Q1. (2018)

4 A student uses a microscope to look at plant cells on a slide.

Which of these methods should they use first?

A Highest power objective lens and focus moving the lens away from the slide

B Highest power objective lens and focus moving the lens towards the slide

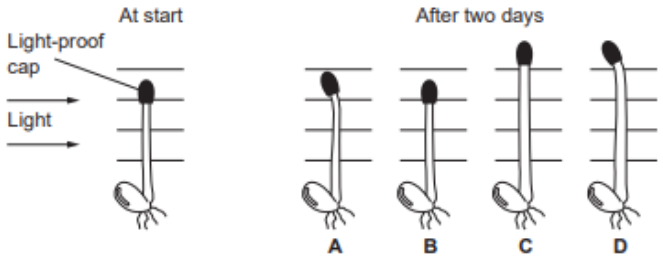
C Lowest power objective lens and focus moving the lens away from the slide

D Lowest power objective lens and focus moving the lens towards the slide

Your answer ☐ **[1]**

Q2. (2018)

9 Seedlings were grown with a light-proof cap over the tip. The seedlings had light from one direction only.



Which diagram shows the correct growth of the seedling after two days in these conditions?

Your answer ☐ **[1]**

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Q3. (2018)

12 Why do plant root hair cells use active transport to take in minerals?

A Minerals are dissolved in water in the soil.

B Minerals are needed by the plant in very low concentrations.

C Minerals are present at very high concentrations in the soil.

D Minerals are present at very low concentrations in the soil.

Your answer ☐ **[1]**

Q4. (2018)

14 Plant roots respond to gravity by growing downwards.

What is this response called?

A Negative gravitropism

B Negative phototropism

C Positive gravitropism

D Positive phototropism

Your answer ☐ **[1]**

Q5. (2018)

15 Transpiration has a cooling effect on the leaves of plants.

Which statement **best** describes how this happens?

A Evaporation of water from the leaf removes heat energy.

B Water entering the stomata takes heat energy from the leaf surface.

C Water dripping off the leaf causes heat energy to be lost.

D Water falling on the leaf removes heat energy.

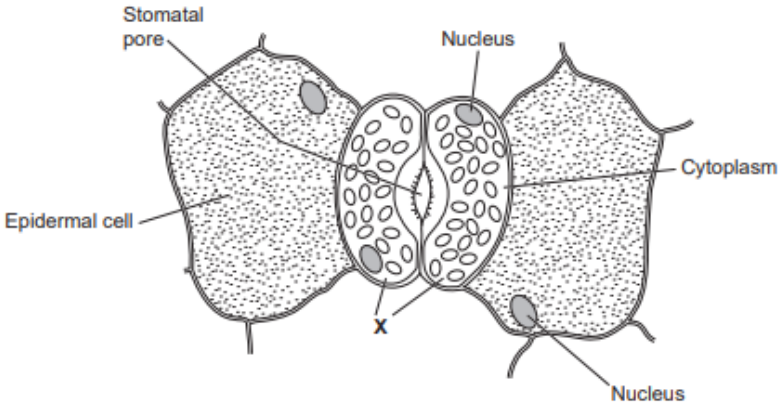
Your answer ☐ **[1]**

Q6. (2018)

A)

17 Stomata are found on the surface of leaves.

The diagram shows some of the surface cells of a leaf.



(a) (i) Write down the name of the cell labelled **X**.

..... **[1]**

B)

(ii) Describe **two** functions of stomata.

.....

.....

..... **[2]**

Q7. (2018) – 17c

A)

(c) Photosynthesis takes place inside chloroplasts.

(i) Complete the chemical equation for photosynthesis.

$6CO_2$ + ... → $C_6H_{12}O_6$ + ... **[2]**

B)

(ii) Energy is taken in from the surroundings for photosynthesis to take place.

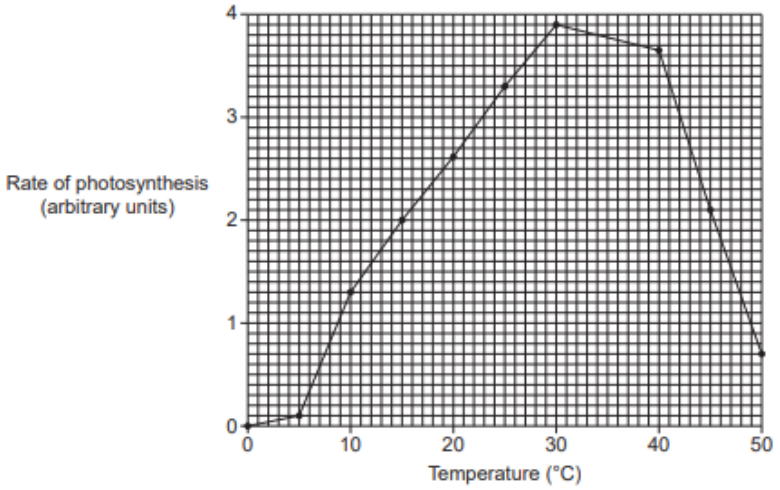
What name is used to describe reactions that take in energy?

