



Surname _____

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Centre Number _____

Candidate Number _____

Candidate Signature _____

GCSE

COMBINED SCIENCE: TRILOGY

F

Foundation Tier

Biology Paper 1F

8464/B/1F

Tuesday 15 May 2018 Afternoon

Time allowed: 1 hour 15 minutes

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]



For this paper you must have:

- **a ruler**
- **a scientific calculator.**

INSTRUCTIONS

- **Use black ink or black ball-point pen.**
- **Answer ALL questions in the spaces provided.**
- **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

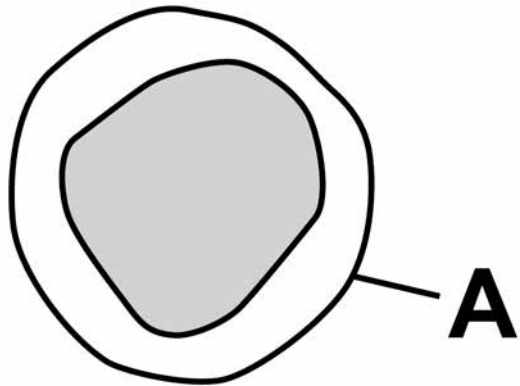
- **The maximum mark for this paper is 70.**
- **The marks for questions are shown in brackets.**
- **You are expected to use a calculator where appropriate.**
- **You are reminded of the need for good English and clear presentation in your answers.**

DO NOT TURN OVER UNTIL TOLD TO DO SO

0	1
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FIGURE 1 shows one type of white blood cell.

FIGURE 1



0	1	.	1
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What is structure A? [1 mark]

Tick ONE box.

Cell membrane

Cell wall

Cytoplasm

Nucleus

0 1 . 2 White blood cells help to defend the body against pathogens.

How do the white blood cells do this? [3 marks]

Tick THREE boxes.

Clone pathogens

Engulf pathogens

Produce antibiotics

Produce antibodies

Produce antitoxins

Produce toxins

[Turn over]



**Measles is a serious disease.
A person can die from measles.**

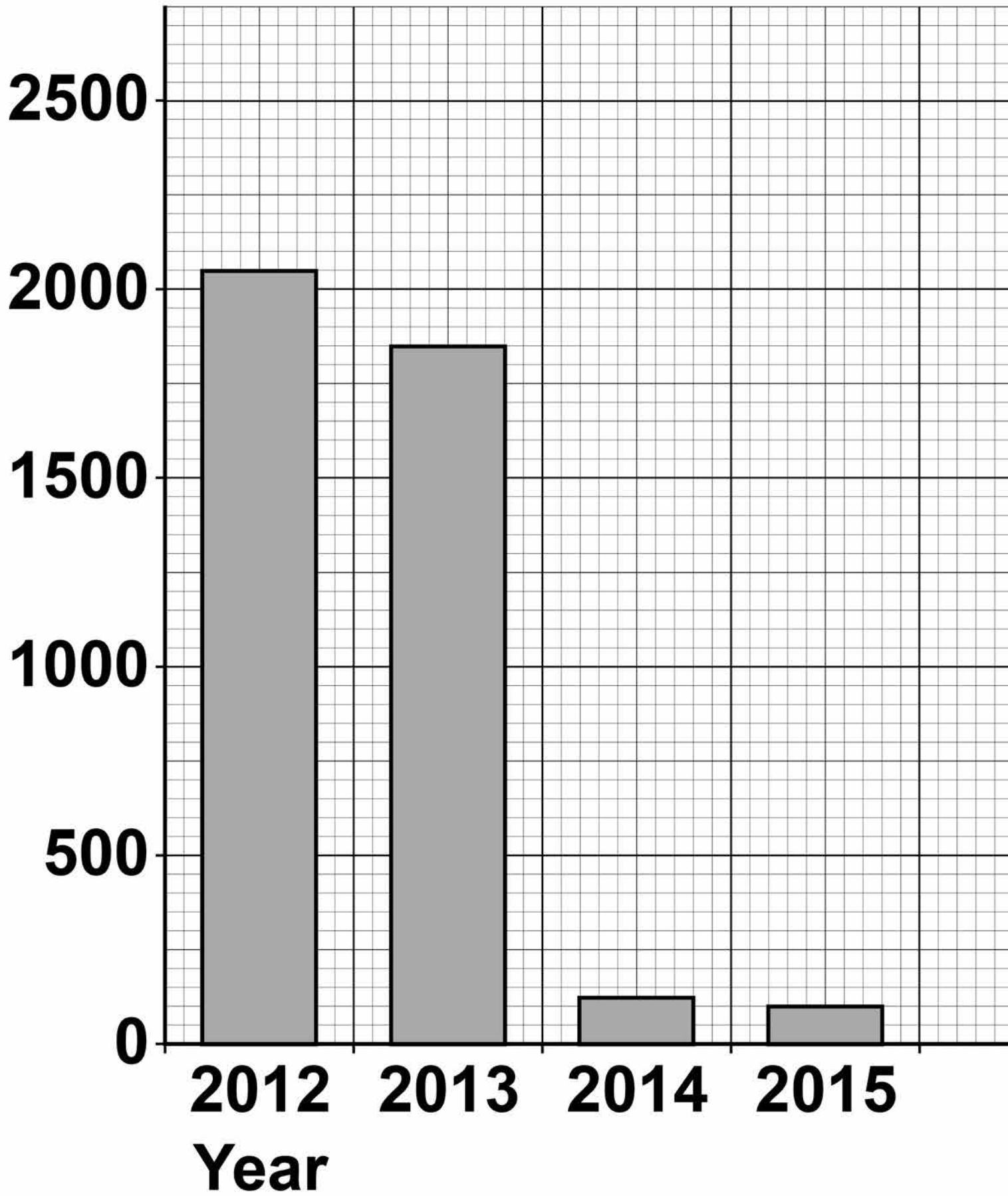
**FIGURE 2, on the opposite page,
shows the number of cases of
measles in England and Wales
between 2012 and 2015**

**0 1 . 3 Use FIGURE 2, on page 7, to
calculate the decrease in the
number of cases of measles
between 2012 and 2015 [2 marks]**

Answer = _____ cases

FIGURE 2

Number of cases of measles



[Turn over]

01.4

Suggest ONE reason for the decrease in the number of cases of measles between 2012 and 2015 [1 mark]

01.5

Antibiotics CANNOT be used to treat measles.

