

Please write clearly in block capitals.

H

Centre number

Candidate
number

Surname

Forename(s)

Candidate signature

I declare this is my own work.

GCSE

COMBINED SCIENCE: TRILOGY

Higher Tier Biology Paper 1

Practice Paper Series – Set 1

Time allowed: 1 hour 15 minutes

Materials

For this paper you must have:

- a ruler
- a scientific calculator.

Instructions

- Use black ink or black ball-point pen.
- Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 70.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering question 09.2 you need to make sure that your answer:
 - is clear, logical, sensibly structured
 - fully developed
 - shows how the points that you make are related or follow on from each other where appropriate.

For Examiner's Use

Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	

This is an original practice paper written for sciencegcse.co.uk to match the style and demand of AQA GCSE Combined Science: Trilogy (8464) Biology Paper 1 (Higher Tier). It is not an AQA examination paper and has not been produced or endorsed by AQA. It is not a prediction of a future examination.

sciencegcse.co.uk | Practice Paper Series – Set 1 | SGC/S1/B/1H

0 1 Smoking is a risk factor for lung cancer.

0 1 . 1 What is meant by a **risk factor**? [1 mark]

Scientists studied 10 000 people for 20 years.

Table 1 shows the results.

Table 1

	Number of people in the study	Number who developed lung cancer
Non-smokers	8000	24
Smokers	2000	72

0 1 . 2 Calculate the percentage of smokers who developed lung cancer. [2 marks]

Percentage of smokers = ... %

0 1 . 3 0.3% of the non-smokers developed lung cancer. [1 mark]

How many times more likely were smokers to develop lung cancer than non-smokers?

Number of times more likely = ...

0 1 . 4 A student concluded: [2 marks]

‘This study proves that smoking causes lung cancer.’

Give **two** reasons why the study does **not** prove this.

1

.....
.....

2

.....
.....

0 1 . 5 Lung cancer is caused by cells dividing in an uncontrolled way to form a tumour. [2 marks]

Describe the difference between a **benign** tumour and a **malignant** tumour.

0 2 Measles is a disease caused by a virus.
Most children are vaccinated against measles.

0 2 . 1 How is the measles virus spread from person to person? [1 mark]

Tick (✓) **one** box.

By inhaling droplets from coughs and sneezes

☐

By mosquito bites

☐

In contaminated food

☐

By touching infected plants

☐

0 2 . 2 Describe how vaccination protects a child against measles. [3 marks]

Question 2 continues on the next page

Table 2 shows the percentage of children vaccinated against measles in one country, and the number of measles cases, in three different years.

Table 2

Year	Percentage of children vaccinated against measles	Number of measles cases
2010	95	120
2014	85	640
2018	92	260

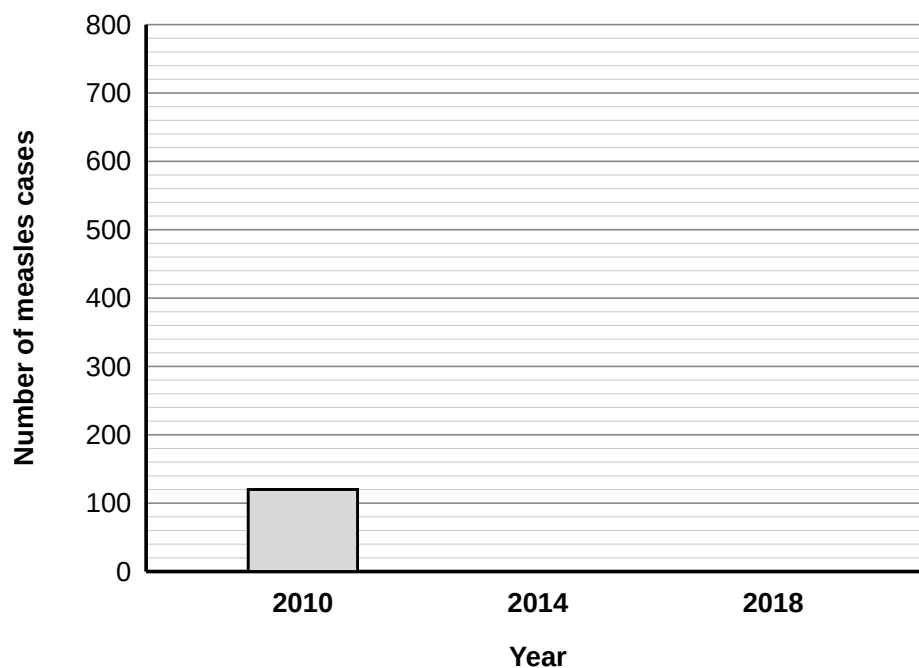
0 2 . 3

Complete the bar chart in **Figure 1** to show the number of measles cases in 2014 and in 2018.

[2 marks]

The bar for 2010 has been drawn for you.

Figure 1



0 2 . 4

Describe the relationship between the percentage of children vaccinated and the number of measles cases.

