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Examiners' Report
June 2016

GCSE Biology 5BI2F 01

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Introduction

There were some very strong answers to several of the questions in this paper indicating good progress in knowledge and understanding of several areas of the specification.

Question 1 appeared to be a fair introduction to the paper for most candidates who were able to express their understanding of digestion and enzyme activity well, albeit in a simple way. Questions 1bi and particularly 1bii provided the most challenge for less able candidates. Several misinterpretations of the graph were seen where candidates focussed their discussion on the rise in temperature rather than relate this to enzyme activity and few candidates were able to express clearly why the activity of the enzyme had stopped at 50 ^{o}C.

Unsurprisingly, candidates performed better on the multiple choice questions or short answer questions where selecting the correct answer to either fill a gap in a sentence or to link boxes provided less challenge. There are several widespread misconceptions across various topics in the specification and a serious lack of understanding in others which have been highlighted throughout this report. Candidates are still repeating the wording of questions in their answers and filling space allocated for answers in this way. This could make it appear to some students that the question has been answered although they seem unaware that further detail is needed to gain any marks. Students didn't respond well to quesiton 3bii where they were asked to explain why the percentage of blood travelling to muscles increases during exercise. As mentioned in many previous reports, many candidates are failing to relate their answer to an increase in metabolism and consequently omit simple detail such as *more* oxygen or *greater* energy demand in their answers.

Other answers also lacked detail and lost marks and there was much evidence to suggest that many students just did not read the question properly.

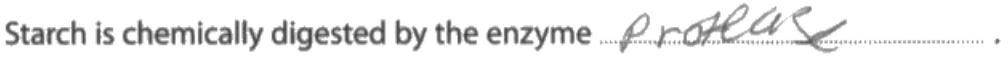
Question 5b was particularly poorly answered indicating a very serious lack of understanding of DNA mutation and similarly question 6bi provided equal challenge in that candidates generally filled the answer space by repeating the question. However, candidates should be complemented on the techniques that they use to answer questions involving calculations. Many more students are now showing working out and gaining marks from this, rather than just writing a final figure which in a significant number of cases was incorrect. Candidates would benefit from more practice on how to analyse data in graphs and tables and this is evident from the sometimes confusing and random answers given. Likewise for extended answers, although it appears that less random information is being used in this type of question, candidates would benefit from planning their answer prior to writing a response and learning how to pick out the key points in a question.

The answers provided to the extended answer questions were, on the whole, more relevant and appropriately linked to the topic being tested where in previous series there often appeared to be serious misconceptions, particularly in genetic modification where candidates often confused this process with selective breeding and cloning. This was far less obvious in this series, with responses across the ability range gaining marks for clear-cut answers that covered some or, in few cases, most of the indicative content. Very few candidates failed to gain the QWC mark for their extended responses as answers were mostly coherent and logically written.

Question 1 (a) (i) 1

More candidates were unable to identify amylase as the enzyme that chemically digests starch than those that were successful in their answer. Protease and lipase were frequently seen in incorrect responses although in many cases the word chosen from the box appeared to be random with the whole range of words used across the responses seen.

Many of the incorrect answers gave the name of another enzyme instead of amylase to complete the sentence.



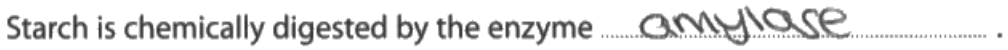
ResultsPlus
Examiner Comments

This student failed to gain marks for completing the sentence with the incorrect enzyme.

ResultsPlus
Examiner Tip

The names of enzymes often sound similar to the substrate that they work with but you will need to remember that amylase is a *carbohydrase* that works on *carbohydrates* such as starch.

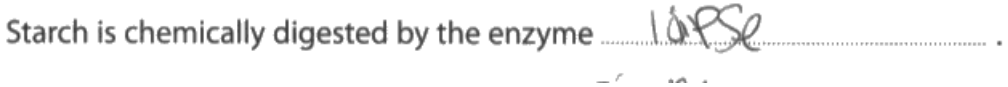
Less students were able to identify amylase from the list of words given to correctly complete the sentence about starch digestion.



ResultsPlus
Examiner Comments

This response gained one mark for finishing the sentence with the correct named enzyme.

The majority of candidates gave the name of another enzyme, either lipase or protease, to complete the sentence about starch digestion.



ResultsPlus
Examiner Comments

This candidate failed to choose the correct enzyme to complete the first sentence for this question and therefore was not awarded a mark.

Question 1 (a) (i) 2

Slightly more candidates were successful in their choice of words to complete the sentence about starch digestion than were successful on the previous question. However, it is very clear that many candidates misunderstand chemical digestion as still over half of students were unable to choose the correct words from the box to state that simple sugars are produced from the breakdown of starch. As with the previous question, incorrect responses spanned the range of words given although, most frequently, amino acids was the term that many candidates incorrectly chose.

Less candidates scored the mark here than those that were able to gain a mark indicating clear misconception across the cohort.

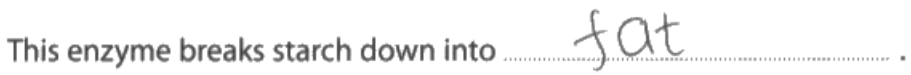
ResultsPlus
Examiner Comments

More able candidates were able to gain a mark by correctly choosing 'simple sugars' to complete the sentence about starch digestion.

ResultsPlus
Examiner Tip

Always read carefully through all words given in boxes before making a choice. Read back through the sentence after you have added words to see if the sentence makes sense.

In many cases, responses indicated that candidates were choosing words at random to complete the sentence about starch digestion. Although amino acids was the most popular incorrect answer, fat came a close second.



ResultsPlus
Examiner Comments

This response failed to gain a mark for incorrectly stating that fat is the product of starch digestion.

Question 1 (b) (i)

Many candidates were able to score the full two marks for their response to this item. Most commonly this was for recognising an increase and then a descrease in the activity of the enzyme. Where activity or temperature values were mentioned in answers, these were generally correct although a fair number of students did quote incorrect temperature values from the graph to highlight peak enzyme activity. Candidates that failed to gain marks most often related the upward gradient of the graph to the enzyme heating up or just discussed a temperature rise without linking this to a rise in enzyme activity. One mark answers frequently failed to discuss any part of the graph after the peak and therefore responses that simply stated 'the enzyme activity increases' or similar without recognising the decrease were limited in their success.

Many candidates were able to score the full two marks for their response. All of these appreciated the increase in enzyme activity with the second mark coming from either quoting the peak at 37°C, and less commonly 50 au, or recognising the decrease in activity. A significant proportion of candidates that included all three marking points in their answer quoted an incorrect temperature or temperature range for the peak activity of the enzyme. Most of these gave the value of 40°C, clearly incorrect, but likely to be a result of a little confusion from reading this value in the question. Despite this, two marks were still gained for covering details that met the criteria for marking points 1 and 2. Less successful candidates scoring one mark most frequently obtained this for recognising an increase in activity with a rise in temperature whilst those that failed to score at all either gave answers that were incoherent or that attempted to *explain* the rise in activity with temperature rather than describe or that implied weak analytical skills where misinterpretation of the graph or the question was evident.

(i) Describe the enzyme activity from 0 °C to 40 °C.

(2)

As the enzyme activity gradually increase the temperature increases also.

ResultsPlus
Examiner Comments

Although this candidate scored one mark for their response they have given details the wrong way round. However, what is provided is evidence enough that the candidate understood the question and was able to read correctly from the graph.

ResultsPlus
Examiner Tip

When asking to 'describe.....' what a graph is showing, always mention the independent variable first.

