

Candidate forename						Candidate surname					
Centre number						Candidate number					

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GCSE
B631/01
GATEWAY SCIENCE
BIOLOGY B

Unit 1 Modules B1 B2 B3 (Foundation Tier)

MONDAY 21 MAY 2012: Morning
DURATION: 1 hour
plus your additional time allowance
MODIFIED ENLARGED

Candidates answer on the Question Paper.
A calculator may be used for this paper.

OCR SUPPLIED MATERIALS:

Insert 1, Question 10

OTHER MATERIALS REQUIRED:

Pencil
Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. HB pencil may be used for graphs and diagrams only.**
- **Answer ALL the questions.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**
- **Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).**

INFORMATION FOR CANDIDATES

- **The number of marks is given in brackets [] at the end of each question or part question.**
- **The total number of marks for this paper is 60.**

BLANK PAGE

Answer ALL the questions.

SECTION A – MODULE B1

- 1 Charlotte and her friend Kamran are walking in the hills.**

They are carrying all their camping equipment in rucksacks.

- (a) Charlotte needs lots of energy to walk up the hills.**

Glucose in Charlotte's muscles reacts with a gas to release energy.

This process is called respiration.

Write down the name of the gas USED in respiration.

_____ **[1]**

- (b) As Charlotte walks uphill her breathing rate increases.**

Explain why her breathing rate increases.

Use ideas about muscles in your answer.

_____ **[2]**

- (c) Charlotte's body temperature also starts to increase.**

To lose heat, more blood starts to flow near her skin surface.

- (i) Write down ONE OTHER way that Charlotte's body loses heat.**

_____ **[1]**

- (ii) It is important that Charlotte's body does NOT get too hot.**

Put a tick (✓) in the box next to the ONE correct statement about high body temperature.

High body temperature is called hypothermia.

☐

High body temperature is a result of homeostasis.

☐

High body temperature can cause dehydration.

☐

High body temperature can cause shivering.

☐

[1]

(d) Kamran has diabetes. This means he has to take insulin with him on his walk.

(i) Put a ring around the organ in the body that makes insulin.

HEART

LIVER

PANCREAS

[1]

(ii) Insulin controls the level of a chemical in the blood.

Write down the name of this chemical.

_____ **[1]**

[Total: 7]

BLANK PAGE

2 Read these facts about fruit flies.

**Fruit flies are used to study genes.
They only have four pairs of
chromosomes in each body cell.
Some fruit flies hatch with smaller wings.
This is caused by a gene mutation.**

**When fruit flies that have normal wings
are mated with fruit flies with smaller
wings, all the offspring have normal
wings.**

(a) Finish the sentences about the fruit flies.

**Fruit flies have four pairs of chromosomes in the
_____ of their body cells.**

Having smaller wings is caused by a mutation.

A mutation is a _____ to a gene.

**The offspring all have normal wings because
having smaller wings is**

a _____ characteristic.

[3]

(b) A fruit fly can inherit smaller wings.

Humans also inherit some characteristics.

Put a tick (✓) in the box next to ONE characteristic inherited by humans.

earlobe shape

☐

scars

☐

spoken language

☐

[1]

[Total: 4]

3 Look at the picture of a little owl.

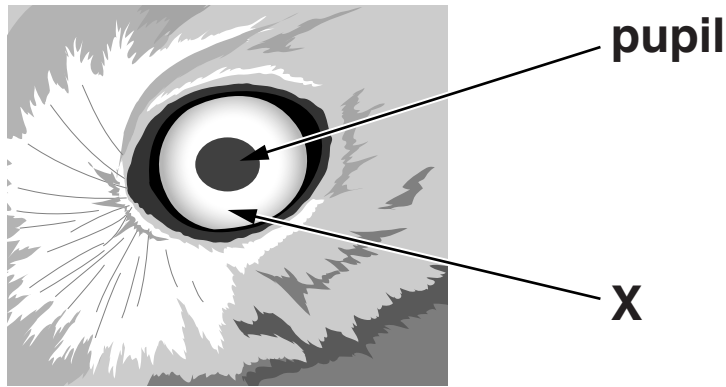


(a) Owls have binocular vision.

