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Examiners' Report June 2024

GCSE Biology 1BI0 2F

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June 2024

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Introduction

The Biology 2F paper assessed 34 of the GCSE (9-1) Biology paper two specification statements. The six questions were ramped so complexity increased across each question as well as across the paper. This allowed all candidates to access all questions. The five topics covered within the specification were: Key concepts in biology, Plant structures and their functions, Animal coordination, control and homeostasis, Exchange and transport in animals, and ecosystems and material cycles.

Mathematical exercises and experimental procedures and design were tested along with specific topics including: microscopy, cell structure, photosynthesis, effect of temperature on enzymes, energy transfers / food chains, environmental change caused by human action, endocrine glands, the role of insulin and diabetes, the role of blood plasma, heart structure, oxygen absorption related to exercise, movement of water, plants, root hair cells, leaf structure, alveoli structure and gas exchange, blood and blood flow, the effect of exercise on heart rate, nephron structure and function, osmosis and decomposition. The two '6-mark' questions covered food tests for glucose and protein and movement of water through and out of a tree.

There were several questions where candidates needed to apply their knowledge to situations that may be new to them but in these cases, all the required information needed to lead candidates to the required responses were supplied in the stems of the questions and items. Candidates could benefit from practising reading the stem and considering which parts are key to stimulate the connections to areas of the specification covered. Few examples were seen of candidates underlining the command words and key words in the given information. However, there was a small increase in the amount of annotation of information presented in diagrams which, it is felt, helped candidates access items. Overall, it was felt that those candidates who did take time to do this gave a more detailed and balanced response to the questions asked.

It was pleasing to see that the vast majority of candidates completed the paper with responses to all or nearly all items. There was also some evidence to show that candidates had reread their work and added points to / altered their answer to improve the response, often gaining a mark.

The standard of answers was varied but thought to be on a par with those seen on the previous specification with many foundation candidates capable of scoring marks on the recall, the mathematical items and more straightforward questions where marks could be gained by interpreting given information although it was pleasing to see some excellent, coherent answers accurately applying germane and salient scientific methodology and terminology. It was encouraging that some candidates used the scaffolding provided to guide their responses. There was, again, a significant number of candidates that used the diagrams, graphs and information in the stem of the question to guide their responses.

Good example of where this was regularly seen include items 2(c)(i), 3(a), 6(d)(i), 6(d)(iii), 7(a) and 10(b).

Items that discriminated well across the available marks included 1(b)(ii), 2(b), 2(c)(i), 3(a), 3(d)(i), 4(b), 4(d)(ii), 4(e), 5(a)(iii), 6(a), and 10(b)(i).

Items that did not discriminate so well included 1(a), 3(b), 3(c), 5(b)(i), 5(b)(ii)-(iii), 6(d)(iii), 7(c)(i), 8(b)(iii) and 10(e), with Level 1 candidates mainly gaining their marks from questions 1 and 2 as well as MCQs, join the boxes, and some maths points.

As in previous years there was an emphasis in items of each question, on applying knowledge which allowed candidates to match the '4 and 5' pass grade descriptors with a pleasing number of candidates clearly showing an understanding of the response required where the command words 'explain', 'compare' and 'plan', were used. However, many candidates could still not develop their responses into a logical specific set of points that answered the question with a significant number often reproducing stock answers related to the topic or based on key words used instead of addressing the construct of the question. It was also not uncommon to see a question using the command word 'describe' being extended to include an explanation, for example item Q04(d)(i) and items using the command word 'explain' to not including the difference or corelation that they then explained, for example item 8(a) compared to item 3(d)(ii) – where the majority of candidates who answered this item clearly stated that the number of moths would decrease with a valid reason. There was a small increase in the number of responses that extended a ‘describe’ response to include an explanation. Although this did not affect the mark it will have taken candidates’ time.

It was disappointing that there was very little evidence seen of candidates underling key words and facts in the stem of the question. This had been steadily increasing over the last few years. However, there seemed to be a small improvement in the number of blank responses to questions compared to the previous year’s paper.

Answers to items based on core practicals showed that most candidates were familiar with relevant procedures even if details were confused, for example, the reagents and positive results used to test for glucose and protein even though ‘Benedict’s and Biuret solutions’ were given to candidates in the stem of item 7(d).

The mean mark for the paper increased significantly on the 2023 paper and as the overall difficulty of items was considered to be roughly comparable shows a small but significant increase in candidate ability. Of the two 6-mark items, candidates found it harder to access Q07(d) (food tests) compared to Q09(c) (movement of water through a plant) with the former having a less even distribution of marks

As expected, and in line with previous series, responses from higher grade candidates showed some excellent, accurate, detailed answers demonstrating a good understanding and application of both scientific concepts and facts. Middle grade candidates could often identify the basic structures and concepts required but were not as adept at developing and justifying their initial statements, for example, explain the reasons for patterns identified or consequences of the initial points made.

The number of candidates using extra paper or writing long responses that resulted in part of their answer being 'out of clip' were again, lower than in the previous year's series. In previous years the use of extra sheets was attributed at least in part to candidates giving long introductions, often restating the stem of the question

It was disappointing to see slightly more cases where candidates 'gave up' thereby leaving the last questions wholly, or more frequently the longer response items in later questions blank.

A complete range of ability was demonstrated by candidates overall and it was pleasing to see detailed responses that were both germane and salient to many of the tasks set covering the required depth and detail outlined in the specification. Items where this was often shown included 3(c)(i)-(ii), 3(d)(ii), 5(b)(ii) and 9(a)(iii).

Mathematical items, as in previous sessions, were addressed well with most candidates picking up valuable marks towards their total score.

Question 1 (a)

This item required candidates to join the boxes stating part S (the focussing wheel) and part T (an objective lens) of a microscope to their function: 'to focus the image so that it is clear' and to magnify the image respectively.

Candidates found this accessible with very few examples of multiple lines being used from 'part S / part T' on standard papers but seen too often in exception scripts. Approximately three quarters of candidates scored both marks available for this item.

Question 1 (b)(i)

Command word: Draw / Label

Two photomicrographs of bacterial cells, as seen with a light and electron microscopes were given in Figure 2. Candidates were required to make a biological drawing of the cell labelled X. The diagram clearly showed two flagella with another 3 shown more faintly. This was to test part of the core practical outlined in Topic 1 point 6.

Three marks were available here. One for each of: the overall shape of cell X, two to five flagella being drawn and one cell structure correctly labelled.

This is not the first time that we have asked candidates to draw a cell from a microscope image and it was pleasing to see that the accessibility had increased with over three quarters of candidates gaining two or three marks.

Candidates who did not gain all three marks available tended to label organelles incorrectly, eg any dark area as a nucleus or drawing the cell body as a circle with a significant number drawing a stylised cell including many candidates that decided the cell was a sperm cell even though the question stated that it is a bacterial cell. Some candidates were not awarded the label mark as they labelled one part correctly, eg cell wall but then added an incorrect label eg mitochondria. The question clearly states, "label **one** part ....", candidates should ensure that when a number (which is always written in bold) is given, then they should do no more than that number as we then apply the list rule where a right and a wrong response cancel each other out so no mark is awarded.

Question 1 (b)(ii)

Command word: State

Candidates are required to have an understanding of the developments in microscopy including electron microscopy and it was pleasing to see very few blank responses to this item which required candidates to give an advantage of using a light and electron microscope. The item discriminated well with approximately one third of candidates getting 0, one and two marks.

Candidates tended to not gain credit by using vague terms, for example stating that you can get a clear image, or that you can see more with a light microscope / electron microscope. Common creditable responses were that light microscopes are portable / cheaper to buy, and that electron microscopes allowed you to see smaller structures / features with many candidates stating greater resolution. Many candidates stated that you could focus or get a clear image with an electron microscope which was not creditable as these points are also applicable to a light microscope. As in past examination series, 'zoom in' was not creditable.

Question 2 (b)

Command word: Name

This was a straightforward recall item although there were three relevant clues, namely: 'green', 'in chloroplasts' and 'absorbs light' to lead to the answer: chlorophyll.

The majority of candidates gained the available mark with incorrect responses including cytoplasm and cellulose which suggests that these candidates knew the correct response but confused these uncreditable answer with the creditable one.

Question 2 (c)(i)

Command word: Plan

Each GCSE science examination is required to test aspects of designing / planning investigations. This exercise was not a core practical but was designed so that candidates could use aspects learnt from the 'pondweed / bubbles' core practical (Topic 6 statement 5) in their plan. This item again was accessible to almost all candidates with over 80% gaining at least one mark. Common errors were not clearly stating that the plants had to be at different distances from the light and / or stating an aspect of the design that would allow results to be obtained to answer the task set. Many candidates that did score on the latter of these points stated to measure the height / mass of the plants (after several days) to see which had grown more, with a minimum standard for credit for giving a response that stated, 'see which one had grown taller / had more leaves'. It was pleasing to see that many candidates stated how to keep an aspect of the plan so that results were comparable, eg water the plants each day with the same volume of water with some specifying eg $10cm^3$ of water each day.

(c) (i) Plan an experiment to investigate if plants grow faster when they receive more light.
Use the equipment shown in Figure 3.

(3)

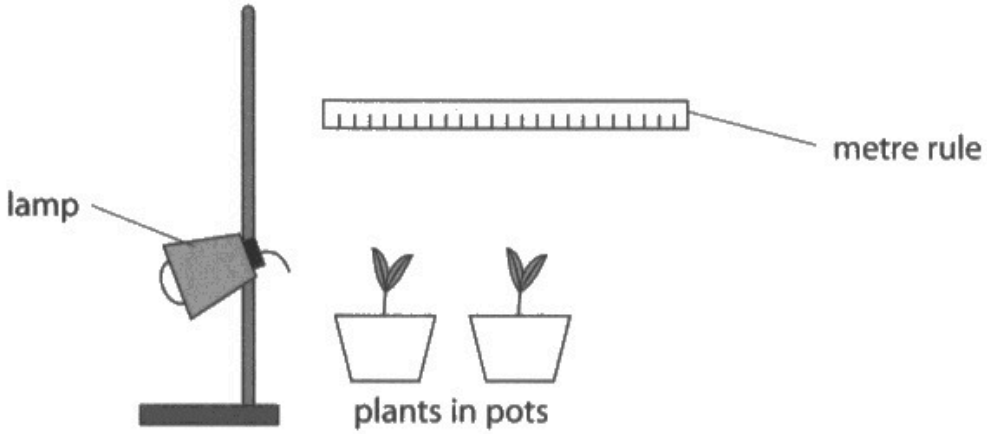

Figure 3

Place the plants varying distances from the lamp and study which one is the tallest after a set amount of days through the results it will show the effect light has on growth

ResultsPlus
Examiner Comments

The candidate here has been credited for MPs 1, 2 and 4 for all three marks available, which were the MPs predominantly seen in candidate responses.

The minimum number of days set in the mark scheme was for more than 1 day (which could work for some of the faster growing plants) so amount of days is sufficient for the mark.

It would have better to have stated the number of days and it should be noted that as in previous years, we do not credit eg **amount** of water as we feel that at GCSE candidates should be able to state the same volume or specify eg each plant being given 10 cm^3 of water each day.