In some cases, although answers were correct, candidates were let down by their choice of terminology. Rather than use correct or more apt scientific wording, candidates quite often used the term 'hotter' rather than 'temperature rise/increase'. Although in this instance it rarely affected marks as three marking points were very frequently covered in answers, the correct use of terminology should be encouraged at all times where candidates should use the terms given for the independent and dependent variables in the question rather than their own alternatives.

(i) Describe the enzyme activity from 0 °C to 40 °C.

(2)

~~It increases~~

The enzyme action increases as it gets hotter. Until it reaches the body temperature of 37° (starts to decrease

ResultsPlus
Examiner Comments

This candidate has covered three marking points in their answer, as responses often did, to gain a maximum of two marks.

ResultsPlus
Examiner Tip

Always use appropriate scientific terminology where possible rather than alternative words that could limit marks in other types of questions.

Less candidates quoted that enzyme activity reached a maximum of 50 au than those quoting the peak temperature. No arbitrary value other than 50 was seen in answers that did include this figure and responses that did use this value generally gained full marks by adding to their answer informaiton about the increase in enzyme activity with the temperature rise. Several responses that did mention arbitrary units failed to include units and although this was ignored on this occasion candidates should be made aware that leaving out units when quoting values in answers could limit marks.

(i) Describe the enzyme activity from 0 °C to 40 °C.

(2)

It increases up until 50 on the enzyme activity and then decreases rapidly.

ResultsPlus
Examiner Comments

This candidate gained two marks for their response, mentioning the peak activity of the enzyme at 50 au and the decrease in activity following this. The candidate has, sensibly, given the units to the value quoted.

ResultsPlus
Examiner Tip

Always include units when quoting values from tables and graphs.

There were a vast number of responses that quoted incorrect temperature values or ranges. It is likely that these students were taking the temperature value quoted in the question and then making the assumption, rather than checking carefully on the graph, that the enzyme activity rose to peak at this particular point. Most of candidates stated that the activity of the enzyme rose until 40°C and if these had looked more closely at the graph before writing their answer they may have been awarded a further mark.

(i) Describe the enzyme activity from 0°C to 40°C.

(2)

Enzymes activity increase rapidly from 0°c to 40°c, for every 5°c the enzymes activity went up by enzyme activity/ arbitrary unit.

ResultsPlus
Examiner Comments

This candidate has quoted an incorrect temperature range in their answer. It is clear from the graph that enzyme activity does not rise between 0 and 40 °C, rather 0 and 37 °C, and this has restricted the mark awarded to 1.

ResultsPlus
Examiner Tip

Read questions carefully and analyse graphs closely in order to gain a full understanding of what they are actually showing.

Many responses that failed to gain marks discussed the temperature rise without linking this in any way to an increase in enzyme activity. Rather than relate the pattern of the graph to enzyme activity, these candidates appear to think that it related to temperature and therefore gave answers along the lines of 'the temperature increases and then decreases'.

(i) Describe the enzyme activity from 0°C to 40°C.

(2)

The temperature increased from 0° to 50° then decreased when it got to 50°.

ResultsPlus
Examiner Comments

This candidate seems confused on what the line graph is actually showing and has also quoted an incorrect value in their response. They have misunderstood the graph to relate to temperature rather than enzyme activity.

ResultsPlus
Examiner Tip

Read the axes labels carefully on graphs given. Rise and fall of graph lines always refer to the dependent variable shown on the Y axis, not the independent variable on the X axis.

Question 1 (b) (ii)

A significant proportion of candidates appeared to misunderstand the question and were unsuccessful in gaining credit for the responses that they gave. Most of these tended to repeat the question with details such as 'because the enzyme stops working at 50 °C' or 'the enzyme cannot work at/above 50 °C without extending their answer further to give a scientifc reason why. Other unsuccessful responses were particularly vague - 'its too hot' or 'the temperature was too high' or '50 was the maximum temperature that enzymes can work at' were seen frequently as was 'the enzyme is killed' and these failed to obtain any marks. Few candidates were able to identify the optimum temperature for this enzyme from the graph and there was little mention of this in general and the temperatures quoted in answers more often included a range of 40-50 °C rather than the 'optimum' range between 36 °C and 38 °C. Some candidates were able to link high temperature with a change in the shape of the enzyme or its active site and this, along with details about the enzyme 'denaturing' were the best responses covering, most commonly, marking points 2 and 3. Marking point 1 was seen less frequently and marking point 4 was only covered by a vast minority.

A large majority of answers focussed on the temperature being too high for the enzyme to work and failed to give any scientific explanation that accounted for the enzyme inactivity at 50 °C. Many responses were just a repeat of the question and others discussed the rise and fall of temperature, seemingly misunderstanding what the graph was actually showing.

(ii) Explain why the enzyme activity stopped at a temperature of 50 °C.

(2)

Because the temperature was too high for the pepsin to function properly.

ResultsPlus
Examiner Comments

This candidate failed to provide an explanation for the enzyme inactivity at the temperature given in the question and is an example of a response that is too similar to the question.

ResultsPlus
Examiner Tip

It is fine to use information from the question in an answer but responses must extend further than just repeating the question. Details need to be included in answers to show knowledge and understanding.

Responses rarely scored 2 marks as candidates failed to provide an explanation for the lack of activity at 50 °C. Of those that did give creditable answers, marking points 2 and 3 were most commonly awarded.

(ii) Explain why the enzyme activity stopped at a temperature of 50 °C.

(2)

The enzyme denatured, meaning its ~~does~~ active site has changed and no longer functions as a normal enzyme because sugars such as glucose no longer activate the enzyme because it doesn't fit.

ResultsPlus
Examiner Comments

This candidate scored a clear 2 marks for stating that the enzyme had denatured and went to define this as the active site changing shape.

ResultsPlus
Examiner Tip

Questions requiring an explanation expect a scientific understanding to be expressed in answers.

Marking point 1 was rarely seen in answers. Where responses attempted to include details about 'optimum temperature' it was usually incorrect in that incorrect temperature values were included in preference to actually stating 'optimum'. For example, several answers stated that the enzyme 'does not work above 40°C/50°C' whereas changing this slightly to enzymes 'do not work above their optimum' could have gained a mark.

(ii) Explain why the enzyme activity stopped at a temperature of 50 °C.

(2)

Because it has gone above the optimum temperature of 37°C and has denatured. Above 37°C it is hard for enzymes to work/break things down. and at 50°C, it doesn't work at all.

ResultsPlus
Examiner Comments

This response included marking point 1 in their answer as well as correctly identifying the actual optimum temperature as shown in the graph. This, in addition to showing understanding that the enzyme had denatured at the high temperature, meant that the candidate gained 2 marks for their answer.

ResultsPlus
Examiner Tip

Try to use scientific terminology in questions that ask you to *explain*. The use of scientific words must be in the context of the question.

Candidates scoring one mark were awarded this, most frequently, for mentioning that the lack of enzyme activity at 50°C was due to the enzyme denaturing. This was the most commonly awarded marking point for one mark answers.

(ii) Explain why the enzyme activity stopped at a temperature of 50 °C.

(2)

Because the temperature is too high, at around 45°C it starts to denature, it can no longer function.

ResultsPlus
Examiner Comments

This candidate related the inactivity of the enzyme at 50°C to the enzyme denaturing for one mark. No other details in the response were rewardable. However, if the candidate had shown understanding that when an enzyme is denatured it's shape is changed or that it's shape would no longer be complementary to its substrate then a further mark could have been awarded.

ResultsPlus
Examiner Tip

Always look at the number of marks available for a response and include as many points in an answer. This candidate has only given one key point for a 2 mark allocation.

