Qualification Accredited

OCR
Oxford Cambridge and RSA

GCSE (9-1)

Examiners' report

TWENTY FIRST CENTURY SCIENCE COMBINED SCIENCE B

J260

For first teaching in 2016

J260/01 Summer 2024 series

Version 1

ocr.org.uk/science

Contents

Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates.

The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. A selection of candidate answers is also provided. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.

A full copy of the question paper and the mark scheme can be downloaded from OCR.

Paper 1 series overview

J260/01 is the first of four Foundation Tier papers taken for Combined Science. It covers content from the topics B1 to B6 plus ideas about science and practical skills. This paper requires candidates to apply their knowledge and understanding of scientific principles and be familiar with a range of practical equipment and techniques. Questions 8 and 9 overlap with the Higher Tier paper. Almost every candidate attempted all the questions and there was no evidence that candidates ran out of time.

It was good to see that candidates were able to successfully follow the instructions throughout the paper for different style responses such as drawing lines, ticking boxes, drawing rings and using letters. Candidates should remember that if they are changing a letter response, they should cross out the incorrect one and replace it fully, rather than trying to rewrite over it.

The questions most often answered correctly were Questions 1 (a), 1 (c) (i), 2 (d) (i), 2 (d) (ii), 5 (c), 5 (e), 6 (b) (i), 6 (b) (ii), 6 (c) (ii). Candidates that did well on this paper were able to analyse information and draw conclusions of the food web in Question 3 (b) (i), apply their knowledge and understanding of natural selection in Question 7 (c), and carry out calculations showing their working in Questions 5 (e) and 9 (d) (i). The most challenging questions were Question 3 (b) (ii), describing interdependence, Question 4 (b) and 4 (c) (iii), applying knowledge of respiration, Question 7 (a) (ii), to know that genetics causes variation, and Question 7 (b) (i) applying knowledge of inheritance using the terms allele/genetic variants.

Candidates who did well on this paper generally:	Candidates who did less well on this paper generally:
• could recall the uses of parts of the microscope in Questions 2 (d) (i) and 2 (d) (ii) • could analyse information and draw conclusions from the food web in Question 3 (b) (i) • could apply knowledge of the carbon cycle in Question 3 (c) (i) • knew that oxygen was required for aerobic respiration and that less ATP was made in anaerobic respiration in Question 4 (a) • could correctly reorder the capture-mark-recapture method in Question 5 (c) • could substitute numbers into the capture-mark-recapture equation in Question 5 (e) • could correctly reorder the explanation of how vaccines work in Question 6 (d) (ii) • could apply their knowledge and understanding of natural selection in Question 7 (c) to achieve at least Level 2 • could be given marks on Question 9 (d) (i) for calculating surface area, volume and simplifying a ratio.	• could not recall that a reflex is a quick response in Question 1 (b) (i) • could not recall that genetic material contains instructions and all the genetic material in a cell is called the genome in Question 2 (b) • could not recall that organisms of the same type living in the same place make up a population in Question 3 (a) • could not give one other benefit of protecting biodiversity in Question 5 (b) (iii), often giving a description of biodiversity instead • understood that more samples should be taken in Question 5 (f) but did not go on to say to calculate a mean • could not calculate percentage decrease to 1 decimal place in Question 6 (c) (iii) • could not recall that genetics cause variation in Question 7 (a) (ii).

Question 1 (a)

1 There are receptors on the inside and outside of your body.

A receptor detects a stimulus.

(a) Receptors are found in sense organs.

Draw lines to connect each **sense organ** with the correct **stimulus**.

Sense organ	Stimulus
Ear	Chemicals in the air
Eye	Light
Nose	Sound

[2]

The first question was well answered as candidates could recall which sense organ matched the stimuli. It was good to see that candidates could follow the instructions and draw three lines from sense organ to stimulus. Most lines were straight and touching the boxes.

Question 1 (b) (i)

(b) If you touch something very hot, your hand pulls away immediately.

This is a reflex response.

(i) Reflex responses are automatic.

Write down **one other** word that describes a reflex response.

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

All candidates answered this recall question. There were some responses that repeated the words automatic and immediate from the stem of the question, so did not give **one other** word. Some candidates misunderstood the question and gave an example of when a reflex would be used, e.g. blinking, or named a part of the nervous system involved such as neurone, muscle.

Assessment for learning

Candidates should be encouraged to read the question carefully and take notice of any words in bold that are important when answering. They could do this by underlining the key words.

Question 1 (b) (ii)

(ii) A reflex response is carried out by an effector.

What is the effector that pulls your hand away when you touch something hot?

Tick (✓) **one** box.

Brain ☐

Kidney ☐

Muscle ☐

Skin ☐

[1]

Candidates could identify that the skin and kidney were not part of the nervous system as these answers were rarely seen. Brain was the most common incorrect answer, mixing up the role of the CNS as an effector with the muscle.