Describe the difference between binocular and monocular vision.

[2]

(b) Look at the picture of the owl's eye.



The owl's eye is similar to a human eye.

Part X is the coloured part of the eye.

Write down the name of part X.

_____ [1]

(c) The pupil lets in light.

Owl eyes have large pupils compared with human eyes.

Suggest why they need large pupils.

_____ [1]

[Total: 4]

4 Read the information about three different people.

HITEN

Age: 14

Mass: 70 kg

Height: 1.80 m

Hiten plays squash three times a week.

CLARE

Age: 16

Mass: 70 kg

Height: 1.70 m

Clare plays hockey once a week and swims for the local club.

JOHN

Age: 16

Mass: 105 kg

Height: 1.80 m

John plays on his computer most days of the week. He does not like to play sport.

(a) Clare eats a high protein diet.

(i) What does her body use the protein for?

_____ **[1]**

(ii) The recommended daily average (RDA) protein intake is calculated using the formula

$$\text{RDA in g} = 0.75 \times \text{body mass in kg}$$

Calculate Clare's RDA.

Clare's RDA = _____ g [1]

(b) Each person's Body Mass Index (BMI) can be calculated using the formula

$$\text{BMI} = \text{mass in kg} / (\text{height in m})^2$$

(i) Hiten has a BMI of 21.60.

Does Clare have a higher or lower BMI?

Explain your answer.

[2]

(ii) John has the highest BMI of all of the three people.

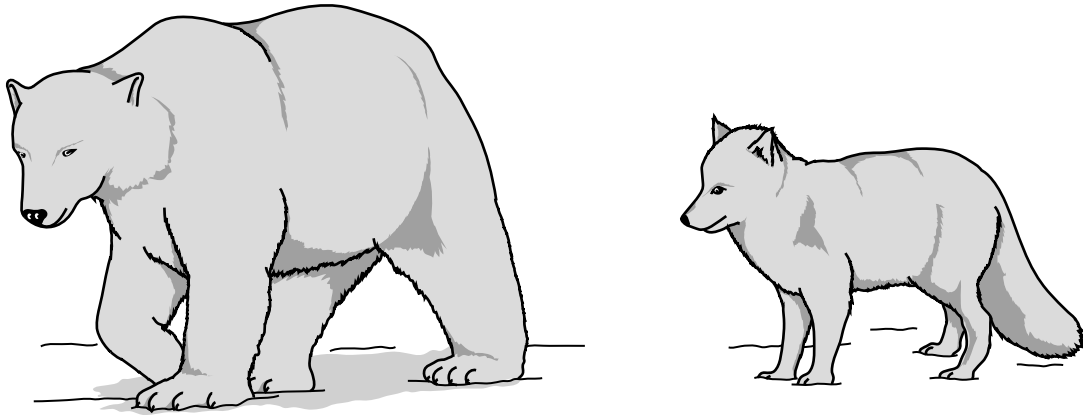
Suggest ONE reason why his BMI is the highest.

[1]

[Total: 5]

SECTION B – MODULE B2

5 Look at the pictures of a polar bear and an Arctic fox.



(a) Both of these animals are adapted to survive in cold Arctic conditions.

Write down TWO ways the ARCTIC FOX is adapted to cold conditions.

1 _____

2 _____

_____ **[2]**

- (b) Look at the polar bear population estimates between 1950 and 2005.**

DATE	POLAR BEAR POPULATION ESTIMATE
1950	5 000
1965	9 000
1984	25 000
2005	20 000

Describe the changes in population estimate and suggest possible reasons for them.

[3]

- (c) (i) Global warming could soon make the polar bear an ENDANGERED species.**

Write down what endangered means.

[1]

- (ii) Pollution from an increasing human population is speeding up global warming.**

Write down ONE pollutant that is causing global warming.

_____ **[1]**

[Total: 7]

6 This question is about plants.

(a) Use the words in this list to complete the sentences.

CARBON DIOXIDE

CHLOROPHYLL

COMPETITION

OXYGEN

PHOTOSYNTHESIS

RESPIRATION

STARCH

Plants make glucose by the process of

_____ .

**This releases _____ as a
waste product.**

Some of the glucose is converted to

_____ and stored. **[3]**

(b) Woodland can be used as a SUSTAINABLE RESOURCE.