Question 1 (c)

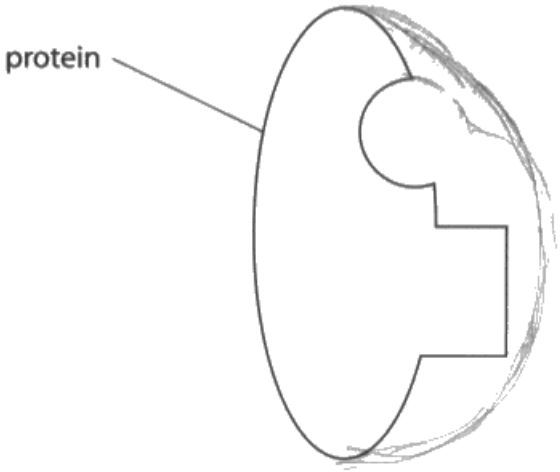
A fair number of candidates answered this question well indicating good understanding of the complementary shapes of the enzyme and its subtrate. Few students failed to draw a diagram at all, although some blank answers were seen, with most making a really good attempt to draw an enzyme that, albeit often in part, fit the substrate. The most common error made by some candidates was to draw a line connecting one part of the substrate to another, particularly in the indented area which did not reflect a complementary shape. Diagrams were sometimes drawn inside the substrate which also failed to gain a mark. In general, diagrams that were drawn outside of the substrate and that showed a 'whole' shape, rather than just connecting one part of the substrate to another, were usually correct.

Many students just drew an outline on the existing shape given on the paper and were, therefore, not credited. Unless a complete shape was drawn candidates failed to gain any marks.

(c) The lock and key hypothesis explains the complementary shape of enzymes and substrates.

Protein is digested by the enzyme pepsin.

The diagram shows a model of a protein.



Draw the complementary shape of pepsin on the diagram.

(1)

ResultsPlus
Examiner Comments

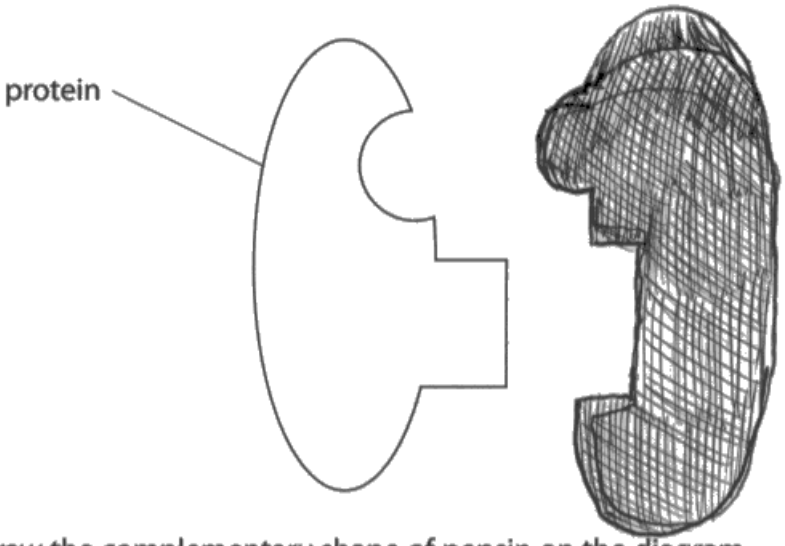
This candidate just drew an outline connecting one part of the diagram to another. This was not credited as it did not show a complementary shape.

Diagrams that were drawn separate from the shape on the question paper generally gained one mark. These showed shapes that were complementary to the substrate.

(c) The lock and key hypothesis explains the complementary shape of enzymes and substrates.

Protein is digested by the enzyme pepsin.

The diagram shows a model of a protein.



Draw the complementary shape of pepsin on the diagram.

(1)

ResultsPlus
Examiner Comments

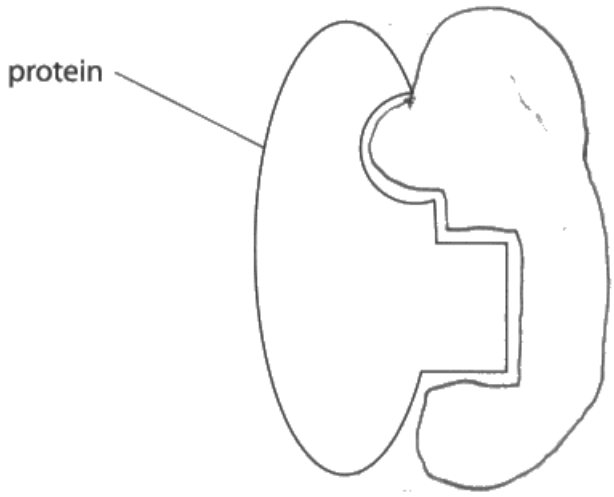
This candidate has drawn a shape that would clearly slot into the substrate shown in the question one mark was therefore gained for this response.

Candidates that drew diagrams outside of the substrate generally gained one mark. These diagrams, in whole or in part, were complementary to the diagram of the substrate given on the paper.

(c) The lock and key hypothesis explains the complementary shape of enzymes and substrates.

Protein is digested by the enzyme pepsin.

The diagram shows a model of a protein.



Draw the complementary shape of pepsin on the diagram.

(1)

ResultsPlus
Examiner Comments

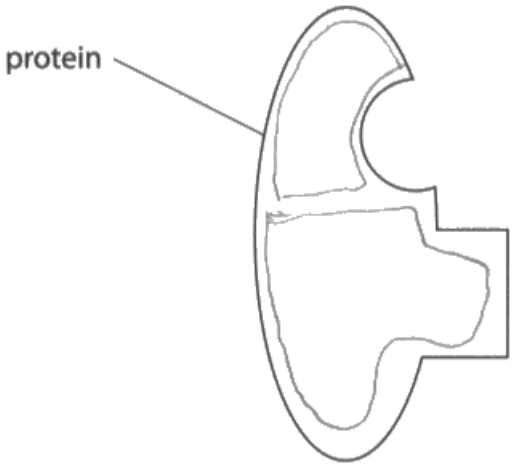
The clear, complementary diagram drawn by this candidate gained one mark.

Although most canddiates drew diagrams outside of the substrate, some just traced the outline of substrate *within* the shape given in the question. This failed to gain any marks as it did not show a complemenatary shape.

(c) The lock and key hypothesis explains the complementary shape of enzymes and substrates.

Protein is digested by the enzyme pepsin.

The diagram shows a model of a protein.



Draw the complementary shape of pepsin on the diagram.

(1)

ResultsPlus
Examiner Comments

This response failed to gain creidt for drawing a shape identical to that of the substrate rather than complementary.

Question 2 (a) (ii)

Most candidates did well on this question with a vast majority understanding that fossils provide evidence for evolution. The few that were unsuccessful tended to choose probiotics as their answer.

A significant proportion of candidates were able to correctly select 'evolution from the list of words provided to complete the sentence about fossils. The most common incorrect answer chosen by those who were less knowledgeable was probiotics.

(ii) Use one word from the box to complete the sentence.

(1)

replication	probiotics
evolution	osmosis

The fossil record provides evidence for evolution

ResultsPlus
Examiner Comments

This candidate was awarded one mark for their correct choice of word from the box, 'evolution', to complete the sentence given.

Responses that did not gain a mark frequently gave 'probiotics' as a word to complete the sentence about fossils.

(ii) Use one word from the box to complete the sentence.

(1)

replication	probiotics
evolution	osmosis

The fossil record provides evidence for probiotics

ResultsPlus
Examiner Comments

No mark was awarded for this response that gave 'probiotics' as a word to complete the given sentence.