..... **[1]**

Q8. (2018) – 17d

A)

(d) The graph is from an experiment to show the effect of temperature on the rate of photosynthesis.



(i) What is the optimum temperature for photosynthesis in this experiment?

..... **[1]**

B)

(ii) The rate of photosynthesis was recorded in 5 °C intervals.

The experiment could be improved to get a more **precise** value for the optimum temperature.

Explain how.

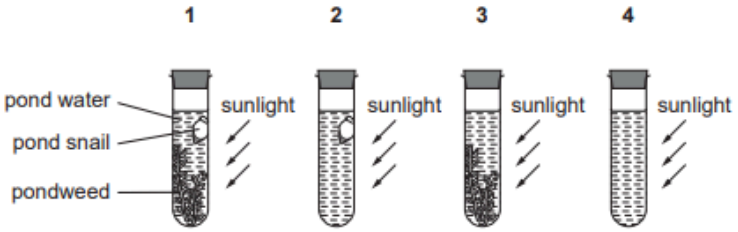
.....

.....

..... **[2]**

Q9. (2019)

15 Pond snails and pondweed are living in water in sealed test tubes.



Carbon dioxide dissolves in water and forms an acid.

In which test tube would the water become most acidic?

A 1

B 2

C 3

D 4

Your answer ☐ **[1]**

Q10. (2019) – 19b

A)

(b) A child sets up an experiment to grow grass seeds in a plastic cup.

The grass seeds in cup **A** are grown directly under a window.
The grass seeds in cup **B** are grown by a window to the side.

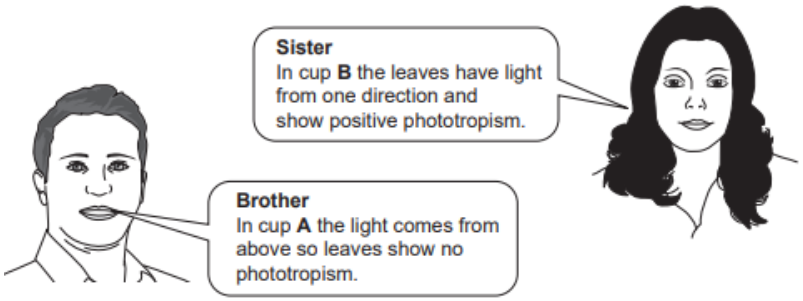
Look at the results.

A
Grass seeds grown directly under a window

B
Grass seeds grown by a window to the side

The child's older brother and sister try to explain what has caused the results.

They make different conclusions.



(i) Explain why the sister has given the better conclusion.

.....

.....

.....

..... **[2]**

B)

(ii) Name the hormone that causes phototropism.

..... **[1]**

Q11. (2020)

A)

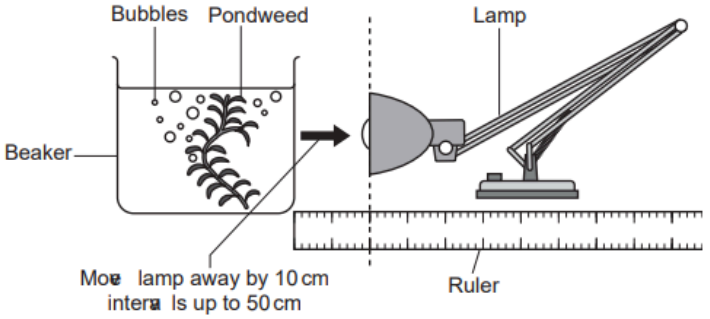
18 Two students investigate photosynthesis. Look at the notes from their investigation.

Aim of the experiment

To use pondweed to see how light intensity affects the rate of photosynthesis.

Method

1. Set up the apparatus as in the diagram.
2. Leave the pondweed for five minutes so it can adjust to the new light intensity.
3. Count the number of bubbles given off by the pondweed in one minute.
4. Move the lamp 10 cm further away from the beaker.
5. Leave the pondweed for five minutes so it can adjust again.
6. Count the number of bubbles given off by the pondweed in one minute.
7. Repeat by moving the lamp further away from the beaker by 10 cm intervals until 50 cm is reached.



