

GCSE (9-1)

Examiners' report

GATEWAY SCIENCE COMBINED SCIENCE A

J250

For first teaching in 2016

J250/01 Summer 2019 series

Version 1

Contents

Introduction	4
Paper 1 series overview	5
Section A overview	6
Question 1	6
Question 2	7
Question 3	8
Question 4	8
Question 5	9
Question 6	10
Question 7	11
Question 8	12
Question 9	13
Question 10	14
Section B overview	15
Question 11 (a)	15
Question 11 (b)	16
Question 11 (c)	16
Question 12 (a) (i)	18
Question 12 (a) (ii)	19
Question 12 (b) (i)	19
Question 12 (b) (ii)	20
Question 13 (a) (i)	21
Question 13 (a) (ii)	21
Question 13 (b) (i)	22
Question 13 (b) (ii)	22
Question 14 (a) (i)	23
Question 14 (a) (ii)	23
Question 14 (a) (iii)	23
Question 14 (b)	24
Question 15 (a) (i)	25
Question (15) (a) (ii)	25
Question 15 (b) (i)	25
Question 15 (b) (ii)	26
Question 16 (a)	27
Question 16 (b) (i)	28

Question 16 (b) (ii)	28
Question 16 (c)	29
Question 17 (a) (i)	31
Question 17 (a) (ii)	32
Question 17 (b)	32
Question 17 (c)	33
Question 17 (d)	33
Question 17 (e) (i)	34
Question 17 (e) (ii)	34



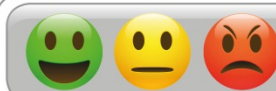
Would you prefer a Word version?

Did you know that you can save this pdf as a Word file using Acrobat Professional?

Simply click on **File > Save As Other . . .** and select **Microsoft Word**

(If you have opened this PDF in your browser you will need to save it first. Simply right click anywhere on the page and select **Save as . . .** to save the PDF. Then open the PDF in Acrobat Professional.)

If you do not have access to Acrobat Professional there are a number of **free** applications available that will also convert PDF to Word (search for *pdf to word converter*).



We value your feedback

We'd like to know your view on the resources we produce. By clicking on the icon above you will help us to ensure that our resources work for you.

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. 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 can be downloaded from OCR.

Paper 1 series overview

This paper examines the Biology content of Combined Science GCSE at Foundation Level. This paper links together different areas of Biology within different contexts, some practical, some familiar and some novel. To do well on this paper, candidates need to be able to apply their knowledge and understanding to unfamiliar contexts and be familiar with a range of practical techniques. Candidates who did well on this paper had good subject knowledge, were able to use data to make conclusions and draw on their conceptual knowledge. These candidates also applied their knowledge to unfamiliar contexts and completed mathematical calculations within a biological context. Candidates who did less well did not respond to questions asking them to apply their knowledge or did not apply their knowledge appropriately.

<i>Candidates who did well on this paper generally did the following:</i>	<i>Candidates who did less well on this paper generally did the following:</i>
<ul style="list-style-type: none"> • Correctly performed calculations to mathematical questions in part A and part B. • Produced clear and concise responses to the Level of Response question, giving a description of the nervous system and describing the role of at least one part. • Demonstrated a good understanding of the scientific method and the need to control variables (Q17). • Applied knowledge and understanding to questions set in a novel context. 	<ul style="list-style-type: none"> • Found it difficult to apply what they had learnt to unfamiliar situations. • Had a lack of understanding of the menstrual cycle and transport in plants. • Did not perform mathematical calculations correctly in parts A and B. • Showed a lack of awareness of the skills involved in practical activities and investigations. • Found the Level of Response question challenging and could not describe the nervous system correctly.

Section A overview

Candidates coped well with selecting choices, and generally performed better on this part of the paper than section B. Questions 3, 5 & 6 proved to be very accessible questions with the majority of candidates answering correctly. Questions 2, 8 were found to be challenging, with question 10 proving to be the most challenging question for candidates.

Question 1

1 Which process supplies **ATP** in all living cells?

- A Circulation
- B Photosynthesis
- C Protein synthesis
- D Respiration

Your answer

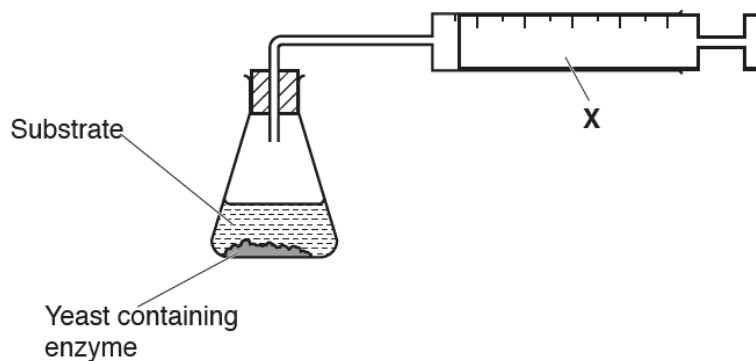
[1]

The majority of candidates correctly identified respiration as the process which supplies ATP in living cells (Answer D). This question assessed AO1.1.

Question 2

2 A student investigates the effect of an enzyme found in yeast on a substrate.

They use the apparatus in the diagram.



