

Candidate Name	Centre Number				Candidate Number			
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GCSE

SCIENCE (Double Award)

**UNIT 1: (Double Award) BIOLOGY 1
FOUNDATION TIER**

SAMPLE ASSESSMENT MATERIALS

(1 hour 15 minutes)

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	7	
2.	10	
3.	12	
4.	10	
5.	6	
6.	15	
Total	60	

ADDITIONAL MATERIALS

In addition to this paper you will require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen. Do not use correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer all questions.

Write your answers in the spaces provided in this booklet.

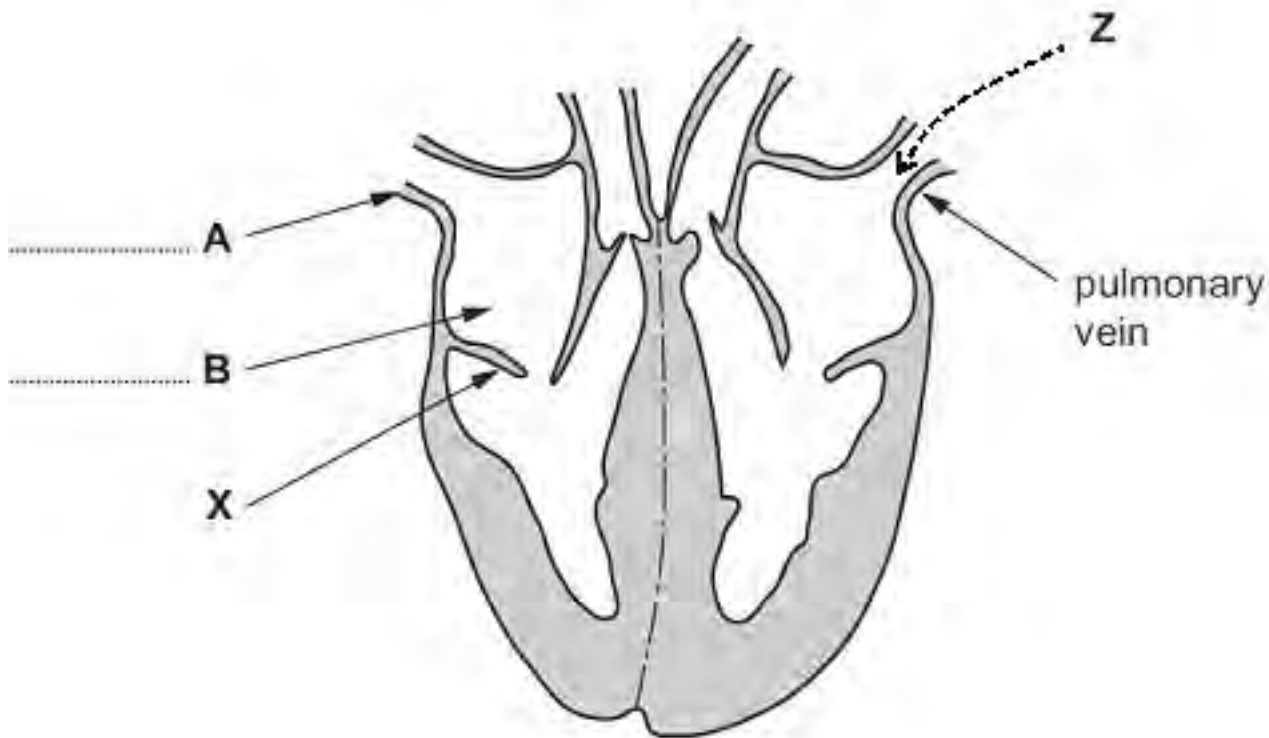
INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

Question 5 is a quality of extended response (QER) question where your writing skills will be assessed.

Answer **all** questions

1. (a) The diagram shows the human heart in section, seen from the front.



(i) Label structures **A** and **B** using some of the terms from the list below. [2]

- aorta atrium vena cava ventricle

(ii) Arrow **Z** shows blood entering the heart.

I State the organ from which this blood has come. [1]

.....

II Continue arrow **Z** to show the path of blood passing through and then leaving the heart. [1]

(iii) Name structure **X** and state its function. [2]

Name

Function.....

.....

- (b) William Harvey was an English doctor in the 17th century. He discovered that blood is forced through the blood vessels by the action of the heart.



Harvey said that

'blood flows through blood vessels in a single circulatory system'.

Harvey's idea contains one error.

Rewrite Harvey's idea correcting the error.

[1]

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.....