(i) What does sustainable resource mean?

_____ **[1]**

(ii) Write down ONE OTHER example of a sustainable resource.

_____ **[1]**

(c) Coal is a fossil fuel. It is made from fossilised plants.

Limestone statues are damaged when coal is burned in factories close to the statues.

Write down the air pollutant that causes the damage.

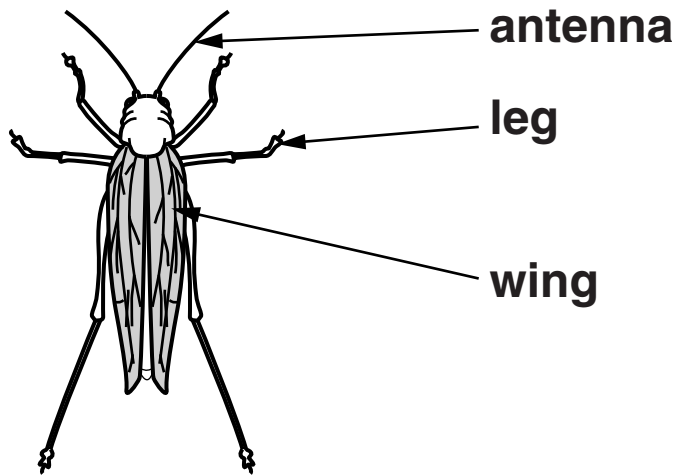
_____ **[1]**

[Total: 6]

BLANK PAGE

7 Fatima catches insects in two different fields, X and Y.

She identifies a grasshopper.

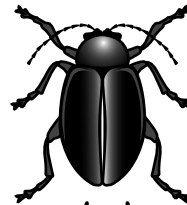


(a) Fatima uses a biological key to identify the other insects.