Question 1 (c) (ii)

(ii) Complete the sentence to explain what would happen if structure **C** was removed from the cell.

Put a (ring) around the correct option.

The speed of nervous impulses would **decrease / increase / stay the same**.

[1]

Candidates were asked to apply their knowledge of the fatty sheath in this AO2 question. Many knew that the sheath was important for the speed of impulses, so stay the same was not really seen. Nearly half of candidates incorrectly thought that without the sheath, the speed would increase.

Question 2 (b)

(b) Complete the sentences about genetic material.

Put a (ring) around each correct option.

Genetic material contains **chloroplasts** / **instructions** / **proteins** which control how cells and organisms develop and function.

All the genetic material in a cell is called the **gene** / **genome** / **nucleotide**.

[2]

Many candidates scored at least 1 mark on this AO1 recall question. The term genome was better known than instructions.

Question 2 (c)

(c) Genetic material is made of DNA.

Which statements about DNA are **true** and which are **false**?

Tick (✓) **one** box in each row.

	True	False
DNA is a polymer.	☐	☐
DNA is a triple helix.	☐	☐
DNA is made from a chain of amino acids.	☐	☐
DNA is made of two strands.	☐	☐

[3]

This question was assessing recall on the structure of DNA. Most candidates were able to gain at least 1 mark on this question.

Misconception

The most common incorrect tick answer was the misconception that DNA is made from a chain of amino acids.

Question 3 (a)

3

(a) Complete the sentences to describe the levels of organisation in an ecosystem.

Put a (ring) around each correct option.

Organisms of the same type living in the same place make up **a community / an ecosystem / a population**.

A community interacting with its environment is **an ecosystem / a food web / a population**.

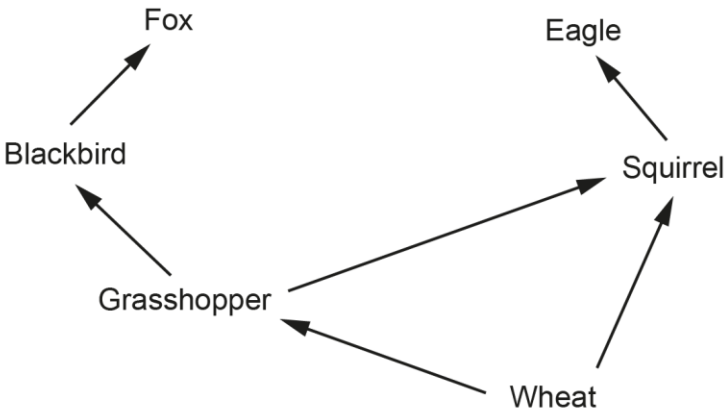
[2]

One mark was the most commonly given mark for ecosystem on this AO1 recall question. Community was often circled instead of population and/or food web circled instead of ecosystem if no marks were given.

Question 3 (b) (i)

(b) **Fig. 3.1** shows a food web diagram. It includes more than one food chain.

Fig. 3.1



(i) Explain what would happen to the Blackbird population if most of the squirrels died from a disease, using **Fig. 3.1**.

.....

.....

.....

.....

.....

..... **[3]**

This question was assessing AO3, the ability to analyse information and draw conclusions. Many responses were successful and candidates could conclude that the blackbird population would increase and that the reason for this would be more food/grasshoppers for them to eat. The second marking point was the least common mark given as many candidates did not give this reason or thought that nothing would eat the grasshoppers. Some candidates went down the incorrect route of the spread of disease to the blackbirds so they would decrease in numbers, or that eagles would switch to eating blackbirds.

Assessment for learning

Candidates should be encouraged to read the question carefully and take note of the word most. Many candidates used absolute words such as all squirrels were killed, so no grasshoppers were eaten.

Question 3 (b) (ii)

(ii) Food chain and food web diagrams help us understand ecosystems.

Suggest **one** benefit of drawing a food web diagram instead of many different food chain diagrams.

.....