What is apparatus **X** used to measure?

- A** Volume of enzyme
- B** Volume of product
- C** Volume of substrate
- D** Volume of yeast

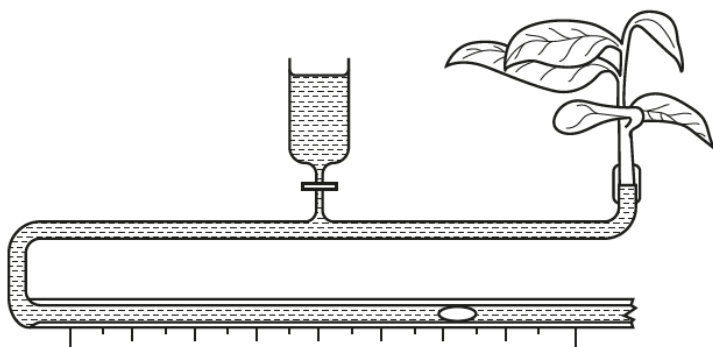
Your answer

[1]

Around half of candidates identified the syringe is used for measuring the volume of product (answer B). Most candidates who answered this question incorrectly selected option C. This question assessed AO2.2.

Question 3

- 3 Look at the apparatus in the diagram.



What is this apparatus used to measure?

- A Rate of blood flow
- B Rate of diffusion
- C Rate of food uptake
- D Rate of water uptake

Your answer

[1]

The majority of candidates correctly identified the potometer is used to measure the rate of water uptake (answer D) suggesting they had encountered this apparatus in their practical work. This question assessed AO1.2.

Question 4

- 4 Root hair cells have large numbers of mitochondria to provide lots of energy.

Why do root hair cells need lots of energy?

- A For active transport of minerals.
- B For active transport of water.
- C For diffusion of minerals.
- D For diffusion of water.

Your answer

[1]

Over half of candidates identified that mitochondria are required to provide energy for the active transport of minerals. Candidates who answered the question incorrectly selected the other options in roughly equal proportions suggesting they did not correctly link active transport of minerals to the need for energy. This question assessed AO1.1.

Question 5

- 5 A student investigates the rate of reaction for photosynthesis using pondweed.

The student records the time it takes pondweed to produce 30 bubbles of oxygen. The student repeats the investigation using different light intensities.

The table shows one of the student's results.

Relative light intensity	Time (s)
0.7	14

The student calculates the rate of reaction using the formula:

$$\text{rate} = \frac{1}{\text{time}}$$

Calculate the rate of reaction for a relative light intensity of 0.7.

- A 0.07
- B 0.7
- C 7
- D 14

Your answer

[1]

The majority of candidates correctly used the equation given to correctly calculate the rate of reaction. D was the most common incorrect answer suggesting they had just substituted the value for time into the formula and not carried out the calculation. This question assessed AO2.2.

Question 6

- 6** The resolution of an electron microscope is $0.0001\text{ }\mu\text{m}$.

The resolution of a light microscope is $0.2\text{ }\mu\text{m}$.

How many times greater is the resolution of the electron microscope compared to the light microscope?

- A** 20
- B** 200
- C** 2000
- D** 20 000

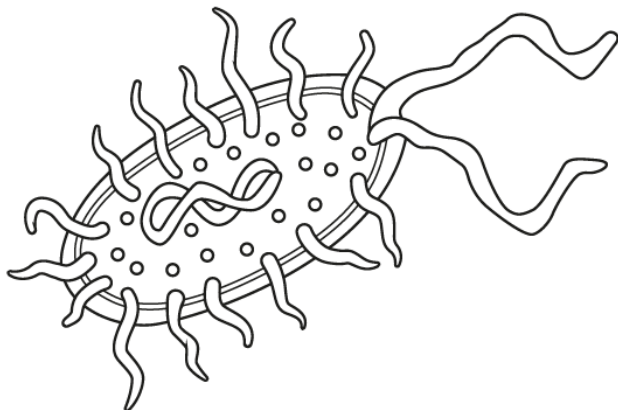
Your answer

[1]

Over half of candidates correctly calculated the difference in the resolution of the light microscope and electron microscope, suggesting most have a good grasp of the mathematical operations required to calculate the answer. B and D were the most commonly selected incorrect answers. This question assessed AO2.2.

Question 7

- 7 A student draws this image of a prokaryotic cell.



The cell image drawn by the student is 55 mm long.

The actual length of the prokaryotic cell is 0.001 mm.

What is the magnification of the student's drawing?

- A 0.055×
- B 0.550×
- C 5500×
- D 55 000×

Your answer

[1]

This question addressed similar mathematical skills to Question 6 and a similar proportion of candidates answered this question correctly. A and B were the most commonly selected incorrect answers. This question assessed AO2.2.

Question 8

- 8 Which of these statements describes **aerobic** respiration in fungi?
- A An endothermic reaction that produces carbon dioxide and water.
 - B An endothermic reaction that produces carbon dioxide and ethanol.
 - C An exothermic reaction that produces carbon dioxide and water.
 - D An exothermic reaction that produces carbon dioxide and ethanol.

Your answer

[1]

Over half of answers did not identify aerobic respiration as being an exothermic reaction that produces carbon dioxide and water (answer C). A was the most commonly selected incorrect answer, suggesting that there is confusion between the terms exothermic and endothermic. This question assessed AO1.1.