Question 2 (a) (iii)

It was clear from the majority of responses given that candidates had been well prepared for this type of examination question where two reasons were expected as a minimum in a response. Consequently, most candidates did attempt to give two reasons for the gaps in fossil records and more often than not they were correct in the details they provided. The most common correct answers were that fossils had not yet been found or discovered and that some had been destroyed, along with a reason why they had been destroyed. There were a large number of answers that were confused about why there were gaps in the fossil record. These frequently implied or clearly stated that fossils 'decayed' or that organisms became 'extinct' without giving enough further detail to gain any credit. There was clear misunderstanding between the terms 'decay' and 'destroyed' with many candidates using these terms incorrectly e.g. fossils decay or that soft tissue is destroyed. Other unsuccessful responses described how fossils were buried too deeply to obtain or gave more explicit details about their location e.g 'buried under the ocean/sea' which lacked the depth of information required for a mark. Other frequently seen incorrect details included fossils or organisms became extinct or died.

Two-mark answers were very infrequent. Where they were seen, students mostly gained marks for covering marking points 3 and 4 in their answers.

(iii) Explain why there are gaps in the fossil record for some organisms.

(2)

because some organisms dont become fossilised or their bones are to brittle so break and crumple under pressure.

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Examiner Comments

This student was able to translate the reasons why there are gaps in the fossil record. This response gained two marks for including valid information that covers both marking points 1 and 4.

Some poorly expressed responses or responses that were ambiguous limited the number of marks that some candidates gained for this question. Amongst these, there were frequent references to fossils or organisms decaying and some confused responses suggested that candidates were confused about 'gaps' and based their answer on trying to explain why there were gaps in rock layers rather than in the fossil record.

(iii) Explain why there are gaps in the fossil record for some organisms.

(2)

So OF the fossil records will have gaps because so of the organisms will just decy over time.

ResultsPlus
Examiner Comments

This vague response was not awarded any marks although if the candidate had implied that the *soft tissue* of the organism decays then this would have met marking point 2.

ResultsPlus
Examiner Tip

It is important to remember to be very clear in the details given in response. Ambiguous answers will not be credited. It is the soft tissue of organisms that decay, not necessarily the organism as a whole.

Responses gaining one mark were most common. These candidates generally hit marking points 3 or 4.

(iii) Explain why there are gaps in the fossil record for some organisms.

(2)

The reason why there is some gaps in the fossil records is because some organisms may be extinct and the fossil remains have been destroyed.

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Examiner Comments

This candidate achieved one mark for clearly stating that fossils may have been destroyed.

Question 2 (c) (i)

Less than half of the candidates were able to recall mitosis as the type of cell division producing genetically identical cells. Unsurprisingly, meiosis was seen often along with a range of other responses many of which were totallly unrelated to cell division.

Although not the most common answer, many candidates identified mitosis as the type of cell division producing identical cells. The spelling of mitosis was varied to the point where it became ambiguous at times and it was unfortunate at times that students lost the mark due to poor literacy skills.

(c) During cloning, DNA is replicated and a single cell divides to form genetically identical cells.

(i) Name the type of cell division that produces genetically identical cells.

(1)

mitosis

ResultsPlus
Examiner Comments

A clear answer with correct spelling of mitosis for one mark.

ResultsPlus
Examiner Tip

Learn the spellings of the different types of cell division. Mitosis is often spelt incorrectly, as is meiosis so that the two are confused. This could negate marks in an examination.

There were very few candidates that failed to attempt this question and most had a go at stating the type of cell division that results in the production of genetically identical cells. Although any form of attempt at answering a question, rather than leaving it blank, is admirable it was clear that a majority of students were not aware that mitosis produces genetically identical cells. Furthermore, the information given in answers also implied misunderstanding in other areas of science e.g osmosis, stem cells and genetic modification were common answers which, by nature of their use in this particular question, showed that over half of candidates were able to recall scientific terminology but had little understanding of its meaning.

(c) During cloning, DNA is replicated and a single cell divides to form genetically identical cells.

(i) Name the type of cell division that produces genetically identical cells.

(1)

osimosis.

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Examiner Comments

This candidate has given the word osmosis, despite the incorrect spelling, as their answer to the question. Osmosis bears no relation to the correct answer at all and the use of this term to answer this particular question also implies that the candidate has little if no idea of its meaning.

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Examiner Tip

There are only two main types of cell division in animal cells and these are mitosis and meiosis. Makes sure you understand the differences between the two, including their spelling, and that you can name specific characteristics of each type.

One of the most common incorrect answers included meiosis, the type of cell divesion that produces gametes. Incorrect spelling of mitosis often involved a combination of meiosis/ mitosis but these were generally awarded a mark if the spelling included a 't' in the middle of the word.

(c) During cloning, DNA is replicated and a single cell divides to form genetically identical cells.

(i) Name the type of cell division that produces genetically identical cells.

(1)

Meiosis

ResultsPlus
Examiner Comments

This response did not gain a mark as the incorrect type of cell division is given.

ResultsPlus
Examiner Tip

Candidates often confuse meiosis and mitosis. It is important that students understand how to distinguish between the two types of cell division.

Question 2 (c) (ii)

Just over half of the candidates were able to score one mark for the response that they gave to this item and this was often awarded for details that referred to conservation of species or increasing population size. The production of mammals with the same characteristics as the parent was not a particularly popular response and where touched on by some candidates, was generally expressed poorly. There were several responses that gave useful characteristics including the production of meat or more food as well as fur and, more commonly, organs for transplant. Some candidates mentioned that cloning could be used to bring back extinct species which was not awarded and there was clear confusion in some responses with genetic modification. Other incorrect responses frequently seen included the use of this technique to clone pets or the use of cloning for research purposes such as using animals to test medicines or to find out about disease or simply to find out more about the mammal.

Few candidates were able to obtain full marks for their response to this item. Of those that did, most gave details covering marking points 1 and 3 in their answer. Although marking point 2 was covered in responses, these were generally poorly expressed which left many too ambiguous to award.

(c) During cloning, DNA is replicated and a single cell divides to form genetically identical cells.

(i) Name the type of cell division that produces genetically identical cells.

(1)

mitosis

ResultsPlus
Examiner Comments

This response covered marking points 1 and 3 for 2 marks. Many candidates were aware that cloning could be carried out to conserve species and although this response does not mention cloning for body organs they have clearly implied this by stated that cloning can be used for transplants.

Most candidates were able to identify that cloning is a technique that could be used to prevent extinction of species and this was expressed in other ways. As well as providing organs (for transplant) one of the most popular answers was to name a useful characteristic that could be seen in a clone and this most often included providing more food or a named food such as meat or milk.

(ii) Describe the advantages of cloning a mammal.

(2)

The advantages of cloning a mammal is that you can get more milk and meat from animals, also you can make more animals that are slowly getting inshinct.

ResultsPlus
Examiner Comments

This candidate scored two marks for stating a useful and valid characteristic and for the details included on increasing population size.

Most candidates achieved one mark for this question, usually for including details that met the criteria for marking point 3. Some candidates were able to express their answers clearly enough to be awarded marking point 2 although this was less often seen.

(ii) Describe the advantages of cloning a mammal.

(2)

You end up with a mammal with the exact characteristics of the mammal you chose to clone. And the same genes of that mammal, basically the copy.

ResultsPlus
Examiner Comments

This candidate clearly understood that the product of cloning is an organism with particular, desired characteristics and was, therefore, awarded marking point 2 for one mark overall.

Some candidates scoring one mark identified a useful feature of a mammal that could be cloned. The feature mentioned most commonly was food or a type of food.

(ii) Describe the advantages of cloning a mammal.

(2)

You can get better animals for the purpose you are looking for like a sheep with good wool or good meat.

ResultsPlus
Examiner Comments

This response gives two features that could be cloned which was only worth one mark. If the student had given another distinct advantage, aside from a feature, then they would have been awarded two marks.

ResultsPlus
Examiner Tip

This expectations of this question are that *different* advantages are given. The advantages given in responses, therefore, must be distinct from each other and not an alternatives covering the same marking point.