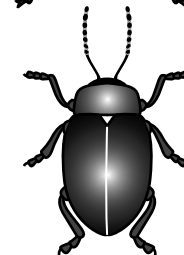
long horn beetle →



flea beetle →



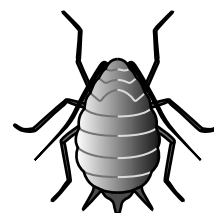
leaf beetle →



wireworm →

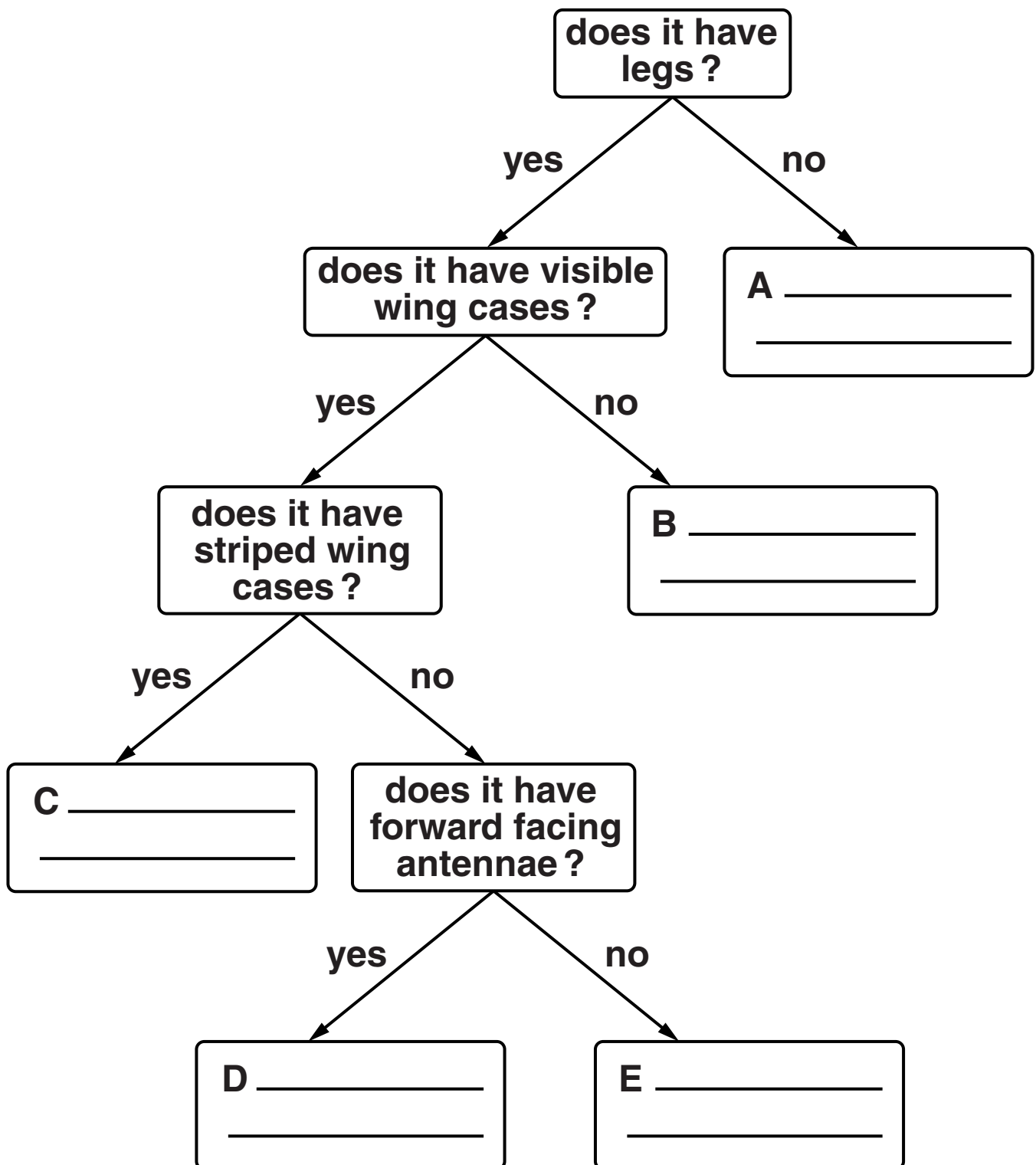


aphid →



Look at the biological key and use it to identify the insects.

Write the name of each insect in the correct box.



[2]

(b) Fatima collects leaf beetles in field X.

She collects them from areas marked by quadrats.

The table shows her results.

area of field X	3200 m²
size of quadrat used	0.25 m²
total number of leaf beetles in 10 quadrats	120
average number of leaf beetles in 1 m²	

- (i) Calculate the average number of leaf beetles in 1 m² of the field.**

answer _____ **[2]**

- (ii) Use the results to estimate the number of leaf beetles in field X.**

answer _____ **[1]**

(c) There are no grasshoppers in field X.

Both grasshoppers and leaf beetles feed on grass.

Grasshoppers have larger mouth parts than leaf beetles.

Suggest what would happen to the population of leaf beetles in field X if grasshoppers got in.

reason _____

_____ **[2]**

[Total: 7]

SECTION C – MODULE B3

8 Look at the chart.

It shows a human growth curve for the first two phases of human growth.



(a) (i) Write down the names of the TWO growth phases shown in the chart.

_____ and _____ [2]

(ii) Use the graph to finish the sentence.

Growth is fastest between _____

and _____ years. [1]

- (b) When humans grow they make different types of cells.**

What name is given to the process of making different TYPES of cells?

Choose from this list.

CLONING

DIFFERENTIATION

DIFFUSION

answer _____ [1]

- (c) Red blood cells are one type of cell made by the human body.**

Write down the job of red blood cells.

_____ [1]

[Total: 5]

9 Fernando grows raspberry plants in his garden.

(a) The shoots of his plants grow upwards in response to light.

Finish the sentences.

The roots of his plants grow downwards in response to _____ .

Fernando can use chemicals to make the fruit ripen more quickly.

**The chemicals are called plant
_____ .**

[2]

(b) Fernando takes some cuttings from his raspberry plants to grow in pots.

Describe how he could do this.

You may use a labelled diagram to help you.

[3]

(c) Fernando also grows different varieties of apples.