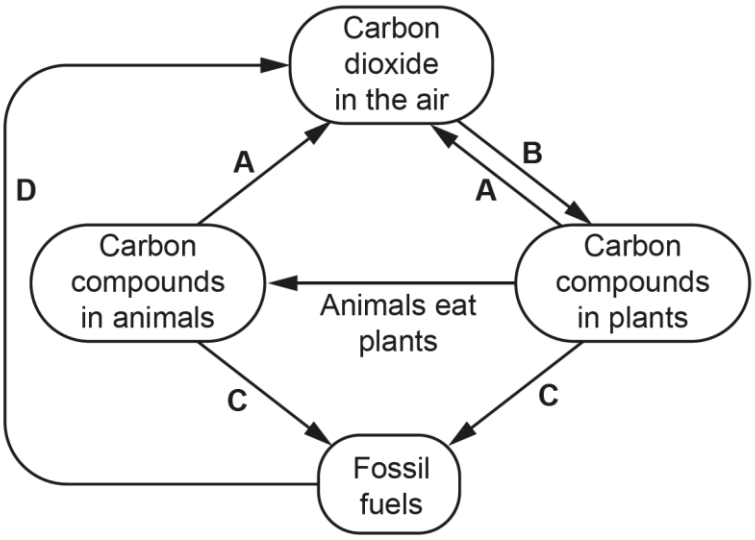
..... **[1]**

Most candidates found this analysis question challenging. They described a web as being an easier way to see what eats what, or easier to understand the information, rather than the idea that a food web can model the interactions/interdependence of populations in a community.

Question 3 (c) (i)

(c) **Fig. 3.2** shows a simple diagram of the carbon cycle.

Fig. 3.2



(i) Draw lines to connect each **letter** from the diagram with the correct **process**.

Letter	Process
A	Combustion
B	Decomposition
C	Photosynthesis
D	Respiration

[3]

Most candidates were able to score at least 1 mark on this question. Photosynthesis and respiration were the most common correct lines drawn.

Question 3 (c) (ii)

(ii) Carbon is cycled through abiotic and biotic components of an ecosystem.

Which components of an ecosystem are **abiotic** and which are **biotic**?

Tick (✓) **one** box in each row.

	Abiotic	**Biotic**
Air	☐	☐
Animals and plants	☐	☐
Fossil fuels	☐	☐

[2]

A few candidates mixed up abiotic and biotic completely. Of those being given only 1 mark, it was often because fossil fuels were incorrectly thought to be biotic.

Question 3 (d)

(d) Producers use carbon compounds to make fatty acids and amino acids.

Complete the sentences to explain what fatty acids and amino acids are then used to make.

Use words from the list.

carbohydrates	**lipids**	**proteins**	**water**

Fatty acids are used to make ..... .

Amino acids are used to make ..... .

[2]

When 1 mark was given, it was for proteins. Many candidates incorrectly thought lipids were used to make carbohydrates.

Question 4 (a)

4

(a) Complete the table to compare aerobic and anaerobic respiration.

	Aerobic respiration	**Anaerobic respiration**
Conditions under which it happens	.....	Low or no oxygen
Amount of ATP produced	High	.....

[2]

Some candidates mixed up the headings on this table, often writing low in the first box and the need for oxygen in the second box, so were given 0 marks. Some candidates also omitted to say oxygen in the first box, just referring to high. Low amounts of ATP produced by anaerobic respiration was the most common correct marking point, although some candidates thought no ATP was made.

Question 4 (b)

(b) Explain why cellular respiration takes place continuously in living cells.

.....

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

Most candidates found this recall question challenging. Answers were vague, saying things such as so they could survive, and we need oxygen to breathe.

Misconception

Many candidates thought that respiration produces energy.

Question 4 (c) (i)

(c) A baker mixes flour, yeast and water together to make bread.

Anaerobic cellular respiration takes place in the yeast in the mixture.

(i) Anaerobic respiration is exothermic.

Predict what will happen to the temperature of the mixture over time.

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

Half of the responses were correct, using terms such as increase and getting hotter. Incorrect answers were stay the same and decrease.

Misconception

The most common incorrect answer was that the temperature decreases. Many candidates incorrectly thought that exothermic means energy is taken in from the surroundings so the temperature would decrease.

Question 4 (c) (ii)

(ii) Bubbles of gas appear in the mixture due to anaerobic respiration in the yeast.

What is the name of the gas?

Tick (✓) **one** box.

- Carbon dioxide ☐
- Hydrogen ☐
- Nitrogen ☐
- Oxygen ☐

[1]

Some candidates incorrectly ticked the distractor oxygen as the bubbles given off in anaerobic respiration.

Question 4 (c) (iii)

(iii) Flour contains starch, which is made from glucose.

Explain why the flour enables respiration to take place in the yeast.

.....

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

This question was testing the application of the knowledge of respiration. Many candidates did not make the link between glucose in the flour being the reactant for respiration.

Misconception

Many candidates thought that glucose produces energy for respiration.

Question 5 (a)

5

(a) Complete the table to show which things are part of the biodiversity of an area.

Tick (✓) **one** box in each row.

	Part of biodiversity	**Not** part of biodiversity
abiotic factors		
genes that living organisms have		
living organisms		
rocks		
water supply		

[3]

The most common mark given on this question was 2. Genes and living organisms were often recognised as being part of biodiversity.

Question 5 (b) (i)

(b) Humans introduced goats to the Galápagos Islands, where they are kept for their meat and milk.

