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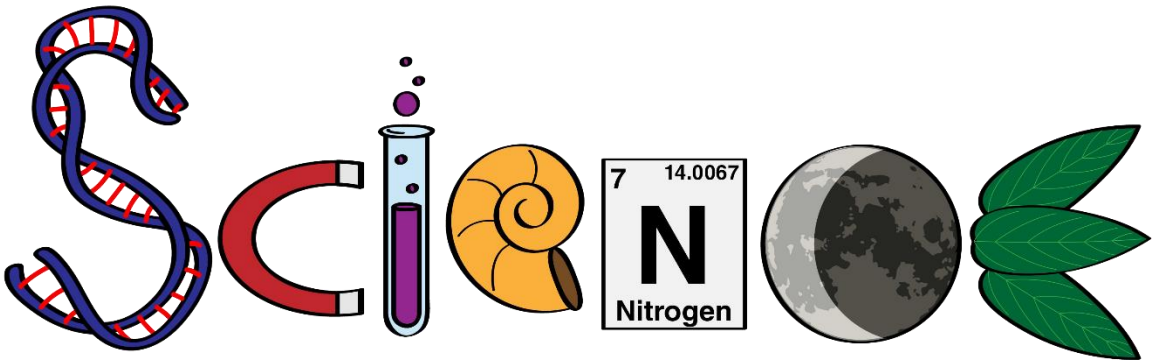

Science Department

2023/2024

Year 8

Term 1, Week 2

Worksheets 3

Name: …….

Class: ……

› 1.2 More about photosynthesis

1.2A Duckweed experiment

Focus

In this exercise, you practise planning experiments, recording results and making conclusions.

Sofia does an experiment to find out if extra nitrate fertiliser helps duckweed plants to grow faster.

She takes five dishes and puts the same amount of distilled water into each of them. She labels the dishes **A**, **B**, **C**, **D** and **E**.

She adds one grain of fertiliser to dish **B**, two grains to dish **C**, three grains to dish **D** and four grains to dish **E**.

She puts five duckweed plants into each dish.

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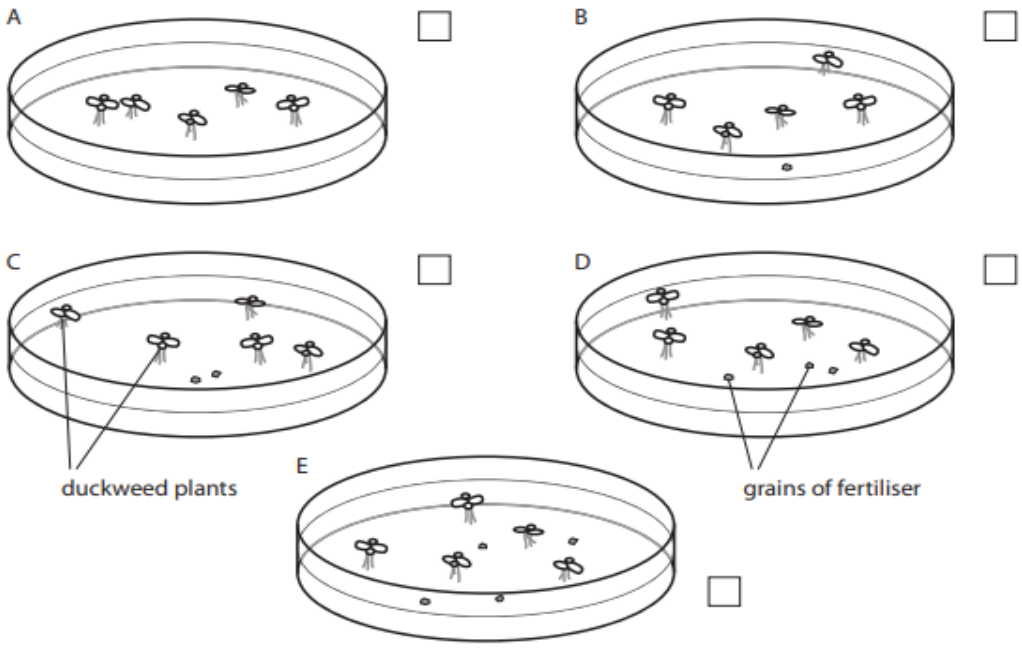

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1 Write the number of grains of fertiliser that Sofia puts into each dish in the boxes next to each diagram.