Question 9

- 9 A student investigates osmosis by placing chips of potato and apple into different concentrations of sucrose solution.

The student calculates the percentage change in length for each chip of potato and apple.

The graph shows the student's results.

Item removed due to third party copyright restrictions

Estimate the concentration of sucrose inside the cells of the **apple**.

- A 0.06 mol/dm³
- B 0.3 mol/dm³
- C 0.5 mol/dm³
- D 1.0 mol/dm³

Your answer

[1]

Approximately half of candidates correctly identified C as the correct answer by reading the value from the graph where the line for apple crossed the x axis. B and D were the most commonly selected incorrect answers. This question assessed AO1.1.

Question 10

10 Which row shows the correct pathway of oxygen from the lungs to the body tissues?

A	artery	atrium	ventricle	vein
B	atrium	artery	vein	ventricle
C	vein	atrium	ventricle	artery
D	vein	ventricle	artery	atrium

Your answer

[1]

This question was incorrectly answered by the majority of candidates with many candidates not realising that the pathway was starting at the lungs. A was the most commonly selected incorrect answer, suggesting that the candidates had not correctly processed the information in the question. This question assessed AO1.1.

Section B overview

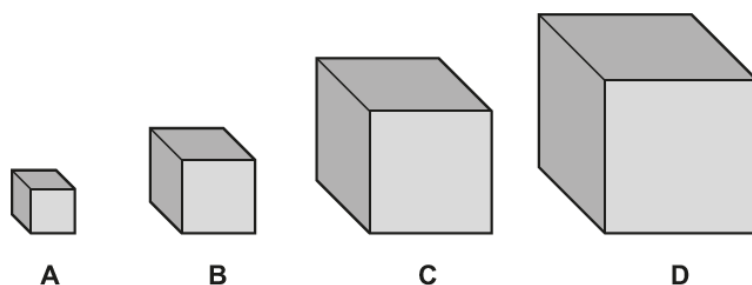
This section tested candidates against AO1, 2 and 3, drawing on familiar and novel contexts. Some of the questions required candidates to answer precisely, applying their knowledge tightly to the context given, and using the stimulus material to work out the answer, using skills of observation and analysis. Careful reading of the question, and care in answering the question precisely was important to gain maximum credit. Candidates appeared to find Question 17 targeting practical skills challenging. Candidates should further develop their ability in applying their knowledge and understanding of practical skills in questions set in the context of practical activities and investigations.

Question 11 (a)

- 11** Surface area is important for gas exchange in living organisms.

Scientists investigate the relationship between surface area and volume.

- (a)** The diagram shows four cubes.



The table shows some data about the cubes.

Cube	Height of cube (cm)	Surface area (cm ²)	Volume (cm ³)	Surface area to volume ratio
A	2	24	8	3.0 : 1
B	4	96	64	1.5 : 1
C	6	216	216	1.0 : 1
D	8	0.8 : 1

Calculate the surface area and volume for cube **D**.
Write your answers in the table.

[2]

Around half of the candidates did not gain marks on this question. Some candidates gained one mark for calculating the volume correctly and a minority gained both marks for calculating the surface area and the volume. This question assessed AO2.2.

Question 11 (b)

- (b) Complete the sentences about the data in the table.
Use the words in the list. You may use the words once, more than once or not at all.

decreases increases stays the same

As the height of the cubes increases the surface area

As the height of the cubes increases the surface area to volume ratio

[1]

Most of the candidates were able to correctly state the relationships between the height of the cube and the surface area and the surface area to volume ratio. This question assessed AO3.1a.

Question 11 (c)

- (c) Look at the picture. It shows a salamander larva with external gills.

Item removed due to third party copyright restrictions

The salamander larva has skin that is a gas exchange surface. The external gills are also a gas exchange surface.

A salamander larva needs external gills to be able to grow larger.

Explain why developing external gills helps gas exchange.

Use ideas about how having gills changes the:

- surface area
- surface area to volume ratio
- distance needed for gases to diffuse.

.....

.....

.....

.....

.....

.....

..... [3]

Most candidates scored 1 mark for this question for stating that the external gills will increase the surface area for gas exchange. Candidates did not follow the guidance given within the question to structure their answers and did not address the three bullet points given. Many candidates did not understand that the gills increase the surface area to volume ratio, and some referred to the surface area of the larva rather than the gills. Answers were assumed to be referring to the gills unless the candidate explicitly stated otherwise. This question assessed AO2.1.

