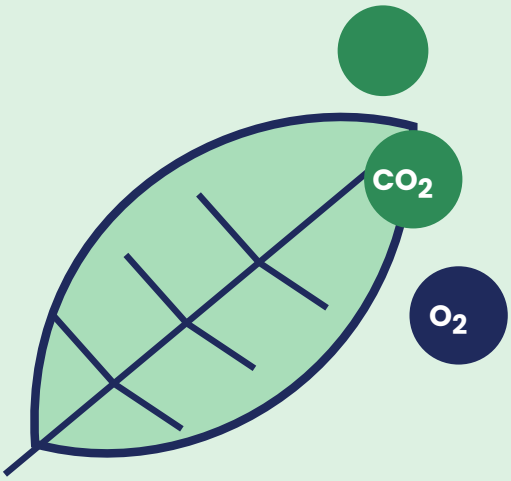
YOUR SCIENCE ONLINE
yourscienceonline.com

Year 10–11 • GCSE & IGCSE Biology

Photosynthesis



Exam-Style Worksheet

Exam-style questions on the photosynthesis equation, uses of glucose, leaf structure, limiting factors and the pondweed practical.

Equation | Glucose | Leaf | Gas exchange | Limiting | Practical

KEY IDEAS IN THIS WORKSHEET **YEAR 10–11**

Name: _____ Class: _____

Date set: _____ Date due: _____

What's inside

Section A	Photosynthesis and the uses of glucose	**18 marks**
Section B	Leaf structure and gas exchange	**12 marks**
Section C	Limiting factors	**11 marks**
Section D	Practical skills	**16 marks**

Instructions

- Answer all questions in the spaces provided.
- Show your working in calculations.
- Marks for each question are shown in [ ].
- Use the word and equation boxes to help you.

Total score

/ 57

© Your Science Online • yourscienceonline.com • For personal and single-classroom use only. Please do not share or resell.

Photosynthesis Worksheet

Year 10–11 • GCSE (AQA 4.4.1) and Cambridge IGCSE 0610 topic 6 • Exam-style questions.

Section A — Photosynthesis and the uses of glucose [18 marks]

1 Define photosynthesis. **[2]**

.....

.....

2 Photosynthesis can be written as a word equation and as a symbol equation.

(a) Write the word equation for photosynthesis, including the conditions above the arrow. **[2]**

.....

.....

(b) Write the balanced symbol equation for photosynthesis. **[2]**

.....

.....

(c) Photosynthesis is an endothermic reaction. Explain what this means. **[1]**

.....

(d) Name the part of the plant cell where photosynthesis takes place and the pigment that absorbs the light. **[2]**

.....

.....

3 Plants use the glucose made in photosynthesis in different ways. Complete the table. **[5]**

Use of glucose	Why the plant does this
Respiration	
Converted to starch	
Converted to cellulose	
Converted to amino acids (with nitrate ions)	
Converted to fats and oils	

4 Explain why a plant that lacks magnesium ions has yellow leaves, and why a plant that lacks nitrate ions grows poorly. **[4]**

Section B Leaf structure and gas exchange [12 marks]

5 Complete the table to describe how each part of a leaf is adapted for photosynthesis. **[7]**

Part of leaf	Adaptation / function
Waxy cuticle	
Upper epidermis	
Palisade mesophyll	
Spongy mesophyll	
Stomata and guard cells	
Xylem	
Phloem	

6 Describe how carbon dioxide gets from the air to the chloroplasts in a palisade cell. **[3]**

7 Explain why most leaves are thin and have a large surface area. **[2]**

Section C Limiting factors [11 marks]

8 State what is meant by a limiting factor. Name **two** factors that can limit the rate of photosynthesis. **[3]**

9 The table shows the rate of photosynthesis (arbitrary units) at different light intensities and carbon dioxide concentrations.

Light intensity (units)	0	10	20	30	40	50	60
0.03% CO_2	0	4	8	11	12	12	12
0.10% CO_2	0	4	8	12	16	20	22

(a) State the limiting factor for the 0.03% CO_2 line between 0 and 20 units. **[1]**

(b) Explain the plateau at 0.03% CO_2 above 40 units. **[2]**

(c) Suggest **one** factor that could be limiting the rate at 0.10% CO_2 above 50 units. **[1]**

(d) The distance of a lamp from a plant is changed from 10 cm to 30 cm. Use the inverse square law to calculate how many times smaller the light intensity becomes. (Higher tier / Extended) **[2]**

(e) A grower heats a greenhouse and adds carbon dioxide. Evaluate this: give **one** benefit and **one** cost. **[2]**

Section D Practical skills [16 marks]

10 A student investigates the effect of light intensity on the rate of photosynthesis of pondweed. A lamp is placed at different distances. The student counts the oxygen bubbles in 3 minutes.

Results:

Distance of lamp (cm)	10	20	30	40
Bubbles in 3 minutes	60	33	18	9
Rate (bubbles per minute)				

(a) Calculate the rate for each distance and write them in the table. **[3]**

(b) State the conclusion from the results. **[2]**

.....

.....

(c) Name the independent variable, the dependent variable and **two** control variables. **[4]**

.....

.....

.....

(d) Suggest why a beaker of water is placed between the lamp and the pondweed. **[1]**

.....

(e) Suggest **one** improvement to make the results more accurate. **[1]**

.....

11 Describe how to test a leaf for starch. Include the safety precautions. **[5]**

.....

.....

.....

.....

.....

END OF WORKSHEET **Total: _____ / 57**