(a) What is the **independent** variable in their investigation?

..... **[1]**

B)

(b) (i) Explain why counting the number of bubbles will not give an **accurate** measure of the rate of photosynthesis.

.....

.....

..... **[2]**

C)

(ii) Describe how the students could develop their investigation to improve the **accuracy** of their results.

.....

.....

.....

..... **[2]**

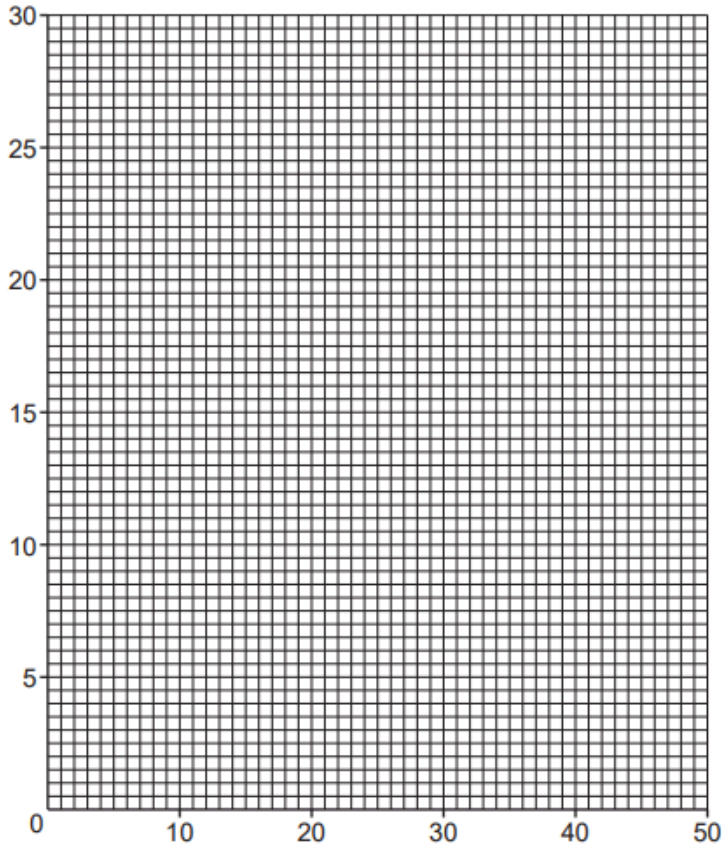
D)

(c) The table shows the results.

Distance from lamp to beaker (cm)	Number of bubbles given off (per minute)
10	30
20	14
30	6
40	2
50	0

(i) One student started to draw a graph but did not finish.

Complete the graph using the results in the table and draw a curve of best fit.



[4]

E)

(ii) Write down what the students could conclude from their investigation.

Include data from the results table in your answer.

.....

.....

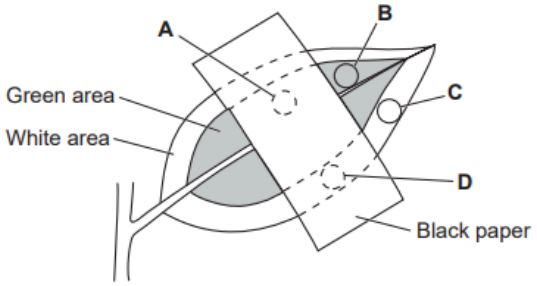
.....

..... **[2]**

Q12. (2021)

9 A piece of black paper was placed over the leaf of a plant.

The plant was kept in the light for 2 days. Four discs were cut from the leaf.



Which disc **A**, **B**, **C** or **D**, would test positive for starch?

Your answer ☐ **[1]**

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Q13. (2021)

22 Marimo moss balls are made up of green algae. They are found in lakes and are known to rise and fall during different times of the day. **Fig. 22.1** shows some moss balls in a beaker of water.

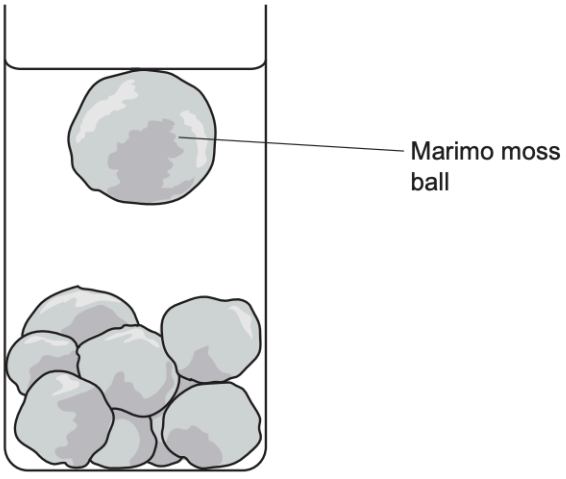

Fig. 22.1

Scientists predict that the moss balls rise because they are covered in tiny bubbles of oxygen.