ResultsPlus
Examiner Tip

If it helps organise thoughts, candidates can write plans and procedures out as bullet or numbered points as this can often help with a) the logical sequence and b) ensuring that sufficient points are made to meet the number of marks available – here 3.

(c) (i) Plan an experiment to investigate if plants grow faster when they receive more light.
Use the equipment shown in Figure 3.

(3)

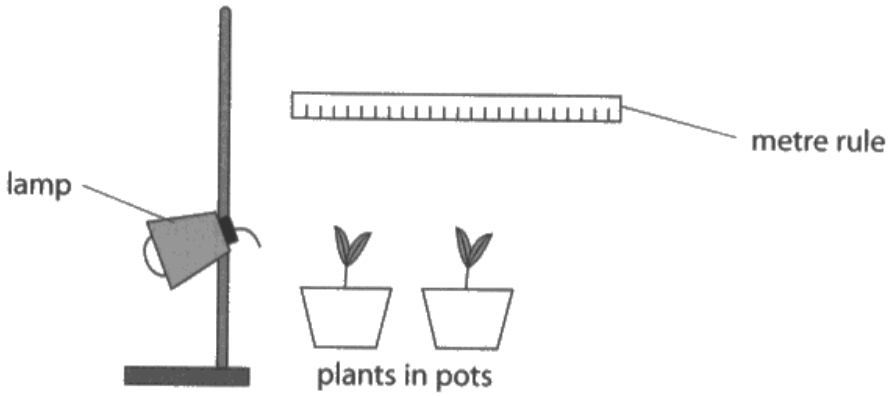

Figure 3

have 3 plants give 1 less Sunlight give 1 regular amount of light and give 1 more light give them 1 month to grow and measure all 3 of their length

ResultsPlus
Examiner Comments

This candidate gains all 3 available marks although there are questions regarding eg the comparability of the light.

When stating the steps in a plan ensure that the only factor being changed is the one being tested, here we could question as to whether 'sunlight' is the same as 'light'. Credit could be given here, however, if the candidate had stated eg leave the plants under different light sources; the sun, a torch and a candle they may not have been credited for MP1.

ResultsPlus
Examiner Tip

Try not to use terms like 'regular amount of light' as it is not clear what that means in terms of light intensity. It is better to state eg bright, average and low light levels or even better to add 'measured by using a light meter'.

Question 2 (c)(ii)

Command word: State

What aspects of an investigation to control to allow the factor being tested to be uncompromised is a requirement that again needs to be tested in each examination series. Here just one variable was required for the mark available.

Although many candidates had already stated eg: water each plant each day with the same volume / stated volume of water, it was pleasing to see many candidates stating use the same type of plant or water them each day with the same volume of water, with many candidates stating a reasonable volume per day eg 20cm^3. It was disappointing to see that less than half of candidates had scored the available one mark available for this item.

(ii) State **one** factor that you would keep the same in this experiment.

(1)

plants because if they are different that species might grow better than another

ResultsPlus
Examiner Comments

This candidate gains the available mark and illustrates the need to read all the response as many candidates qualify their opening vague statement or contradict themselves in their answer.

Here the candidate starts with the plants – when they mean the same type or even better the same species of plant – although they gain the mark through qualifying what it is about the plants that needs to be kept the same.

(ii) State **one** factor that you would keep the same in this experiment.

(1)

the same light source

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Examiner Comments

The available mark was not awarded here as the stem of the question states 'use the equipment shown in Figure 3' which showed just one light source.

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Examiner Tip

When improving experimental design or controlling a factor ensure that you refer to the introduction / any diagram included to ensure that you are not just repeating information already given.

Question 2 (c)(iii)

Command word: Explain

This item was more difficult for candidates to access with almost exactly half failing to score any marks at all and most stating that as temperature increases reaction rates increase and so photosynthesis will get faster and faster, failing to recognise the 'very high' and 'temperature of '60^{o}C' were the indicators that most living things cannot survive at such temperatures due to enzymes denaturing. Those candidates that did score were mainly awarded just one of the two marks available, for stating that the rate of photosynthesis would decrease. Of these, few candidates could give a valid reason with the most common creditable explanations being that at 60^{o}C the plant would die or the plant would dry out because all the water would evaporate. Enzymes were rarely mentioned although when they were included in the response a very good understanding of denaturing was explained.

(iii) A plant was kept at a very high temperature of 60 °C.

Explain the effect of this temperature on photosynthesis.

(2)

with photosynethisis, the temperature tends to increase the rate of photosynthesis as it's the process that makes plants grow to be healthy.

ResultsPlus
Examiner Comments

This is not an unreasonable statement for how the rate of photosynthesis changes for increases in temperatures from eg ten to twenty degrees Celsius so it understandable, however this has been tested repeatedly in the course of this specification and the candidate has not picked up on the very high temperature stated in the stem of the question.

When we put information in a question it is always relevant to the area of biology being tested. The clue 'very high' temperature here should make candidates think why has the examiner written that, rather than just stated at 60^{O}C.

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Examiner Tip

Underline key words in the question to help you think about the areas of the specification that are being tested.

Question 3 (a)

Command word: State

Candidates were presented with a food chain with four organisms linked by arrows. The task was to state what the arrows represented. It was pleasing that the number of candidates who could access this increased from previous years with roughly half the candidates scoring the mark available. Most of these gained the mark by stating that the arrows meant it is eaten by, often with qualification eg the oak tree is eaten by the aphids. A significant number of candidates gained credit by giving the more technical response of energy flow / transfer of energy. A large proportion of candidates that did not score stated 'eats', some with qualification eg the oak tree eats the aphids.

3 Figure 4 shows a food chain in an oak woodland.

Figure 4

(a) State what the arrows in the food chain represent.

(1)

The arrow points to whatever takes energy from where the arrow is pointing from. Pointing to the consumer

ResultsPlus
Examiner Comments

An example of a good creditable response for the available mark with a qualification that those that eat organisms in food chains are known as consumers.

ResultsPlus
Examiner Tip

If you are not sure of technical terms or processes keep it simple and clearly describe what you wish to say. This may also help you remember the technical / biological terms as shown here with the use of consumer.

3 Figure 4 shows a food chain in an oak woodland.

Figure 4

(a) State what the arrows in the food chain represent.

(1)

[redacted] What they are being eaten by.

ResultsPlus
Examiner Comments

An example of the creditable, common response, "... eaten by".

ResultsPlus
Examiner Tip

Keep it simple. This a food chain so 'eaten by' is worth a creditable mark.

Question 3 (c)

Command word: Calculate

Candidates were required to calculate 15% of 6g of food, the amount of food a robin consumes that is used for growth.

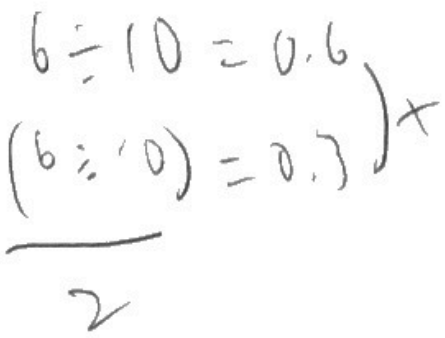
This was a relatively straightforward task, with the relevant data required given in the stem of the question, with roughly three quarters of candidates scoring both marks available. A very small number of candidates only received one mark. These candidates usually lost one of the two available marks by subtracting their answer, 0.9g, from either 6, giving 5.1g as the percentage of food consumed that was not used for growth, or more rarely from 1 or 100.

(c) A robin in this woodland eats 6 g of food in a day.

The robin uses 15% of this food for growth.

Calculate the mass of food that is used for growth.

(2)



0.9 g

ResultsPlus Examiner Comments

This candidate has correctly used 'chunking' to calculate 15% of 6g and thereby gained both marks available.

ResultsPlus Examiner Tip

If a mathematical method works for you – then use it.

However, don't forget to check at the end that you have answered the question set and as a quick check ask yourself 'does my answer sound reasonable?'

(c) A robin in this woodland eats 6 g of food in a day.

The robin uses 15% of this food for growth.

Calculate the mass of food that is used for growth.

(2)

15% of 6g = 0.9

6 − 0.9 = 5.1

5.1 g

ResultsPlus
Examiner Comments

This candidate has also correctly calculated 15% of 6g as 0.9g. They have then, however subtracted that from 6g to find the mass that is not used in growth, so one mark of the two available is awarded.

ResultsPlus
Examiner Tip

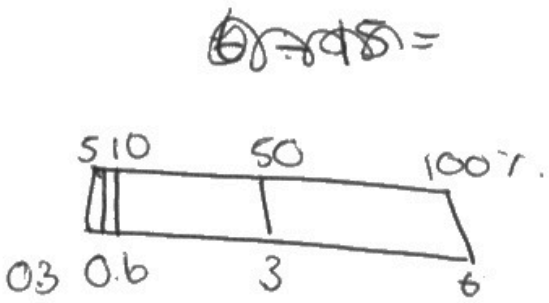
Check that the answer calculated to any mathematical question sounds 'reasonable' and that you have answered the question set.

(c) A robin in this woodland eats 6 g of food in a day.

The robin uses 15% of this food for growth.

Calculate the mass of food that is used for growth.

(2)



0.9 g

ResultsPlus
Examiner Comments

A different but good method is used by this candidate to calculate 15% of 6g gaining the two marks available. Here though, the diagram helps the candidate to visualise the % calculated which should help them judge that their answer is a reasonable one for the question set.

Question 3 (d)(i)

Command word: State

Candidates were required to give two human activities that would cause global warming. It was pleasing to see that over three quarters of candidates gaining at least one of the two marks available here with MP1, burning fossil fuels / wood being the creditable answer seen most often. MP2, deforestation and MP3 animal farming were seen regularly, usually as the second mark to accompany MP1. Candidates that only scored one mark here often did so as they gave 2 versions of MP1, eg driving cars / driving lorries / driving motorbikes / driving planes. MP4 was seen, but often did not gain marks as eg littering had to be developed to link to the process of rotting eg organic waste materials being used in landfill sites which was seen, albeit rarely. The question asked for human activities so factories or cars stated without qualification did not gain credit.

(d) Temperatures in England have increased over the last 20 years.

(i) State **two** human activities that have caused this temperature increase.

(2)

1 The burning of fossil fuels causes a significant increase in temperature.

2 The constant use of cars releases carbon dioxide into the atmosphere, which causes an increase in temperature.

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Examiner Comments

Here the candidate has stated burning fossils fuels and an example of burning fossil fuels as their two responses so only gain one mark.

ResultsPlus
Examiner Tip

When asked for two 'things' that eg cause something – ensure that they are sufficiently different but still answer the question to both gain credit.

(d) Temperatures in England have increased over the last 20 years.

(i) State **two** human activities that have caused this temperature increase.

(2)

1 burning fossil fuels.

2 deforestation.

ResultsPlus
Examiner Comments

Two creditworthy responses, each gaining a mark.