On one of the islands:

- Some of the goats escaped and now live in the forest.
- This has caused the area covered by forest to decrease.
- This has reduced the biodiversity of the island.

The forest provides food, shade and water for Galápagos tortoises.

(i) Suggest why the tortoise population size decreased after the introduction of the goats.

Tick (✓) **two** boxes.

The tortoises became too hot. ☐

The tortoises' habitat increased. ☐

There was too much water. ☐

There were fewer plants for the tortoises to eat. ☐

There were fewer predators of the tortoises. ☐

[2]

Many candidates were given at least 1 mark on this question for there being fewer plants for tortoises to eat. Some candidates incorrectly thought that there were fewer predators of the tortoises.

Question 5 (b) (iii)

(iii) Protecting the biodiversity of the forest helps the Galápagos tortoises to survive.

Write down **one other** benefit of protecting biodiversity.

.....

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

This question was challenging for many. Candidates often described biodiversity rather than a benefit of having a greater variety of species in the forest, or just repeated the stem of the question about helping the tortoises to survive. Many responses included ideas about global warming and climate change. Correct responses referred to food or habitats.

Question 5 (d)

(d) Write down **one** reason why Riley takes a sample instead of counting the whole population.

.....

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

Most correct responses to this question mentioned the much longer time it would take to count the whole population. Some candidates understood that counting the whole population would be difficult but didn't give a reason why.

Question 5 (e)

(e) The table shows Riley's results:

Number of goats in sample 1	10
Number of goats in sample 2	14
Number of marked goats recaptured in sample 2	7

Calculate the estimated population size of the goats.

Use the equation: $\text{Population size} = \dfrac{\text{number of goats in sample 1} \times \text{number of goats in sample 2}}{\text{number of marked goats recaptured in sample 2}}$

Population size = ... goats **[2]**

Most candidates could substitute the numbers given into the equation to get 20 goats and 2 marks. The main error was using two for the number of goats. This may have been from misreading the label and using the two from sample 2.

OCR support

The Science Mathematical Skills Handbook provides both teachers and students support on the use of mathematical skills in GCSE sciences.

Question 5 (f)

(f) Describe **one** way Riley can change their approach to be more confident in their estimate of the population size.

.....

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

Candidates found this question challenging. The most common marking point given was for a larger sample size. Many responses stated they should repeat the samples, but few went on to say 'and find a mean'.

Question 6 (a)

6 The health of most organisms is affected by disease.

(a) Diseases can be communicable or non-communicable.

Complete the table to describe the possible causes of each type of disease.

Tick (✓) the correct boxes in each row.

	Can be caused by		
Type of disease	**Genetic factors**	**Lifestyle factors**	**Pathogens**
Communicable			
Non-communicable			

[2]

Many candidates did not gain any marks on this question. Of those that only received 1 mark, it was because they knew that communicable diseases can be caused by pathogens. Some candidates ticked both communicable and non-communicable for some of the causes. Some candidates did not use ticks but wrote in the boxes, giving examples of the causes.

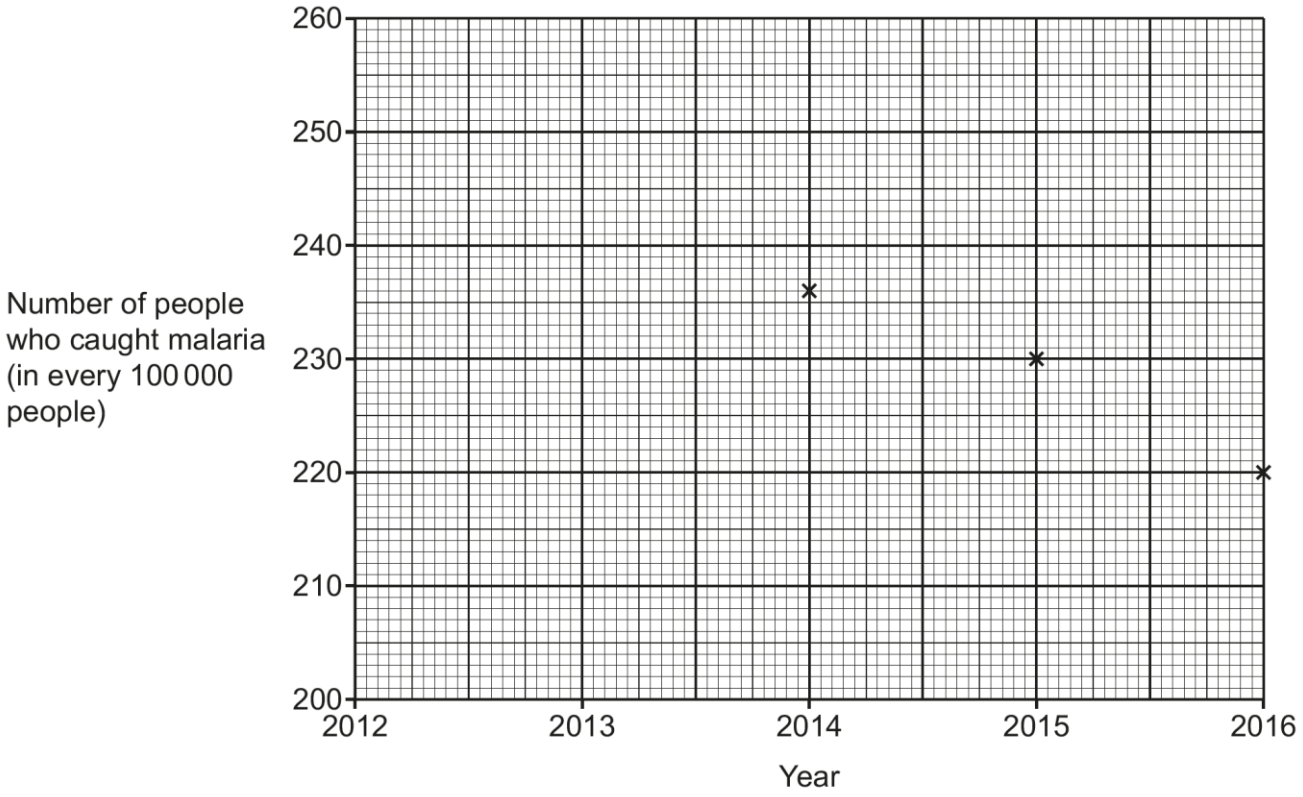
Question 6 (c) (i)