Suggest why. [1 mark]

0 1 . 6 Gonorrhoea is a disease caused by a bacterium.

Gonorrhoea CAN be treated with antibiotics.

Give ONE other way to control the spread of gonorrhoea. [1 mark]

[Turn over]

A scientist investigated how effective different antibiotics were at killing gonorrhoea bacteria.

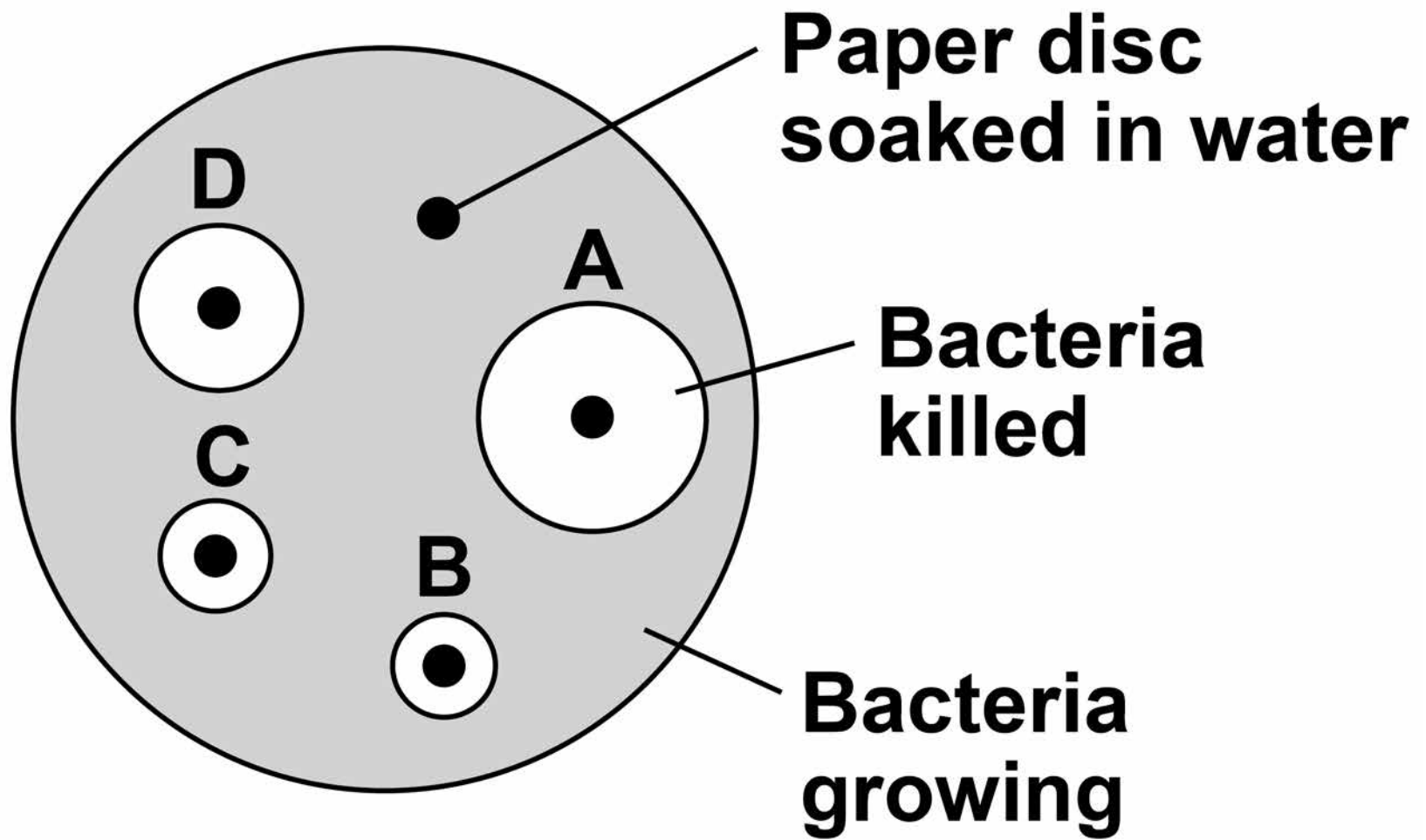
This is the method used.

- 1. Grow gonorrhoea bacteria on agar in a Petri dish.**
- 2. Place one paper disc soaked in water onto the agar.**
- 3. Place four other paper discs, each soaked in a different antibiotic, A, B, C, and D, onto the agar.**
- 4. Use the same sized paper discs and the same concentration of each antibiotic.**
- 5. Incubate the Petri dish for 3 days.**

FIGURE 3, on page 11, shows the scientist's results.

A clear area around the disc means the antibiotic has killed the bacteria.

FIGURE 3



01.7

Give ONE control variable the scientist used. [1 mark]

[Turn over]

01.8 Suggest why **ONE** disc was soaked in water. [1 mark]

01.9

Which antibiotic in FIGURE 3, on page 11, would be the best to treat gonorrhoea?

Give a reason for your answer.
[2 marks]

Antibiotic _____

Reason _____

[Turn over]

13

BLANK PAGE



0 2

This question is about photosynthesis.

0 2 . 1

What are the TWO products of photosynthesis? [2 marks]

Tick TWO boxes.