Candidates failed to gain a mark for stating that cloning could be used to bring back extinct species. Responses that contained details along these lines were seen frequently.

(ii) Describe the advantages of cloning a mammal.

(2)

can bring back extinct species of mammals.

ResultsPlus
Examiner Comments

No marks were gained for answers that mentioned cloning could bring back extinct species.

Question 3 (a) (ii)

Many responses incorrectly described the role of the heart valves in pumping the blood or just included basic details about the pathway of blood through the heart without focussing on the function of the valves. Some candidates described the role of the valves as 'putting oxygen into the blood' or mentioned some form of control that unfortunately did not include preventing backflow. The most commonly awarded mark was for preventing backflow although this was expressed in various ways including, quite frequently, use of the term 'backwash'. The function of the valves in opening and closing was seen rarely. The lack of understanding in general meant that few candidates scored full marks. Although one mark responses were awarded more often, the lack of understanding of the role of valves resulted in the majority of candidates failing to score at all.

Only the most able candidates were able to score two marks for thier response to this question. The majority of these answers mentioned how the opening and/or closing of the valves prevented backflow of blood although some discussed how this action ensured that blood flows in one direction only.

(ii) Describe the role of the valve labelled in the diagram.

(2)

The valve sits above the left and right atrium. It opens in one direction and no otherway so it sends the bloodflow one way to prevent it from backflowing from the heart.

ResultsPlus
Examiner Comments

This is a clearly written response gaining two marks for describing how the 'one-way' opening of the valves prevents backflow of blood.

One mark answers usually gave information about preventing backflow of blood. It was rare to award one mark to candidates that were able to recall that valves open and/or close.

(ii) Describe the role of the valve labelled in the diagram.

(2)

this allows the blood to flow the right way so it wouldn't flow backwards

ResultsPlus
Examiner Comments

This response was typical of many one mark responses seen. Marking point 2 was awarded in this case.

ResultsPlus
Examiner Tip

For questions worth more than one mark, be sure to provide details on as many different points as the number of marks suggests.

There were a surprisingly large proportion of candidates that incorrectly described a role of the valves as 'pumping the blood' and as many that seemed to forget the basic function of the values as opening and closing. Although several responses mentioned some form of control, this was less likely to be related to backflow.

(ii) Describe the role of the valve labelled in the diagram.

(2)

The role is pumping blood into the heart from the [illegible] body. The valve lets the blood in and out, in this case, in.

ResultsPlus
Examiner Comments

This response was typical of many that were misconceived in thinking that the valves played a role in pumping blood through the heart or body. The last sentence of the answer starts to touch on information related to backflow but does not state this clearly.

Question 3 (b) (i)

The majority of candidates were able to demonstrate their mathematical skills in this question to gain full marks for their response which was particularly pleasing. In many cases, working out was shown and presented in a way that enabled some candidates to gain at least one of the two marks allocated. It was apparent that some candidates were confused by 'how many times' in the question and consequently went on to carry out a subtraction calculation using data that was correctly extracted from the information given i.e. 60 and 15. Use of this specific data alone, regardless of the calculation carried out, gained one mark if it was shown clearly in workings although the incorrect final answer of 45 limited the number of marks awarded to one. It was doubly unfortunate that some candidates expressed their answer as a percentage. The only acceptable answer in these cases was 400% although 4% was seen on several occasions which was not awarded.

Many candidatess subtracted 15 from 60 rather than dividing,and obviously ended up with the incorrect answer of 45. However, if working was shown, this generally gained one mark for identifying the values 60 and 15 which were integral to arriving at the correct final answer. In some cases, candidates failed to give enough time to analyse the data and the units given in the table. This resulted in many responses giving answers as percentages which lost some candidates at least one mark.

(b) Blood from the left side of the heart travels to different organs of the body.

The table shows the percentage of blood travelling to different organs at rest and during exercise.

	percentage of blood (%)	
organ	at rest	during exercise
brain	19	3
muscles	15	60
skin	9	18
liver	28	7
rest of body	29	12

(i) During exercise the percentage of blood travelling to the skin doubles.

Calculate how many times the percentage of blood travelling to the muscles increases during exercise.

(2)

60 - 15

45 %

ResultsPlus
Examiner Comments

This candidate has correctly extracted 60 and 15 for one mark but has, unfortunately, used them in an incorrect calculation to arrive at 45% for a final answer. In addition to this, even though the value given as a final answer is incorrect, they have also given this value as a percentage which is doubly incorrect.

ResultsPlus
Examiner Tip

Take time to look at the data given in tables and graphs and the units that go alongside this data. Careful analysis and an understanding of what data is showing could prevent loss of marks.

Some candiates failed to show any working although were fortunate in arriving at the correct final answer for two marks. Those that were confident enough to do this, however, did risk losing one mark if final values given were incorrect or the incorrect units given to correct values.

(b) Blood from the left side of the heart travels to different organs of the body.

The table shows the percentage of blood travelling to different organs at rest and during exercise.

	percentage of blood (%)	
organ	at rest	during exercise
brain	19	3
muscles	15	60
skin	9	18
liver	28	7
rest of body	29	12

(i) During exercise the percentage of blood travelling to the skin doubles.

Calculate how many times the percentage of blood travelling to the muscles increases during exercise.

(2)

4 times

ResultsPlus
Examiner Comments

This candidate gained two marks for showing the correct final answer without any workings shown.

ResultsPlus
Examiner Tip

Always show working out to questions that requires some form of calculation to be carried out. It is easy to arrive at an incorrect value despite how confident you may feel at answering the question.

Most candidates were fortunate in gaining full marks for their answer to this question and it was particularly pleasing to see that nearly all of these students showed clearly how they had arrived at the final value given on the answer line.

(b) Blood from the left side of the heart travels to different organs of the body.

The table shows the percentage of blood travelling to different organs at rest and during exercise.

	percentage of blood (%)	
organ	at rest	during exercise
brain	19	3
muscles	15	60
skin	9	18
liver	28	7
rest of body	29	12

(i) During exercise the percentage of blood travelling to the skin doubles.

Calculate how many times the percentage of blood travelling to the muscles increases during exercise.

(2)

60 ÷ 15 =

4

ResultsPlus
Examiner Comments

The working out and final answer are clearly displayed in this response for two marks.

It was difficult to work out how some candidates arrived at the values they gave as their final answer. These were generally responses that failed to show any form of working out which, in itself, may have restricted marks in some cases to one.

(b) Blood from the left side of the heart travels to different organs of the body.

The table shows the percentage of blood travelling to different organs at rest and during exercise.

	percentage of blood (%)	
organ	at rest	during exercise
brain	19	3
muscles	15	60
skin	9	18
liver	28	7
rest of body	29	12

(i) During exercise the percentage of blood travelling to the skin doubles.

Calculate how many times the percentage of blood travelling to the muscles increases during exercise.

(2)

0

ResultsPlus
Examiner Comments

It is unclear how this candidate arrived at their final value. No working out has been shown and the final value is incorrect so no mark awarded.

Question 3 (b) (ii)

Most candidates scored only one of the three marks available for this question and this was more often due to candidates focussing more on increased blood flow to muscles, repeating, in most cases, the wording of the question with infrequent mention of increased oxygen or energy demand. Students again failed to understand the *greater* demand for oxygen and/or energy during exercise and gave answers such as 'oxygen is carried by the blood to muscles' which explained nothing more that what also happens at rest. Some responses hinted at muscles working *harder* although didn't quite make it clear enough that it was any more so than at rest e.g 'muscles are working all the time' or 'the body (rather than muscles) is working harder' or simply 'muscles work (during exercise)'. This has been a recurrent error across many examination series where the omission of a comparison to the body at rest has cost students marks. There was frequent mention of oxygen and frequent mention of muscles working but very infrequent mention of how these factors are influenced or changed as a result of more intense exercise. Very few candidates also failed to achieve the carbon dioxide and/or the lactic acid mark (marking points 4 and 5) in their responses and although some touched on details linked to anaerobic respiration the detals provided lacked clarity or were too vague to credit any marks.