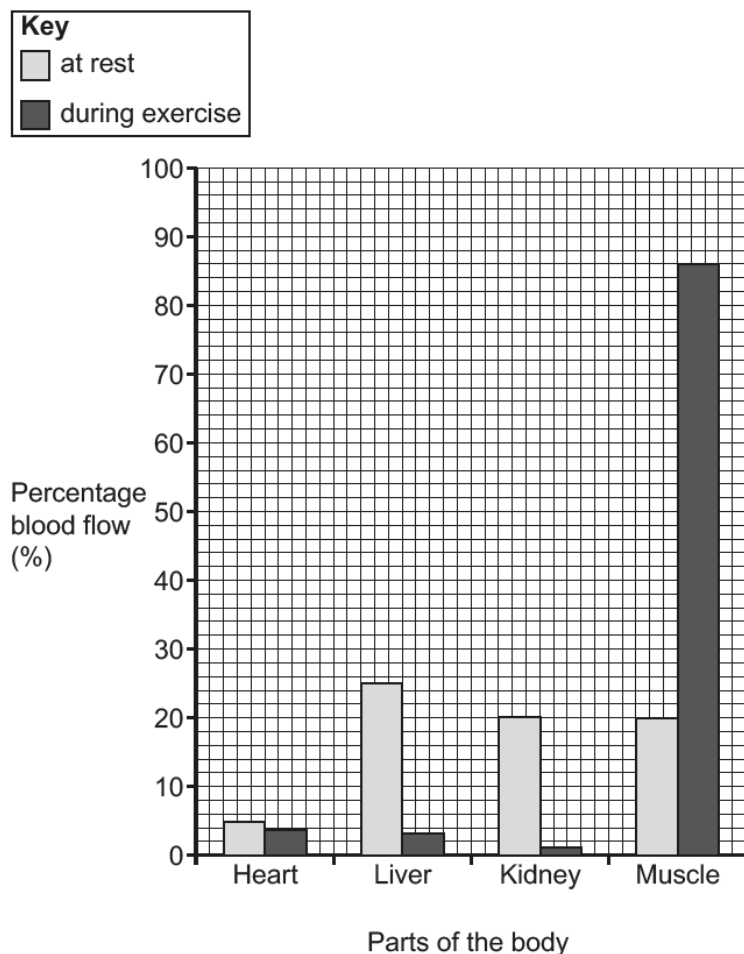
Exemplar 1

The development of external gills is beneficial because the Salamander will have a larger surface area so it can diffuse more effectively and more gas can diffuse in the first place, also the distance of how far the gas has to travel decreases meaning it can exchange gas quicker and because of the larger surface area to volume ratio it means the Salamander can exchange much more gas [3]

This candidate has clearly addressed all three bullet points within the question and has gained maximum marks.

Question 12 (a) (i)

- 12 The bar chart shows percentage blood flow to different parts of the body at rest and during exercise.



- (a) (i) Percentage blood flow to the **muscle** changes during exercise.

Calculate this change in percentage blood flow.

Change in percentage blood flow = % **[1]**

Around half of the candidates correctly worked out the difference in blood flow to the muscle by subtracting the value at rest from that during exercise. This question assessed AO2.2.

Question 12 (a) (ii)

- (ii) Use ideas about aerobic respiration to explain the change in blood flow to muscle during exercise.

.....

.....

.....

.....

..... [2]

Most candidates did not gain marks on this question. Many understood that aerobic respiration requires oxygen and blood flow will increase. However, they did not state that oxygen (or glucose) is required by the muscles to perform aerobic respiration. Candidates also did not state that substrates required for aerobic respiration (oxygen or glucose) are transported to the muscles or that products of aerobic respiration (carbon dioxide, water or heat) are transported away from the muscles. Many candidates discussed ideas about anaerobic respiration and made references to the accumulation of lactic acid which were ignored. This question assessed AO2.1 and AO2.2.

Question 12 (b) (i)

- (b) The blood is transported to the muscles in arteries and capillaries.

- (i) Give two differences between the **wall** structure of arteries and capillaries.

1

.....

2

.....

[2]

Over half of candidates gained one mark in this question for correctly stating that arteries have thicker walls (or capillaries have thinner walls). Answers needed to be comparative to gain marks, so it was also possible to gain one mark for stating arteries have thick walls and capillaries have thin walls. A minority of candidates gained a second mark for a match to one of the other marking points, e.g. arteries have elastic walls. This question assessed AO1.1.

Question 12 (b) (ii)

- (ii) Write down **one** reason why there is a difference in wall structure between arteries and capillaries.

.....

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

Fewer than half of the candidates gained a mark for this question. Many just repeated ideas which could be used to answer part (i) of this question, e.g. arteries have thicker walls, and did not explain why they have this property. Candidates who did gain a mark usually stated that arteries carry blood under higher pressure. A smaller number of candidates referred to the properties of capillaries, e.g. wall one cell thick to allow materials to diffuse. This question assessed AO1.1.

Question 13 (a) (i)

13 Fig. 13.1 represents a cell dividing to form two new cells.

Item removed due to third party copyright restrictions

(a) (i) What is the name of the part of the cell labelled **X** in **Fig. 13.1**?

Tick (✓) **one** box.

Chloroplast

☐

Cell membrane

☐

Mitochondria

☐

Nucleus

☐

[1]

Most candidates correctly identified the cell membrane. This question assessed AO1.1.

Question 13 (a) (ii)

(ii) Explain how the structure of part **X** is related to its functions.

.....

.....

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

Fewer than half of the candidates achieved marks on this question. The most common creditworthy answer was for stating that the cell membrane controls what goes in and out of the cell. Many students that did not gain credit referred to the cell membrane protecting the cell and/or the nucleus, or stated it allows substances in and out of the cell with no reference to controlling these processes. This question assessed AO1.1.

Question 13 (b) (i)

- (b) (i) Complete these sentences about the type of cell division shown in **Fig. 13.1**.