Carbon dioxide

Chlorophyll

Glucose

Oxygen

Water

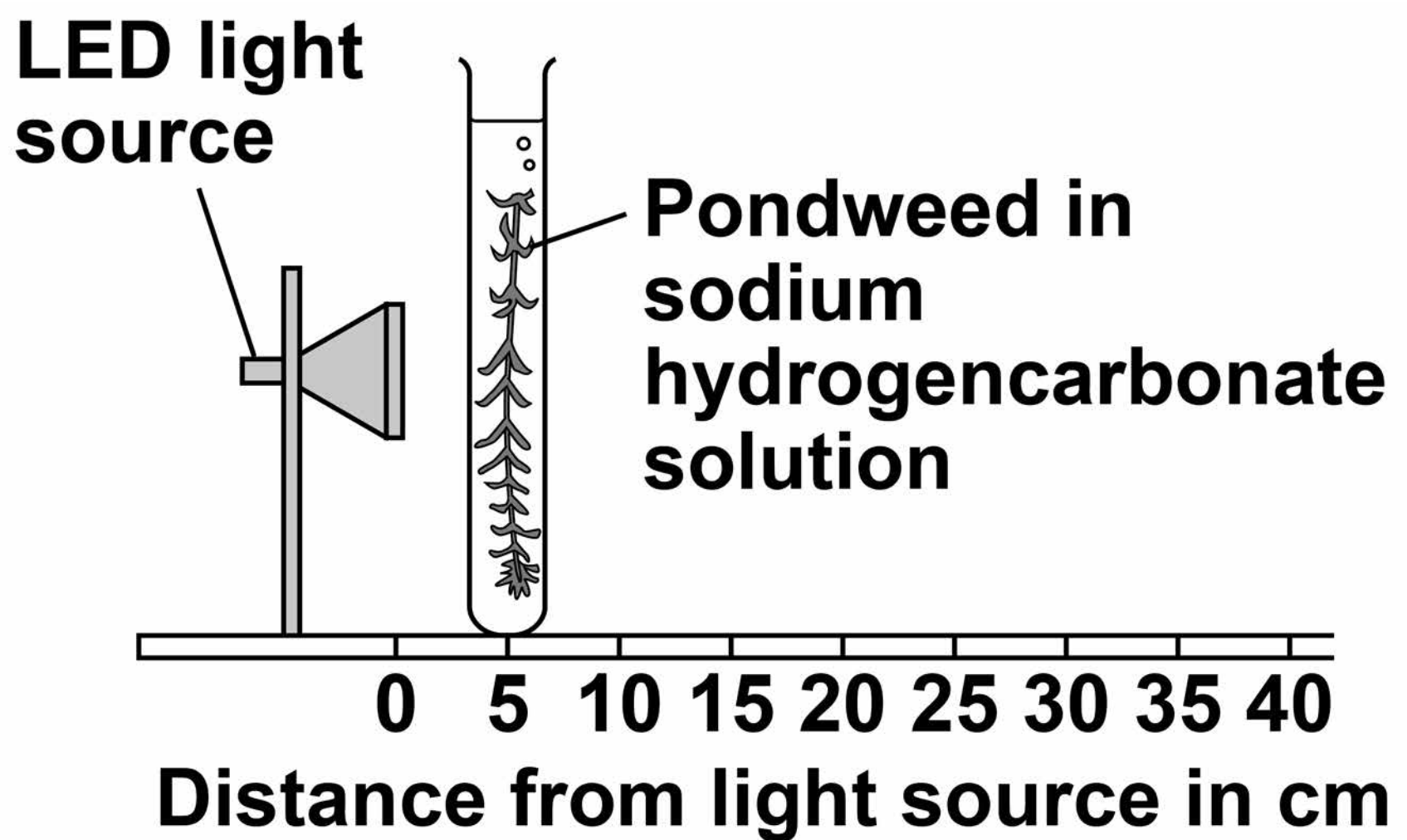
[Turn over]



A student investigated the effect of light intensity on the rate of photosynthesis.

FIGURE 4 shows the apparatus.

FIGURE 4



This is the method used.

- 1. Place the pondweed at 5 cm from the light source.**
- 2. Measure the rate of photosynthesis by counting the number of bubbles produced in 30 seconds.**
- 3. Repeat the investigation with the pondweed at different distances from the light source.**

[Turn over]

0 2 . 2 How could the student measure the rate of photosynthesis more accurately? [2 marks]

Tick TWO boxes.

Count the number of bubbles produced in 1 minute

Measure the change in mass of the pondweed in 30 seconds

Measure the volume of gas produced in 30 seconds

Place the pondweed further from the light source

Use water instead of sodium hydrogencarbonate solution

0 2 . 3 The LED light source does NOT get hot.

Why is this important? [1 mark]

[Turn over]

TABLE 1 shows the student's results.

TABLE 1

Distance of light source from pondweed in cm	Number of bubbles produced in 30 seconds
5	40
10	13
15	5
20	2
25	1
30	0

02.4 Calculate the number of bubbles produced in 2 minutes when the light source was 10 cm from the pondweed. [1 mark]

**Number of bubbles produced in
2 minutes = _____**

[Turn over]

0 2 . 5 Plot the data from TABLE 1 on FIGURE 5 opposite.

