Solutions

Each answer shows the steps, then the **result**.

2.1

- **starch**
- starch is the store made from the glucose produced, so finding it shows that **photosynthesis has taken place** in that part of the leaf

2.2

- to remove the green **chlorophyll** from the leaf
- so that the colour of the iodine solution can be seen against a pale leaf

2.3

- ethanol is **flammable** and would catch fire over a flame

2.4

- to **destarch** it: any starch already in the leaves is used up or moved away
- so that any starch found at the end of the experiment must have been made **during** the experiment

2.5

- the **green** parts go **blue-black**; the **white** parts stay **orange-brown**
- starch was made only where there was chlorophyll
- so **chlorophyll is needed** for photosynthesis; the white part of the same leaf acts as the control, because everything else about it is the same

2.6

- it turns **purple**
- the pondweed has taken in more carbon dioxide for photosynthesis than it gave out in respiration
- so the carbon dioxide concentration of the water has **fallen** below normal

3.1 B

- the covered strip received no light, so no photosynthesis happened there and no starch was made: **orange-brown**
- the uncovered part had light, chlorophyll and carbon dioxide, so it made starch: **blue-black**
- **A** has it the wrong way round; **C** and **D** would show that light made no difference, which is not what happens

3.2

(a)

- **purple**

- the pondweed photosynthesised faster than it respired, so it took in more carbon dioxide than it gave out
- the carbon dioxide concentration of the water fell below normal, and the indicator shows this as purple

(b)

- **yellow**
- in the dark there is no photosynthesis, but the pondweed still respires, so carbon dioxide was added to the water

(c)

- it is the **control**: it shows that any colour change in A and B was caused by the pondweed and not by the light, the tube or the indicator itself

3.3

(a)

- **oxygen**
- it **relights a glowing splint**

(b)

- the volume of gas **rises steeply** between 0.0% and 0.4%, from 0.2 cm^3 to 4.1 cm^3
- above 0.4% the volume **levels off** at about 4.5 cm^3
- so the rate rises with carbon dioxide concentration at first, and then stops rising

(c)

- above 0.4%, carbon dioxide is no longer the **limiting factor**
- something else is limiting the rate – here the **light intensity** or the **temperature**, because both were held constant
- so adding more carbon dioxide cannot make the reaction go any faster

(d)

- light intensity is a **control variable**: if it changed, a change in the rate could not be blamed on the carbon dioxide

(e)

- **repeat** each concentration at least three times
- calculate a **mean** volume for each, ignoring any anomalous result