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Examiner Tip

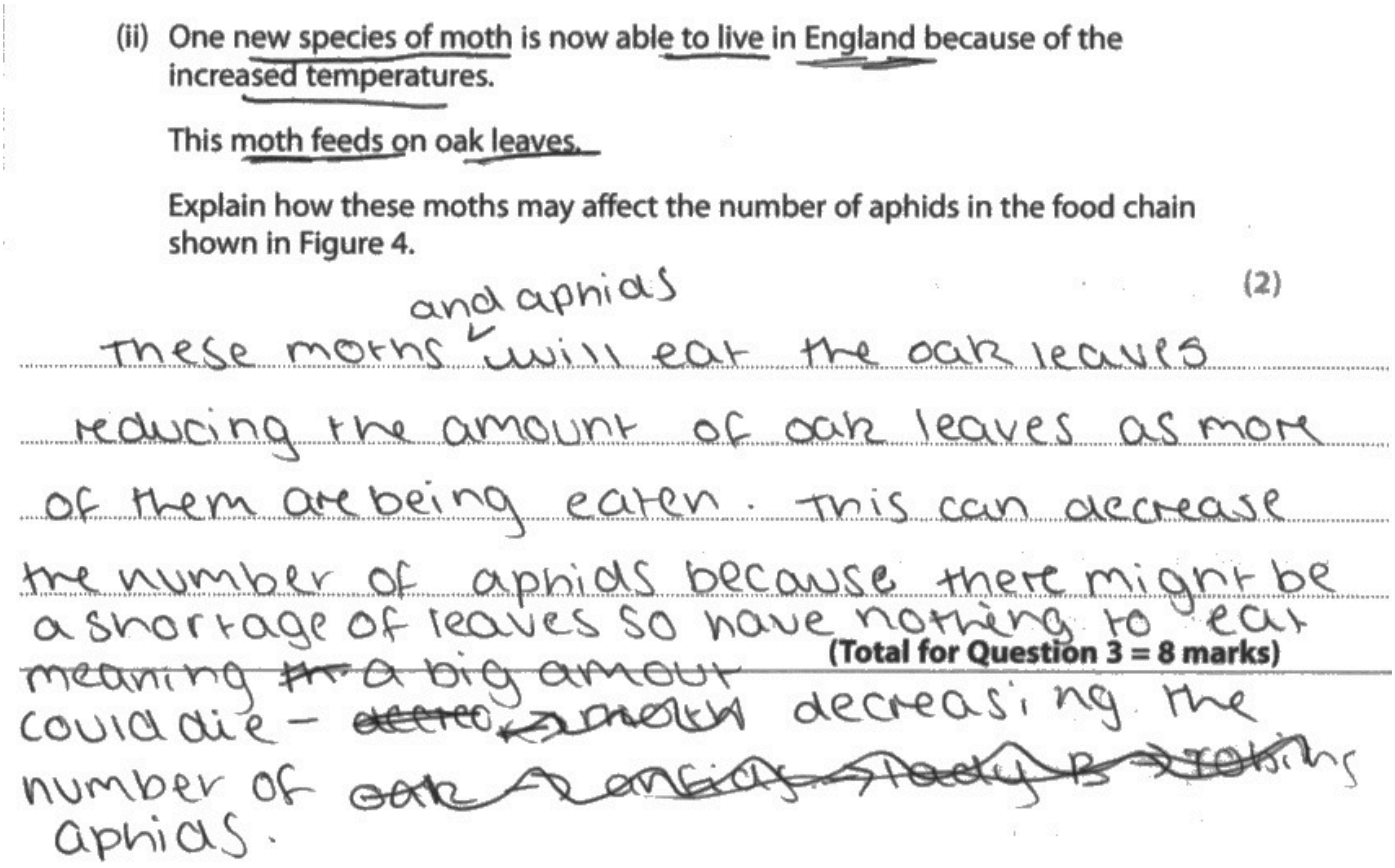
Keep answers simple when the command word is something like 'State' as is the case here. Candidates that describe and explain their basic answer to state items use up valuable time and on occasions lose the marks gained by contradicting themselves.

Check that you have answered the question set – here it is human activities that are required so a quick check on what the question is asking and whether both my answers address this is always recommended.

Question 3 (d)(ii)

Command word: Explain

Candidates had to state how the numbers of aphids would be affected by the presence of moths and give a reason for this effect to occur. It was very pleasing to see well over half of the candidates gaining both available marks with the use of biological concepts and terminology such as outcompete / competing for food being regularly seen. Some candidates gained the first mark: the decrease in aphid number, but didn't quite address the reason, stating for example that the decrease was because the moths also lived on the oak tree.



(ii) One new species of moth is now able to live in England because of the increased temperatures.

This moth feeds on oak leaves.

Explain how these moths may affect the number of aphids in the food chain shown in Figure 4.

(2)

These moths and aphids will eat the oak leaves reducing the amount of oak leaves as more of them are being eaten. This can decrease the number of aphids because there might be a shortage of leaves so have nothing to eat meaning ~~the~~ a big amount could die - ~~decrease~~ moth decreasing the number of ~~oak~~ ~~aphids~~ ~~stocky~~ ~~B~~ ~~robins~~ aphids.

(Total for Question 3 = 8 marks)

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Examiner Comments

Both marks are awarded here for clearly describing and explaining the effect of the moths on the numbers of aphids on the oak tree.

Although no biological terms are used here, the candidate clearly explains the effect of moths on the numbers of aphids thus gaining both available marks.

Question 4 (a)

Command word: Draw

Candidates were asked to show the position of the ovaries by drawing two crosses on the outline of a female body which was shown.

Well over half the candidates scored here with a few candidates placing their crosses almost randomly on the diagram. The commonest error seen was putting the crosses where the testes are found (in a male) or in the legs. Although 'Draw crosses' was stated in the stem of the question, any correct indication, eg arrows, of the position of the ovaries was credited.

4 Endocrine glands produce hormones.

(a) Draw **two** crosses on Figure 5 to show the position of the ovaries.

(1)

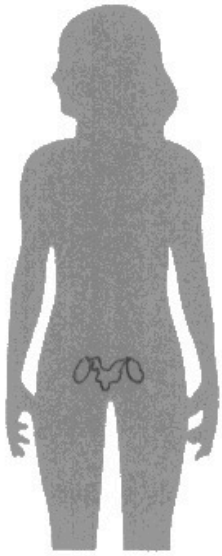

Figure 5

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Examiner Comments

Here the candidate has not used crosses but drawn the shape of the ovaries within the ovals used as tolerance correctly, so gains the available mark.

ResultsPlus
Examiner Tip

Although this gets credit, ensure that if the question states draw two crosses then use crosses, just in case they are required for credit.

4 Endocrine glands produce hormones.

(a) Draw **two** crosses on Figure 5 to show the position of the ovaries.

(1)

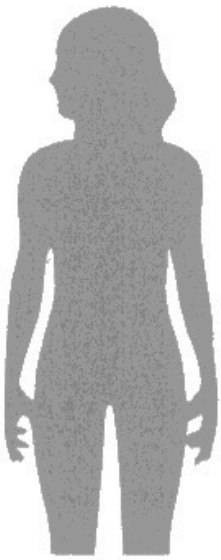

Figure 5

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Examiner Comments

The candidate has left this question blank thereby not gaining the mark.

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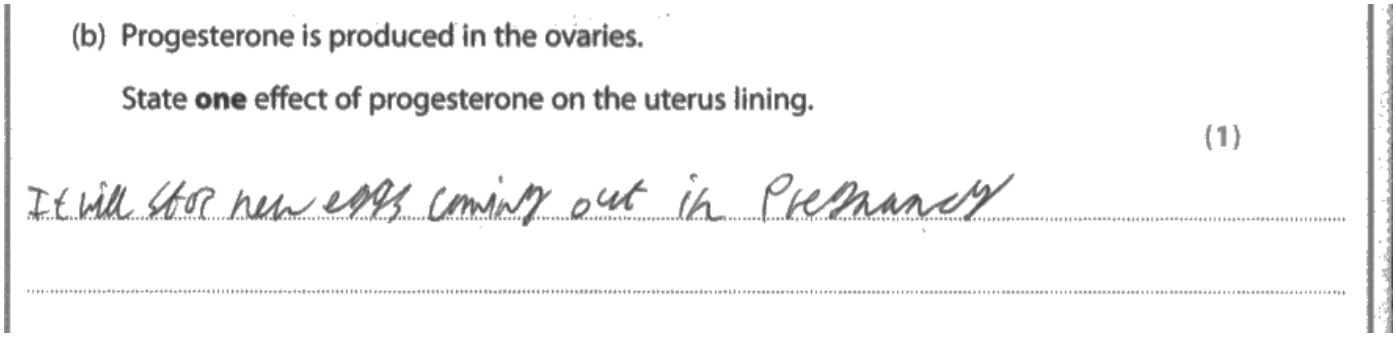
Examiner Tip

Even if you do not know the answer and so do not want to waste time answering a question, on this type of task, have an attempt, as the time taken to draw two crosses is minimal and the generous creditable area was such that you stand a good chance of scoring here.

Question 4 (b)

Command word: State

Candidates were required to write **one** effect of progesterone on the uterus lining. Slightly under half of the candidates gained this mark with thicken and maintain (the lining) being seen regularly to gain the available mark.



(b) Progesterone is produced in the ovaries.

State **one** effect of progesterone on the uterus lining.

(1)

It will stop new eggs coming out in Pregnancy

ResultsPlus
Examiner Comments

The task here, is to state an effect on the uterus lining – make sure that you address this in your response – here the candidate's answer does not relate to the uterus lining and so does not gain the mark available.

(b) Progesterone is produced in the ovaries.

State **one** effect of progesterone on the uterus lining.

(1)

maintains the uterus lining.

A correct response gaining the available mark.

Keep your answer simple ensuring that you address the task set. Here the uterus lining can only do a few things, break up, get thinner, get thicker, be maintained, so as shown here state your answer without wasting time by extending your response with unnecessary details.

Question 4 (c)(ii)

Command word: State

Candidates had to state how insulin is transported around the body. How is almost any substance transported around the body – in the blood. Almost two thirds of candidates correctly gained this mark with many giving extra detail including, for example, dissolved in the blood plasma.

(ii) State how insulin is transported from its endocrine gland to its target organs.

(1)

~~It~~ gets injected, and goes through the body. Injectind under or near the belly.

ResultsPlus
Examiner Comments

This candidate has not answered the question which clearly states from its endocrine gland to its target organ, and has instead stated where insulin is often injected by diabetics.

ResultsPlus
Examiner Tip

Make sure you read the question and answer it.

(ii) State how insulin is transported from its endocrine gland to its target organs.

(1)

bloodstream

ResultsPlus
Examiner Comments

This candidate gains the mark available as though they have not really stated the way insulin is transported around from the endocrine gland to its target organ, what else could this response mean?

ResultsPlus
Examiner Tip

Although this response gains the available mark – ensure that you answer the question set rather than just state an object, substance or in this case system.

Question 4 (c)(iii)

Command word: Name

Only one third of candidates could correctly identify the main target organ for insulin. The liver was most often seen, but muscles was also credited as the idea of 'main' is not completely clear cut for foundation candidates.