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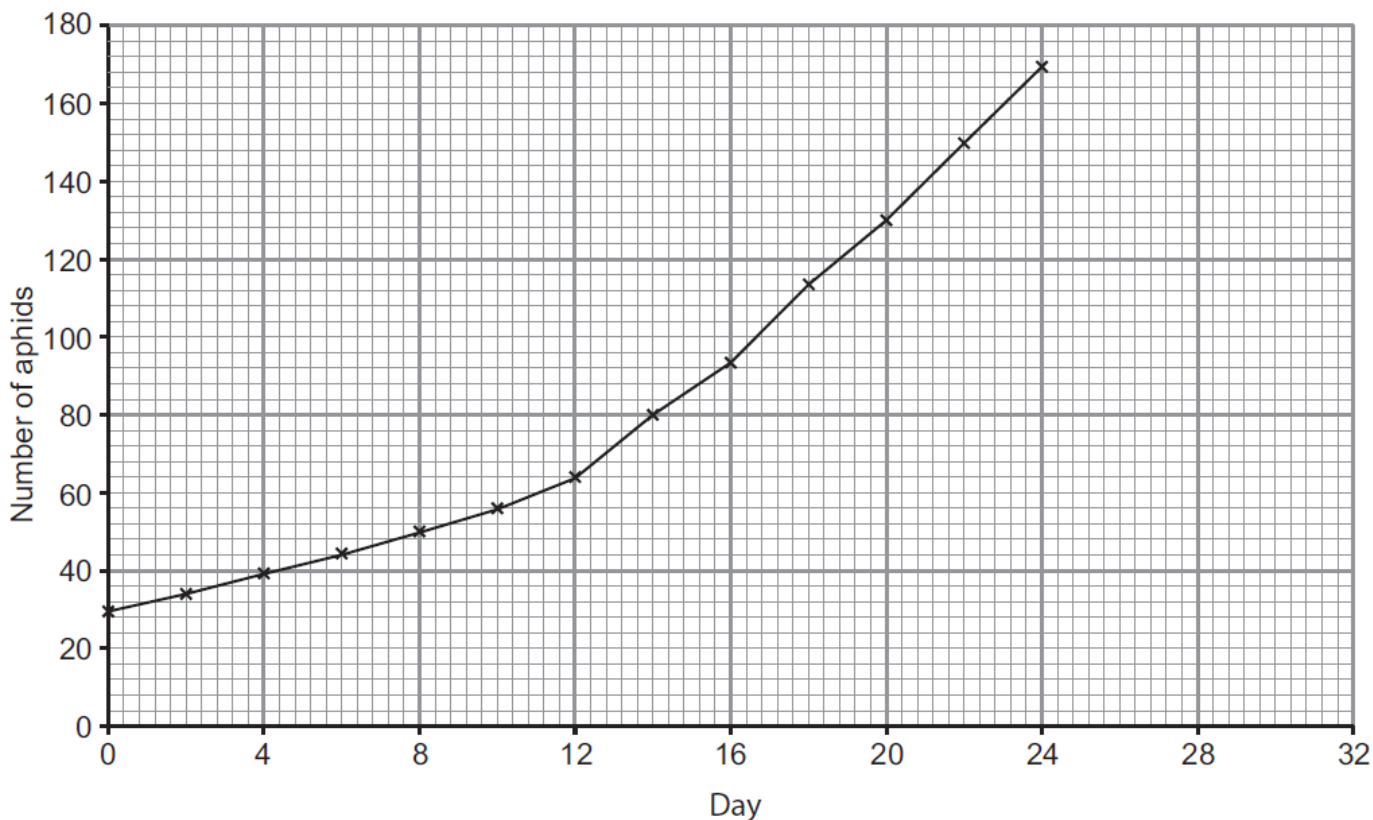
2. The diagram below shows a garden food chain.



(a) Name the second stage consumer in the above food chain. [1]

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(b) In an investigation into pest control, scientists monitored the number of aphids on a rose bush over 24 days. The results are shown in the graph below.



(i) At day 4, there were 40 aphids on the rose bush. How many more days did it take for this number to double? [1]

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- (ii) On day 24, the scientists added ladybirds to the rose bush. The number of aphids on the rose bush was counted for the next 8 days and is shown in the table below.

day	number of aphids
26	174
28	160
30	110
32	100

- I Use the data in the table to plot the points for days 26 to 32. [1]
- II Join all the plots with a ruler for days 24 to 32. [1]
- (c) (i) From the graph, in which two day period was there the greatest change in aphid numbers? [1]

day to day

- (ii) Use the above information to suggest a reason for the change in aphid numbers between:

I day 0 to day 24 [1]

.....

II day 24 to day 32 [1]

.....