(c) Malaria is a common communicable disease.

The table shows the number of people who caught malaria in Southern Africa between 2012 and 2016.

Year	Number of people who caught malaria (in every 100 000 people)
2012	254
2013	245
2014	236
2015	230
2016	220

(i) Plot the data for 2012 and 2013 on the graph.



[2]

The skill of plotting was being tested here. Most candidates were given 2 marks. When candidates were not given any marks, it was sometimes because the pencil mark made was too thick, wide and blurry, covering over a whole box or more.

Assessment for learning

Candidates should be encouraged to practise plotting points using a sharp pencil. Plots should be drawn as a small cross that do not cover squares and can be easily read.

Question 6 (c) (ii)

(ii) Describe the trend in the data.

.....

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

Candidates performed very well on this question and most could successfully describe the trend.

Question 6 (c) (iii)

(iii) Calculate the percentage decrease in the number of people who caught malaria between the years 2012 and 2016.

Give your answer to **1** decimal place.

Percentage decrease = ...% **[3]**

This calculation was more challenging than that in Question 5 (e) and was aimed at standard demand. Without the equation given like in Question 5 (e), candidates often did not show their working and therefore could not access the working out marks on the mark scheme. When working was seen, many candidates could work out the change in numbers of people to get 34, but then didn't realise they had to divide this by the original number of 254, often leaving it at 34 or dividing by 220. Some incorrect answers were correctly rounded to 1 decimal place to access an error carried forward mark.

Assessment for learning

Exam technique should encourage candidates to show all the working out on a calculation question. Even if the answer is incorrect, candidates can be awarded working out marks and/or the correct conversion to 1 decimal place, but only if this can be seen by the examiner.

Question 6 (d) (i)

(d)

(i) Some people in Southern Africa use anti-malarial paint to decorate their house.

The anti-malarial paint contains a chemical that kills insects.

Suggest why the paint can help stop the spread of malaria.

.....

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

Over half of the candidates found this question difficult. Candidates should use the information to make the link between the insects and the spread of malaria. Some candidates correctly said that insects carry or spread malaria. Incorrect answers used simple terms such as germs or bugs, or that mosquitoes/insects are killed, but didn't refer to the malaria.

Question 7 (a) (i)

7 A farmer in Africa grows pumpkins.

(a) There is variation between the four pumpkins shown:

(i) Describe **one** visible example of variation between the pumpkins.

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

Many candidates recognised that the pumpkins were different colours or textures for 1 mark. Some candidates stated that they were different or had different skins but didn't say how they were different visually.

Question 7 (a) (ii)

(ii) The environment may cause some of this variation.

State **one other** possible cause of the variation between the pumpkins.

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

Most candidates gave examples of environmental causes of variation, such as the weather, climate change, sunlight and water, rather than **one other** cause.

Assessment for learning

Candidates should be encouraged to read the question carefully and take notice of any words in bold that are important when answering. They could do this by underlining the key words such as environment and one other in this example.

Question 7 (b) (i) and 7 (b) (ii)

(b) The farmer collects 100 seeds from the largest pumpkins.

Next year, the farmer will use these seeds to grow more pumpkin plants.