Use words from the list. Each word can be used once, more than once, or not at all.

cell cycle mitosis multiplication replication repair

This type of cell division is called

Before the cell divides, DNA takes place in the nucleus. **[2]**

Most candidates gained both marks on this question by correctly selecting mitosis and replication as the processes. This question assessed AO1.1.

Question 13 (b) (ii)

- (ii) The dividing cell is a stem cell.

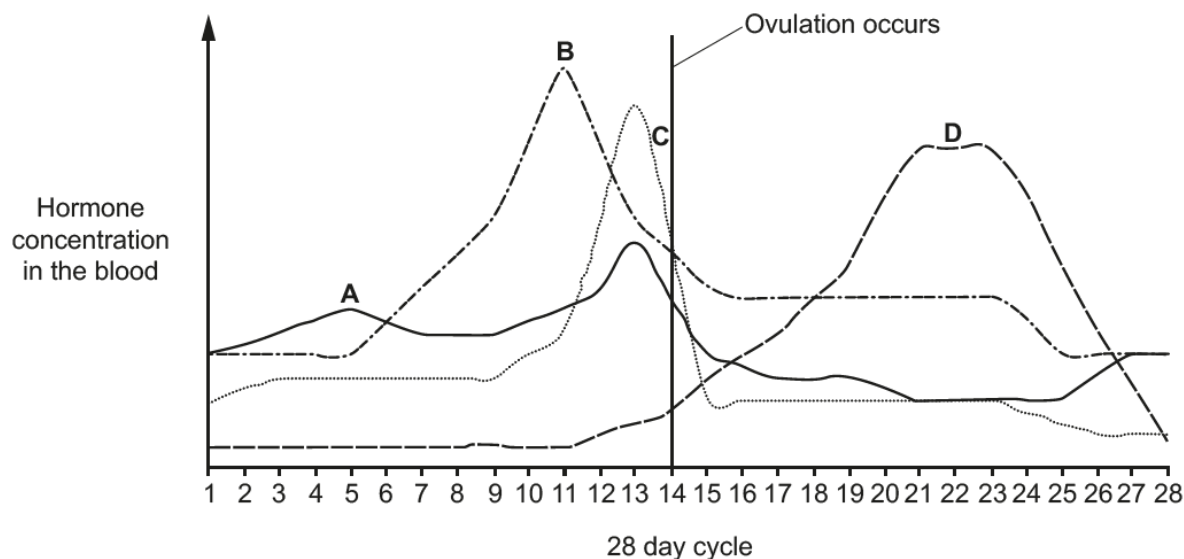
Describe the function of stem cells.

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

Around half of the candidates gained credit on this question. Many candidates stated stem cells are undifferentiated which does not gain credit as they have not stated a function. Marks were most commonly given for the idea that stem cells are required for development, growth or repair. A common misconception was thinking this question referred to plants. This question assessed AO1.1.

Question 14 (a) (i)

- 14 The diagram shows the changes that occur to female hormone concentrations in the blood during the menstrual cycle.



- (a) (i) Which line represents the hormone **progesterone**?

Choose from **A, B, C** or **D**

.....

[1]

Fewer than half of the candidates correctly identified line D as representing the hormone progesterone. This question assessed AO2.1.

Question 14 (a) (ii)

- (ii) Explain your answer to part (a)(i).

.....
 [1]


As the line on the graph shows the level of progesterone rising before day 14 candidates needed to identify that the level of the hormone peaks after ovulation (or day 14). A very small proportion of candidates gained credit on this question. This question assessed AO2.1.

Question 14 (a) (iii)

- (iii) Describe the role of progesterone in the menstrual cycle.

.....
 [1]

A minority of candidates correctly stated the role of progesterone in the menstrual cycle. This question assessed AO1.1.

	OCR support	<p>There are two resources which can be used to support the teaching of the menstrual cycle. They are titled Hormone control of menstruation and Menstrual cycle. These resources can be found under the Teaching activities drop-down here.</p> <p>https://www.ocr.org.uk/qualifications/gcse/gateway-science-suite-biology-a-j247-from-2016/planning-and-teaching/</p>
---	--------------------	---

Question 14 (b)

- (b) Progesterone and a second hormone are used in the combined pill taken to prevent pregnancy.

Explain how the combined pill works.

.....

.....

.....

.....

..... [2]

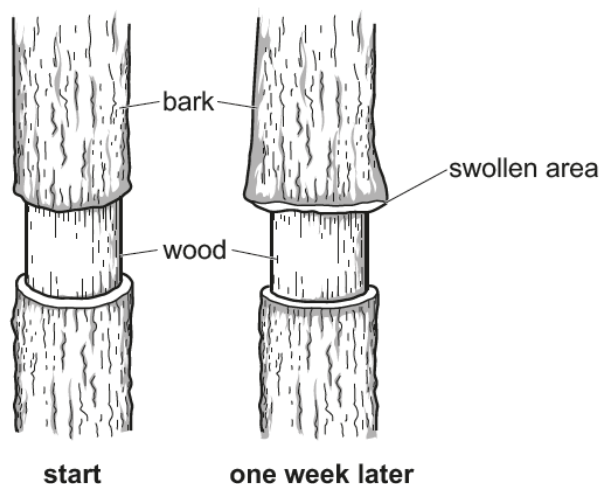
A minority of candidates gained marks on this question and there were lots of different misconceptions about the role of hormones in the menstrual cycle, and lots stated the pill 'kills sperm'. Many candidates referred to the pill 'stopping' or 'preventing' pregnancy which is information given within the stem of the question. The most common creditworthy answer was for the idea that the combined pill prevents ovulation. This question assessed AO1.1.