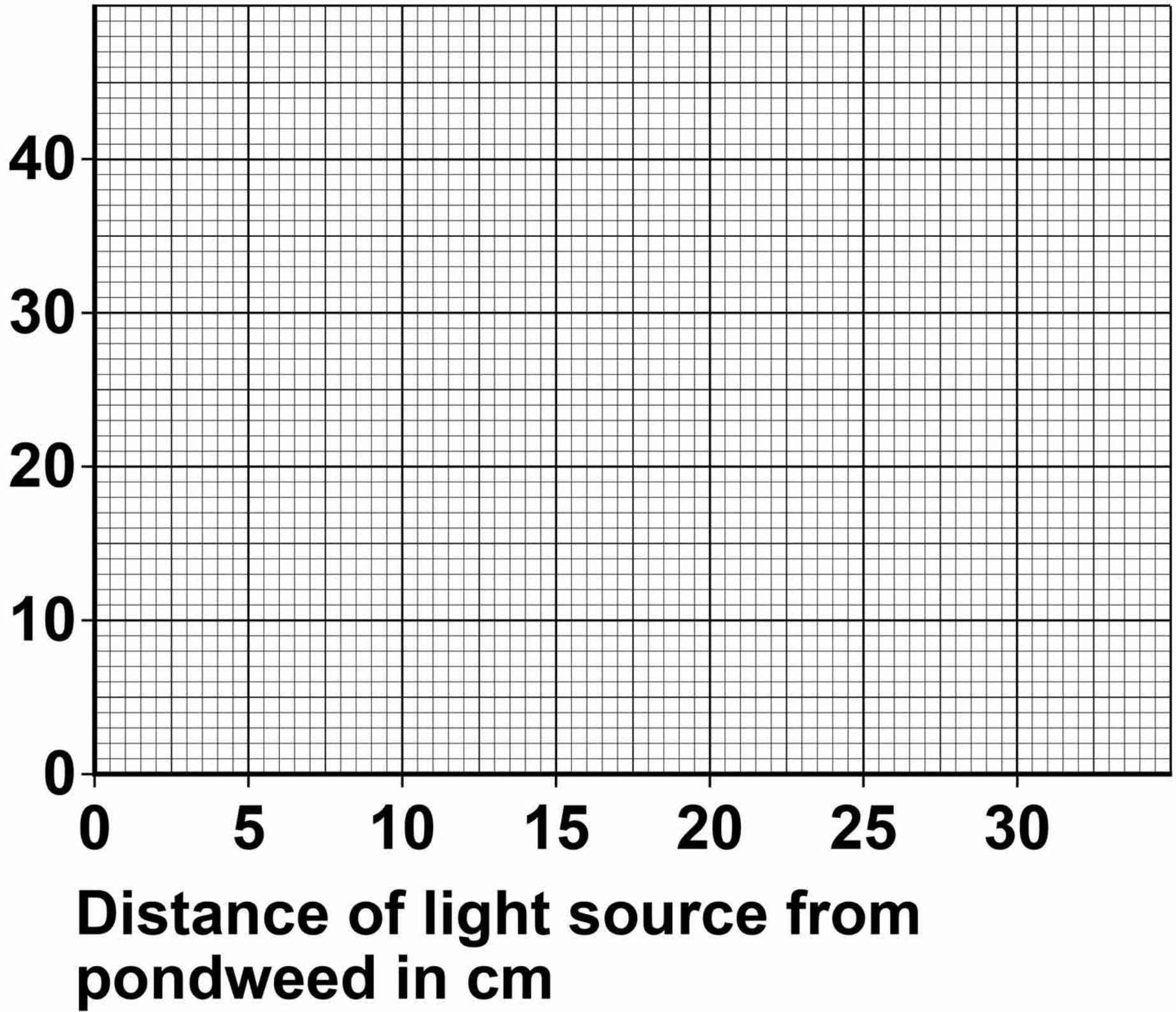
Draw a line of best fit. [3 marks]

0 2 . 6 Give ONE conclusion that can be made from these results. [1 mark]

10

FIGURE 5

**Number of
bubbles produced
in 30 seconds**



[Turn over]

03

A student investigated the effect of different concentrations of sugar solution on pieces of potato.

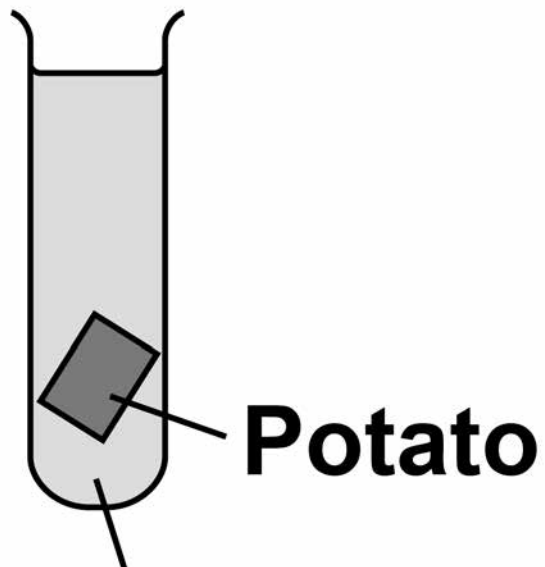
This is the method used.

- 1. Cut three pieces of potato to the same length.**
- 2. Dry each piece on a paper towel.**
- 3. Weigh each piece.**
- 4. Place each piece in a different concentration of sugar solution.**
- 5. Leave all three pieces for 2 hours.**
- 6. Remove the three pieces of potato from the solutions.**
- 7. Dry each piece on a paper towel.**
- 8. Measure the length and mass of each piece of potato.**

FIGURE 6 shows how the investigation was set up.

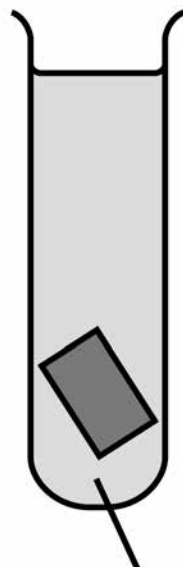
FIGURE 6

**Tube
A**



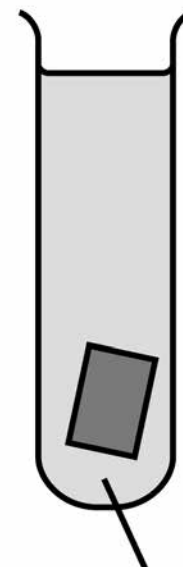
**Water
0.0 mol/dm³**

**Tube
B**



**Sugar
solution
0.4 mol/dm³**

**Tube
C**



**Sugar
solution
0.8 mol/dm³**

0 3 . 1

Why did the student dry each piece of potato before weighing it? [1 mark]

[Turn over]



03.2 What TWO changes would you expect in the potato in TUBE A after 2 hours? [2 marks]

Tick TWO boxes.

Breaks into pieces

Decrease in hardness

Decrease in size

Increase in mass

Increase in length

03.3 Complete the sentences.
[3 marks]

**Water moves into and out of cells
by a process called _____.**

Water would move _____

the potato cells in TUBE A.

**The solution outside the potato in
TUBE A is at a _____**

**concentration than the solution
inside the potato cells.**

[Turn over]

BLANK PAGE



03.4 The potato in TUBE B did NOT change.

Give ONE conclusion that can be made from this observation.
[1 mark]

[Turn over]

03.5 **FIGURE 7** shows the root of a germinating seed.

