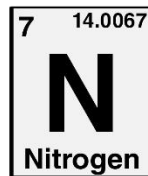
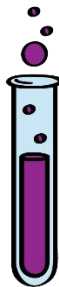
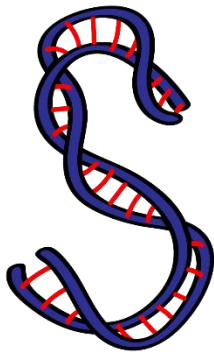




**ASPIRE**  
INTERNATIONAL SCHOOL



Science Department

2023/2024

Year 8

Term 1

Model answer of worksheet 2, 3 & 4

## Topic 1.1 Photosynthesis

1.2 More about photosynthesis

Name: .....

Class: .....

## Exercise 1.1A How light level affects photosynthesis

1 The type of plant; the mass of the plant; the temperature

2

Apparatus	Amount of light	Volume of gas collected in cm <sup>3</sup>
A	high	18.3
B	low	7.2
C	none	0.5

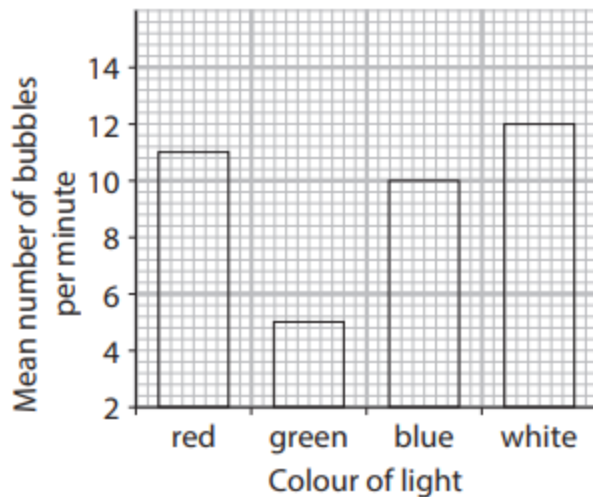
3 Plants photosynthesise faster when they have more light.

## Exercise 1.1B The effect of different colours of light on the rate of photosynthesis

- 1 The colour of the light / cellophane.
- 2 The number of bubbles produced in one minute.
- 3 Any three from: the light intensity (strength); the type of water the water plant was in; the quantity of water plant; the type of water plant; the temperature.
- 4 For example:

Colour of light	Number of bubbles per minute			
	1st try	2nd try	3rd try	mean
white	11	13	12	12
red	10	12	11	11
green	4	5	6	5
blue	8	12	10	10

5



- 6 Accept any valid conclusion that can be made from these results, for example: plants photosynthesise fastest in white light; photosynthesis happens faster in blue light than in green light.

### Exercise 1.1C Turning an idea into a hypothesis that can be tested

1 Accept any answer that:

- is in the form of a clearly phrased hypothesis
- relates to the effect of carbon dioxide on the rate of photosynthesis of an aquatic plant
- can be tested by experiment.

For example, a possible hypothesis could be:

Water plants give off more bubbles per minute when they are given more carbon dioxide.

2 Look for:

- a clear statement of the independent variable and dependent variable
- at least two other variables that will be controlled
- a clearly explained method, with enough detail that someone else could follow it, including a labelled diagram of the apparatus
- a clear description of how the independent variable will be changed
- a clear description of how and when results will be collected
- a results chart, with headings and units (but no results)
- a prediction based on scientific understanding.

## Model answer of worksheet 2

### 1.2 More about photosynthesis

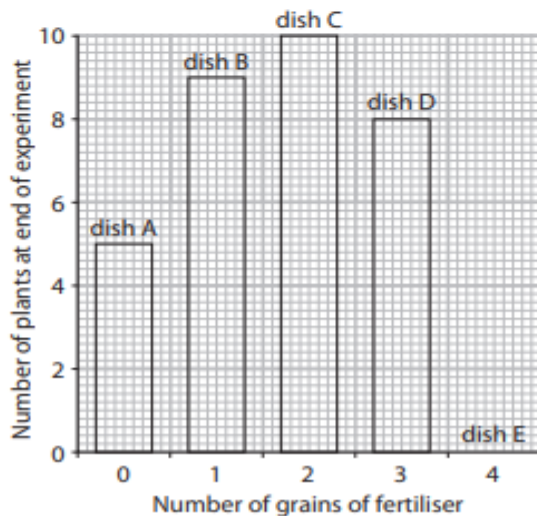
#### Exercise 1.2A Duckweed experiment

- 1 A 0, B 1, C 2, D 3, E 4
- 2 quantity of fertiliser
- 3 number of duckweed plants, volume of water, temperature, light intensity

4

Dish	Number of grains of fertiliser	Number of plants at end of experiment
A	0	5
B	1	9
C	2	10
D	3	8
E	4	0

5



- 6 Duckweed plants grew and reproduced faster in the dishes with 1 or 2 grains of fertiliser than with no fertiliser.

This shows that adding fertiliser causes the duckweed plants to grow and reproduce faster.