2 Which variable does Sofia change in her experiment? Tick (✓) the correct answer.

number of duckweed plants ☐

volume of water ☐

quantity of fertiliser ☐

3 Which variables should Sofia keep the same in her experiment? Tick (✓) all the correct answers.

number of duckweed plants ☐

quantity of fertiliser ☐

light intensity ☐

volume of water ☐

temperature ☐

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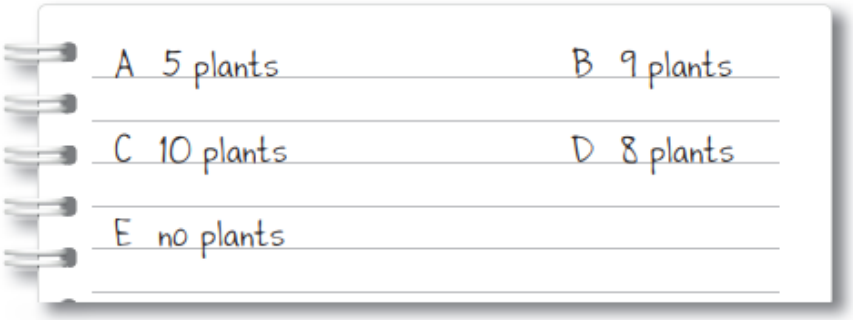
After two weeks, Sofia counts the number of duckweed plants in each dish. She writes the results in her notebook.



4 Complete the results chart.

Dish	Number of grains of fertiliser	Number of plants at end of experiment
A	0	5

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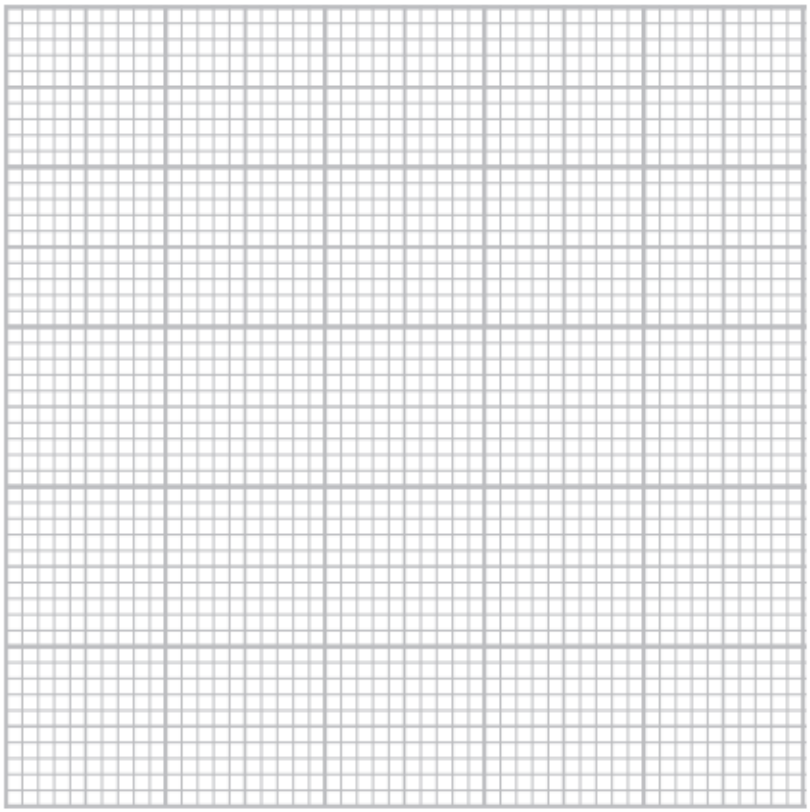
5 Draw a bar chart to display Sofia's results.