FIGURE 7



Describe TWO ways the root is adapted to absorb water efficiently. [2 marks]

1

2

[Turn over]

9

04

Exercise can improve health.

A student measured her breathing rate at rest, when walking and when jogging.

FIGURE 8 opposite shows her results.

04.1

Compare the breathing rates when doing the THREE different activities.

Use values from FIGURE 8 in your answer. [3 marks]

FIGURE 8

**Breathing
rate in
breaths
per minute**



[Turn over]



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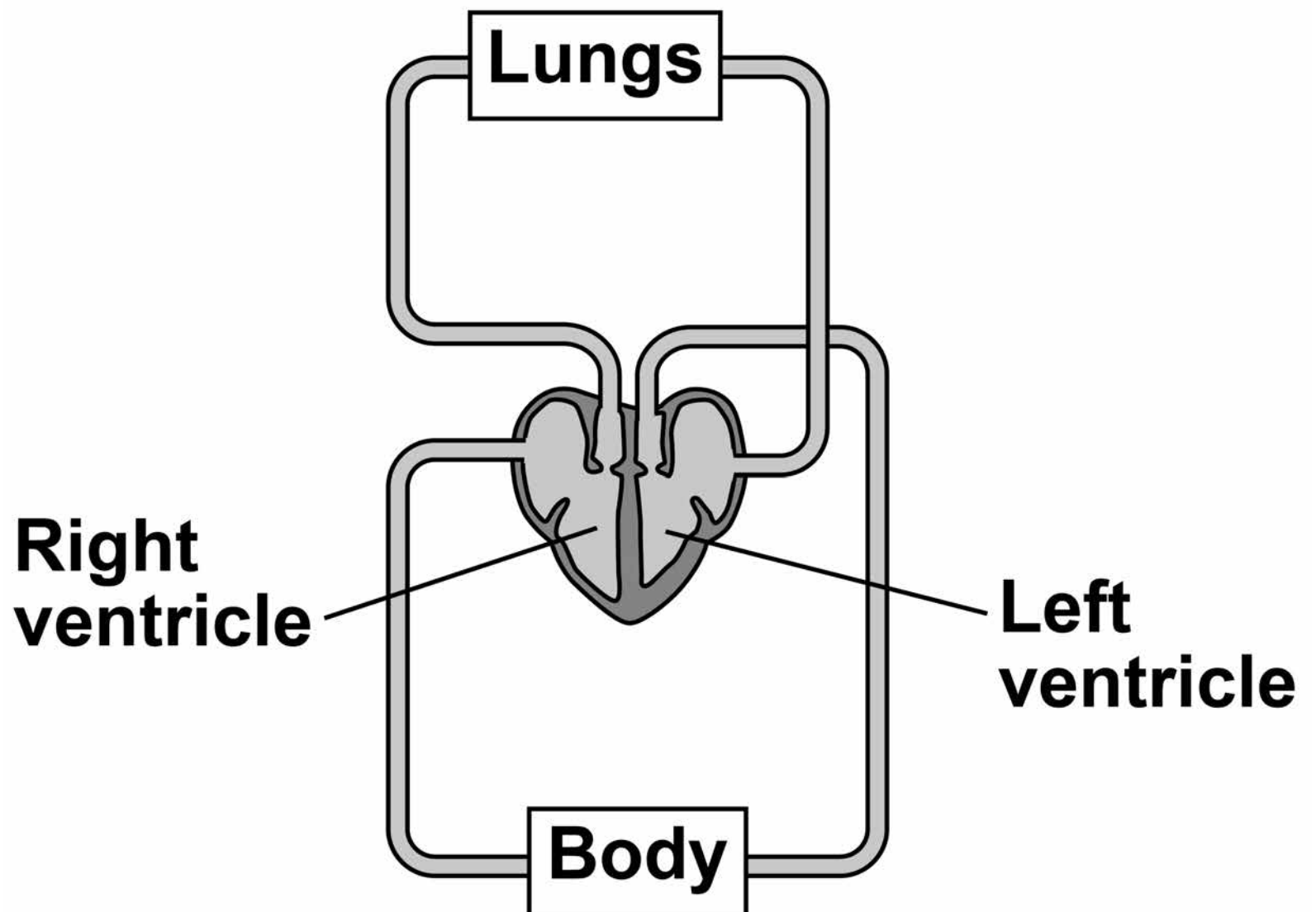


04.2 Explain why the breathing rate changes when doing different activities. [3 marks]

[Turn over]

FIGURE 9 shows the heart in the circulatory system.

FIGURE 9



04.3 The heart is a double pump.

Describe what this means.

Use FIGURE 9 to help you.
[2 marks]

0 4 . 4

The wall of the left ventricle is much thicker than the wall of the right ventricle.

**Suggest ONE reason for this.
[1 mark]**

[Turn over]

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04.5 People are encouraged to exercise after recovering from a heart attack.

Suggest ONE reason why.
[1 mark]

[Turn over]