The farmer predicts that next year's pumpkin plants will produce a higher number of large pumpkins.

(i) Explain why this prediction could be **correct**.

.....

.....

.....

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

(ii) Explain why this prediction could be **incorrect**.

.....

.....

.....

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

Candidates found it difficult to apply knowledge and understanding on Questions 7 (b) (i) and 7 (b) (ii). Many candidates repeated the stem of the question without explaining why the prediction could be correct/incorrect. Those that did understand why the characteristics were passed on often mentioned genetics or DNA but not genetic variants or alleles. A few limited correct responses referred to selective breeding for Question 7 (b) (i) and/or alleles in both Questions 7 (b) (i) and 7 (b) (ii). Question 7 (b) (ii) was more successfully answered as many candidates understood that the environment, weather, water would stop the pumpkins growing to their full potential.

Assessment for learning

Candidates should be encouraged to learn key terms such as genetic variants or alleles to explain inheritance.

Question 7 (c)*

(c)* Giraffes live on the land around the farm. A few of the giraffes have shorter necks, but most of them have long necks.

The farmer's son thinks giraffes with long necks became more common because they stretched up to eat the leaves on trees. The farmer knows this is **incorrect**.

Explain how natural selection led to giraffes with long necks becoming more common over many generations.

.....

.....

.....

.....

.....

..... **[6]**

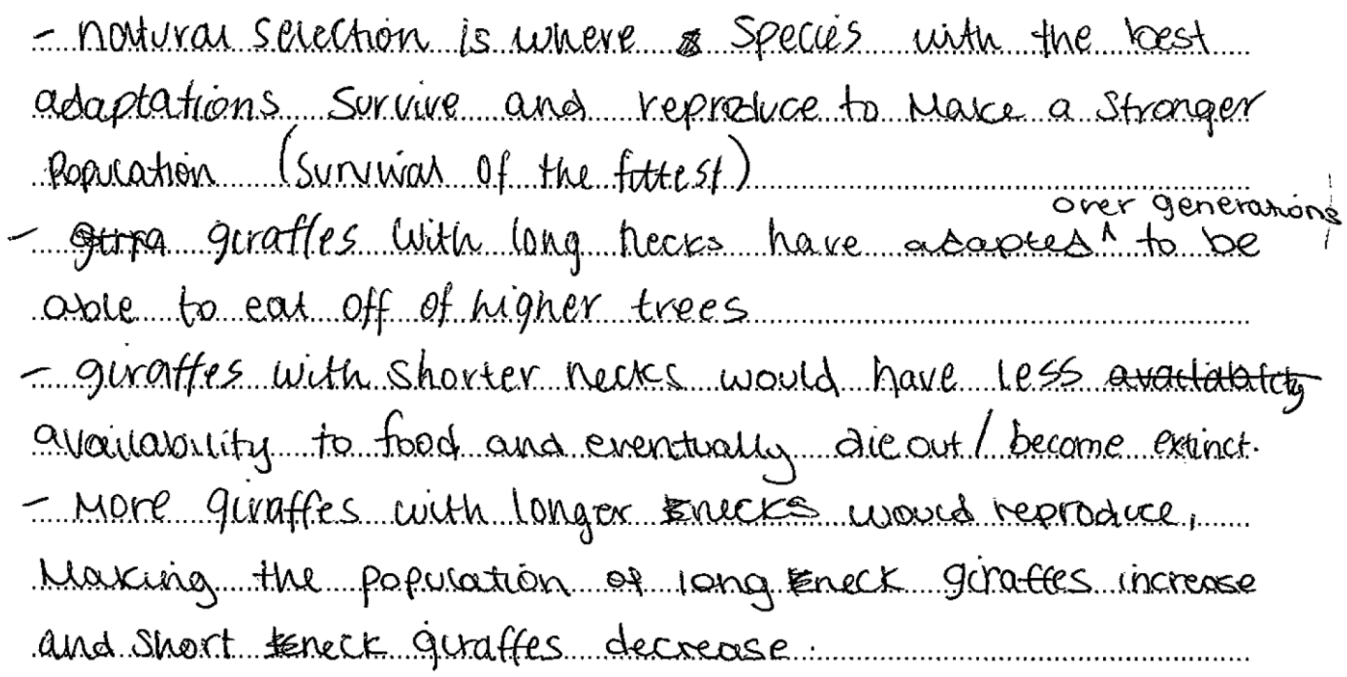
This 6-mark Level of Response question assessed AO2. It required knowledge of natural selection and the application of these ideas to the longer necked giraffes becoming more common. Most candidates could explain the advantages of having a longer neck such as to get more food and/or how this may have been caused by a mutation. Many candidates knew that the characteristics were passed on to offspring and some referenced the passing on of genes. Both these explanations were commonly seen for Level 2. A few candidates were awarded Level 3 as they provided further detail about increased breeding and could use some of the technical terms in natural selection such as variation, competition and genes. Very few candidates referred to alleles and some candidates incorrectly thought this question was about selective breeding or Lamarckism.

