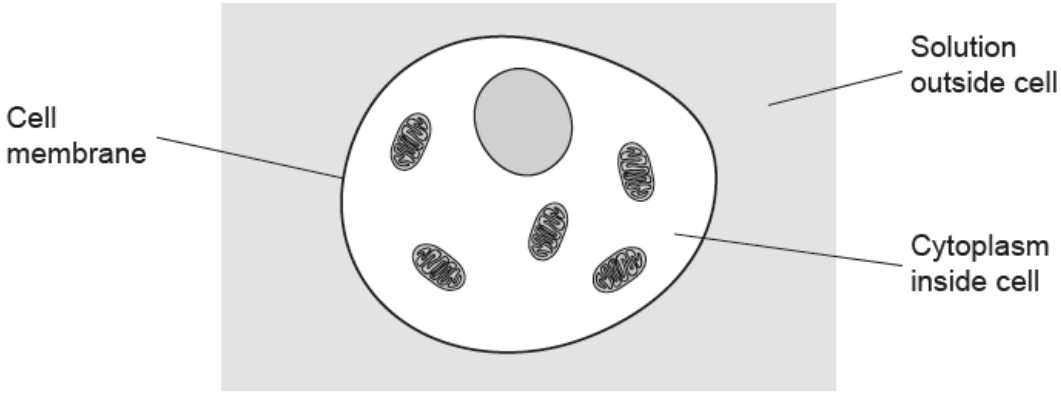
Practical Skills – 2021/20 GCSE 21st GCSE Biology B

1. Nov/2021/Paper_J257_04/No.1

Substances can move into and out of cells.

(a) The diagram shows an animal cell.



(i) Osmosis is a type of diffusion.

Which type of particles move through the cell membrane by osmosis?

Tick (✓) **one** box.

- Particles of all substances ☐
- Particles of salt ☐
- Particles of sugar ☐
- Particles of water ☐

[1]

(ii) What would be the **net** movement of these particles by osmosis?

Draw **one** line to join the correct start of the answer to the correct end.

From where they are concentrated…	…to where they are less concentrated.
From where they are **not** concentrated…	…to where they are more concentrated.
	…to where they have the same concentration.

[1]

(iii) Explain how the cell's membrane is able to let some particles move through it but prevents other particles from doing so.

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..... **[2]**

(b) Substances move into and out of plant cells.

A student investigated how the mass of raw pieces of potato is affected by soaking them in water containing different amounts of sugar.

The results of the investigation are shown in the table.

Volume of water (cm^3)	Mass of sugar (g)	Mean percentage change in mass of soaked potato pieces (%)
25	0	16
25	2	4
25	4	–11
25	6	–24

(i)* At the start of the investigation the student was given:

- four cut pieces of potato ready to use
- four beakers of water containing sugar, which were made using the volumes and masses stated in the table

Describe the apparatus **and** method the student could have used to collect the data in the final column of the table.

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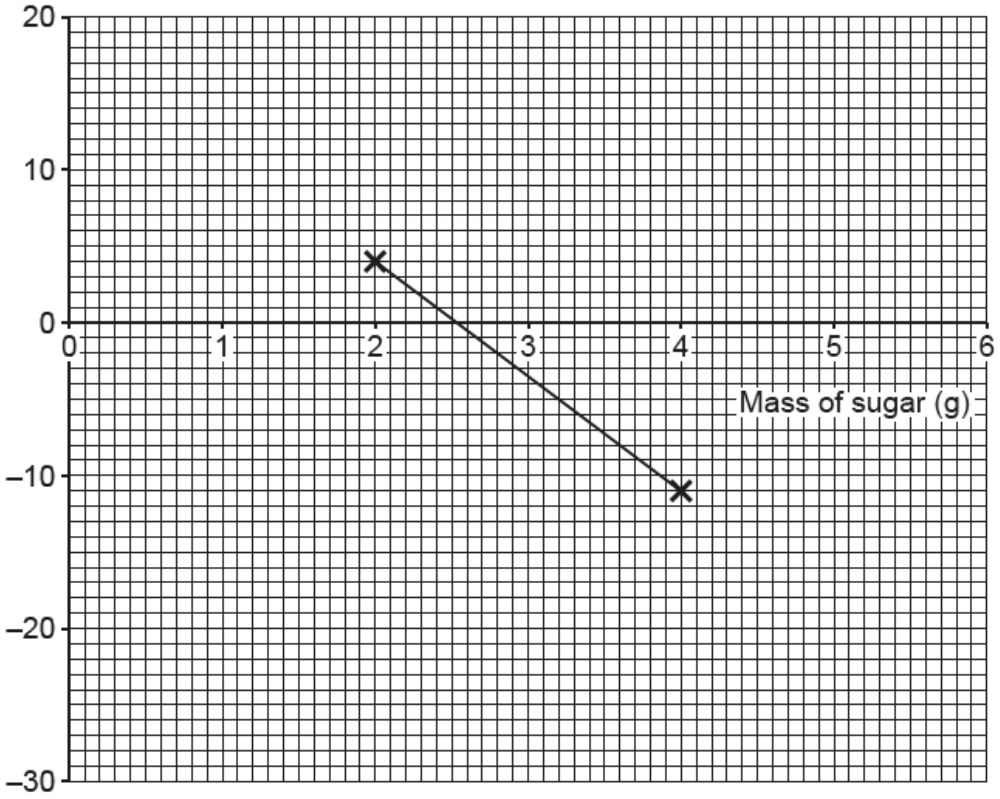
Some of the results of the investigation are shown in the graph.