10

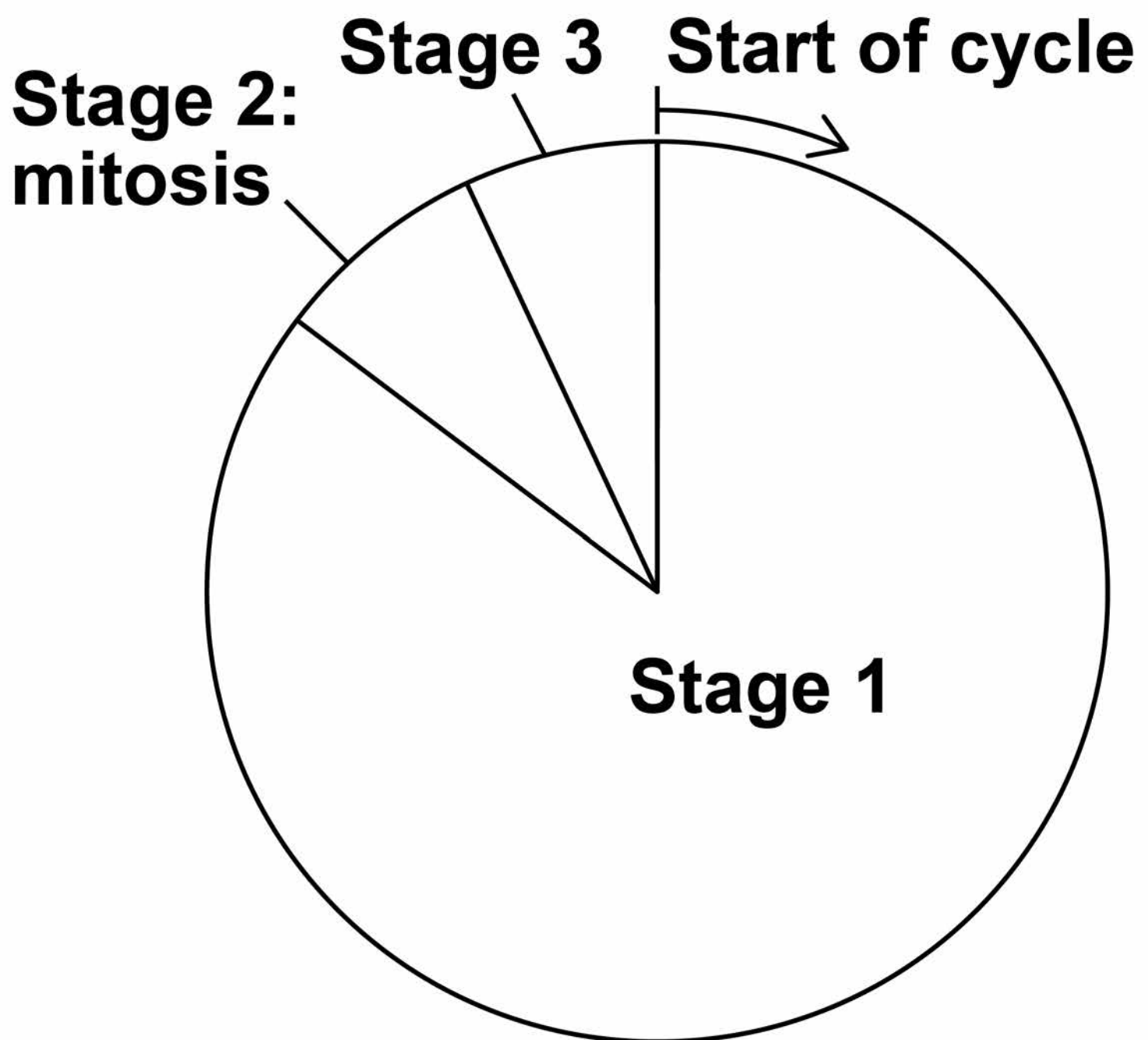
05

Cells divide in a series of stages called the cell cycle.

Stage 2 of the cycle is mitosis.

FIGURE 10 shows a simplified cell cycle for a human body cell.

FIGURE 10



05.1 Draw ONE line from each stage in the cell cycle to what happens during that stage. [2 marks]

Stage in the cell cycle

What happens during that stage

Stage 1

Nucleus divides

Stage 2

Cell divides into two

Stage 3

Copies of the DNA are made

[Turn over]



05.2 The mass of DNA in a human body cell at the start of the cell cycle is 6 picograms.

What mass of DNA will be in each of the new cells produced by this cell division? [1 mark]

Tick ONE box.

3 picograms

6 picograms

9 picograms

12 picograms

05.3 Stem cells are undifferentiated cells.

Which statement about stem cells is correct? [1 mark]

Tick ONE box.

Animal stem cells are found in meristems

Animal stem cells divide by meiosis

Meristem cells in plants can differentiate throughout the life of the plant

Meristem cells in plants can only differentiate into one type of cell

[Turn over]



Stem cells from human embryos can differentiate into most types of human cell.

Research is being done into the use of embryonic stem cells in medical treatments.

The long-term effects of using embryonic stem cells in patients are not well understood.

In therapeutic cloning, human embryos are produced using a donated human egg cell and a cell from the patient.

- **The embryo produced contains the same genetic information as the patient.**
- **Stem cells are taken from the embryo and stimulated to divide to form cells the patient needs.**
- **The embryo is then destroyed.**

05.4 Suggest TWO advantages of therapeutic cloning. [2 marks]

1

2

[Turn over]

05.5

Suggest TWO disadvantages of therapeutic cloning. [2 marks]

1

2

8

06

This question is about cell structures.

06.1

Draw ONE line from each cell structure to the type of cell where the structure is found. [2 marks]