Exemplar 1

Because the ones with shorter necks wouldn't have been able to reach as many of the leaves as the ones with longer necks so they could starve to death without being able to mate. Whereas the ones with longer necks would be able to survive and mate and pass on their long neck genes.

This response was given Level 3, 6 marks. The candidate has explained in lines 1-4 that shorter neck giraffes wouldn't be able to reach as many leaves as the longer neck giraffes, so would die out and not mate. This is an advantage of having a long neck over a short neck. The explanation that longer neck giraffes would be able to survive and mate is describing that the longer neck giraffes are more likely to breed (compared to short neck giraffes) and pass on its genes. This response has a detailed explanation and correctly uses the technical term gene in natural selection.

Exemplar 2



This response was given Level 2, 4 marks. The first three lines are a general description of natural selection. Lines 4-7 compare the giraffe necks and how the long neck giraffes have more food. This is an advantage of having a longer neck. Lines 8-10 explain that longer neck giraffes would be more likely to reproduce. This is the increased breeding explanation. There is no further detail on natural selection that includes passing on the characteristic/gene to the offspring, so this response does not meet the detailed explanation required for Level 3.

OCR support

Candidates can use the support activities to practise Level of Response questions using How to answer 6 mark LOR questions.

Question 8 (a)

8 Charlie knows that hormones are important in human reproduction.

(a) Describe **one** role of hormones in human reproduction.

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

Question 8 (a) is the start of the overlap questions with the Higher Tier paper.

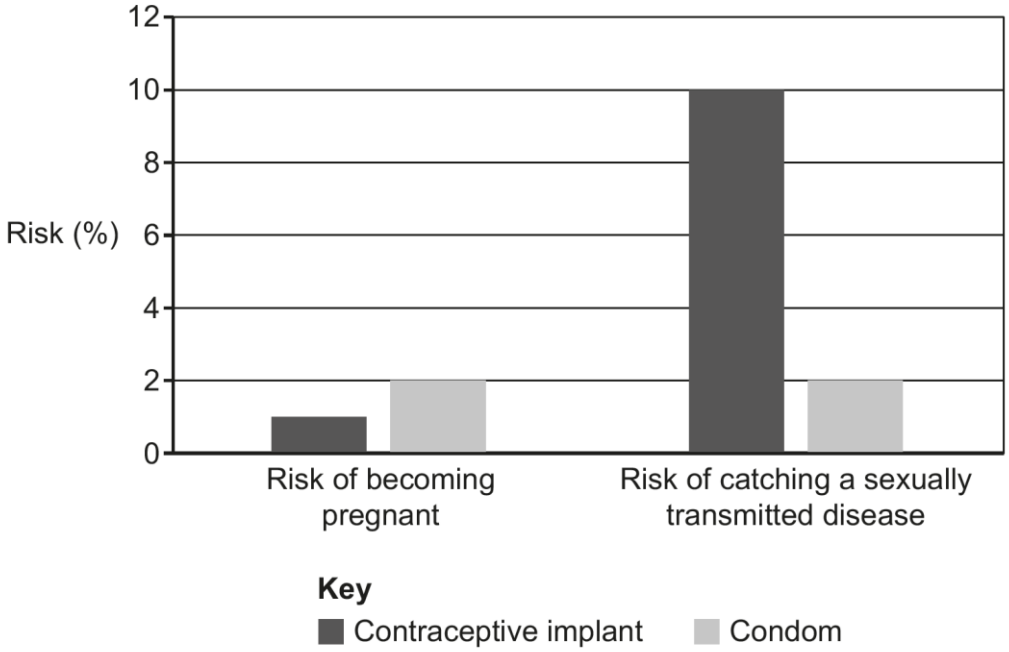
Ovulation/egg release was the most common correct answer seen. Many candidates gave a more general role of hormones such as mood swings, puberty and growth. Menstruation was seen regularly but was insufficient for the mark as it was not specific enough and the answer required the idea of regulation or control.

Question 8 (b) (ii)

(ii) A clinical trial compared the contraceptive implant with a condom.

The trial compared:

- the risk of becoming pregnant
- the risk of catching a sexually transmitted disease.



Charlie looks at the chart and decides to use a condom instead of the contraceptive implant.

Evaluate Charlie's decision, using the information from the chart.

.....

.....

.....

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

Candidates were asked to analyse information on the graph and evaluate Charlie's decision in this AO3 question. Many candidates were given at least 1 mark for recognising that the risk of getting a sexually transmitted disease was much lower when using a condom, as this could be seen from the large difference in the bars. The second mark was more difficult to explain as many said that the risk of getting pregnant was the same or was still low and didn't recognise that the condom had a higher risk of pregnancy. Comparative language was required here.