- (d) The scientists used the following method to estimate the total number of aphids on the rose bush:

$$\text{total number of aphids} = \frac{\text{number of aphids on one leaf}}{\text{number of leaves on the rose bush}} \times \text{number of leaves on the rose bush}$$

Suggest **one** improvement to their method of estimating the number of aphids on the rose bush. [1]

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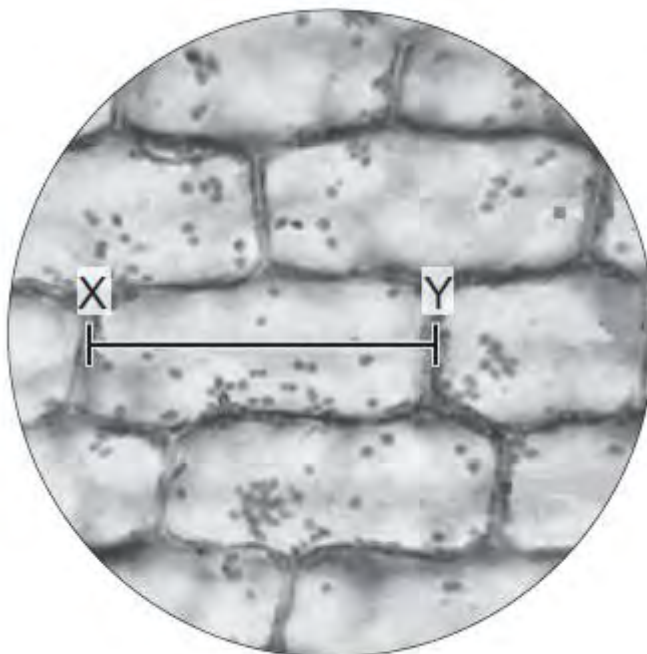
- (e) Explain how controlling aphids by using pesticides would affect the numbers of blue tits in the food chain above. [2]

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3. The photograph shows cells from a freshwater plant called *Elodea* viewed down a microscope.



- (a) (i) The line **X – Y** shows the length of one cell.
Measure the line **X – Y** and write your answer in the space below. [1]

length of line **X – Y** = mm

- (ii) The photograph has a magnification of $\times 100$.
Calculate the actual length of the cell. [1]

actual length of cell = mm

- (b) Photosynthesis takes place in the chloroplasts.

- (i) Underline the correct answer in the following sentence. [1]

Chloroplasts are found in the cytoplasm / vacuole / nucleus

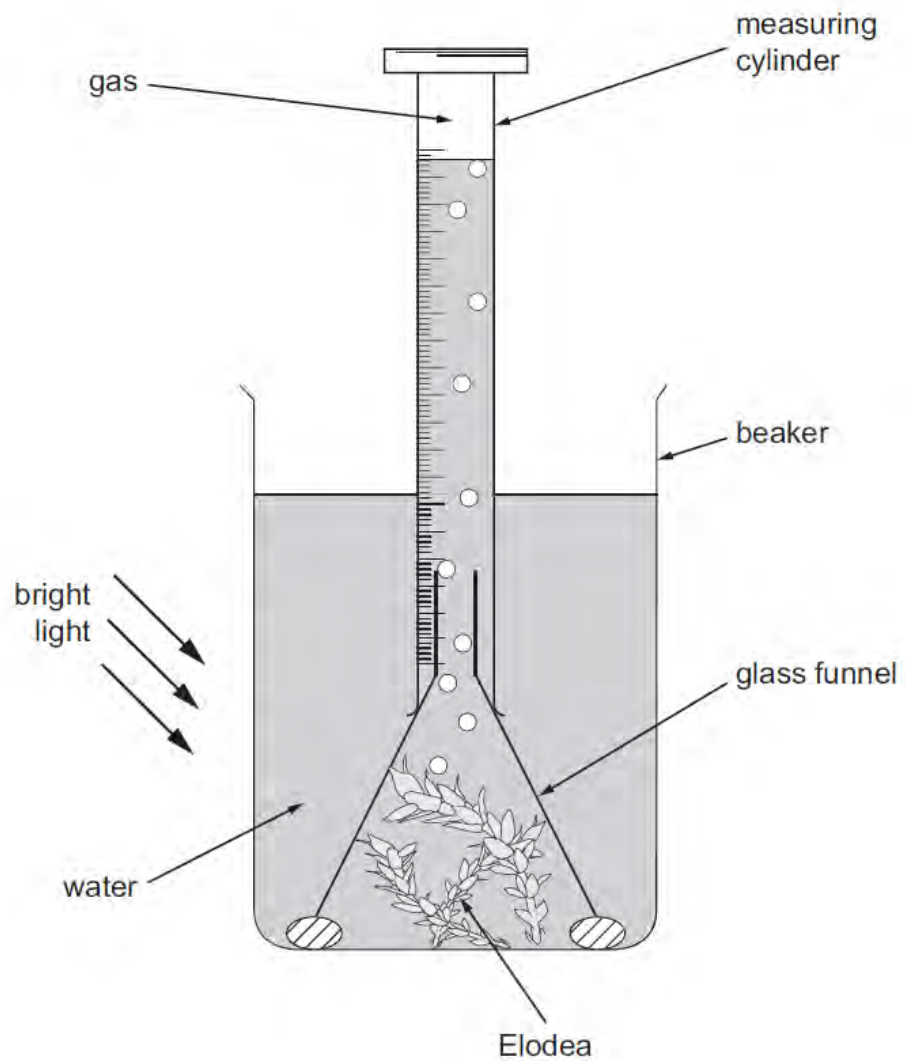
- (ii) Chloroplasts contain chlorophyll.
State the function of chlorophyll. [1]