Cell structure

Type of cell where the structure is found

Nucleus

Prokaryotic cells

Permanent vacuole

Plant cells only

Plasmid

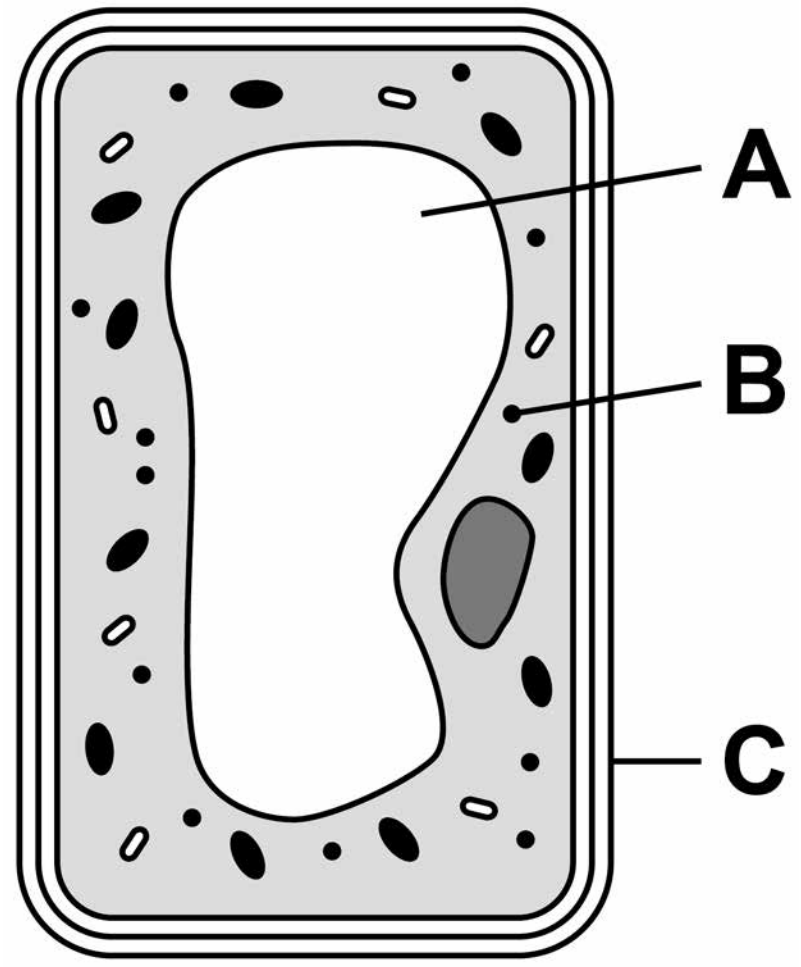
Eukaryotic cells

[Turn over]



06.2 FIGURE 11 shows a plant cell.

FIGURE 11



What are the names of structures A, B and C? [1 mark]

Tick ONE box.

	Structure A	Structure B	Structure C
<input type="checkbox"/>	Chloroplast	Vacuole	Cell wall
<input type="checkbox"/>	Nucleus	Chloroplast	Cell membrane
<input type="checkbox"/>	Vacuole	Mitochondrion	Cell membrane
<input type="checkbox"/>	Vacuole	Ribosome	Cell wall

[Turn over]

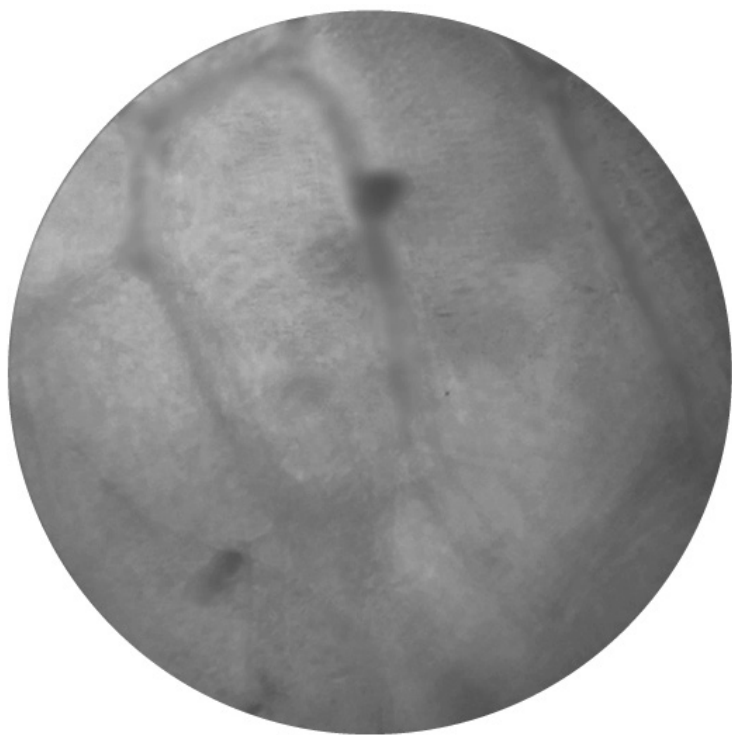


A student observed slides of onion cells using a microscope.

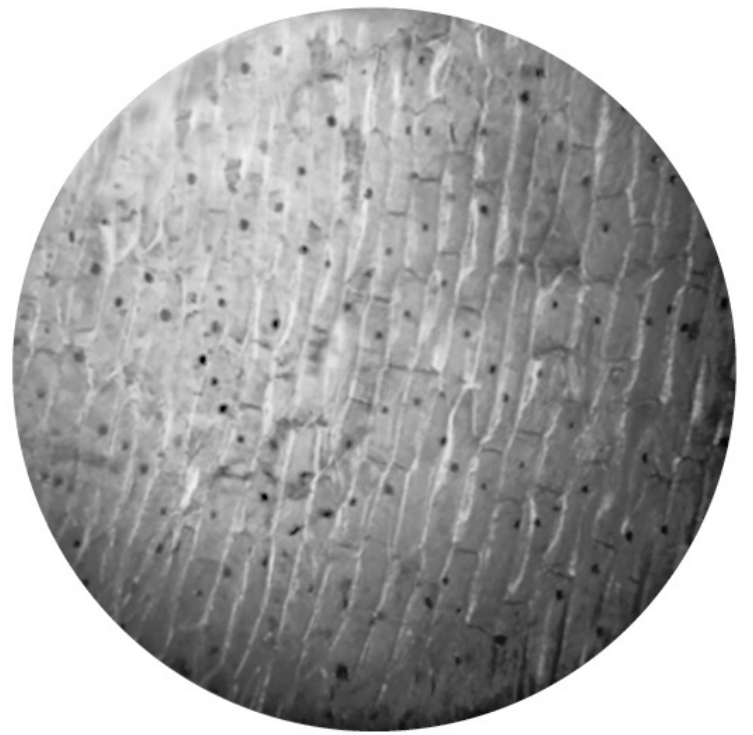
FIGURE 12 shows two of the slides the student observed.

FIGURE 12

SLIDE A



SLIDE B



The cells on the slides are NOT clear to see.

