1. Mistletoe is a green plant that can often be seen growing high in a tree in winter.

Mistletoe can make its own food but very slowly.

Therefore, it needs to take some food from the tree that it grows on. The tree does not benefit.

Complete these sentences about how the mistletoe feeds.

Use words from the list.

chlorophyll	**leaf**	**phloem**	**photosynthesis**
respiration	**starch**	**sunlight**	**xylem**

Mistletoe can make some food by ..... .

This is because it contains the green chemical ..... which traps energy

from ..... .

The energy is used by the mistletoe to make sugars.

The mistletoe also gets some sugars from the ..... tissue of the tree.

[4]

2. A student investigates the rate of photosynthesis by counting the number of gas bubbles produced by a plant.

The table shows their results.

Number of gas bubbles			
Reading 1	**Reading 2**	**Reading 3**	**Reading 4**
26	29	26	27

What is the mean number of bubbles produced?

A 25
B 26
C 27
D 28

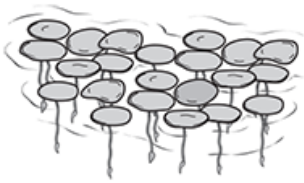
Your answer ☐ **[1]**

3. Which two substances are the **products** of photosynthesis?

A Carbon dioxide and water
B Glucose and carbon dioxide
C Glucose and oxygen
D Oxygen and water

Your answer ☐ **[1]**

4. Duckweed is a small plant that floats on the surface of ponds.



Each plant has one leaf and it usually reproduces by dividing into two.

Only occasionally does it reproduce sexually by growing flowers.

A student investigates the effect of acid rain on the reproduction rate of duckweed.

This is the student's method:

- Put pondwater with a pH of 4.5 in four different beakers.
- Add five duckweed plants to each beaker.
- Repeat this with beakers containing pondwater at pH 6.5 and 8.5.
- Leave the beakers for 10 days in the same conditions.
- After 10 days count how many duckweed plants are in each beaker.

The table shows the student's results.

	Number of duckweed plants after 10 days				
pH of pondwater	**Beaker 1**	**Beaker 2**	**Beaker 3**	**Beaker 4**	**mean**
4.5	6	5	7	6	6
6.5	12	14	11	11	12
8.5	7	6	5	14	8

i. What is the **independent** variable in this investigation?

[1]

ii. Identify the **pH** of the pondwater where the mean number of duckweed plants is the same as the mode for the four beakers.

Tick (✓) **one** box.

4.5 ☐

6.5 ☐

8.5 ☐

[1]

iii. The student thinks that there is a problem with their data at pH 8.5. This resulted in the mean being inaccurate.

Explain how the student could improve their investigation to get a more accurate result for the mean.

[2]

iv. The student concluded that acid pollution slows the rate of duckweed reproduction.

Explain how acid pollution slows the rate of duckweed reproduction.

Use ideas about enzymes and photosynthesis in your answer.

[2]

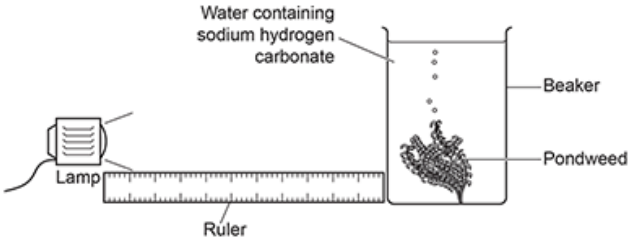
v. The student also concluded that pH 6.5 is the best pH for duckweed reproduction.

The student's teacher says that they need to extend the experiment to be sure of this.

Describe how the student should extend their experiment.

[2]

5. A student plans to investigate photosynthesis using this apparatus.



Describe how the student could use this apparatus to investigate the effect of light intensity on the rate of photosynthesis.

In your answer you should include:

- how to change the light intensity
- the variables that need to be kept constant
- the measurements that should be taken.

[6]

6(a). Complete the word equation for photosynthesis.

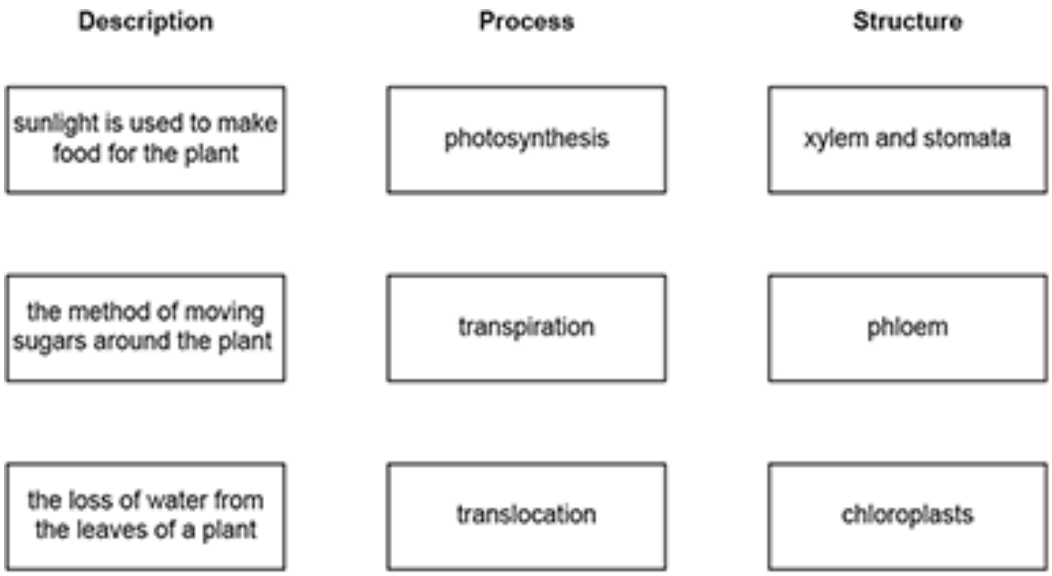
carbon dioxide + ... ⟶ glucose + ...

[2]

(b). Photosynthesis, transpiration and translocation are three processes occurring in plants.

Draw **three** lines to connect each **description** to its correct **process**.

Then draw **three** lines to connect each **process** to the **structure** where that process takes place.



[4]

7. A student investigates the effect of light intensity on the rate of photosynthesis.

They count the number of gas bubbles released by a plant under water.
The table shows their results.

Light intensity	Number of gas bubbles		
	Repeat 1	Repeat 2	Repeat 3
Low	6	7	8
Medium	10	10	11
High	13	19	14

Which number could be classed as anomalous (an outlier)?

A 6
B 8
C 11
D 19

Your answer ☐ **[1]**

END OF QUESTION PAPER