Put 'number of grains of fertiliser' on the horizontal axis.

Put 'number of plants at end of experiment' on the vertical axis.



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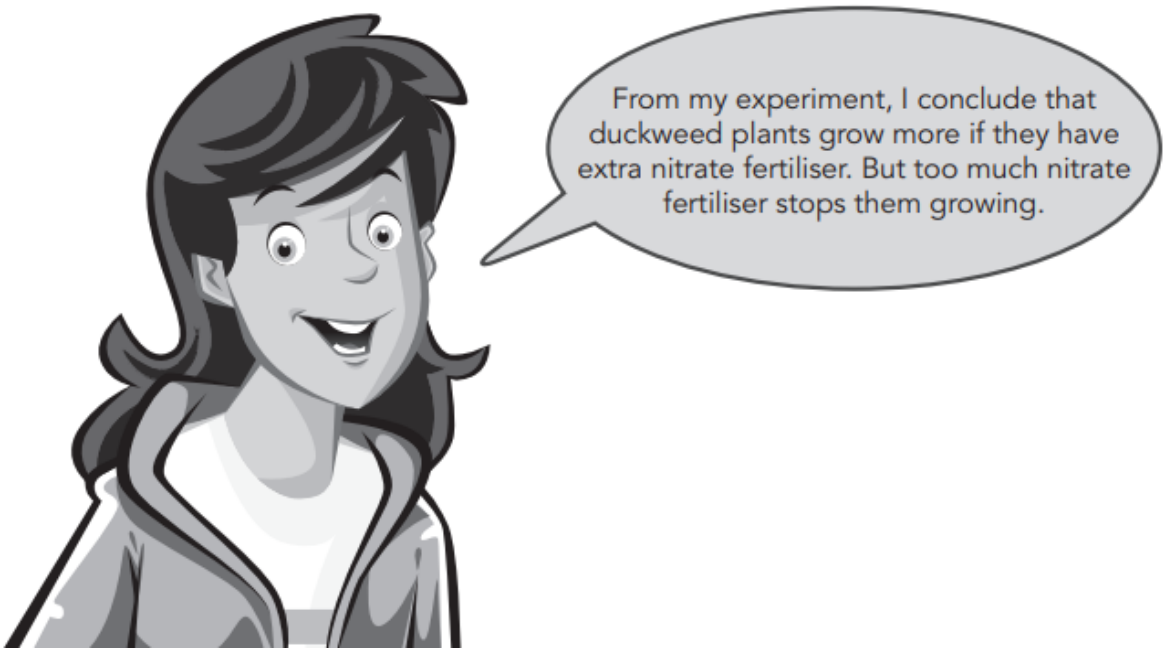
Sofia says:



6 Explain how Sofia's results support her conclusion.

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7 How can Sofia improve her experiment?

Tick (✓) the correct answer.

Use three sets of dishes for each quantity of fertiliser. ☐

Use a different kind of water plant in each dish. ☐

Put each dish in a different temperature. ☐

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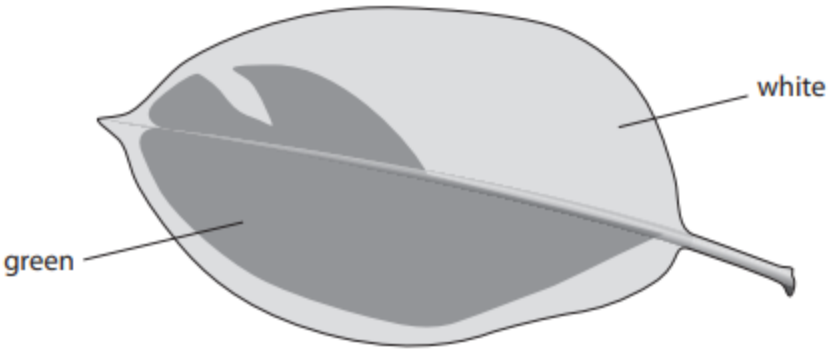
1.2B Testing a variegated leaf for starch

Practice

In this exercise, you provide explanations using your scientific knowledge.