Question 8 (b) (iii)

(iii) Suggest why the risk of becoming pregnant and the risk of catching a sexually transmitted disease are equal when using a condom.

.....

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

Correct answers referred to the condom being a barrier or provided a description of a barrier. Most incorrect answers were about the condom splitting or breaking.

Question 9 (a) (ii)

(ii) Small molecules are used by cells in aerobic respiration.

Complete the table.

Tick (✓) **one** box in each row.

Small molecule	**Needed** for aerobic respiration	**Produced** by aerobic respiration	**Not** needed for or produced by aerobic respiration
Oxygen			
Urea			
Water			

[2]

Most candidates were given 1 or 2 marks on this recall question about aerobic respiration. Water as a product was the least well understood.

Assessment for learning

Candidates should be encouraged to learn key terms such as reactants and products when learning the respiration and photosynthesis equations in Biology.

Question 9 (c)

(c) Small molecules move into and out of the blood.

Which statements about how this happens are **true**, and which are **false**?

Tick (✓) **one** box in each row.

	True	False
Carbon dioxide and urea move out of cells into the blood.	☐	☐
Oxygen and carbon dioxide move between blood in capillaries and air in alveoli.	☐	☐
Urea is filtered into the blood by the kidneys.	☐	☐
Water and food molecules are absorbed from the digestive system into blood in capillaries.	☐	☐

[3]

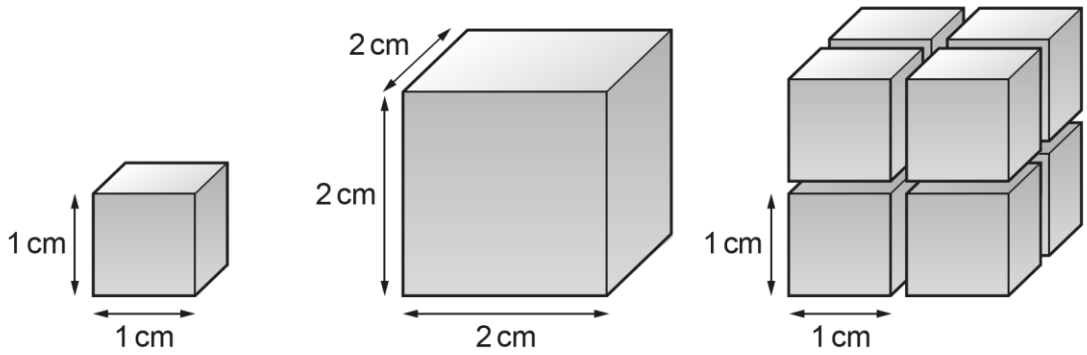
The majority of candidates were able to gain at least 1 mark on this question. They knew that oxygen and carbon dioxide move between blood in capillaries and air in alveoli. The statements that included urea were the most common incorrect boxes ticked.

Question 9 (d) (i)

(d) Exchange surfaces affect the surface area:volume ratio of multicellular organisms.

Alex uses cubes as models for different organisms.

Organism **A** represents a small organism.
Organism **B** represents a large organism **without** exchange surfaces.
Organism **C** represents a large organism **with** exchange surfaces.



(i) Calculate the surface area:volume ratio of organism **B**.

Give your answer in its simplest form.

Surface area:volume ratio = ... : ..... **[4]**

More working out was seen on this question compared to Question 6 (c) (iii), although some candidates did just put a ratio on the answer line without workings. Many candidates did not score on this question. Of those that were given 1 or 2 marks, it was for either calculating the volume and/or for simplifying an incorrect ratio. Calculating surface area was found to be more difficult. Many candidates had the idea that there were 6 sides, but then multiplied this by 2.

Exemplar 3

12 : 2

6 : 1

Surface area:volume ratio = 6 : 1 **[4]**

This response is an example where very limited working out has been shown but it can be marked. The simplification of an incorrect ratio can be seen and can be given 1 mark. If the candidate had just written 6:1 on the answer line, no marks would have been given. It is therefore important that candidates show all their working out to access all the marking points available.

Assessment for learning

Exam technique should encourage candidates to show all the working out on a calculation question. Even if the answer is incorrect, candidates can be given working out marks and/or the simplification of an incorrect ratio, but only if this can be seen by the examiner.

Question 9 (d) (ii)

(ii) The surface area:volume ratio of organism **A** is 6:1.

Explain why the surface area:volume ratio of organism **C** is also 6:1.

.....

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

Candidates that answered this question could often recognise that there were many of A cubes making up C. Some candidates could not explain this in enough detail to get a mark by only saying that the cubes were the same, or that there was one A in C.

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