(ii) Complete the graph by adding the missing axis name **and** plotting the missing results.
[2]

(iii) Describe **and** explain the results of the investigation.
Use data from the graph to support your answer.

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..... **[4]**

(iv) Estimate the **concentration** of sugar inside the potato cells, using the graph.
Use the equation: concentration = $\frac{\text{mass}}{\text{volume}}$
Give your answer in g/cm^3.

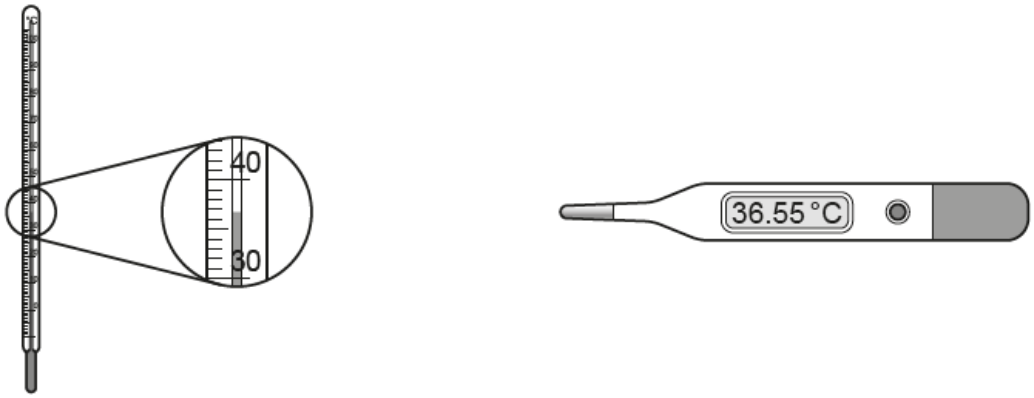
Concentration = ... g/cm^3 **[2]**

2. Nov/2021/Paper_J257_04/No.5

Beth and Leo plan to investigate the effect of exercise on body temperature.

Beth will exercise for 30 minutes. Leo will measure Beth's body temperature before, during and after exercise.

(a) **Fig. 5.1** shows two thermometers they could use to measure Beth's temperature.



Glass thermometer

Digital thermometer

Fig. 5.1

They plan to use the glass thermometer to measure Beth's temperature.

Suggest **two** reasons why using the **digital** thermometer would improve the quality of the data they collect.

1. .....

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2. .....

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[2]

(b) **Fig. 5.2** shows the data they collected using a digital thermometer.