Zara found a plant that had leaves with some green areas and some white areas. Leaves like this are called variegated leaves.



She decided to test one of the leaves for starch. She made this prediction:

The green parts of the leaf will contain starch, but the white parts will not.

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1 What is the substance that makes leaves green?

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2 Explain why Zara's prediction is likely to be correct.

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3 First, Zara put the leaf into boiling water, and left it there for 5 minutes.

Explain why she did this.

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4 Next, she took the leaf out of the water and put it into some hot alcohol.

Explain why she did this.

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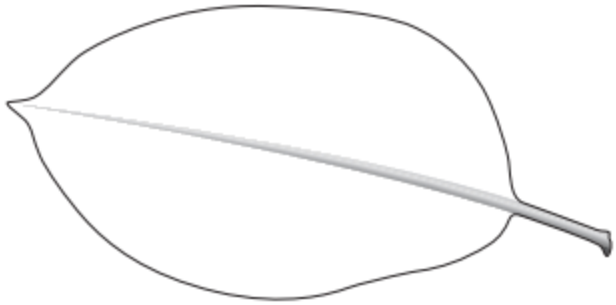
5 Lastly, Zara dipped the leaf into water and spread it out on a white tile. The leaf looked white.

She added iodine solution to the leaf. Some parts of the leaf went orange-brown, and some went blue-black.

On the diagram below, shade in the parts of the leaf that would go blue-black, if Zara's prediction was correct.



6 What substance causes the iodine to turn blue-black?

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1.2C Floating discs experiment

Challenge

In this task, you will interpret the results of an experiment. You will think about variables, write a conclusion and use your scientific knowledge to explain a set of results.

Sofia and Zara do an experiment to investigate photosynthesis.

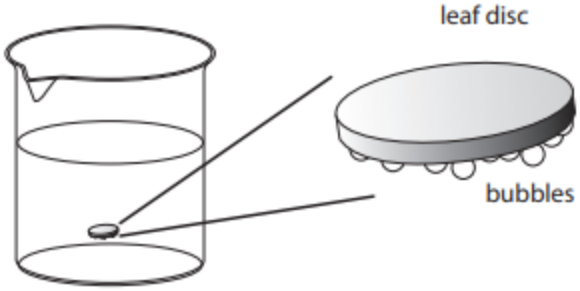
They cut ten little discs out of a leaf. Each disc is exactly the same size and is cut from the same leaf.

They put one disc into water in a small beaker and shine light onto it.

Little bubbles appear on the underside of the leaf disc.

After a while, the bubbles of gas make the leaf disc float to the surface of the water.

Sofia and Zara record the time taken for the leaf disc to float to the surface, then repeat their experiment with four more leaf discs.



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1 Name the gas that the leaf disc produced when it photosynthesised.

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2 Explain why the bubbles of gas formed on the underside of the leaf, not on the top.

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3 In what way does the time taken for the leaf disc to rise depend on the bubbles of gas? Explain your answer.

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Sofia and Zara do the investigation again, but this time they put the beaker and the leaf discs in a room with only dim lighting.

Here are the girls' results from both tests.

	Time taken for leaf disc to rise to the surface, in seconds					
Conditions	Try 1	Try 2	Try 3	Try 4	Try 5	Mean
bright light	14	3	12	14	11	
dim light	44	66	69	77	71	

4 Suggest the hypothesis that the girls were testing.

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5 What was the independent variable in the girls' experiment?

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6 Sofia thought that there was one anomalous result in each row of their results table.

Draw circles around the two anomalous results in the table.

7 Calculate the mean times taken for each row in the results table. Write your answers in the last column.

Remember not to include the anomalous results when you calculate the mean.

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8 Suggest why the times taken for the five leaf discs to rise in each of the lighting conditions were not all the same.

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9 Write a conclusion for the girls' experiment.

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10 Suggest an explanation for the difference between the mean times for the leaf discs to rise in bright light and in dim light.

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