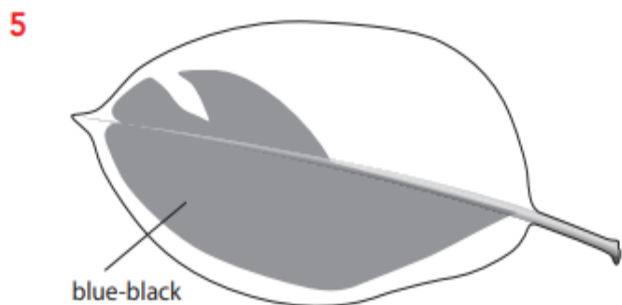
However, fewer plants grew and reproduced when 3 grains of fertiliser were added than when 2 were added, and all the plants died when 4 grains were added.

- 7 Use three sets of dishes for each quantity of fertiliser.

(The other two choices would be different experiments and would not test Sofia's original idea, which was that giving duckweed plants extra nitrate fertiliser helps them to grow and reproduce faster.)

### Exercise 1.2B Testing a variegated leaf for starch

- 1 chlorophyll
- 2 Chlorophyll absorbs energy from sunlight. Without chlorophyll, the leaf cells will not be able to photosynthesise and make glucose. Without glucose, they will not be able to make starch.
- 3 This is to break down the cell membranes in the leaf, allowing the iodine solution to get to the starch.
- 4 This is to remove the chlorophyll from the leaf, making it easier to see any colour changes when iodine solution is added.



- 6 starch

### Exercise 1.2C Floating discs experiment

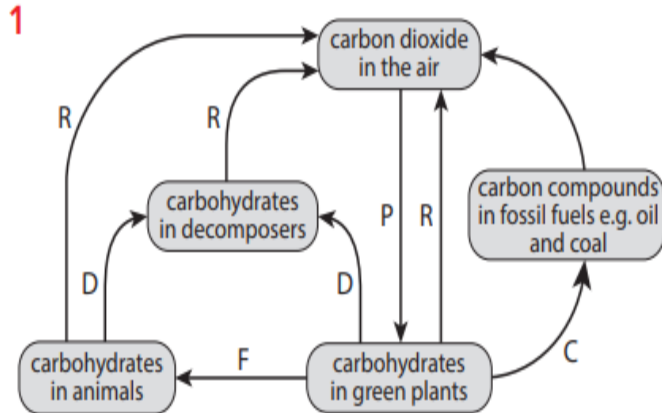
- 1 oxygen
- 2 The stomata (little holes in the epidermis) are on the underside of leaves. The oxygen is made by the cells inside the leaf, from where it diffuses out through the stomata.
- 3 The more bubbles of oxygen produced, the more quickly the leaf disc will rise; the bubbles of gas collecting under the leaf make it float upwards. A mention of the gas bubbles attached to the leaf making it less dense would show a very good level of understanding.
- 4 For example: Leaves photosynthesise more quickly in bright light than in dim light or leaves make more oxygen in bright light than in dim light.
- 5 Light intensity/brightness
- 6 3 (bright light) and 44 (dim light) should be circled.
- 7 Mean for bright light = 12.75, 12.8 or 13.  
Mean for dim light = 70.75, 70.8 or 71.

- 8** There were a lot of variables that the girls could not control, however hard they tried. For example: the bubbles of oxygen might not come out of every part of each leaf evenly, so some of the leaf discs would tip over and rise to the surface more quickly or more slowly; some of the discs might hit the sides of the beaker, which would make them rise more slowly; it would be difficult to decide exactly when to start the timer, and when to stop it.
- 9** The conclusion should be a response to the hypothesis that the learner stated in the answer to question 4. For example: Leaf discs photosynthesise more quickly in bright light than in dim light.
- 10** Leaves use light as their energy source for photosynthesis, so they photosynthesise more quickly in bright light than in dim light. This means that they make oxygen more quickly. Oxygen bubbles collect more quickly on the undersides of the leaf discs in bright light, so the discs rise to the surface more quickly.

## Model answer of worksheet 4:

### 1.3 The carbon cycle

#### Exercise 1.3 Completing a carbon cycle diagram



2 So that the gases in the tube could not mix with the air. This allowed Arun to see how the processes happening inside the tubes changed the concentration of carbon dioxide in the tube.

3 Any two from: temperature, volume of indicator, time the apparatus was left for.

4

Tube	Contents	Colour of indicator at start	Colour of indicator after two hours
A	plant and animal	red	red
B	animal only	red	yellow
C	plant only	red	purple
D	nothing	red	red

5 In tube A, the plant photosynthesised and respired, but it photosynthesised more than it respired. The animal respired. Overall, about the same quantity of carbon dioxide was taken in for photosynthesis as was given out by respiration. The quantity of carbon dioxide in the tube did not change.

In tube B, the animal respired, giving out carbon dioxide. There was a high concentration of carbon dioxide in the tube.

In tube C, the plant photosynthesised and respired, but it photosynthesised more than it respired. More carbon dioxide was taken in than was given out. So there was almost no carbon dioxide left in the tube.

In tube D, there was no respiration or photosynthesis. The quantity of carbon dioxide in the tube did not change.

6 Look for these ideas:

- The only process that removes carbon dioxide from the atmosphere is photosynthesis.
- Respiration and combustion add carbon dioxide to the atmosphere.
- If there was no photosynthesis, then carbon dioxide would build up in the atmosphere.