[1 mark]

Turn over for the next question

Do not write outside the box

- 0 3** A student measured her breathing at rest and during exercise.

Table 3 shows the results.

Table 3

	At rest	During exercise
Breathing rate in breaths per minute	14	30
Volume of each breath in dm ³	0.50	1.2

- 0 3 . 1** During hard exercise some of the student's muscle cells respire anaerobically. [1 mark]

Complete the word equation for anaerobic respiration in muscle cells.

glucose →

- 0 3 . 2** Calculate the total volume of air the student breathed in per minute during exercise. [2 marks]

Use **Table 3**.

Volume of air per minute = ... dm³

- 0 3 . 3** Explain why the student's breathing rate increased during exercise. [2 marks]

.....

.....

.....

- 0 3 . 4** The student measured her breathing rate at rest only once. [1 mark]

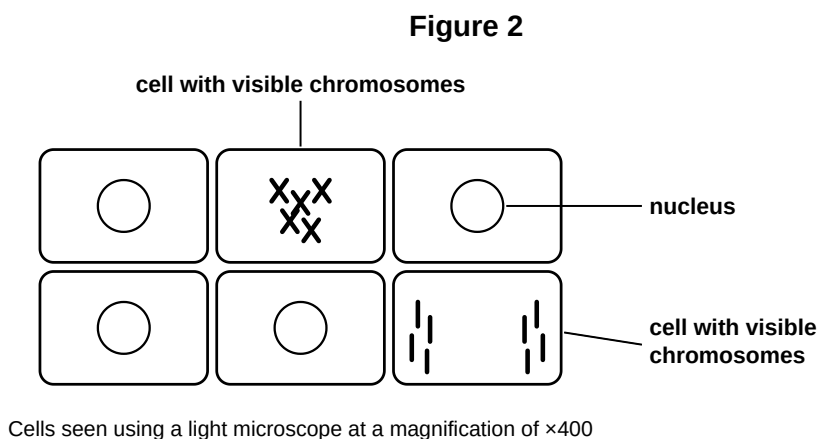
Suggest how the student could get a more reliable value for her breathing rate at rest.

.....

.....

Turn over for the next question

- 0 4** A student looked at cells from the tip of a plant root using a microscope.
Figure 2 shows some of the cells.



- 0 4 . 1** Cells in the root tip divide by mitosis. [2 marks]
- Describe what happens in a cell during the cell cycle **before** the cell divides.

.....

.....

.....

- 0 4 . 2** Describe what happens to the chromosomes and the cell **during** mitosis. [2 marks]

.....

.....

.....

The student counted the cells in two different areas of the root tip.
Table 4 shows the results.

Table 4

Area	Total number of cells	Number of cells with visible chromosomes
1	38	5
2	42	7

0 4 . 3 Calculate the percentage of all the cells counted that had visible chromosomes. [2 marks]

Use **Table 4**.

Percentage = ... %

0 4 . 4 The image of one root cell in **Figure 2** was 28 mm long. [3 marks]

Calculate the real length of the cell.

Give your answer in metres, in standard form.

Real length = ... m

0 5 Plants absorb mineral ions, such as nitrate ions, from the soil through root hair cells.

0 5 . 1 Describe **two** ways in which a root hair cell is adapted to absorb mineral ions. [2 marks]

1

.....
.....

2

.....
.....

Question 5 continues on the next page

A scientist measured the uptake of nitrate ions by the roots of barley plants.
The roots were kept in a nitrate solution with oxygen bubbled through it, and then in the same solution without oxygen.

Table 5 shows the results.

Table 5

Condition	Rate of uptake of nitrate ions in arbitrary units
Oxygen bubbled through the solution	48
No oxygen	12

- 0 5 . 2** Calculate the percentage decrease in the rate of uptake when the oxygen was removed. [2 marks]

Percentage decrease = ... %

- 0 5 . 3** The concentration of nitrate ions in the roots was higher than the concentration in the solution. [3 marks]

Explain why removing the oxygen reduced the rate of uptake of nitrate ions.

.....

.....

.....

.....

.....

- 0 5 . 4** The rate of uptake did **not** fall to zero when the oxygen was removed. [1 mark]
Suggest **one** reason why.

.....

.....