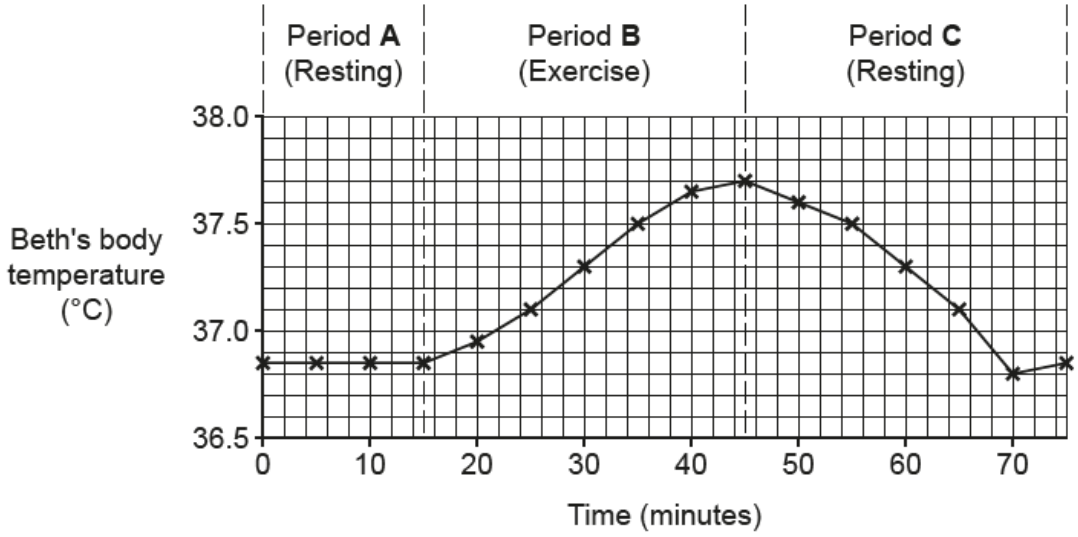

Fig. 5.2

Calculate the difference between the highest and lowest body temperatures for Beth, using **Fig. 5.2**.

Difference = ... °C **[1]**

(c) Beth and Leo wrote a prediction before starting the investigation:

Prediction: Body temperature in all humans will increase during exercise.

(i) Give **one** way in which the results in **Fig. 5.2** support the prediction.

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(ii) Give **one** way in which the results in **Fig. 5.2** do **not** support the prediction.

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..... **[1]**

(iii) How could Beth and Leo increase their confidence in their prediction?

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..... **[1]**

(d) Complete the sentences to explain the results in **period B** in **Fig. 5.2**.

Beth's muscles were contracting more during period B. This requires more .....

from a process called ..... in Beth's cells.

This process is described as ..... because it warms the surrounding body tissues.

[3]

(e)* Describe the results shown in period **C** in **Fig. 5.2** and explain what happened in the student's body to cause these results.

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3. Nov/2020/Paper_J257_04/No.2

Milk contains proteins and other nutrients.

(a) Milk can be tested for proteins by adding a reagent.

Draw **one** line to connect the correct **reagent** with the correct **result if proteins are present**.

Reagent	Result if proteins are present
Benedict's solution	Brown-black colour
Biuret solution	Cloudy white emulsion
Ethanol	Lilac colour
Iodine solution	Red-brown precipitate

[2]

(b) Carbohydrates, lipids and proteins are all nutrients found in milk. Digestion breaks them down into smaller molecules that are absorbed into the blood.

Complete the table to identify the smaller molecules.

Large molecule	**Smaller molecules it is broken down into**
Carbohydrate	Sugars
Lipid	..... AND .....
Protein	.....

[2]

(c)* Milk contains a carbohydrate called lactose. Only people with a particular mutation in their DNA can digest lactose.

If people **without** the mutation drink milk, they can suffer very unpleasant stomach pains and diarrhoea.

The mutation first appeared in a small number of people approximately 10 000 years ago. It is now found in almost half the world's population.

Explain how natural selection caused the mutation to become so common.

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4. Nov/2021/Paper_J257_01/No.5

A student is investigating a factor required for photosynthesis.

The student conducts an experiment using this method:

Step 1: Place a plant in the dark for a day.

Step 2: Remove the plant from the dark.

Step 3: Secure a piece of paper on one leaf as shown in **Fig. 5.1**.

Step 4: Leave the plant in the light for one day.

Step 5: Remove the leaf and test it for starch.

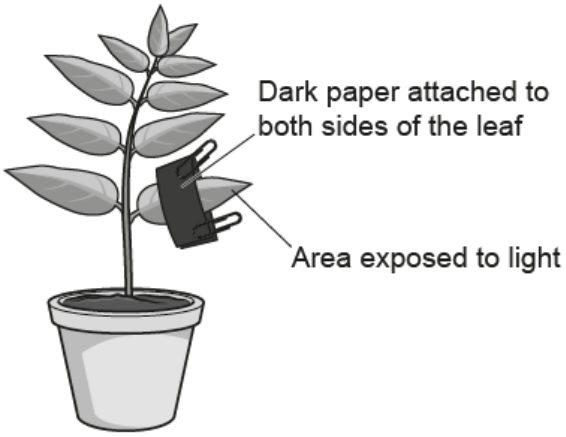

Fig. 5.1

(a) Which reagent would be used to test for starch?

Tick (✓) **one** box.

- Benedict's ☐
- Biuret ☐
- Iodine ☐

[1]

(b) A positive test for starch results in the reagent turning black/blue.

Shade the leaf in **Fig. 5.2** to show the area that would turn black/blue.