Question 4 (d)(i)

Command word: Describe

Figure 6 presents a graph of blood glucose concentration from midday to 2pm. Candidates were required to describe the trend from midday to 1pm. This was an accessible question with the vast majority of candidates scoring one or two marks with the majority scoring just one by saying the concentration goes down. For both marks to be awarded, the candidate had to distinguish between the slow decrease between 12pm and 12.30pm / the increased rate of decrease between 12.30pm and 1pm.

A few candidates described the increase between 1pm and 2pm although if they described the decrease to 1pm and then the increase to 2pm the latter was just treated as extra if irrelevant information. A few candidates lost marks as they described the whole graph without reference to times: for example the blood glucose concentration decreases and increase gains no marks as the candidate's response should refer to the change between midday and 1 pm. However, the blood glucose concentration decreases from midday to 1pm and then increases from 1pm to 2pm gains the general one mark and the comment regarding from 1pm to 2pm is just treated as irrelevant extra information.

(d) People with type 1 diabetes cannot produce insulin.

Figure 6 shows the blood glucose concentration for a person with type 1 diabetes.

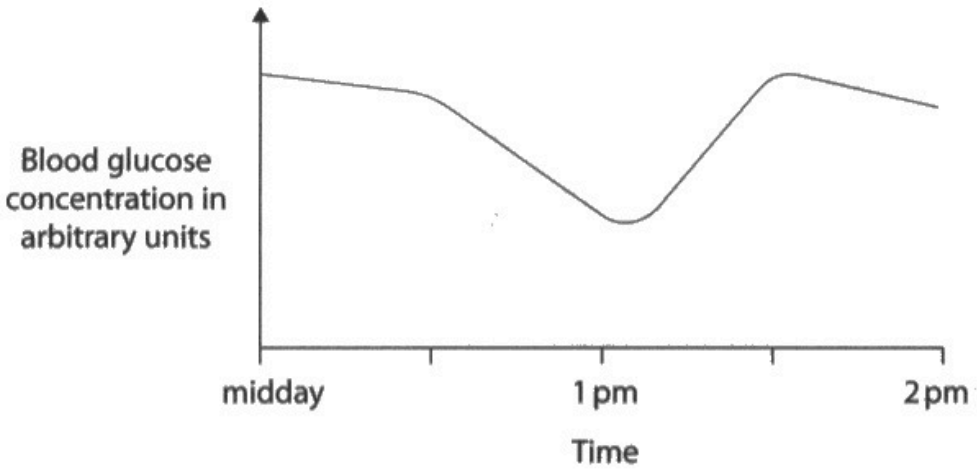


Figure 6

(i) Describe the trend from midday to 1 pm.

(2)

the blood glucose concentration decreases once it reaches 12.30 pm. So sugar levels were already high at mid day but decreased until at 12.30 the decrease increased quickened until 1 pm.

ResultsPlus
Examiner Comments

A good two mark response clearly identifying the two different rates of decrease.

ResultsPlus
Examiner Tip

Look carefully at a graph when asked to describe any trend shown.

- Only describe the part of the graph required.
- If the trend decreases / increases / stays the same for part of the graph (or table) you are asked to describe, make sure that you clearly refer to when the change occurs.

Question 4 (d)(ii)

Command word: State

The graph shows an increase in blood glucose concentration from 1pm and candidates had to state what the person (with type 1 diabetes) could have done to cause the increase.

Roughly half of the candidates gained the available mark with most stating eating, with some excellent understanding shown by many candidates qualifying that the diabetic ate something which would release glucose / sugar. Candidates that did not gain the mark here mainly stated that they would inject insulin which of course has the opposite effect.

(ii) State what a person with type 1 diabetes could have done to cause the change in the blood glucose concentration from 1.05 pm to 1.30 pm.

(1)

They have eaten a meal ~~or injected insulin~~

ResultsPlus
Examiner Comments

This candidate has gained the mark for stating 'eaten a meal' and has fortuitously crossed out the injecting insulin which would have cancelled the mark as it has the opposite effect.

ResultsPlus
Examiner Tip

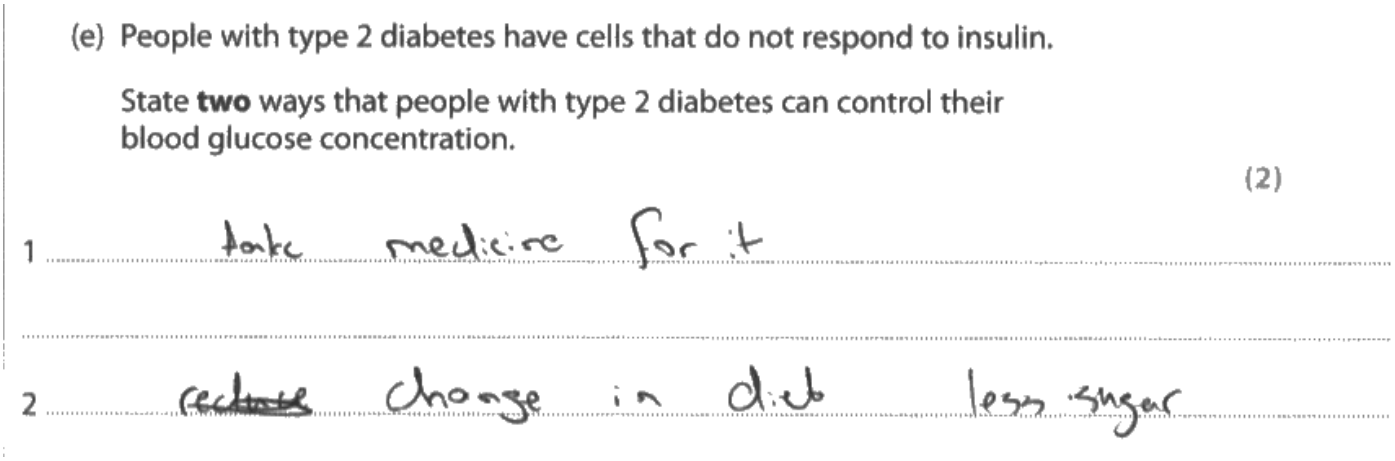
Check your work to ensure that you have answered the question and you have not given a right and wrong answer. If the instruction asks for one thing, or in this case what the person may have done, with the number of marks as 1, do not give more than one response as a wrong answer will cancel out the creditworthy one.

Note however that this is not the same as giving extra / further information to exemplify / clarify the first response – which is to be encouraged.

Question 4 (e)

Command word: State

As this task asked candidates to state **two** ways a type 2 diabetic can control their blood glucose level (which has been asked before) it was disappointing that only three quarters of candidates scored marks here. Only one third of these scored both marks available with some candidates mixing up glucagon and insulin but most losing a mark by talking about monitoring blood glucose levels rather than controlling it. The general idea of eating something or having a healthy diet was insufficient for credit. Controlling their diet by reducing the amount of sugary foods consumed was required for the 'diet' mark.



(e) People with type 2 diabetes have cells that do not respond to insulin.

State **two** ways that people with type 2 diabetes can control their blood glucose concentration.

(2)

1 take medicine for it

2 ~~reduce~~ change in diet less sugar

ResultsPlus
Examiner Comments

Take medicine is too vague for credit, however by adding 'less sugar' to the second response of change in diet is sufficient for one mark to be awarded.

ResultsPlus
Examiner Tip

The gap suggest that the 'less sugar' was added after the change in diet was written. This shows the benefit of reading your answer and qualifying it to make the response more targeted to answering the task set.

(e) People with type 2 diabetes have cells that do not respond to insulin.

State **two** ways that people with type 2 diabetes can control their blood glucose concentration.

1 they can exercise.

2 control what they eat.

ResultsPlus
Examiner Comments

These are the minimum ways of expressing MP1 and MP2 to gain marks. However, a little exemplification / clarification is recommended, eg exercise more.

Question 5 (a)(ii)

Command word: Name

Approximately one third of candidates gained the available mark here by correctly stating starch.

Question 5 (a)(iii)

Command word: State

Over half of the candidates gained the mark here, mostly for saying that the guard cells opened and closed the stomata although a significant number of candidates thought that the guard cells were the stomata and some talked about the guard cells breathing oxygen into the leaf.

(iii) State how the guard cells control the amount of gas exchange that occurs through the stomata.

(1)

During the daytime, when photosynthesis can happen, guard cells will open stomata to let CO_2 through; Howere close it, when it is night.

ResultsPlus
Examiner Comments

An excellent answer showing understanding of how guard cells work to gain the mark available.

(iii) State how the guard cells control the amount of gas exchange that occurs through the stomata.

(1)

they open or close stomata

ResultsPlus
Examiner Comments

A good answer that gains the available mark.

ResultsPlus
Examiner Tip

Keep your answer simple and when the command word is state and only one mark is available, you do not usually have to write very much to gain the mark.

Question 5 (b)(i)

Command word: Calculate

Candidates had to find a mean after selecting the correct numbers from the table of data in Figure 8.

Calculating a mean is relatively accessible for foundation candidates and so it was not surprising that the vast majority of candidates scored here with most of these gaining all three marks. Those that scored no marks tended to leave this item blank.

A few candidates selected the wrong set of data from the table which allowed them to still gain two marks and a very small number divided by the wrong number.

Question 5 (b)(ii)

Command word: Explain

Many candidates found this question confusing, with almost three quarters scoring no marks on this question. It appeared that relatively few candidates used the data in the table in Figure 8 to say that as the water content of the soil increased, the cuticle was thinner, with most candidates stating that the more water means that the cuticle will get thicker as more water would be absorbed to make the cuticle swell.

For MP2, the reason for the difference in thickness, candidates linked the change to having more water, rather than, with more water available, more could be lost from the leaf. It is thought that although candidates know that the cuticle is waterproof, many have not got an understanding that this is to stop the plant losing too much water / drying out.

Those candidates that did state that with more water available, the cuticle was thinner, often showed a clear understanding of the function of the cuticle demonstrated by some excellent answers.

Candidates need to be made aware that when an item is part '(b)(ii)' it means that information given in the start of Q05(b) still applies and often is useful in answering this part of the question. In such cases, make sure that you refer to that part of this question to help answer the task set.

(ii) Explain why the thickness of the cuticle is different when a plant is grown in soil with a higher water content.

(2)

when there is a lower water content the the thickness of the cuticle is higher so that the plant can absorb the little amount of water whereas when there is a higher water content of water the thickness of the cuticle is less because there is too much water

ResultsPlus
Examiner Comments

This candidate has put their answer in the reverse of how the mark scheme is set out but gains the mark for the reverse observation thus gaining one mark from hitting MP1. However they continue to suggest that the cuticle is involved in absorbing water and so did not address MP2 or MP3.

ResultsPlus
Examiner Tip

This is a good start to answering the question but you need to link less water available to the need for a thicker cuticle.

(ii) Explain why the thickness of the cuticle is different when a plant is grown in soil with a higher water content.

(2)

when the soil has a higher water content the thickness of the cuticle is small as it doesn't have to store water as it has a high supply.

ResultsPlus
Examiner Comments

A clearly written correct response showing excellent understanding of the role of the waxy cuticle, gaining both marks available.

ResultsPlus
Examiner Tip

In an 'explain' question try to make your response logical – linking the observation or deduction to the relevant science.