Turn over for the next question

Do not write outside the box

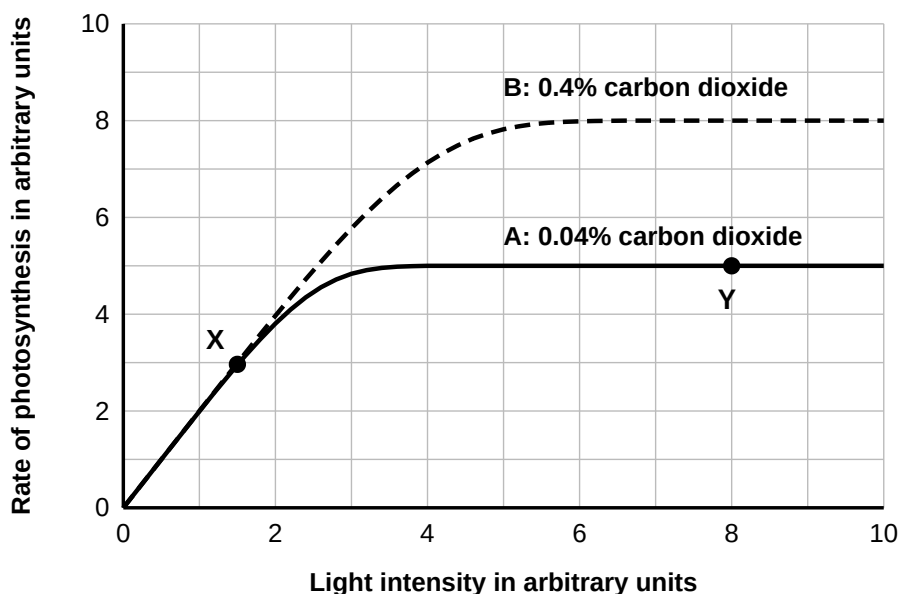
06

A scientist investigated the effect of light intensity on the rate of photosynthesis of a plant at two different concentrations of carbon dioxide.

The temperature was kept at 25 °C.

Figure 3 shows the results.

Figure 3



06.1

Which factor is limiting the rate of photosynthesis at point X?

[1 mark]

Tick (✓) **one** box.

Carbon dioxide concentration

☐

Light intensity

☐

Temperature

☐

Water

☐

06.2

Name the factor that is limiting the rate of photosynthesis at point Y.

[1 mark]

06.3

Explain how **Figure 3** shows that this factor is limiting the rate at point Y.

[2 marks]

Do not write outside the box

06.4 In the investigation, light intensity was changed by moving a lamp. [2 marks]

When the lamp was 20 cm from the plant, the light intensity was 800 arbitrary units.

Calculate the light intensity when the lamp was 40 cm from the plant.

Use the inverse square law.

Light intensity = _____ arbitrary units

06.5 A farmer grows tomatoes in a greenhouse. [3 marks]

The farmer adds carbon dioxide to the air in the greenhouse and uses heaters.

Explain how the farmer should decide how much carbon dioxide and heating to use.

07 The heart pumps blood around the body.

07.1 Which blood vessel carries oxygenated blood from the lungs to the heart? [1 mark]

Tick (✓) **one** box.

Aorta

☐

Pulmonary artery

☐

Pulmonary vein

☐

Vena cava

☐

07.2 The natural resting heart rate is controlled by a group of cells that act as a pacemaker. [1 mark]

Where in the heart are these cells found?

0 7 . 3 Some people have an irregular heartbeat. [2 marks]

Describe how an artificial pacemaker helps a person who has an irregular heartbeat.

0 7 . 4 The heart muscle receives blood through the coronary arteries. [3 marks]

Explain what happens to the heart muscle if a coronary artery becomes blocked.

0 8 During exercise, the body needs to supply more oxygen to the muscles.

0 8 . 1 Explain how the alveoli in the lungs are adapted for efficient gas exchange. [3 marks]

Question 8 continues on the next page

A student exercised hard for 10 minutes and then rested.

The concentration of lactic acid in her blood was measured every 5 minutes.

Table 6 shows the results.

Table 6

Time in minutes	0	5	10	15	20	25	30
Concentration of lactic acid in blood in mmol/dm ³	1.0	6.0	9.0	7.0	4.5	2.5	1.5

08.2 Describe the pattern shown in **Table 6**. [2 marks]

.....

.....

.....

08.3 The student's breathing rate stayed high for several minutes after she stopped exercising. [3 marks]

Explain why.

.....

.....

.....

.....

.....

09 Coronary heart disease is a non-communicable disease.

09.1 Describe how coronary heart disease develops. [2 marks]

.....

.....

.....

.....

Question 9 continues on the next page

Table 7 gives some information about the two treatments.

	Statins	Stents
What the treatment is	Tablets taken every day for the rest of the patient's life	A small tube inserted into a narrowed artery in an operation lasting about one hour
Reduction in the risk of a heart attack over 5 years	30%	45%
Time before the treatment starts to work	Several months	Immediately
Possible problems	Side effects such as muscle pain; some patients forget to take the tablets	Risk of infection or a blood clot after the operation; the artery can become narrow again
Cost to the health service	£100 per year	£5000 (one payment)

A 60-year-old patient has high blood cholesterol and one narrowed coronary artery.

Evaluate the use of statins and the use of stents to treat this patient.

Use **Table 7** and your own knowledge.

[illegible]

Do not write outside the box

END OF QUESTIONS

Additional page, if required.

Write the question numbers in the left-hand margin.

[illegible]

Do not write outside the box

Write the question numbers in the left-hand margin.

This image shows a single page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

There are no more questions in this paper. Original practice paper © sciencegcse.co.uk – free to use for non-commercial education. Not an AQA paper.