Few candidates were able to express their understanding clearly to gain all three marks for their answer. In rare cases, three mark answers generally covered marking points 1, 2 and 3 rather than marking points 3 and 4. The latter were very infrequently credited in the answers seen.

(ii) Explain why the percentage of blood travelling to the muscles increases during exercise.

(3)

More contractions of the muscles, ~~means the heart pumps more.~~ means more ~~more resp~~ respiration is happening, so more oxygen is needed around the body. This means the heart pumps more, so more blood will be needed to carry oxygen to the body

ResultsPlus
Examiner Comments

Although not particularly well expressed, this candidate was able to score the full three marks for providing an answer that covers the first three marking points given on the markscheme: more oxygen, muscles working harder and linking these points to 'more' respiration.

ResultsPlus
Examiner Tip

Remember that during exercise the body demands 'more' oxygen and glucose as there is a greater energy demand.

Some three mark answers strongly implied that 'more' oxygen was needed simply by stating that 'more' blood carrying oxygen was delivered to muscles (or words to that effect).

(ii) Explain why the percentage of blood travelling to the muscles increases during exercise.

(3)

The reason is because during exercise body needs more energy which it gets by doing aerobic respiration using oxygen, which is in the blood. The heart beat increases to get the blood with oxygen to the muscles faster.

ResultsPlus
Examiner Comments

This response just gained three marks. Two of these marks are clear-cut: more energy and respiration were awarded without hesitation. However, the oxygen mark was given as a benefit of doubt where the candidate states that the blood carrying oxygen is delivered to muscles *faster* implies that more oxygen is transported to muscles.

Less able candidates were unable to provide any more detail other than what was in the question and many responses simply repeated what they had already been given.

(ii) Explain why the percentage of blood travelling to the muscles increases during exercise.

(3)

Because when your excersing you need more blood to pump round your body when you are doing exercise otherwise you won't be able to exercise properly

ResultsPlus
Examiner Comments

This candidate has failed to explain why the percentage of blood travelling to muscles increases and has just repeated what has already been given in the question.

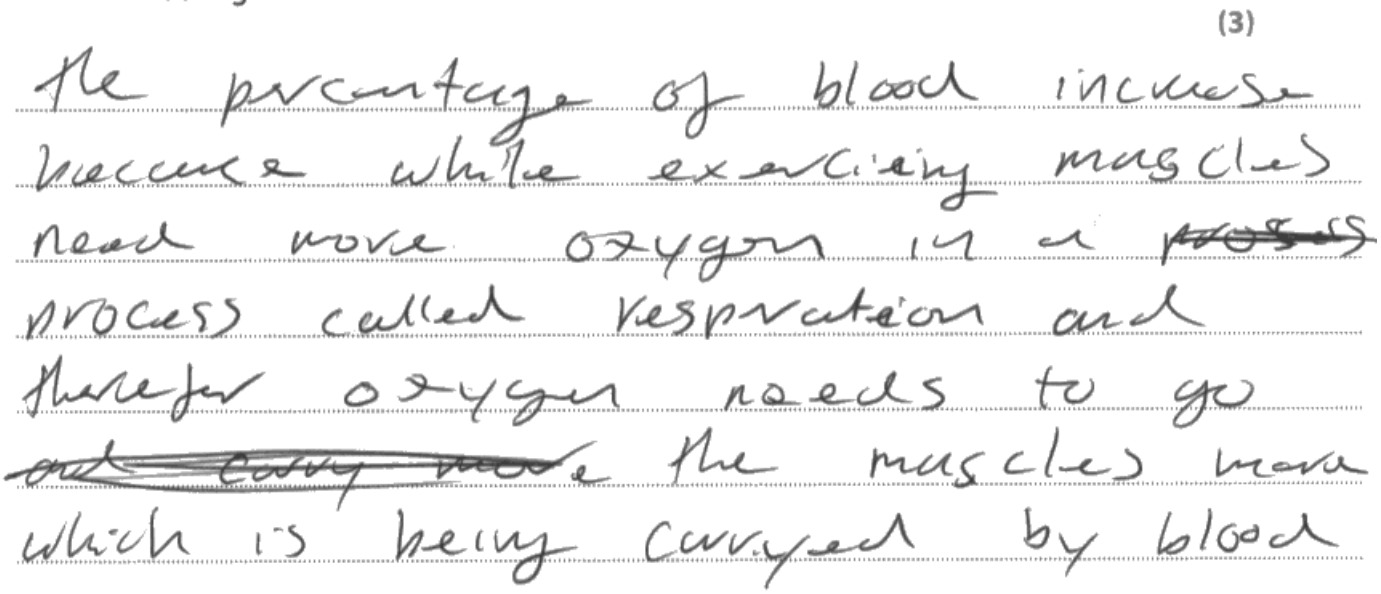
ResultsPlus
Examiner Tip

To gain any marks, more information that what is provided in the question is required in responses. Never just repeat the question, even if it is just reworded.

Candidates scoring two marks inevitably gained one of these for identifying that muscles work *harder* or for recognising that more oxygen was needed by the muscles during exericise. Some answers, however, included information on respiration although most failed to include *aerobic*. This omission was not penalised and a mark was awarded to those that were able to link, albeit loosely, exercise with (a faster rate of) respiration.

(ii) Explain why the percentage of blood travelling to the muscles increases during exercise.

(3)



ResultsPlus
Examiner Comments

This response was awarded two marks for clearly stating that more oxygen was required (marking point 1) for respiration (marking point 2).

Most candidates scored one mark. This was often given for including information that implied *more* oxygen or that stated clearly that muscles worked *harder.*

(ii) Explain why the percentage of blood travelling to the muscles increases during exercise.

(3)

The percentage of blood travelling to the muscles increase because during exercise your muscle need oxygen to work So therefore more ~~blood~~ oxygenated blood is pumped to the muscles to keep them working.

ResultsPlus
Examiner Comments

This is a one mark response that was awarded for stating that more oxygen was 'pumped' to muscles.

Question 3 (c)

Although there were a number of good answers to this question, it was evident that there is some confusion on the role of lactic acid. Several responses were clear in stating that lactic acid provided energy for muscles or that lactic acid was needed by muscles to keep working. A large number of candidates recognised that the equation represented anaerobic respiration but were unable to give any further details to fully answer the question. In some of these cases, candidates just described the equation in a more lengthy response that failed to touch on any marking points other than the one allocating a mark for anaerobic respiration. Candidates also incorrectly, but often, referred to glucose being made from lactic acid or from energy and there were numerous vague references to muscle fatigue or cramp which were not awarded.

A minority of candidates scored two marks and this was most often for understanding that the equation represented anaerobic respiration and that this process took place in the absence of oxygen. Usually, any further details provided to explain why this process took place were either incorrect or too vague to credit.

(c) The word equation shows a process that takes place in muscles during vigorous exercise.

glucose ⟶ lactic acid

Explain why this process takes place during vigorous exercise.

(2)

This process is used during anaerobic respiration without the use of oxygen. The reason it is used during vigorous exercise is because the breathing rate increases meaning more oxygen is needed to be taken in and if this doesnt happen the person is in oxygen debt and anaerobic respiration occurs.

(Total for Question 3 = 10 marks)

ResultsPlus
Examiner Comments

This candidate recognised that anaerobic respiration took place in the absence of oxygen although the remainder of the information, which makes an attempt to describe why this process took place, is incorrect.