Question 5 (b)(iii)

Command word: State

This item was a direct testing of specification point 6.14B and so it was disappointing that it was not well answered by many candidates with the majority stating that plants growing in dry soils had to have bigger leaves so that they could catch / absorb more water when it rains, with only about one eighth of candidates scoring the mark.

(iii) State **one** other way that the leaves of plants are adapted to help plants grow in soil with low water content.

(1)

The leaves could have a high Surface area So it will absorb more Sunlight

ResultsPlus
Examiner Comments

A not uncommon response which is not creditable and does not even address the question asked.

ResultsPlus
Examiner Tip

This question is asking about water so do not make your response about sunlight.

Question 6 (b)

Command word: State

Candidates were asked to state an adaptation of an alveolus to increase the rate of gas exchange.

This was well answered by a large minority of candidates showing a good understanding of the subject covered. It was disappointing that a concept that has been covered many times before in previous exam series and had a diagram of an alveolus with its capillary network was not more mark yielding over the cohort. Large surface area was the creditable response seen most often with thin walls / walls are just one cell thick also often seen. Few candidates mentioned a good blood supply, with the capillary network having a large surface area seen just once.

(b) State **one** adaptation of an alveolus that increases the rate of gas exchange.

(1)

ResultsPlus
Examiner Comments

A less common but creditable response.

Question 6 (c)

Command word: Describe

This two mark item required candidates to say how blood is moved from the heart to the lungs. There are 2 parts to this question – how it is moved which is due to the heart muscles contracting (although most candidates gained their one mark by simply stating that the heart pumps the blood) and the structures involved, namely the right ventricle and the pulmonary artery. This part of the specification tends to be quite well covered but this question required candidates to apply what they have been taught, eg the right hand side of the heart sends blood to the lungs and the pulmonary artery carries blood to the lungs into a cohesive structure which many candidates found difficult with less than one in ten candidates gaining both marks.

(c) Describe how blood is moved from the heart to the lungs.

(2)

The blood is pumped through the bronchi, into the bronchioles and then into the alveoli.

ResultsPlus
Examiner Comments

This candidate has missed the point thereby not addressing the question and so gains no marks.

ResultsPlus
Examiner Tip

When asked how something, for example, is moved from one place to another – at least begin with where it starts and end with where it is going.

(c) Describe how blood is moved from the heart to the lungs.

(2)

It is mored through the pullumerery artary.
Heart will contract and push blood through the artary and through the pullunerary artary to the lungs.

ResultsPlus
Examiner Comments

A good logical description addressing the main points and gaining both marks available.

ResultsPlus
Examiner Tip

When faced with an item that requires a description of how something happens, take it one step at a time and state simply what makes it happen and how the relevant structures are involved.

Question 6 (d)(i)

Command word: Describe

Candidates had to describe the trend shown in the graph / Figure 10 which was basically the heart rate increases and then decreases – both parts were required for the first mark to be credited.

The second mark was awarded if the candidate stated, for example, when the change from increasing to decreasing or increasing slowly to increasing at a faster rate occurred which was data read from the graph.

(d) Figure 10 shows the heart rate of a person before, during and after exercise.

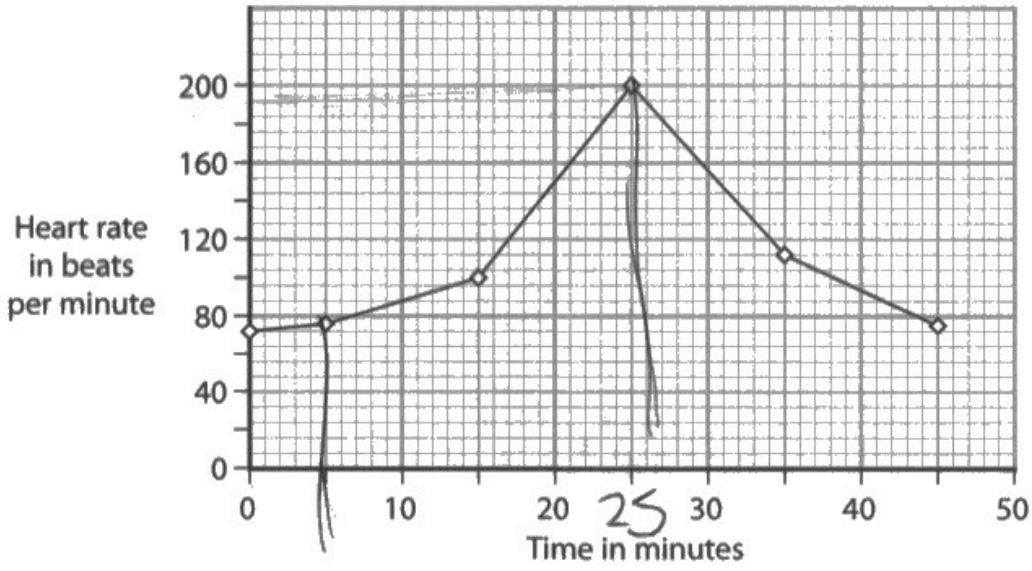


Figure 10

(i) Describe the trend shown in Figure 10.

Use data from Figure 10 to support your answer.

(2)

After they have spent upto 20-25 minutes continusly doing exercise their heart rate goes upto 200 bpm

ResultsPlus
Examiner Comments

A good response, but unfortunately only addresses the first part of the graph for one mark.

ResultsPlus
Examiner Tip

When reading data from a graph draw lines from the key points, as this candidate has done, to help you obtain accurate data to use in your response.

(d) Figure 10 shows the heart rate of a person before, during and after exercise.

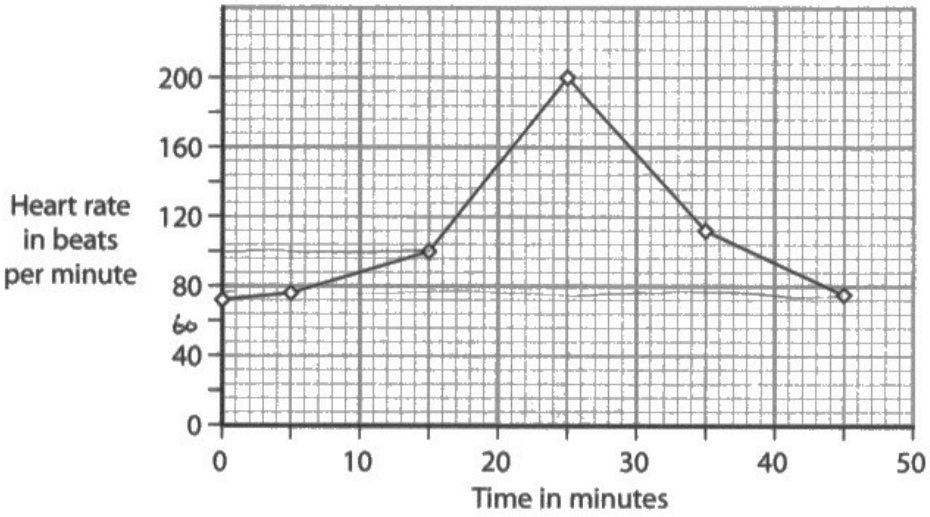


Figure 10

(i) Describe the trend shown in Figure 10.

Use data from Figure 10 to support your answer.

(2)

from 0 to ~~15~~ 15 minutes their heart rate slowly increases from 70bpm to 100bpm. from 15 to 25 minutes their heart rate increases rapidly from 100bpm to 200bpm. from 25 to 45 minutes, their heart rate decreases from 200bpm to 75bpm.

ResultsPlus
Examiner Comments

A good comprehensive response that logically addresses the changes in rate and specifies times when the changes occurred to gain both marks.

ResultsPlus
Examiner Tip

When asked to describe changes in data presented in a graph or in a table, work through logically stating how the data has changed as well as use information to say when it changed.

Question 6 (d)(ii)

This item continued from item 6(d)(i) requiring the candidates to explain the changes in heart rate from 0 to 25 minutes shown in Figure 10.

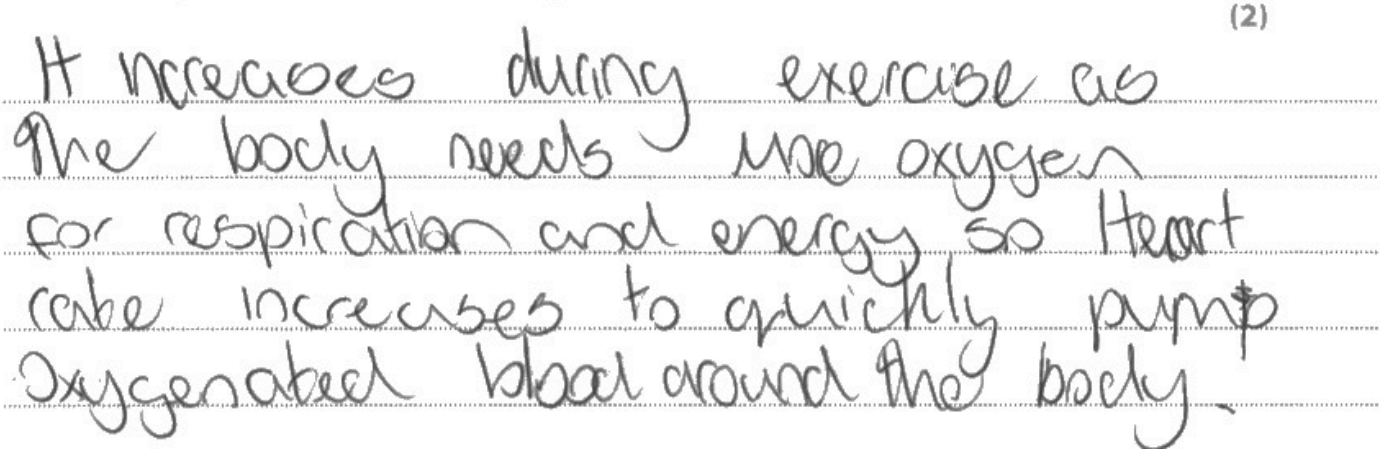
Most candidates again described the graph with some repeating what they had already said in part 6(d)(i).

It was disappointing that few candidates could relate the increasing heart rate to needing more oxygen / removing more carbon dioxide / more respiration – with a significant minority relating the increase to exercising.

Some of the candidates that did relate the increased heart rate to exercise were the ones that then developed their response to needing more oxygen, thus gaining all three available marks but these were in the minority with oxygen hardly mentioned and energy / respiration hardly seen at all.

(ii) Explain the trend shown in Figure 10 from 5 minutes to 25 minutes.

(2)



ResultsPlus
Examiner Comments

A good response that relates increased heart rate to more oxygen for respiration.

ResultsPlus
Examiner Tip

Explain the trend means that you have to make two steps, firstly the change – here it is increasing but to explain you have to say why it is increasing. This will usually be to get more of a resource for a basic function / requirement. You have to think what is changing, how is it changing, why is it changing.

(ii) Explain the trend shown in Figure 10 from 5 minutes to 25 minutes.

(2)

At 5 minutes their heart rate has elevated to 65 bpm and slowly increases to 90 bpm at 15 mins Then from 15 minutes to 25 the heart dramatically increases to 200 ~~bpm~~ bpm.