Here are the names of five of the varieties that he grows.

greengold

redgold

greencrisp

yellowcrisp

sweetred

Read the information about Fernando's apples.

- **Greengold are small, green and have little taste.**
- **Redgold are large, red and have little taste.**
- **Greencrisp are large, green and taste sour.**
- **Yellowcrisp are large, yellow and taste sour.**
- **Sweetred are small, red and taste sweet.**

Fernando uses selective breeding to grow large, sweet, red apples.

He starts by choosing the two varieties of apples he needs and breeding them.

(i) Write down the TWO varieties he should use in his breeding program.

_____ and _____ **[1]**

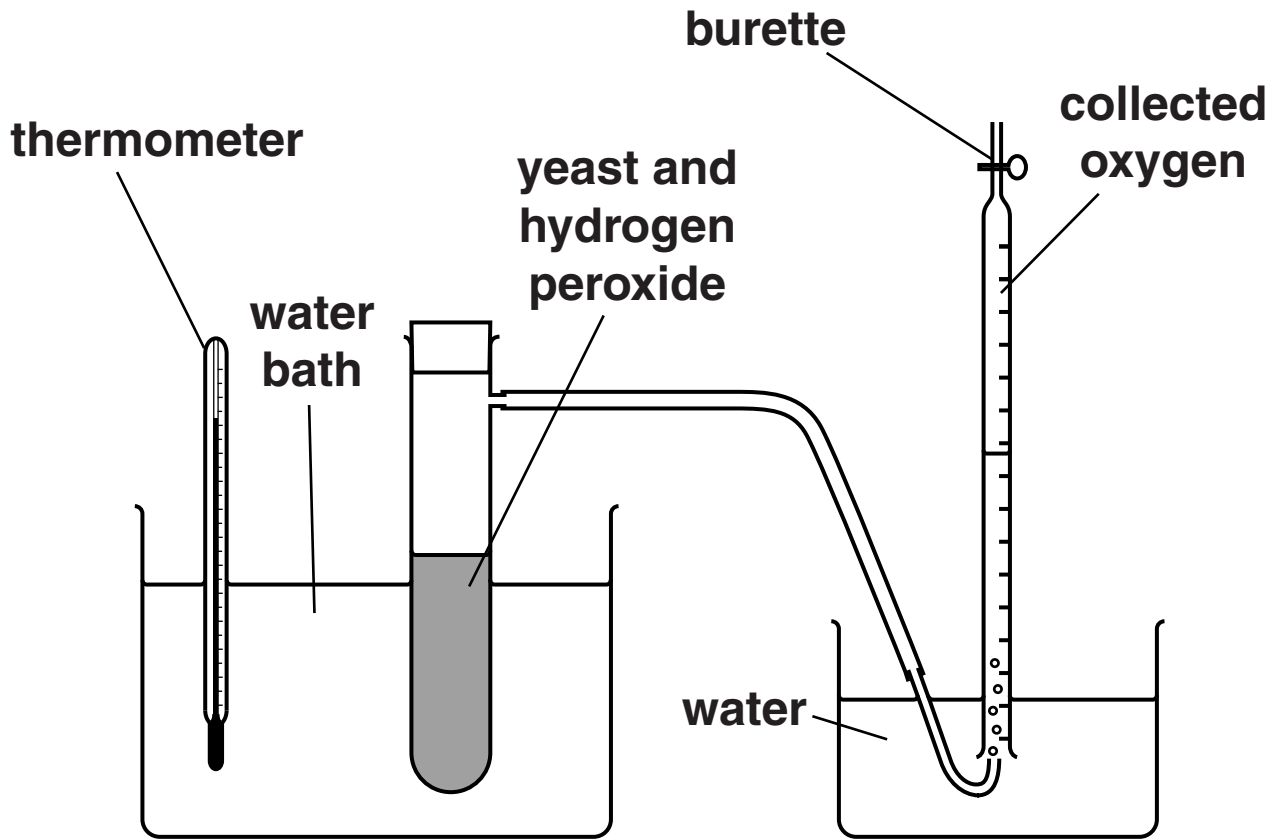
- (ii) Describe what he would need to do as part of his breeding program to produce trees that provide large, sweet, red apples.