06.3 Describe how the student should adjust the microscope to see the cells on **SLIDE A** more clearly.
[1 mark]

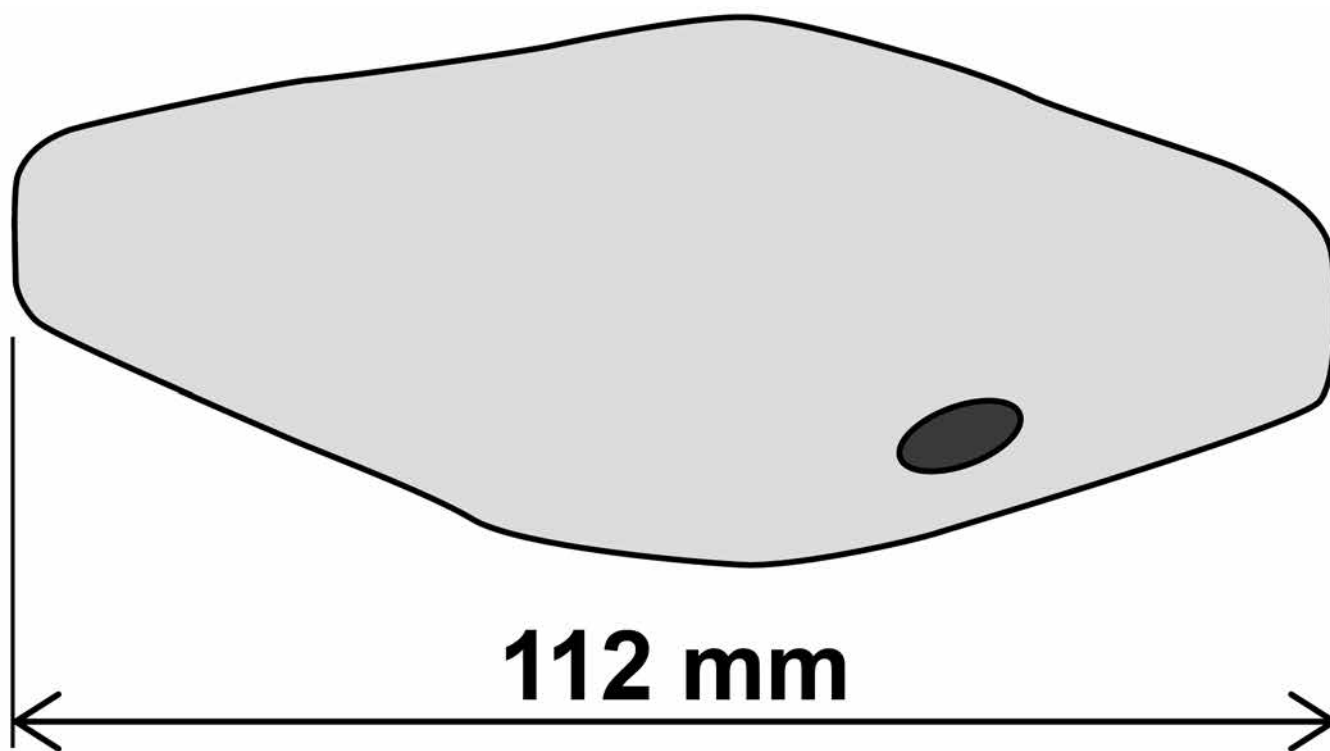
06.4 Describe how the student should adjust the microscope to see the cells on **SLIDE B** more clearly.
[2 marks]

[Turn over]

06.5 The student made the necessary adjustments to get a clear image.

FIGURE 13 shows the student's drawing of one of the cells.

FIGURE 13



The real length of the cell was 280 micrometres (μm).

Calculate the magnification of the drawing. [3 marks]

Magnification = x _____

[Turn over]

9

07

Coronary heart disease (CHD) is a non-communicable disease.

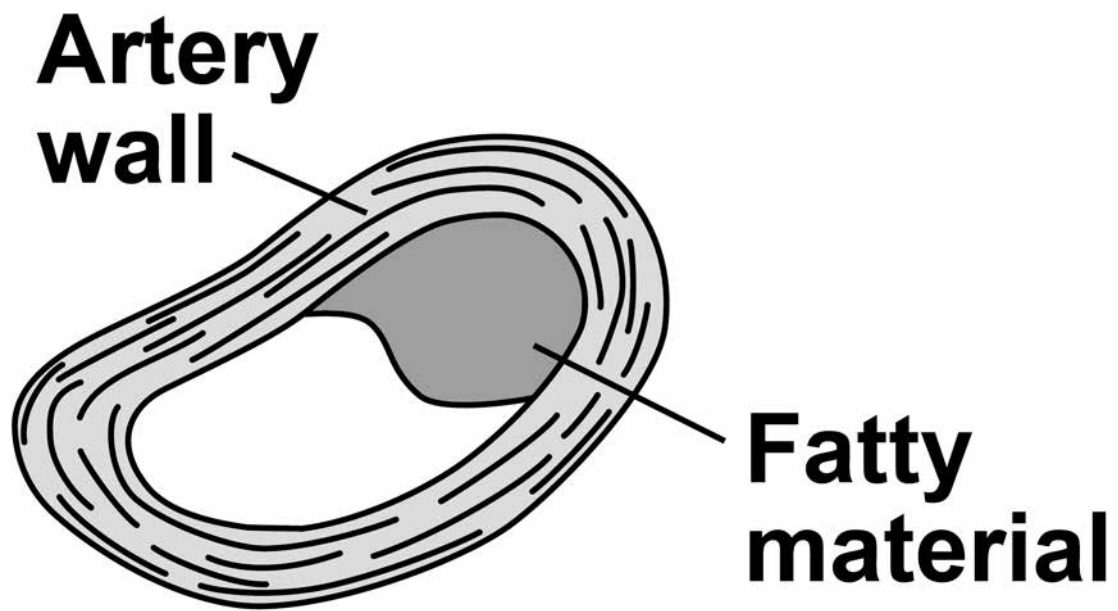
CHD is caused when fatty material builds up in the coronary arteries.

07.1

Explain what a non-communicable disease is. [2 marks]

FIGURE 14 shows a coronary artery of someone with CHD.

FIGURE 14



07.2 Explain how CHD can cause a heart attack. [3 marks]

[Turn over]

07.3

Explain how lifestyle and medical risk factors increase the chance of developing CHD. [6 marks]

END OF QUESTIONS

11



There are no questions printed on this page

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Question	Mark
1	
2	
3	
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5	
6	
7	
TOTAL	

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