.

Figure 4

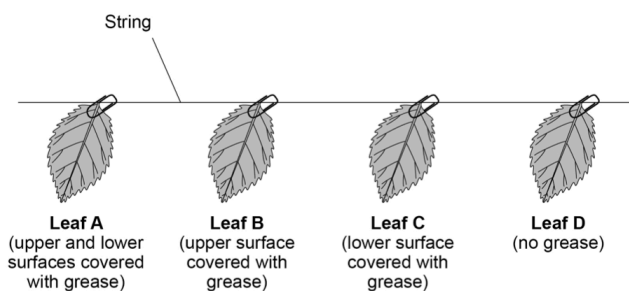


Table 2 shows the results.

Table 2

Leaf	Surfaces covered with grease	Mass of leaf at start in grams	Mass of leaf after 24 hours in grams	Loss in mass after 24 hours in grams
A	Upper and lower	2.01	1.97	X
B	Only upper	2.00	1.87	0.13
C	Only lower	2.01	1.96	0.05
D	None	1.98	1.83	0.15

A)

0 3 . 3 Calculate value **X** in **Table 2**.

[1 mark]

Value **X** = _____ g

B)

0 3 . 4 The loss in mass of water was measured after 24 hours.

Calculate the mass of water lost in grams per hour for leaf **D**.

[2 marks]

Mass of water lost per hour = _____ g

C)

The student concluded:

'More water is lost from the lower surface of a leaf than from the upper surface.'

0 3 . 5 What evidence is there in **Table 2** to support the student's conclusion?

[1 mark]

D)

0 3 . 6 What do the results in **Table 2** show about the number of stomata on the surfaces of a leaf?

[1 mark]

Tick (✓) **one** box.

There are more stomata on the lower surface.

☐

There are more stomata on the upper surface.

☐

There are the same number of stomata on both surfaces.

☐

E)

0 3 . 7 The investigation was done at 20 °C

How would the mass of water lost be different if the investigation was done at 25 °C?

Give a reason for your answer.

[2 marks]

Difference _____

Reason _____

Q5. (2021)

Dissolved sugars are transported in the phloem.

0 4 . 3 What is the name of the process that moves dissolved sugars through the phloem?

[1 mark]

Tick (✓) **one** box.

Evaporation

☐

Osmosis

☐

Translocation

☐

Q6. (2021)

0 4 . 4 Give **one** use of sugars in a plant.

[1 mark]

Q7. (2021)

0 4 . 6 Why do the stomata open during the day?

[1 mark]

Tick (✓) **one** box.

To allow carbon dioxide in

☐

To allow nitrogen in

☐

To allow oxygen in

☐

Q8. (2021)

A student investigated the number of stomata per mm² on the upper and lower surfaces of leaves.

The leaves were taken from the same plant.

Table 1 shows the results.

Table 1

Leaf	Number of stomata per mm ²	
	Upper surface	Lower surface
1	0	37
2	1	36
3	2	30
4	1	32
5	1	35
Mean	1	X

0 4 . 9 Water vapour is lost through stomata.

Explain the difference in the number of stomata on the upper and lower surfaces of the leaves.

Use Table 1.

[3 marks]

Q9. (2023)

Plants lose water from their leaves through small pores called stomata.

0 3 . 2 What is the evaporation of water from leaves called?

[1 mark]

Tick (✓) **one** box.

Active transport

☐

Respiration

☐

Transpiration

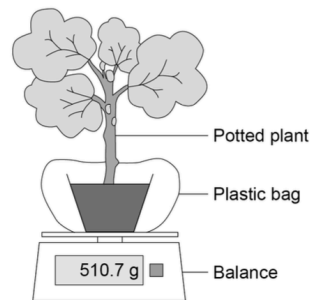
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Q10. (2023)

A student investigated the mass of water lost from a plant.

Figure 4 shows the apparatus.

Figure 4



This is the method used.

1. Seal a plastic bag around the pot of a potted plant.
2. Place the plant on a balance in a room at 20 °C.
3. Record the mass.
4. Record the mass every hour for 5 hours.
5. Calculate the total mass of water lost from the plant after each hour.

Table 1 shows the results.