.....

(iii) Complete the word equation for photosynthesis. [1]

..... + water \longrightarrow + oxygen

(c) Bethan investigated the rate of photosynthesis in Canadian pondweed (*Elodea*) at three different temperatures using the apparatus shown below.



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She counted the bubbles coming from the funnel every minute for ten minutes and recorded the results in the table below.

Temperature of water (°C)	Number of bubbles in each minute										Total number of bubbles in ten minutes	Mean number of bubbles per minute
	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th		
5	1	2	1	2	2	1	1	1	2	2	15	1.5
15	2	3	2	3	4	3	3	3	3	3	.....	.....
25	3	6	3	6	7	7	8	8	6	6	.....	.....

(i) Calculate the total and mean number of bubbles per minute for *Elodea* in water at 15°C and at 25°C. **Write your answers in the table.** [1]

(ii) State the name of the gas in the bubbles. [1]

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(iii) What conclusions can you make about the effect of temperature on the rate of photosynthesis in this investigation? [2]

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(iv) Instead of counting the number of bubbles, Bethan could have measured the volume of gas collecting in the measuring cylinder. Explain which is the better method to use. [3]

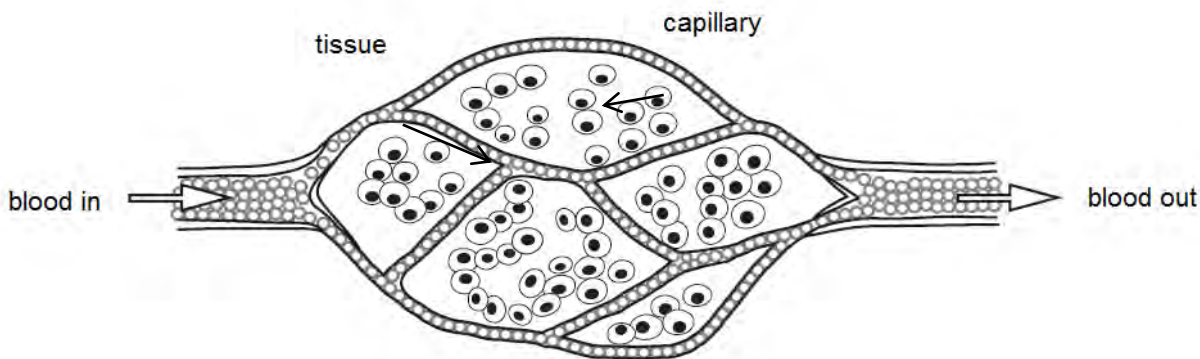
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4. The diagram shows blood flowing through capillaries in a tissue.



(a) State the process by which molecules pass between the blood and tissue cells. [1]

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(b) (i) Megan wanted to test a sample of blood plasma for the presence of glucose. Describe the method she should use and state the colour change that would be observed in a positive result. [4]

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- (ii) Megan tested further samples of blood plasma for the presence of two other food molecules.

Complete the table below to show the expected results. [2]

reagent used	molecule tested for	colour of reagent	colour of plasma after testing	positive result = ✓ negative result = ✗
.....	starch	.....	brown	✗
Biuret	.....	.....	violet	.....

