

13. Photosynthesis

Starter Quiz · 课前小测

A-Level Biology

Name: _____ Score: _____

1. In a chloroplast, the stacks of thylakoids (grana) are where:

- ☐ the light-dependent stage happens
- ☐ the Calvin cycle happens
- ☐ DNA is stored
- ☐ respiration happens

2. Water is split in the light-dependent stage by _____.

3. In fixation, the enzyme rubisco:

- ☐ joins CO₂ to RuBP (5C) to make two molecules of GP (3C)
- ☐ splits water
- ☐ makes ATP
- ☐ breaks down glucose

4. A limiting factor is:

- ☐ the factor in shortest supply that holds back the rate of photosynthesis
- ☐ the factor that is always present in excess
- ☐ the product of photosynthesis
- ☐ the colour of the leaf

5. The light-dependent stage produces:

- ☐ ATP and reduced NADP
- ☐ glucose directly
- ☐ carbon dioxide
- ☐ only oxygen, nothing else

6. Cyclic photophosphorylation:

- ☐ uses photosystem I only and makes only ATP
- ☐ uses both photosystems and makes ATP and reduced NADP
- ☐ splits water
- ☐ happens in the stroma

7. The enzyme that joins CO₂ to RuBP in the fixation step is _____.

8. Adding carbon dioxide can raise the rate of photosynthesis when CO₂ is the limiting factor.

- ☐ True ☐ False

9. The light-dependent stage happens in the thylakoid membranes, and the Calvin cycle in the stroma.

- ☐ True ☐ False

10. The Calvin cycle is the light-independent stage; it uses the ATP and reduced NADP made by the light-dependent stage.

- ☐ True ☐ False

A-Level Biology

1. **the light-dependent stage happens**

The thylakoid membranes hold the pigments and carry out the light-dependent stage; the stroma runs the Calvin cycle.

2. **photolysis**

Photolysis releases electrons, H^+ and oxygen — the oxygen we breathe is a by-product.

3. **joins CO_2 to RuBP (5C) to make two molecules of GP (3C)**

Rubisco catalyses carbon fixation: $CO_2 + RuBP \rightarrow 2 GP$.

4. **the factor in shortest supply that holds back the rate of photosynthesis**

The limiting factor is whichever requirement is in shortest supply, capping the overall rate.

5. **ATP and reduced NADP**

It uses light to make ATP and reduced NADP, which power the Calvin cycle.

6. **uses photosystem I only and makes only ATP**

Cyclic photophosphorylation uses PSI alone and produces ATP only (no NADP reduced, no water split).

7. **rubisco**

Rubisco is the most abundant enzyme on Earth — it fixes nearly all the carbon in the living world.

8. **True**

Only the factor in shortest supply limits the rate, so increasing it speeds things up.

9. **True**

Light reactions need the membranes (pigments); the Calvin cycle uses the enzymes dissolved in the stroma.

10. **True**

It does not need light directly, but it cannot run without the ATP and reduced NADP from the light reactions.