ResultsPlus
Examiner Comments

This candidate has simply described the changes in heart rate from 0 to 25 minutes whereas the question asks you to explain why the changes have occurred.

ResultsPlus
Examiner Tip

Make sure you know the difference between the command words 'describe' and 'explain': describe means 'say what you see' and explain means 'why' have the changes occurred.

Question 6 (d)(iii)

The equation for calculating cardiac output was given and candidates had to read 200 bpm from the graph and then multiply that by 0.13 dm^3 (given in the question) to produce 26dm^3 per minute.

A minority of responses seen simply multiplied the two numbers in the stem of the question, 25 minutes and 0.13dm^3 with a few saying "how should I know what the heart rate is" gaining no marks.

Overall the question scored well with significantly over half the candidates gaining all three marks available, many drawing across from the peak at 25 minutes on the graph to get an accurate 200 bpm.

(iii) The stroke volume is the volume of blood pumped during one beat of the heart.

At 25 minutes the stroke volume was 0.13 dm^3.

Calculate the cardiac output of the heart of this person at 25 minutes.

Use the equation

cardiac output = stroke volume × heart rate

$0.13 \times 25 = 3.25 dm^3$ (3)

3.25 ..... dm^3 per minute

ResultsPlus
Examiner Comments

No marks were awarded for just taking the two figures in the stem of the question and multiplying them together. Candidates who did this often had used the graph and stated that the heart rate increased to 200 bpm at 25 minutes.

ResultsPlus
Examiner Tip

If the equation states heart rate then that is what you need to substitute into the equation. We will not ask a question where the heart rate is required without giving it in the question and as this is part of question 6, the graph at the start (before part (a)) applies to all parts of the question – so the heart rate can easily be read from there.

Question 7 (b)

Command word: Explain

To gain marks here, candidates had to explain why red blood cells do not move from the blood into the Bowman's capsule.

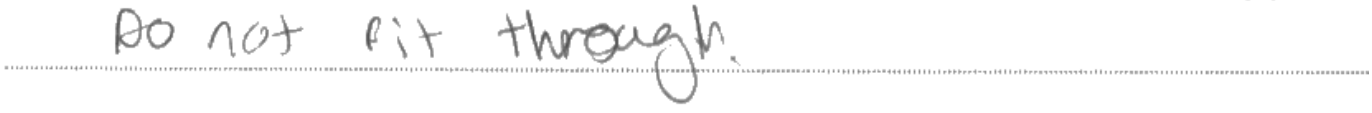
Over half of the candidates gained the two marks available here by saying they were too big to get through the small holes in the walls of the capillaries / glomerulus. Some candidates said that the blood cells would not fit in the Bowman's capsule which was not credited as the question was about the glomerulus / capillary.

Part 7(a) had stated that small soluble substances including glucose are forced through small holes in the glomerulus into the Bowman's capsule, which is what should be taught, so it was not unreasonable to insist on awarding the mark for stating that the red blood cells are too large to fit through the small holes in the glomerulus / capillaries.

Some candidates did not gain this mark as they answered the question what is the benefit of red blood cells not leaving the glomerulus / capillaries, which is a valid point but not the question set.

(b) Explain why red blood cells do not move from blood in the glomerulus into the Bowman's capsule.

(2)



ResultsPlus
Examiner Comments

Although not eloquently put, this answers the question set and so gains the available mark.

ResultsPlus
Examiner Tip

Although this gains one mark, try to specify what you are talking about and for both marks available try to give a complete answer. The red blood cells do fit through eg the capillary but do not fit through the small holes in the capillary walls.

Question 7 (c)(i)

This was the first time the function of this part of the nephron had been asked directly at this level although it had been part of mark schemes for general questions about the nephron. The question does ask the candidates to describe what happens to make the urine more concentrated. Urine could only become more concentrated by removing water or adding solutes and although not expected to be covered or known at GCSE, some urea can be added to the urine in the collecting duct and so candidates who wrote this gained credit. Water being absorbed back into the body was seen regularly but not as often as was expected.

(c) (i) Describe what happens in the collecting duct to make the urine more concentrated.

(2)

It adds things like urea and other waste into the urine to be removed from the body

ResultsPlus Examiner Comments

Although not on the GCSE specification and therefore not expected to be seen, urea being added to urine in the collecting duct is correct and so gained credit.

ResultsPlus Examiner Tip

If a question is hard and not usually asked – think how could it happen / be caused etc and use your logic to suggest an answer.

(c) (i) Describe what happens in the collecting duct to make the urine more concentrated.

(2)

The water is filtered out and absorbed which would make the urine more concentrated.

ResultsPlus
Examiner Comments

Although 'filtered' is not quite the correct word to use, the answer is basically correct so easily gains the available mark.

Question 7 (c)(ii)

Command word: State

This was a recall question that should have been common knowledge and so it was disappointing that one third of candidates did not gain credit with incorrect responses ranging from the stomach to the nephron.

However, it scored reasonably well overall with two thirds of the candidates gaining the available mark.

Question 7 (d)

Command word: Describe

This 6 mark question required knowledge of food tests.

Candidates had to describe how they could test a sample of food to see if it contained glucose (a reducing sugar) and protein.

Scaffolding included giving the candidates the names of Benedict's and Biuret solutions as well as reminding them to state the expected results.

To gain all 6 marks available candidates had to state they would add the food to each of the solutions, that Benedict's solution needed heating / boiling (to speed up the reaction), and link Benedict's solution to glucose and Biuret to protein and look for a (correct) colour change.

For a response to be graded as Level 3 for this type of question, the description has to be accurate, with relevant understanding throughout with the procedures fully developed.

It was disappointing to find candidates adding iodine (solution) considering they were given Benedict's and Biuret solution in the stem of the question.

Candidates did not score as well as expected on this core practical question with many not able to start with 'put some food in the Benedict's solution and some in Biuret solution'. Too many candidates negated to heat the Benedict’s solution, equally too many boiled both. Colour changes were often not specified and even when they were, what the results meant were confused.

The modal mark here was 0 with 4 being the next commonest mark where candidates only had to add carry out a correct test and state that they should note the colour change. For 6 marks both tests had to be described with one correct colour change linked to either glucose or protein.

*(d) Describe how you would use laboratory tests to show if a food contains glucose (a reducing sugar) and protein.

Include in your answer:

- how you would prepare the sample of food
- how you would use Benedict's solution and Biuret solution
- the results you would expect.

(6)

Put the samples of food into ~~one~~ spotting tiles and add a drop of Biuret solution to the food. If the food turns purple/blue, ~~other~~ protein is present, keep adding a drop of biuret to ~~the~~ food sample ~~each~~ time until it does not change colour meaning there is no more protein present.

put samples of food into ~~one~~ spotting tiles again and add a drop of benedict solution to the food. If the food turns blue, glucose is present, keep adding a drop of benedict's into each tile on a food sample until the food doesnt change its ~~colour~~ colour meaning there is no more ~~protein~~ glucose present.

ResultsPlus
Examiner Comments

A reasonable four mark response where the candidate has added Biuret solution to the food and related the change in colour from blue to purple (we can ignore the fact that the candidate says the food will turn purple as if something like white bread was tested it may well look purple) as indicating protein is present. Benedict's test is not credited as heating is not included and the colour change is incorrect.

ResultsPlus
Examiner Tip

Make sure that you know the core practicals in detail as each exam series is going to test more than one of them.

Question 8 (a)

Command word: Explain

Candidates were asked to explain why the wall of the left ventricle is thicker than that of the right ventricle. Again this is a standard aspect of the heart which is tested regularly and is specified as required knowledge in the specification. However we have not asked it in exactly this way this before int paper 2F.

The common misconception was that the walls need to be thicker to withstand the high pressure of the blood in the L Ventricle rather than to require to exert more pressure on the blood. Variations on MP1 were often awarded, however candidates found it easier to express MP2 with most stating that the wall was thicker because it had to push blood further (around the body).

8 (a) The heart pumps blood.

Explain why the wall of the left ventricle of the heart is thicker than the wall of the right ventricle of the heart.

(2)

BECAUSE IT NEEDS TO BE MORE MUSCULAR TO PUMP BLOOD TO THE ALL BODY ORGANS

ResultsPlus
Examiner Comments

Both marks are awarded here for 'more muscular' and 'to all the body organs'.

ResultsPlus
Examiner Tip

This is an 'explain' question so it is good to start with 'because' as this helps you to phrase your response in the correct way.

8 (a) The heart pumps blood.

Explain why the wall of the left ventricle of the heart is thicker than the wall of the right ventricle of the heart.

(2)

Because on the left ventricle the wall needs to be thicker to maintain the high blood pressure as more blood is passed through the left ventricle.

ResultsPlus
Examiner Comments

Here we just get MP1 for 'maintain' the high blood pressure.

It is a common misconception that the left hand side pumps more blood than the right hand side so the rest of the response is not creditable.

Question 8 (b)(i)

Just under two thirds of candidates correctly identified part X as plasma with the commonly seen non-creditable responses of water.

Question 8 (b)(iii)

Few candidates scored here. The specification states that candidates should know lymphocytes and phagocytes but of course other correctly named white blood cells were also credited, however B cells, T cells and memory cells are types of lymphocytes and so only one of a list of these would be credited.

(iii) Name **two** types of white blood cell.

(2)

1 T cell

2 Absorb

ResultsPlus
Examiner Comments

T Cell is credited as a type of lymphocyte, however no mark is awarded for absorb.

(iii) Name **two** types of white blood cell.

(2)

1 Memory lymphocytes

2 lymphocytes.

ResultsPlus
Examiner Comments

Here the candidate has written lymphocyte and a type of lymphocyte and so is awarded just one mark.

Question 8 (c)(i)

Command word: Calculate

To gain credit on this item, candidates had to calculate the volume of red blood cells in 470cm^3 of blood having been told that red blood cells make up 44% of the blood.

There are several variations of how to calculate the volume and all of them were acceptable. The majority of candidates did so by dividing 470 by 100 and then multiplying by 44 to get 206.8 Candidates were asked to give the volume to the nearest whole number and so, 206.8 need to be expressed as 207 for all three marks to be awarded.

There were marks for eg rounding up an incorrect calculated number that was correctly rounded to the nearest whole number.

Question 8 (c)(ii)

Command word: State

Two precautions taken when blood is collected from a patient by a doctor were required to gain the two marks available for this item. Candidates tended to access this question well although some gave answers about before and after the blood sample was taken.

This item scored well with over half the candidates gaining at least one mark. Candidates lost marks for giving responses such as 'check that the patient has no disease' and make sure you use the right arm which come under the category of 'before' the blood was taken as well as 'use a **clean** needle' rather than 'use a **sterilised** or **new** needle'.

(ii) Before donating blood, a person has a small blood sample taken to check that the blood is healthy.

State **two** precautions a doctor should take when collecting this sample.

(2)

1 thar theire are no air bubbles in the cerinje

2 thar the needle is clean

ResultsPlus
Examiner Comments

No marks are awarded here. This is relatively late on in the paper and targeted at Level 4/5 and so we expect a more scientific response than just eg clean needle.

ResultsPlus
Examiner Tip

At this stage of the paper try to make your response as scientific as possible including using words like sterilised here instead of clean.