- (iii) The table shows that starch is not present in the blood plasma, even though starch is part of the human diet.
Explain why starch is not found in the plasma. [3]

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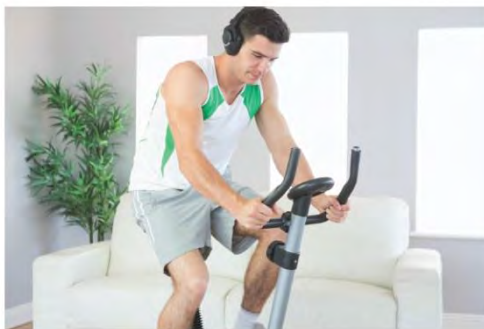
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5. Dan works out on an exercise bicycle.



Dan says he is fitter than Alex because his breathing rate returns to normal after exercise sooner than Alex's. You decide to test Dan's claim by carrying out a comparison of the effect of exercise on the breathing rate (number of breaths per minute) of these two students.

Describe your investigation. Make sure that it is a fair test.

[6 QER]

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6. Read this newspaper article.

A daily dose of chocolate may be good for you.

A study in Cardiff University has found that eating up to two small bars of chocolate a day may help to protect against heart disease, possibly by supplying nutrients known as flavonoids.

Scientists examined the diets of 21 000 people over 18 years old and found that eating up to 100 g of chocolate a day lowered the risk of dying from heart disease by 25%. These findings are backed up by a review of published evidence involving 158 000 people from around the world, which also showed a significant reduction of heart disease amongst the regular chocolate eaters.

However, one scientist also said “many people eat food which is too high in sugar and fat, including chocolate. This can be very bad for health. We need to help people make informed choices.”

Telegraph 16/06/15
Sarah Knapton Science editor

- (a) (i) The scientists used several research methods. Use the information in the article to decide which of these statements are true/false and **circle** your answers. [2]

		True or false	
1	The scientists did their own original work	true	false
2	The scientists used the findings from a number of studies.	true	false
3	The scientists did laboratory experiments	true	false
4	The scientists did a statistical analysis	true	false
5	The scientists used probability calculations	true	false
6	The scientists tested the ideas on volunteers	true	false

- (ii) The scientists used:
- a large sample size
 - results from people of different ethnicity.

Explain how each of these methods increased the strength of confidence in their conclusions? [2]

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- (iii) Apart from heart disease, state some of the health risks of eating a diet that is too high in sugar and fat. [3]

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- (iv) What information is given on packets of food to “help people make informed choices” about the ingredients in the food? [2]

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- (v) The newspaper article suggests that nutrients called flavonoids found in chocolate help to protect against heart disease.

The table below gives five classes of flavonoid and foods rich in each one.

	Class of flavonoid				
	flavonol	flavan-3-ol	flavone	flavonone	anthocyanidin
Food source	onions apples lettuce tomatoes beans almonds	apples bananas blueberries peaches pears strawberries	parsley peppers celery apples oranges melon	oranges grapefruit lemons tomatoes	blueberries bananas strawberries cherries pears cabbage

From the table:

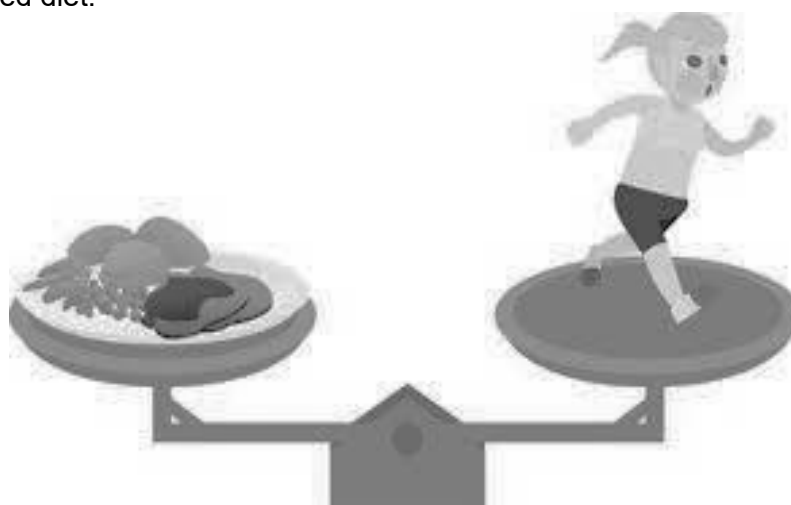
I which **one** of the foods gives the greatest variety of flavonoids? [1]

.....

II which two flavonoids would be missing from a banana and melon smoothie? [1]

..... and

(b) The poster below comes from a healthy eating campaign promoting a balanced diet.



What is meant by the term 'balanced diet'? [2]

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(c) Some doctors want the government to put an extra tax on foods with a high sugar content and use the money from the tax to reduce the price of fruit and vegetables in the shops. Suggest **one reason for** and **one reason against** doing this. [2]

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