Question 15 (a) (i)

- 15** Translocation involves movement of substances in plants. A scientist investigates translocation in a tree.

She cuts a ring of bark away from the stem of a tree. The tree is then left for one week.

The diagram shows the stem of the tree at the start and one week later.



- (a)** Removing the bark affects translocation but **not** transpiration.

- (i)** Which transport vessels have been removed along with the ring of bark?

..... [1]

A small minority of candidates correctly identified the phloem vessels as being removed. This question assessed AO2.1.

Question (15) (a) (ii)

- (ii)** Which transport vessels remain in the wood?

..... [1]


Candidates who gained credit in the first part of this question generally gained credit for naming xylem vessels here. This question assessed AO2.1.

Question 15 (b) (i)

- (b) (i)** Write down **one** substance that is translocated.

..... [1]

Very few candidates gained credit on this question. Many copied words from the labelled diagrams (bark, wood, swollen area). Water, oxygen or glucose were the most commonly named substances which did not gain credit. This question assessed AO1.1.

	Misconception	The term 'sugar' or 'sucrose' should be used when referring to translocation. Glucose is converted into sucrose before it is transported.
---	----------------------	---

Question 15 (b) (ii)

- (ii) What conclusion can be made about the direction of movement in the vessels that have been removed in the ring of bark?

Explain your answer using evidence from the diagram.

.....

.....

.....

.....

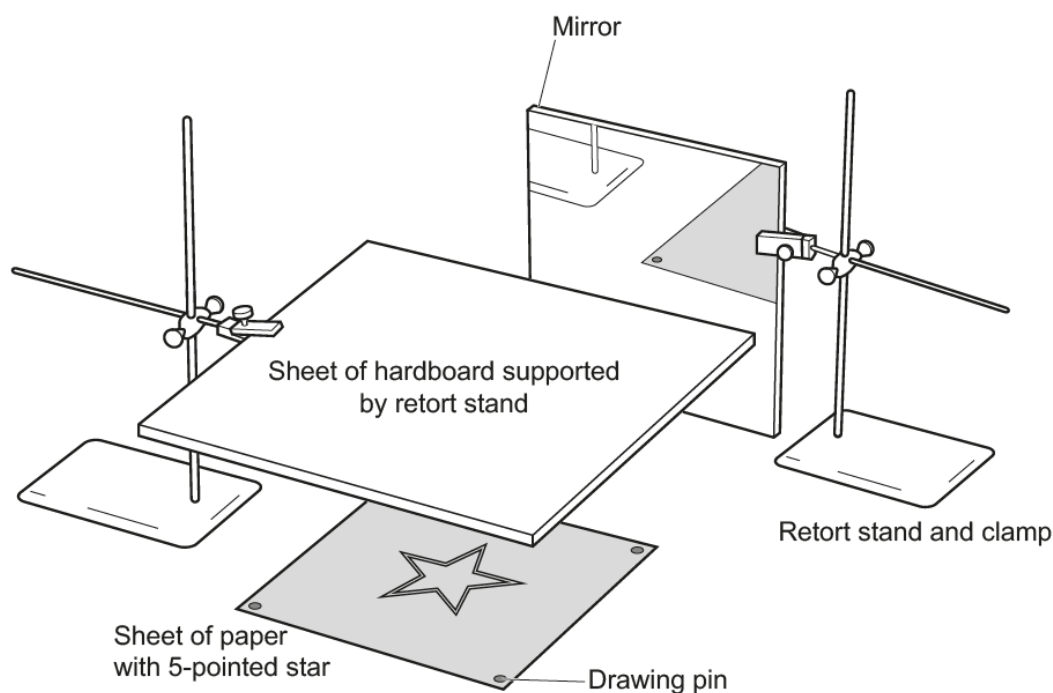
..... [1]

A minority of candidates gained credit on this question for analysing the information presented in the diagram. As the swelling is at the top of the cut, substances must be moving downwards to accumulate here. Many candidates identified the area of swelling or the direction of movement but did not link the two to gain the mark. This question assessed AO3.2b.

Question 16 (a)

16 A student investigates coordination.

The student sets up the apparatus in the diagram.



The student asks a friend to draw around the star, keeping between the two lines.

The friend can only see the star in the mirror.

The student measures how many seconds it takes the friend to draw around the star. He also counts the number of errors they make.

This is repeated five times.

(a) Sight is used by the friend to detect where to draw around the star.

What organ is used for detecting light?

..... [1]

Around half of the candidates correctly identified the eye as being used to detect light. Many candidates named parts of the eye such as the retina or pupil rather than the organ. 'The brain' and 'mirror' were also common incorrect answers. This question assessed AO1.1.

Question 16 (b) (i)

(b) The student records the results in a table.