Question 9 (a)(i)

Command word: Name

Just over half the candidates correctly identified the part labelled X of the root hair cell as the vacuole. The common non-creditable answer seen was cytoplasm.

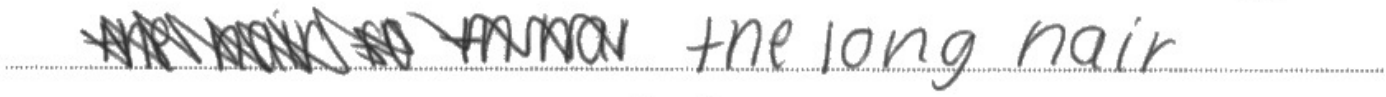
Question 9 (a)(ii)

It was surprising that many candidates demonstrated little understanding of what a root hair cell was as they have been used in several previous examinations.

Less than half gained the mark available here, mainly for saying the root hair cell has an increased / large surface area with very few candidates referring to mitochondria or making creditable comments about the cell wall.

(ii) State **one** way that the structure of the root hair cell increases the volume of substances it absorbs.

(1)



ResultsPlus
Examiner Comments

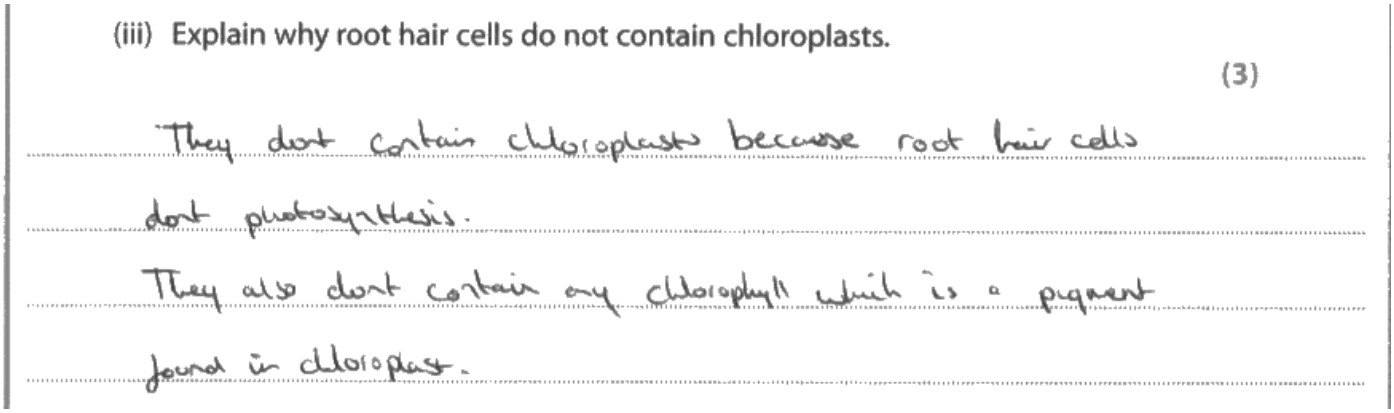
Large surface area was awarded for saying the '**long** hair cell' as the 'long' incorporates the idea of increased surface area.

Question 9 (a)(iii)

Command word: Explain

Although the introduction to Q09 stated that the root hair cell was from a plant, a significant number of candidates wrote about animal / human hair not needing to be green. A significant number of candidates who did write about plant roots still said vague, non-creditable comments such as because the roots don't need to be green. However there were many excellent responses seen that explained why plant roots tend not to have chloroplasts covering all the marking points. Some candidates stated that roots don't have chloroplasts as they don't ned to photosynthesise without any reference to lack of light.

Almost half of the candidates did score here, mainly gaining one mark for saying that the roots are underground / are in the dark with a few also stating that the cells could therefore not photosynthesise. Roughly 1 in 10 responses clearly understood why root hair cells do not contain chloroplasts and gave excellent responses gaining all three marks available.



(iii) Explain why root hair cells do not contain chloroplasts.

(3)

They dont contain chloroplasts because root hair cells dont photosynthesis.

They also dont contain any chlorophyll which is a pigment found in chloroplast.

ResultsPlus
Examiner Comments

A response worthy of one mark as it states that the roots don't photosynthesise but no more as it does not link this to being underground where there is no light.

ResultsPlus
Examiner Tip

This is a three mark 'explain' item so use the word because eg root cells don't photosynthesise because.....

(iii) Explain why root hair cells do not contain chloroplasts.

(3)

Because root hair cells are on the roots, which are underground, so they do not need chlorophyll for photosynthesis as they do not interact with light.

ResultsPlus
Examiner Comments

This is clearly worthy of three marks with all 3 marking points met.

ResultsPlus
Examiner Tip

This question is about roots – if you don't know what to write – think what is it about roots that means they do not photosynthesise.

Question 9 (b)

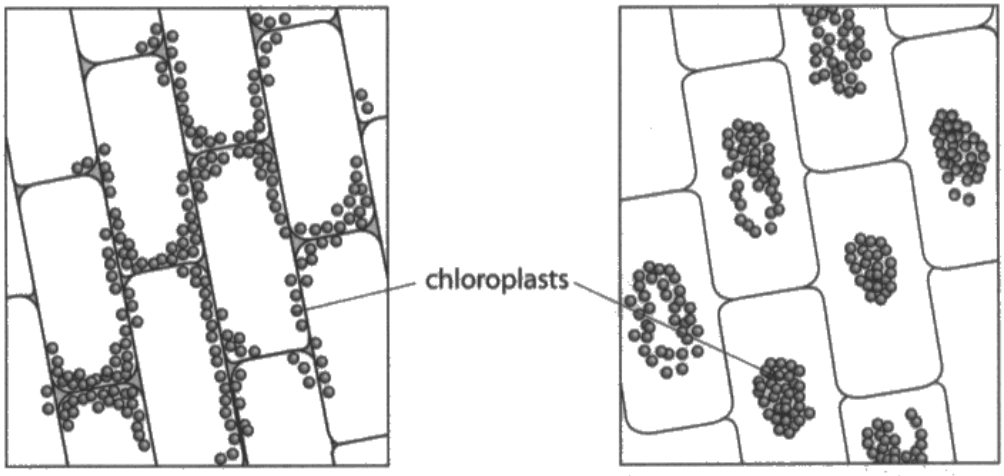
There were many occasions here when candidates referred to the *elodea* cells when they meant chloroplasts in the *elodea* cells. This includes using the word they. They are clumped together in the salt solution gains no marks as they refers to the cells not the chloroplasts.

Most candidates correctly referred to chloroplasts being around the edge in water and in the centre (of the cell) when in the 10% salt solution for their two marks. Marks were also given for the cells being larger in the 10% salt solution and reference to the gaps between cells in the water.

(b) A student studied the water plant *Elodea*.

The student used a light microscope to observe the cells of the plant in tap water and in a 10% salt solution.

Figure 14 shows *Elodea* cells in tap water and in a 10% salt solution.



Elodea cells in tap water

Elodea cells in 10% salt solution

Figure 14

Describe **two** ways that the *Elodea* cells in the 10% salt solution are different from the *Elodea* cells in tap water.

(2)

1 The Elodea cells in tap water are located around the outside of the cell

2 The Elodea cells in 10% salt solution are grouped up together in the middle of the cell

ResultsPlus
Examiner Comments

No marks are given here as the candidate refers to cells not chloroplasts.

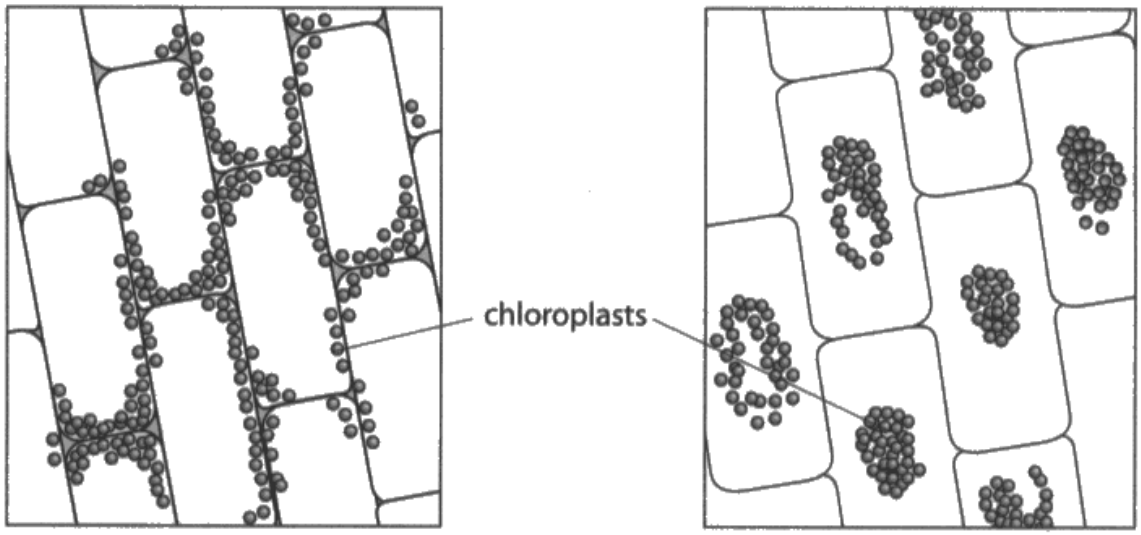
ResultsPlus
Examiner Tip

Be careful what you refer to in your response. Here the chloroplasts are clearly labelled so do not refer to them as cells.

(b) A student studied the water plant *Elodea*.

The student used a light microscope to observe the cells of the plant in tap water and in a 10% salt solution.

Figure 14 shows *Elodea* cells in tap water and in a 10% salt solution.



Elodea cells in tap water

Elodea cells in 10% salt solution

Figure 14

Describe **two** ways that the *Elodea* cells in the 10% salt solution are different from the *Elodea* cells in tap water.

(2)

1 They are in the centre of the cell

2 They are in more of a fixed spot.

ResultsPlus
Examiner Comments

Do not use words such as they or it as here 'they' refers to the cells, not the chloroplasts.

Question 9 (c)

Command word: Explain

Candidates were given a diagram of a tree with arrows, representing water, going into the roots, up the trunk / stem, through the branches, and then into and out of the leaves.

The modal score here was four marks, with few candidates failing to score at all. For Level 2 to be awarded a general more than one part of the root taken by water was needed, for example: water is absorbed by the roots and then goes up the tree and into the leaves and for four marks to be awarded there also had to be reference to explain how water moves into / through / out of the plant. Many candidates could manage osmosis for the process of water moving into the roots and evaporation / diffusion for water moving out of the leaves. Very few transpiration and tree trunks were seen.

For Level 3 roots, trunk / branches and leaves were required with a little detail included eg a correct reference to xylem or stomata. So, for example, stating water moves from the soil into the roots, up the stem in xylem and then into and out of the leaves. For the full 6 marks though there also had to be an explanation of how the water was moved into, through or out of the tree.

*(c) The arrows in Figure 15 show the direction of water movement through a tree.

