C1.3 Photosynthesis (HL)

What the Cell · DP Biology · worksheet · HL statements C1.3.9–19

Name _____ **Date** _____ **Total** _____ / 40

About 40 minutes, or one section at a time. The number of marks shows how many separate points to make.

Section A: Recall

10 marks

1 **State** the name given to the chlorophyll that emits excited electrons in a photosystem. C1.3.9 **[1]**

2 **State** two places where photosystems are found. C1.3.9 **[2]**

3 **State** the three products of photolysis of water. C1.3.11 **[2]**

4 **Name** the enzyme that fixes carbon dioxide and the product of the reaction. C1.3.15 **[2]**

5 **State** the fraction of triose phosphate converted back to RuBP when glucose is made. C1.3.17 **[1]**

6 **State** where protons build up in a chloroplast during the light-dependent reactions. C1.3.14 **[1]**

7 **State** where the proton that NADP accepts comes from. C1.3.13 **[1]**

Section B: Understanding

14 marks

8 **Explain** the advantages of arranging many pigment molecules in a photosystem. C1.3.10 **[3]**

9 **Distinguish** between cyclic and non-cyclic photophosphorylation. C1.3.12 **[3]**

10 **Explain** the roles of ATP and reduced NADP in the Calvin cycle. C1.3.16, C1.3.17 **[3]**

11 **Explain** why chloroplasts contain very large amounts of rubisco. C1.3.15 **[2]**

12 **Outline** how a plant makes amino acids from what the Calvin cycle produces. C1.3.18 **[2]**

13 **State** one consequence for the Earth of oxygen released by photosynthesis. C1.3.11 **[1]**

Section C: Working with evidence

10 marks

All data in this section are invented for practice. The patterns are realistic.

14 C1.3.15, C1.3.16, C1.3.19

A suspension of algae was kept in bright light with plenty of carbon dioxide. At time 0 the light was switched off. The concentrations of glycerate 3-phosphate (GP) and RuBP were measured, relative to the values in the light.

Time / s	−20	0	10	20	40	60
GP	1.0	1.0	1.6	2.0	2.2	2.2
RuBP	1.0	1.0	0.5	0.2	0.1	0.05

a **Describe** the change in RuBP after the light was switched off. **[2]**

b **Explain** why GP increased. **[2]**

c **Explain** why RuBP decreased. **[2]**

d In a second experiment the light stayed on, but carbon dioxide was removed. **Predict** the changes in GP and RuBP, with a reason. **[2]**

e **State** the two products of the light-dependent reactions that ran out in the dark. **[1]**

f **Suggest** why the changes began within seconds. **[1]**

Section D: Longer answer

6 marks

15 **Explain** how light energy is used to make ATP and reduced NADP in a thylakoid. C1.3.12–14 **[6]**