Attempt	Time to draw around the star (s)	Number of errors
1	57	15
2	56	10
3	44	8
4	46	6
5	39	4

(i) Look at the results for **time** to draw around the star.

What is the **median** for these results?

Median = s [1]

A majority of candidates correctly stated the median value (46). 44 was the most common incorrect answer, possibly because candidates selected the middle value as shown in the table rather than arranging the numbers in order to select the median. This question assessed AO1.2.

Question 16 (b) (ii)

(ii) At the start of the investigation the student made this statement.

Practising a task helps you to improve.

Write about how the results **support** this statement.

.....

.....

.....

..... [2]

This question was well-answered with most candidates gaining at least one mark. Where both marks were not scored the candidates often just commented on the time decreasing or the number of errors decreasing and not both. This question assessed AO3.2a.

Question 16 (c)

***(c)** Drawing around the star is a coordinated response.

Describe the parts of the nervous system **and** how they work together to coordinate this response.

.....

.....

.....

.....

.....

..... [6]

In order to gain maximum marks for this question, the candidates needed to give a clear description of the parts of the nervous system and explain how they work together to bring about the response. Stating any two parts of the nervous system in the correct order was sufficient to gain credit at Level 1. Alternatively, describing the role of any one part would gain credit at Level 1, e.g. describing impulses travelling along a neurone, or muscles bringing about the response/movement. If they linked these ideas together then this would take the answer in to Level 2. Many students described a reflex arc rather than the coordinated response shown in the question which could gain credit up to Level 2. A very small number of candidates achieved Level 3, as they needed to describe how the parts work together to bring about movement of the hand to draw the star. This question assessed AO1.1 and AO2.1.

Exemplar 2

The central nervous system is made up of 6 different parts: The stimulus, Sensory neurons, Sensory receptors, Relay neurons, Brain and spinal cord, Motor neurons and the effector. All of these parts work together to coordinate a response suitable for the situation. The sensory receptor detects a change and sends an impulse ^{along} the sensory neuron, which is then passed to the relay neuron which then goes ^{through} the spinal cord to the brain which sends a response to the motor neuron, the impulse travels along the motor neuron to the desired effector (E.g. a muscle) [6]

This response achieved Level 2, with 4 marks. The candidate has listed parts of the nervous system in the correct order and clearly described the role of one part. However, the candidate has not achieved Level 3 as they have not described how the movement of the hand is coordinated.

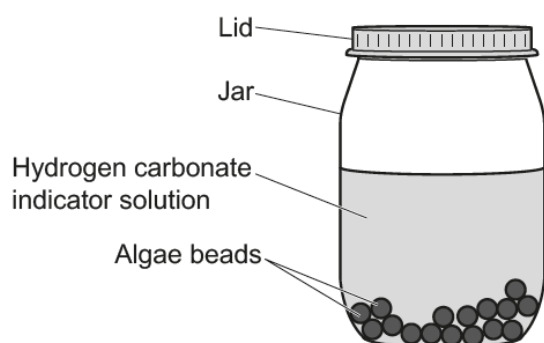
Question 17 (a) (i)

17 A student investigates photosynthesis.

The student uses small organisms called algae, trapped inside beads.

The algae beads are put inside a jar containing hydrogen carbonate indicator solution.

A lid is placed on the jar to stop any air getting in.



At the start of the investigation the hydrogen carbonate indicator solution is red showing the presence of carbon dioxide. This changes to purple when there is no carbon dioxide present.

The student times how long it takes the indicator solution to turn purple.

She repeats the investigation using different numbers of algae beads.

The table shows her results.

Number of algae beads	Time for indicator solution to turn purple (minutes)			
	Trial 1	Trial 2	Trial 3	Mean
0	No change	No change	No change	No change
10	56	57	55	56
20	32	36	33	34
30	19	8	17	18
40	6	7	9	

(a) (i) Calculate the mean for **40** beads.

Give your answer to the **nearest whole number**.

Mean = **[1]**

Most candidates correctly calculated the mean and rounded it to the nearest whole number (7). Common errors included giving an unrounded answer or rounding it up to 8. This question assessed AO1.2.

Question 17 (a) (ii)

- (ii) Look at the mean for
- 30 beads**
- .

Explain why the student did **not** use the result for **trial 2** when calculating the mean.

.....

.....

.....

..... [2]

Around half of the candidates gained at least one mark for this question; most commonly for identifying the result as being an outlier or anomaly. Expanding on this, e.g. by stating the result is 'much lower' or the mean would be more accurate would gain the second mark. This question assessed AO3.1b.

Question 17 (b)

- (b) Look at the results for 10, 20 and 40 beads.


Which set of data is the most **precise**?

Explain your answer.

.....

..... [1]

Candidates' responses to this question suggested they are not clear about the meaning of the term precise and most candidates did not gain marks on this question. We were looking for the idea that it has the smallest range. Comparative answers were also accepted, e.g. the numbers are closer (than the others). This question assessed AO3.2a

	OCR support	<p>There is a Glossary of Terms relating to practicals, which can be used to support the teaching of practical terminology. It is found under the Teacher guides drop-down here.</p> <p>https://www.ocr.org.uk/qualifications/gcse/gateway-science-suite-combined-science-a-j250-from-2016/planning-and-teaching/</p>
---	--------------------	---

Question 17 (c)

(c) Explain why the student sets up a bottle with **zero** algae beads in.