There were several answers that reflected some understanding of the use of glucose in anaerobic respiration and although these were not particularly well expressed in many cases the details were clear enough to award a mark for marking point 3.

(c) The word equation shows a process that takes place in muscles during vigorous exercise.

glucose ⟶ lactic acid

Explain why this process takes place during vigorous exercise.

(2)

Because as the muscles use excersise they absorb the glucose from the blood and use the energy from it. ~~be~~ then

ResultsPlus
Examiner Comments

This candidate has shown enough understanding of the importance of glucose in anaerobic respiration to be awarded a mark. The response implies that energy is provided by glucose for marking point 3.

Several responses made an attempt at interpreting the equation into information that provided very little more detail that what the actual equation gave. Although better than no response at all as an attempt had been made at answering the question, these responses usually failed to gain any credit.

(c) The word equation shows a process that takes place in muscles during vigorous exercise.

glucose ⟶ lactic acid

Explain why this process takes place during vigorous exercise.

(2)

This process takes place because the glucose is used up or worked to hard that it turns into lsnc acid which builds up during vigaurous exercise. They dont have any energy anymore

ResultsPlus
Examiner Comments

This candidate has more or less put the equation into words without providing the details needed to answer the question. An explanation as to why this process takes place has not been given and therefore no mark was awarded.

Question 4 (a) (ii)

Many candidates scored one mark for the responses given to this question with the vast majority of the cohort identifying part Y as the nucleus. However, a large proportion of candidates failed to give any further information than this and there was several misconceptions that were common across responses seen. Where candidates did identify part Y as the nucleus, several went on to desribe its function as controlling what goes in and out of the cell or, as seen in many previous examination series, 'it is the brain of the cell' for no mark. Other candidates confused the nucleus with atomic structure, describing it as containing protons and neutrons. In general, most candidates were able to correctly describe one function of the nucleus, rather than two as the mark allocation suggested, with the most frequently awarded details being that it contained DNA, rather than genetic information, genes or chromosomes, or that it controlled the activities of the cell. Less able candidates had difficulty in expressing this clearly for example, 'the nucleus is in charge' or 'it controls the plant' was seen fairly often. Few mentioned that it gave the cell its characteristics and although attempts were made along these lines, it was more often that candidates referred to the characteristics of the organism as a whole rather than the individual cell e.g. 'it controls what colour eyes you have' or 'what colour flowers the plant will produce'.

The vast majority of the cohort named part Y as the nucleus and made an attempt to describe one function. It may have been the case that these candidates were under the impression that providing the name of part Y gave them one of the two marks but naming part Y was not what the question asked. There were few candidates that gained two marks but of those that did, the most common answers given included its role in controlling cell activity, expressed in various ways and that it contained DNA, as opposed to the other alternatives given on the markscheme.

(ii) Describe the role of part **Y**.

(2)

The labelled part Y is the nucleus, it contains the DNA and controls the cell and its reactions.

ResultsPlus
Examiner Comments

This clearly expressed answer gained two marks for providing two functions of DNA - contains DNA and controls the reactions of the cell are both clear points on the markscheme.

ResultsPlus
Examiner Tip

Read examination questions carefully and follow the instructions that are given. Naming part Y as part of a response in this case is fine (but not awarded a mark) if you then take this further to provide a description of its functions.

Around a third of candidates were not able to gain any credit for the responses that they gave. Although it is likely that many of these were able to identify part Y as the nucleus, no further creditable detail on the function of the nucleus was provided. Less able candidates did attempt this question though, with very few blank spaces seen and the answers given did refer to functions of cell components, although just not the nucleus.

(ii) Describe the role of part **Y**.

(2)

Part A is a cell wall, it acts as a barior, so stops diseases from getting into the body

ResultsPlus
Examiner Comments

This candidates failed to score any marks for their attempt at desribing the function of the nucleus. It could be the case where the student has failed to look carefully at the label line on the diagram and misunderstood what it is actually indicating.

ResultsPlus
Examiner Tip

In this question, it is expected that students interpret diagrams carefully and this is very important when accurate interpretation is necessary in order to gain marks.

Candidates scoring one mark, and this made up most of the cohort, were able to describe one function of the nucleus. Like other candidates that were more or less successful in their responses, the nucleus was nearly always named along with the most commonly seen function of containing DNA. Alternatively, 'it controls the cell' was also seen, albeit less often, although any reference to chemical reactions was rarely given.

(ii) Describe the role of part **Y**.

(2)

The nucleus is where the organisms DNA is kept.

ResultsPlus
Examiner Comments

Most one mark answers gave 'contains DNA' as the function of the nucleus. This is a clear, one mark answer.

ResultsPlus
Examiner Tip

Some candidates mistook the instruction given by this question and gave the nucleus as part of their answer. This was not awarded a mark as the question asks for the role of part Y, not the name.

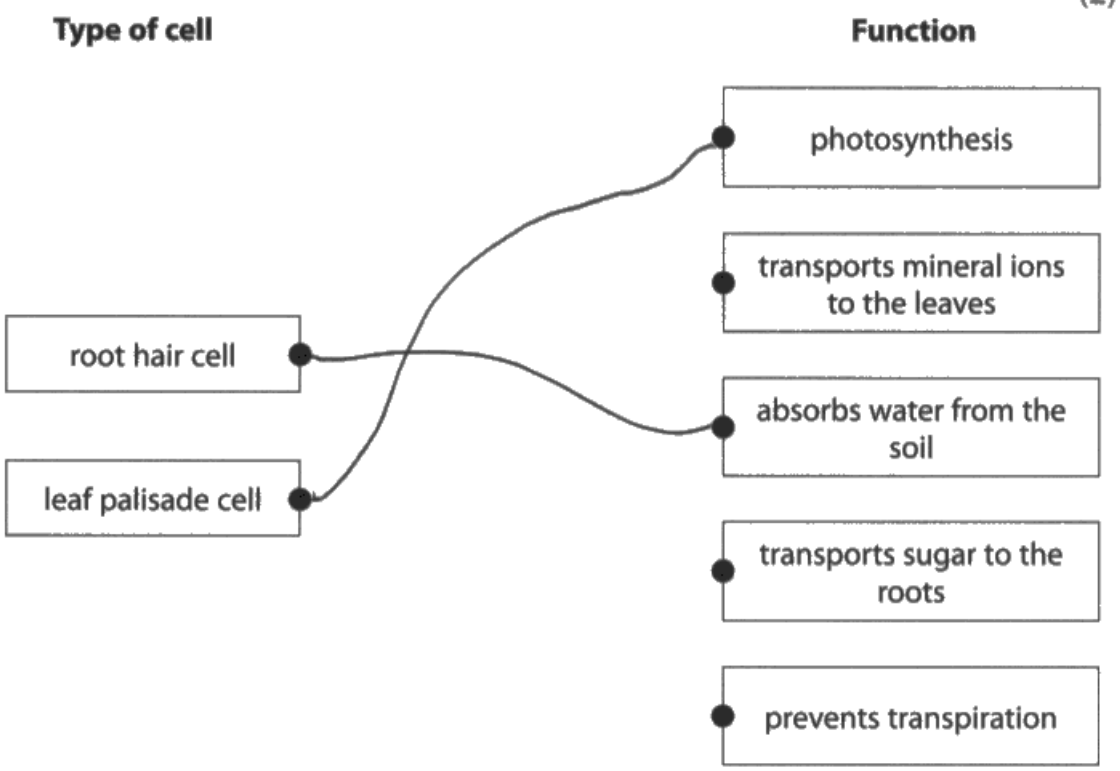
Question 4 (a) (iii)

One mark answers were most common where candidates most often obtained credit for correctly linking the root hair cell to its function. However, the role of the leaf palisade cell appeared widely unknown by the cohort. Although candidates attempted the question, this cell was linked to every option available but photosynthesis least often.