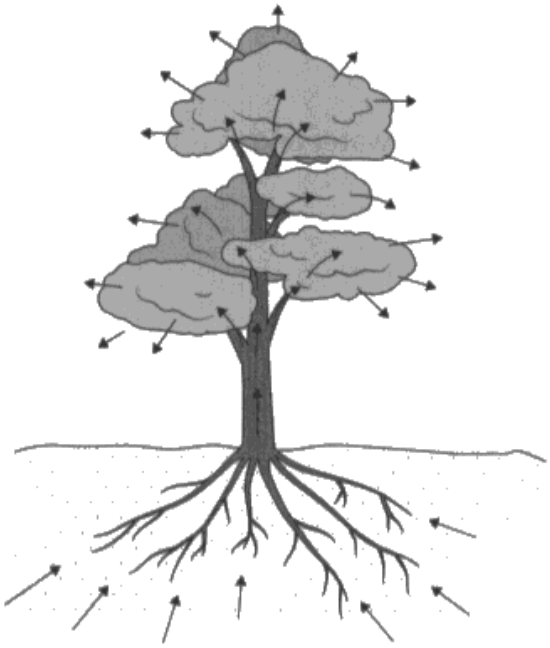


Figure 15

Explain how water is moved from the soil, through the plant and into the air.

(6)

- Water enters the plant ~~by the soil~~ from the soil to the roots
- goes up the plant through the cuticle
- water will enter eny leaves on the way
- where it is diffused into the air

ResultsPlus
Examiner Comments

More than one part of the root taken by water is included in the response so Level 2 is awarded. The reference to water diffused out of the leaf is enough to move the mark to the top of Level 2 so four marks awarded.

ResultsPlus
Examiner Tip

When asked to describe eg, a route – ensure that you refer to all the parts of the root. Here reference to up the trunk of the tree would have increased the marks significantly.

Question 10 (a)

Command word: State

Candidates were presented with details of a method to compare the rate of decomposition rates of holly and oak leaves.

Candidates had to state two variables that should be controlled in the investigation. Candidates were relatively good at answering this question with very few blank space being seen.

The stem of the question stated that 200g of leaves were placed in each bag and that the mass was recorded every 10 days for 50 days.

Common creditable responses included keeping the temperature constant and ensuring that the bags were made out of the same material.

Even though candidates were told, for example 200g of holly leaves and 200g of oak leaves, they still wrote answers to the question that included keep the mass of the leaves at the start the same. Some candidates stated keep the light intensity the same but this was not credited as candidates should know that light does not affect the rate of decomposition. Some candidates did get this mark when they referred to neither in sunlight, if they referred to the heat effect of the sun however obliquely.

Candidates did not find this question easy to access with very few gaining both marks available.

10 A student investigated the decomposition of two different types of leaf.

The student placed 200 grams of holly leaves in a net bag.

The student placed 200 grams of oak leaves in another net bag.

The bags were left in a classroom.

The mass of the leaves in each bag was recorded every 10 days for 50 days.

(a) State **two** variables that would need to be controlled in this investigation.

(2)

1 The temperature

2 The humidity

ResultsPlus
Examiner Comments

Two marks awarded for two relevant factors that should be controlled.

ResultsPlus
Examiner Tip

Keep it simple. If you are asked to state two factors, you do not need to explain or describe in any detail so just state the two and move on as shown here.

10 A student investigated the decomposition of two different types of leaf.

The student placed 200 grams of holly leaves in a net bag.

The student placed 200 grams of oak leaves in another net bag.

The bags were left in a classroom.

The mass of the leaves in each bag was recorded every 10 days for 50 days.

(a) State **two** variables that would need to be controlled in this investigation.

1 location

2 ~~temperature~~.

ResultsPlus
Examiner Comments

Is temperature crossed out? It does not matter as nothing is written to replace it so we mark it anyway.

Location needs a bit more detail and justification for credit as the stem of the question states both are left in a classroom.

ResultsPlus
Examiner Tip

Check that your answer is not already covered in the introduction to the question. Here it states left in a classroom and so location could be credited but it needs more specific details eg do not leave one near the radiator of the classroom and the other in a cold cupboard.

Question 10 (b)(i)

The mass of holly and oak trees every 10 days was recorded and presented in a table.

Candidates had to calculate the rate of decomposition of the holly leaves from day 0 to day 50.

Most candidates calculated the difference in mass as 80 grams (200 – 120) for one mark however although the majority of candidates scored here, and more candidates scored the full two marks rather than one mark, a significant number of candidates dropped a mark by dividing by 5 instead of 50 mistaking the five sets of data recorded as 5 days. Some candidates used the wrong set of data and calculated the rate of decay for the oak leaves.

(b) The results of this investigation are shown in Figure 16.

time in days	mass of leaves in grams	
	holly	oak
0	200	200
10	191	181
20	176	154
30	159	122
40	147	96
50	120	70

Figure 16

(i) Calculate the rate of decomposition of holly leaves from 0 to 50 days.

(2)

200 − 120 = 80

80 ÷ 50 = 1.6

1.6 grams per day

ResultsPlus
Examiner Comments

A neatly set out correct answer for two marks.

ResultsPlus
Examiner Tip

Try to set out your working as neatly as possible so it is easy for the marker to see the stages in your calculation. That way if the answer is wrong the marker can easily see any stages, eg here dividing by 50, allowing some marks to be awarded.

(b) The results of this investigation are shown in Figure 16.

time in days	mass of leaves in grams	
	holly	oak
0	200	200
10	191	181
20	176	154
30	159	122
40	147	96
50	120	70

Figure 16

(i) Calculate the rate of decomposition of holly leaves from 0 to 50 days.

(2)

-80 ÷ 50

..... 1·6 ..... grams per day

ResultsPlus
Examiner Comments

Make sure that you write your answer clearly on the answer line as if it is unclear (here it is still clear) you may not get the marks you deserve.

(b) The results of this investigation are shown in Figure 16.

time in days	mass of leaves in grams	
	holly	oak
0	200	200
10	191	181
20	176	154
30	159	122
40	147	96
50	120	70

Figure 16

(i) Calculate the rate of decomposition of holly leaves from 0 to 50 days.

(2)

27+12+17+15+9=80÷6=13.3

13 grams per day

ResultsPlus
Examiner Comments

There is just one of the two marks awarded here, the loss of mass is correctly calculated but then that mass has been divided by 6 instead of 50.

ResultsPlus
Examiner Tip

Take care and check the details of the question, here 80 should have been divided by 50, not 6. 50 is the number of days the leaves were left and 6 is the number of numbers in the table.

Also check carefully if your answer is reasonable.

If the rate of decay was 13 grams per day then over the 50 days of the investigation 650 grams of the 200 grams has been decomposed.

Question 10 (b)(ii)

This item required candidates to compare the rate of decay for the holly leaves and the oak leaves. Compare means that the candidate has to say what is the same and what is the difference. Here both sets of leaves lost mass but oak leaves lost more mass.

Some candidates calculated the rate of decay per day for each set of leaves but gained no marks as they did not continue and state that one was more than the other.

Question 10 (c)

Command word: Explain

This item was not well answered and marks awarded were comparably low with significantly less than half of candidates scoring any marks at all. The candidates had to explain why it is important for the environment that dead leaves decompose. Many candidates had problems expressing themselves in creditable ways with creditable responses roughly evenly split between the first and second alternatives in the mark scheme: minerals being released which are used by other plants or to make sure that the leaves do not build up thus covering small plants.

(c) Explain why it is important for the environment that dead leaves are decomposed.

(2)

So that the nitrates from the decomposing material is released back into the soil + air to continue the cycle.

ResultsPlus
Examiner Comments

Reference to nitrates being released into the soil is MP1.

Reference to being part of the cycle of life is creditable under the accept for MP2.

Question 10 (d)

This item asked candidates to name one type of organism that decomposes leaves. As snails were referred to in the question it is not surprising that they were the commonest correct decomposer mentioned but many others from worms to ants were acceptable for the available mark to be awarded. Over half the candidates gained this mark.

Question 10 (e)

Candidates were presented with a table showing the mass of leaves and snails kept in a container at the start and end of a month.

Candidates had to calculate the mass lost by the leaves and the increase in mass of the snails and compare the two.

The majority of candidates gained no marks as they primarily failed to state the difference in the decrease in mass of leaves and the increase in mass of the snails as well as not comparing and explaining this difference. The majority of explanations was that the mass of leaves decreased because the snails were eating them whilst the snails mass increased because they had eaten the leaves.

Of the one in five candidates that did state that the snails gained less than the leaves lost, only a few could go on to give a reason to explain the difference. The relatively small number that did tended to say that not all the leaves were digested with some saying that some was used up for movement.

(e) Leaves are eaten by snails.

1 600 grams of leaves and 10 snails were kept in a container for one month.

A scientist measured the mass of the leaves and the mass of the snails at the start and end of one month.

Figure 17 shows the results.

	mass in grams	
	at start of month	at end of month
leaves	1 600	400
snails	200	320

Figure 17

Explain why the change in mass of the leaves is not the same as the change in mass of the snails.

(2)

The snails would eat the leaves. This causes the leaves to decrease. The snails would then increase in mass as they will be gaining energy transfer from the leaves.

ResultsPlus
Examiner Comments

A typical response gaining no marks. The candidate has missed the point that 1200 grams of leaves were eaten by the snails but the mass of the snails only increased by 120 grams.

ResultsPlus
Examiner Tip

If you are presented with figures and asked to compare them, it is always useful to find the change in the two sets of figures which takes little time and then use that as your basis for your answer.

(e) Leaves are eaten by snails.

1 600 grams of leaves and 10 snails were kept in a container for one month.

A scientist measured the mass of the leaves and the mass of the snails at the start and end of one month.

Figure 17 shows the results.

	mass in grams	
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leaves	1 600	400
snails	200	320

Figure 17

Explain why the change in mass of the leaves is not the same as the change in mass of the snails.

(2)

because the shail doesn't use the ~~t~~ all the energy in the leaves and anaerobically Respires energy and some energy is also used in waist like places

ResultsPlus
Examiner Comments

A good answer, gaining both available marks, which refers to the mass lost by the leaves is greater than the mass gained by the snails and then gives an explanation for the difference.

Paper Summary

Based on their performance on this paper, candidates should:

- Ensure that they read the question carefully so that their response is targeted to the question being asked.
- Not just regurgitate stock answers as more often than not they are required to apply knowledge to a different situation to that which was taught.
- Have a clear understanding of the requirements in answering questions that use 'describe' and 'explain' as command words.
- Keep your responses simple and targeted to answering the question / task set.
- Not give a list of alternative ideas, as more often than not, an incorrect response disqualifies a creditable one.
- Develop responses so that consequences of initial points are covered in items where 2 or more points are available.
- Be precise and specific as many vague answers seen showed that candidates had a basic understanding of the concepts being tested but were unable to express their ideas clearly enough to be awarded marks.
- Go through your responses at the end of the exam, if you have time, asking: Have I answered the question? Can I add a piece of detail that will make the response clearer? Does my response cover the number of marks available for this item? However, do not change all your response unless you are really sure that it is not creditable.
- Ensure when submitting exception scripts they know what is required for specific types of questions eg joining boxes with one straight line – see comments made on item Q01(a).

Grade boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

https://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html

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