.....
 [1]

For this question, candidates needed to clearly communicate the idea that it was being used as a control or an example of this, e.g. to see if carbon dioxide is used up without any beads present. There were lots of vague ideas about setting up a 'fair test' but these were not explained effectively. This question assessed AO2.2.

Question 17 (d)

(d) Use ideas about photosynthesis to explain the pattern in the results.

.....

 [3]

Very few candidates achieved more than one mark on this question. The most common answer that gained credit was for linking more beads to more photosynthesis (or carbon dioxide being used up more quickly). It appeared that a lot of candidates did not realise the algae carried out photosynthesis. Very few candidates addressed AO3.2b by linking more algae to more chloroplasts or more light or carbon dioxide being absorbed. This question addressed AO3.2b and AO3.1a.

Exemplar 3

More algae used the faster the process happens and oxygen will be produced more quickly as the time of indicator changes to purple. The less of algae means a slower process to get rid of carbon dioxide in the jar. [3]

This response achieved 1 mark for clearly stating that more algae leads to a faster rate of photosynthesis. The second part of their response is largely a restatement of this.

Question 17 (e) (i)

- (e) The student wants to investigate the effect of temperature on the rate of photosynthesis.

The student uses a stop watch and a bottle of hydrogen carbonate indicator solution containing 20 algae beads.

- (i) The student also uses a large beaker and a kettle of hot water.

Explain why the student uses the beaker and kettle of hot water.

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

Very few candidates identified that the beaker of hot water was being used as a water bath or as a means of changing or controlling the temperature. This question assessed AO2.2.

Question 17 (e) (ii)

- (ii) Describe how the student could develop her method to find the best temperature for photosynthesis.

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

Fewer than half of the candidates clearly stated they would need to put the algal beads at different temperatures. Very few candidates stated the need to control other variables or gave examples of these. This question assessed AO2.2 and AO3.3a.

Exemplar 4

Use different temperatures for of hot water
 starting low, and increasing - Also use the
 same amount of algae in each test, otherwise
 the results will come out differently as more algae
 there is the faster the reaction will occur.
 They should also use the same amount of water
 and keep the room the same light. And also use [3]
 an evaporator

This response achieved 2 marks for clearly stating that the experiment should be performed at different temperatures and has identified one other variable they need to control. Very few candidates achieved more than one mark on this question.

Supporting you

For further details of this qualification please visit the subject webpage.

Review of results

If any of your students' results are not as expected, you may wish to consider one of our review of results services. For full information about the options available visit the [OCR website](#). If university places are at stake you may wish to consider priority service 2 reviews of marking which have an earlier deadline to ensure your reviews are processed in time for university applications.



Review students' exam performance with our free online results analysis tool. Available for GCSE, A Level and Cambridge Nationals.

It allows you to:

- review and run analysis reports on exam performance
- analyse results at question and/or topic level*
- compare your centre with OCR national averages
- identify trends across the centre
- facilitate effective planning and delivery of courses
- identify areas of the curriculum where students excel or struggle
- help pinpoint strengths and weaknesses of students and teaching departments.

*To find out which reports are available for a specific subject, please visit ocr.org.uk/administration/support-and-tools/active-results/

Find out more at ocr.org.uk/activeresults

CPD Training

Attend one of our popular CPD courses to hear exam feedback directly from a senior assessor or drop in to an online Q&A session.

Please find details for all our courses on the relevant subject page on our website.

www.ocr.org.uk

OCR Resources: *the small print*

OCR's resources are provided to support the delivery of OCR qualifications, but in no way constitute an endorsed teaching method that is required by OCR. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources. We update our resources on a regular basis, so please check the OCR website to ensure you have the most up to date version.

This resource may be freely copied and distributed, as long as the OCR logo and this small print remain intact and OCR is acknowledged as the originator of this work.

Our documents are updated over time. Whilst every effort is made to check all documents, there may be contradictions between published support and the specification, therefore please use the information on the latest specification at all times. Where changes are made to specifications these will be indicated within the document, there will be a new version number indicated, and a summary of the changes. If you do notice a discrepancy between the specification and a resource please contact us at: resources.feedback@ocr.org.uk.

Whether you already offer OCR qualifications, are new to OCR, or are considering switching from your current provider/awarding organisation, you can request more information by completing the Expression of Interest form which can be found here: www.ocr.org.uk/expression-of-interest

Please get in touch if you want to discuss the accessibility of resources we offer to support delivery of our qualifications: resources.feedback@ocr.org.uk

Looking for a resource?

There is now a quick and easy search tool to help find **free** resources for your qualification: www.ocr.org.uk/i-want-to/find-resources/

www.ocr.org.uk

OCR Customer Support Centre

General qualifications

Telephone 01223 553998

Facsimile 01223 552627

Email general.qualifications@ocr.org.uk

OCR is part of Cambridge Assessment, a department of the University of Cambridge. *For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored.*

© **OCR 2019** Oxford Cambridge and RSA Examinations is a Company Limited by Guarantee. Registered in England. Registered office The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA. Registered company number 3484466. OCR is an exempt charity.



**Cambridge
Assessment**