A)

(a) The scientists test their prediction by using a chemical that stops a biological process in the algae. When the chemical is added they found the moss balls did **not** rise.

(ii) Explain why the moss balls did **not** rise.

.....

..... **[1]**

B)

(b) The scientists then investigate how exposure to light affects a moss ball which had been in the dark.

- In **Experiment 1**, a moss ball is exposed to 12 hours of light then 12 hours of darkness.
- In **Experiment 2**, the moss ball is exposed to continuous light for 24 hours.

They measure the height of the moss ball in a column of water.

Fig. 22.2 shows their results.

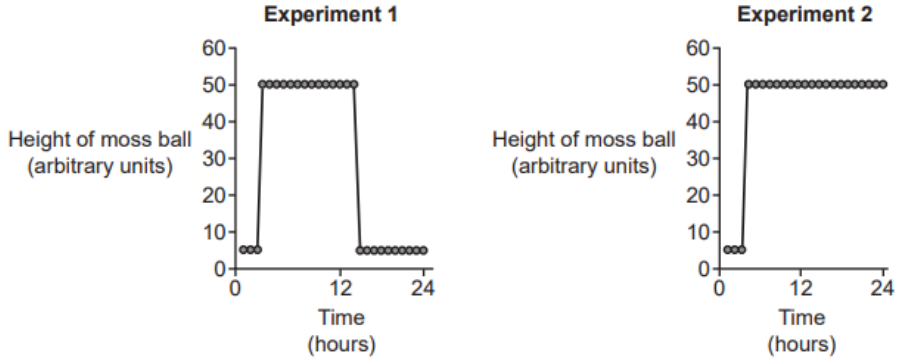

Fig. 22.2

(i) What conclusion can be made from **Experiment 1** about the effect of light on the position of the moss ball?

.....

.....

.....

..... **[2]**

C)

(ii) Suggest an explanation for the differences between the two graphs.

.....

.....

.....

..... **[2]**

D)

(c) Light is one environmental factor that affects plants.

Explain how increasing the temperature from 15 °C to 40 °C can affect plants.

.....

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.....

..... **[3]**

Q13. (2022)

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]**

Q14. (2022)

14 Which row shows the correct type of reaction for photosynthesis and for respiration?

		Photosynthesis	Respiration
Type of Reaction	**A**	endothermic	endothermic
	B	exothermic	exothermic
	C	endothermic	exothermic
	D	exothermic	endothermic

Your answer ☐ **[1]**

Q15. (2022)

A)

18 Photosynthesis, transpiration and translocation are three processes occurring in plants.

(a) 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.

Description	Process	Structure
sunlight is used to make food for the plant	photosynthesis	xylem and stomata
the method of moving sugars around the plant	transpiration	phloem
the loss of water from the leaves of a plant	translocation	chloroplasts

[4]

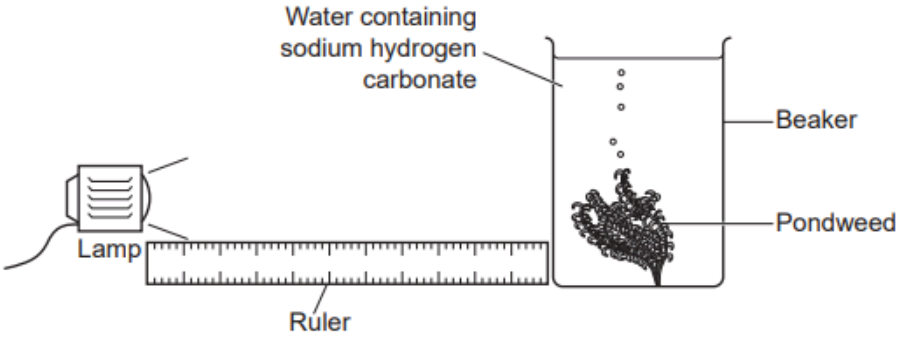
B)

(b) Complete the word equation for photosynthesis.

carbon dioxide + ... ⟶ glucose + ... **[2]**

Q16. (2023)

20* 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.

.....

.....

.....

.....

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..... **[6]**

Q17. (2024)

4 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]**

Q18. (2024)

12 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]**