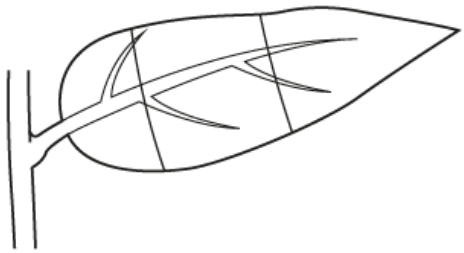

Fig. 5.2

[1]

(c) Complete the sentences to explain why the student placed the plant in the dark for a day, in **Step 1** of their method.

Put a (ring) around the correct answers.

The plant was placed in the dark so that it would not **grow / photosynthesise / respire**.

In the dark it will use up all of its existing stores of **carbon dioxide / starch / water**.

[2]

(d) The student was investigating only one factor that is required in photosynthesis.

Which **one** factor was being investigated?

..... **[1]**

5. Nov/2021/Paper_J257_02/No.8

Substances can move into and out of cells.

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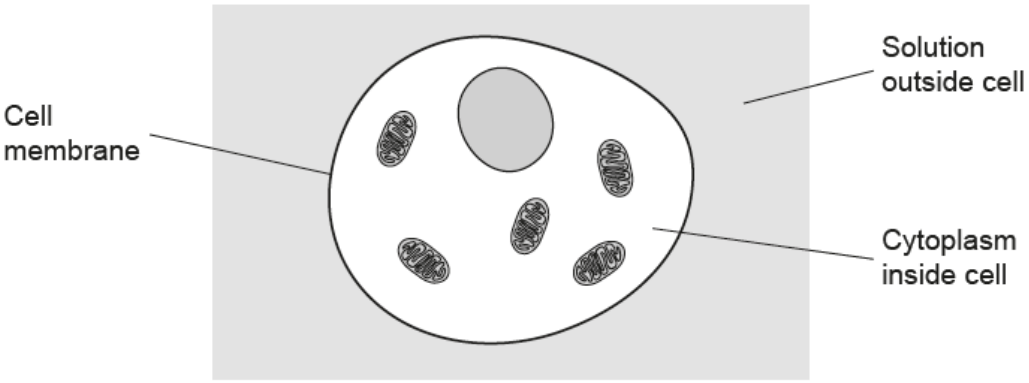

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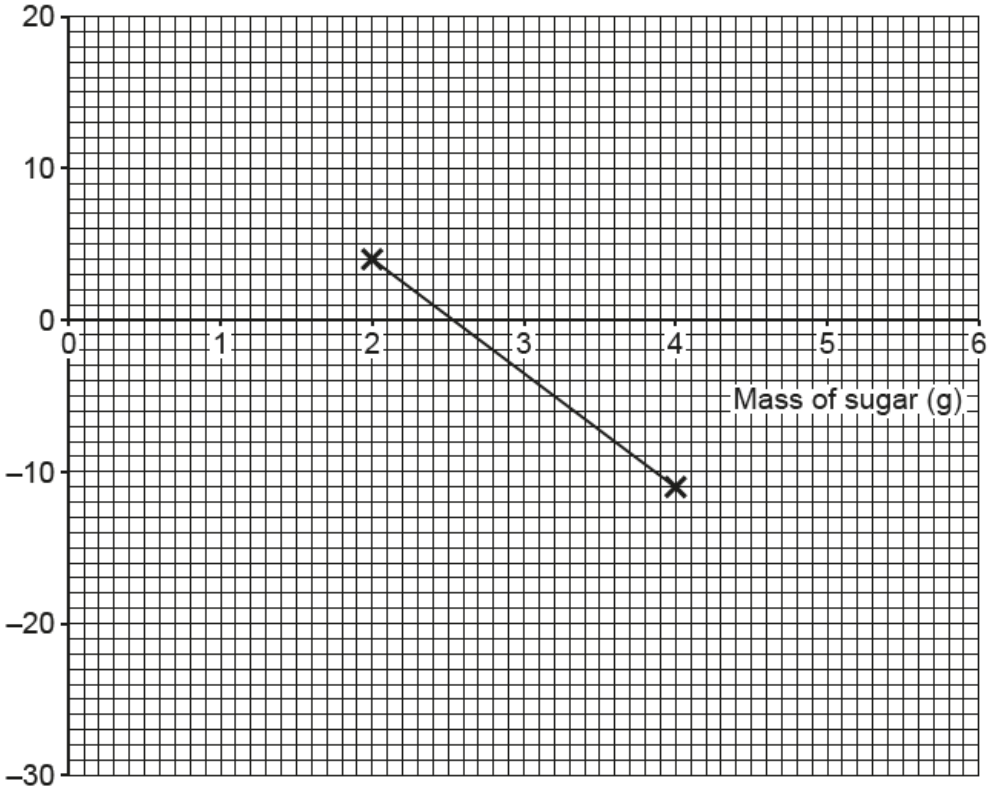

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