Table 1

Time in hours	Mass in grams	Total mass of water lost in grams
0	510.7	0.0
1	508.9	1.8
2	507.1	3.6
3	505.3	5.4
4	503.5	7.2
5	X	9.0

A)

0 3 . 3 Calculate mass X in Table 1.

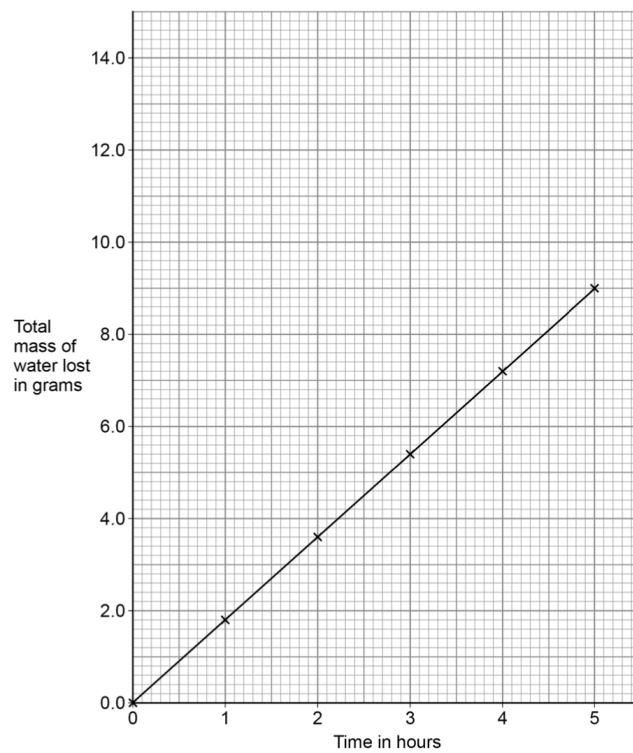
[2 marks]

Mass X = _____ grams

B)

Figure 5 shows the results.

Figure 5



0 3 . 4 What was the rate of water loss from the plant?

[1 mark]

Tick (✓) **one** box.

0.9 grams/hour

☐

1.8 grams/hour

☐

9.0 grams/hour

☐

C)

0 3 . 5 The investigation was repeated at a **lower** temperature.

[2 marks]

Draw **one** line on **Figure 5** to show how the results would be different at a **lower** temperature.

D)

0 3 . 6 Suggest **one** change to the investigation that would **increase** the rate of water loss from the plant.

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

[1 mark]

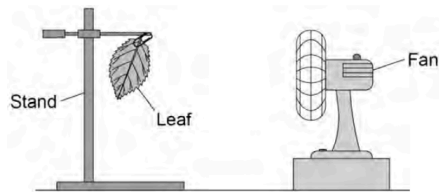
0 2

A student investigated the loss of mass from leaves that were placed in winds of different speed.

The student used an electric fan to create different wind speeds.

Figure 4 shows the apparatus.

Figure 4



This is the method used.

1. Record the mass of one leaf taken from a plant.
2. Attach the leaf to a stand.
3. Leave for 1 hour with the fan off.
4. Record the final mass of the leaf.
5. Repeat steps 1 to 4 with the fan set at different speeds. Use leaves of a similar size each time.
6. Calculate the loss of mass for each leaf.

Table 1 shows the results.

Table 1

Fan setting	Loss of mass in grams
Off	0.06
Low speed	0.15
Medium speed	0.23
High speed	0.31

A)

0 2 . 1

Why did the student do one experiment with the fan off?

[1 mark]

B)

0 2 . 2

How does **increasing** fan speed affect the loss of mass from the leaves?

Use Table 1.

[1 mark]

C)

0 2 . 3

Explain why the mass of the leaves decreased at all fan speeds.

[3 marks]

D)

0 2 . 4 The student repeated the investigation in a room at a higher temperature.

Complete the sentence.

Choose the answer from the box.

[1 mark]

smaller	the same	greater
----------------	-----------------	----------------

At a higher temperature the loss of mass from the leaves
would be _____.

E)

0 2 . 5 How could the student check the repeatability of the results?

[1 mark]

Tick (✓) **one** box.

Do the investigation again using a different method.

☐

Do the investigation again using a different type of plant.

☐

Do the investigation again using the same method.

☐