[2]

[Total: 8]

10 Catherine and Ben investigate an enzyme in yeast.

The picture shows their apparatus.



The enzyme in the yeast breaks down hydrogen peroxide to make oxygen and water.

Catherine and Ben collect the oxygen in the burette for 5 minutes.

They repeat the investigation using different temperatures.

The table opposite and on insert 1 shows their results.

temperature in °C	volume of oxygen collected in cm ³			
	first attempt	second attempt	third attempt	average
10	0.3	0.2	0.1	0.2
20	6.1	6.0	6.4	6.2
30	35.1	34.7	34.0	34.6
40	39.6	40.9	38.6	39.7
50	13.9	13.2	2.9	10.0
60	0.8	0.5	0.5	

(a) Calculate the average volume collected at 60 °C.

Show your working.

answer _____ cm³ [1]

(b) Ben tells Catherine they have recorded an anomalous result.

(i) Write down their anomalous result.

_____ [1]

(ii) Ben knows they recorded the amount of oxygen that was in the burette accurately.

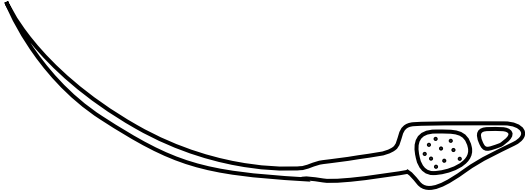
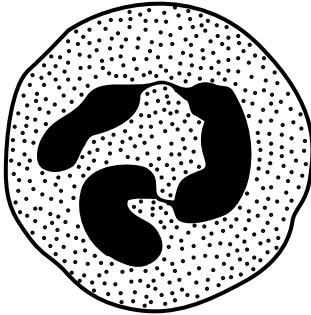
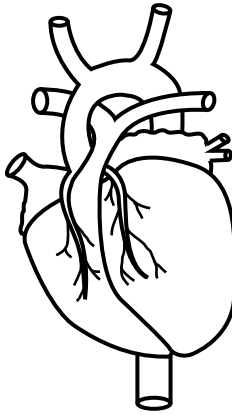
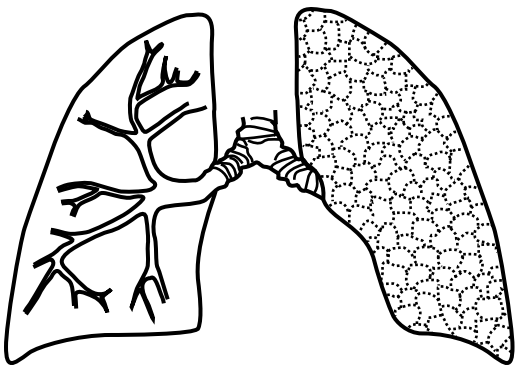
Suggest ONE reason why the amount was not what they expected.

_____ [1]

[Total: 3]

BLANK PAGE

11 Look at the diagrams of cells and organs.

NAME	DIAGRAM
sperm cell	 A diagram of a sperm cell, showing a long, thin, curved tail (flagellum) and a small, oval head at the end.
white blood cell	 A diagram of a white blood cell, showing a large, irregularly shaped cell with a granular interior and a large, dark, kidney-shaped nucleus.
heart	 A diagram of a human heart, showing the four chambers (atria and ventricles) and the major blood vessels (aorta, pulmonary artery, and pulmonary veins) entering and exiting.
lungs	 A diagram of two human lungs, showing the branching bronchial tree and the lobes of the lungs. The right lung is shown with a dotted pattern, and the left lung is shown with a solid outline.

(a) Which diagram shows the part of the body where oxygen enters the blood?

_____ **[1]**

(b) Which diagram shows the part of the body adapted for fertilisation?

_____ **[1]**

(c) Write down the job of the white blood cell.

_____ **[1]**

(d) Blood is taken from the heart to the lungs by a blood vessel.

Which TYPE of blood vessel takes blood from the heart to the lungs?

_____ **[1]**

[Total: 4]

END OF QUESTION PAPER

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.