Candidates scoring two marks for correctly linking both cells to their function was not often seen. About one third of candidates were able to identify the correct functions although more often responses were seen where at least one was wrong.

(iii) Draw one straight line from each type of cell to the function of that cell.

(2)



ResultsPlus
Examiner Comments

This candidate has clearly linked each of the cells given to their correct function for 2 marks.

Question 4 (b) (i)

This was a well-answered question with most candidates, for one mark, able to add up the total length to arrive at 75 or showing awareness of having to divide the sum of the lengths by 5. Mistakes costing marks were made by students that added the seed number and divided this into the total length (75 divided by 15) arriving at a final value of 5 or that calculated a range (10.7) rather than a mean. Other responses that did not gain the full two marks implied misunderstanding of the word 'mean' and included a calculation of the median (14.5) instead and further responses that failed to add the lengths of the seeds correctly yet understood that the value they obtained should be divided by 5. Candidates that gained one mark for their answer inevitably achieved this by showing clear working out, rather than providing a final answer.

Most candidates gained full marks for their answer. Working out was clearly shown with the final answer written clearly on the answer line provided.

(b) The diagram shows one broad bean pod containing five seeds.

The length of each seed in a broad bean pod, from a plant grown in one area of a garden, is shown in the table.

seed number	length / mm
1	14.5
2	20.7
3	17.3
4	12.5
5	10.0

(i) Calculate the mean length of the seeds.

(2)

14·5 + 20·7 + 17·3 + 12·5 + 10 = 75

75 ÷ 5 = 15

Mean length = 15 mm

ResultsPlus
Examiner Comments

This candidate showed their working out clearly including the correct figures in a calculation that would have given them one mark even if they had arrived at an incorrect final answer.

ResultsPlus
Examiner Tip

Always show working out to a question that expects a calculation to be carried out.

Although some candidates arrived at the correct answer, not all showed their working out.

(b) The diagram shows one broad bean pod containing five seeds.

The length of each seed in a broad bean pod, from a plant grown in one area of a garden, is shown in the table.

seed number	length / mm
1	14.5
2	20.7
3	17.3
4	12.5
5	10.0

(i) Calculate the mean length of the seeds.

(2)

Mean length = 15 mm

ResultsPlus
Examiner Comments

This response does not include any working out but gives a final, correct answer.

ResultsPlus
Examiner Tip

Be careful about just providing a final answer without showing any working. This could lose marks as working out could show information that gains marks if the final answer given on the answer line is incorrect.

Most candidates were sensible in that they showed their working out to the calculation even if their final answer to this calculation was incorrect.

(b) The diagram shows one broad bean pod containing five seeds.

The length of each seed in a broad bean pod, from a plant grown in one area of a garden, is shown in the table.

seed number	length / mm
1	14.5
2	20.7
3	17.3
4	12.5
5	10.0

(i) Calculate the mean length of the seeds.

(2)

14.5 + 20.7 = 35.2 (1)

35.2 + 17.3 = 52.5 (1)

52.5 + 12.5 = 65.0

65.0 + 10.0 = 75.0

75 ÷ 5 =

Mean length = 13 mm

ResultsPlus
Examiner Comments

The final answer in this response is incorrect although the figures shown in the calculation indicate some understanding of the values needed in the calculation to work out the answer. It is fortunate in this case that the student has shown the correct sum to earn one mark but just calculated incorrectly.

ResultsPlus
Examiner Tip

Always double-check answers to calculations or use a calculator where necessary to work out answers.

Few candidates were not able to score at all for their response. There was a minority, however, that appeared confused on how to work out the mean length and carried out calculations using random figures to arrive at incorrect answers.

(b) The diagram shows one broad bean pod containing five seeds.

The length of each seed in a broad bean pod, from a plant grown in one area of a garden, is shown in the table.

seed number	length / mm
1	14.5
2	20.7
3	17.3
4	12.5
5	10.0

(i) Calculate the mean length of the seeds.

(2)

20.7 − 10.0

Mean length = 10.7 mm

ResultsPlus
Examiner Comments

This candidate has selected random lengths of seed from the table and used them in a calculation that has gained no marks at all.

Question 4 (b) (ii)

Over half of candidates showed good understanding in their responses of the factors that might affect the length of the pods in the garden. Most popular answers included more sunlight and water although other, less common answers were seen such as more minerals or more photosynthesis. Very few candidates referred to genetics in their answers and, similarly, to bean variety or growing time.

(ii) A pod was taken from a plant grown in a different area of this garden. The mean length of the seeds in this pod is greater.

Suggest reasons why the mean length of these seeds is greater.

(2)

Because the plant grown in the other area could have ~~less~~ more exposure to the sun, making photosynthesis happen more and the plant grows more.

ResultsPlus
Examiner Comments

This answer gained two marks for clearly identifying more sunlight as a factor influencing the growth of the pods and linking this to photosynthesis.

ResultsPlus
Examiner Tip

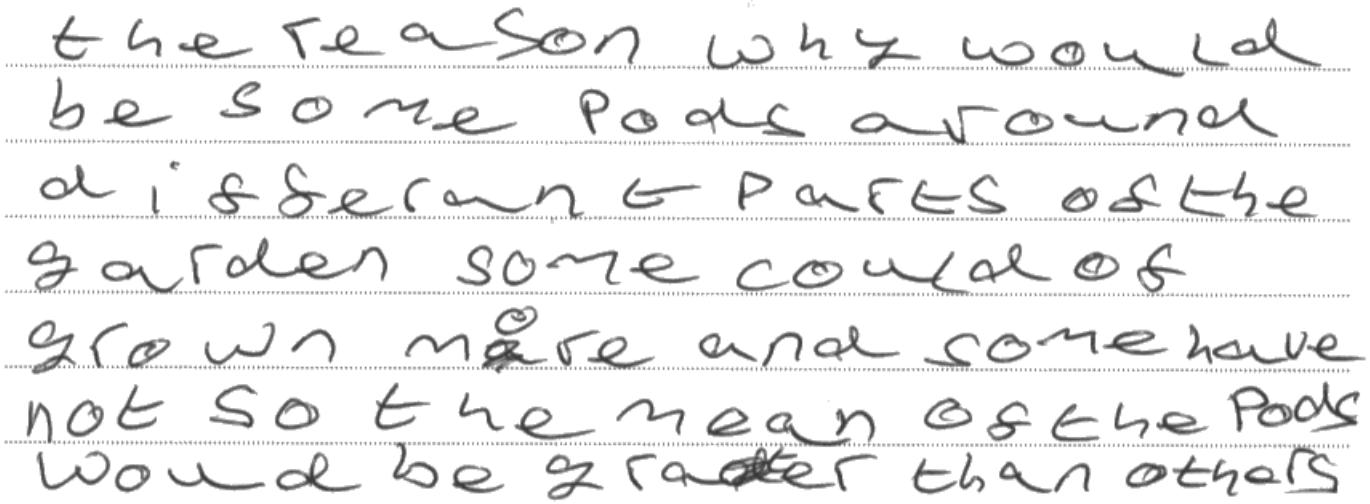
Some candidates based their suggestion on the pods with a lower mean length and gave details that included *less* sunlight or *less* water. This is not what the question asks and therefore these responses failed to gain marks.

The percentage of students that failed to gain marks for their response was approximately the same as the number of students that gained one mark. Some unsuccessful answers basically repeated the question, stating that the plants grow more without providing a reason why.

(ii) A pod was taken from a plant grown in a different area of this garden. The mean length of the seeds in this pod is greater.

Suggest reasons why the mean length of these seeds is greater.

(2)



ResultsPlus
Examiner Comments

This response did not gain any credit . It failed to provide any reason why the mean length of the pods was greater in another part of the garden.

ResultsPlus
Examiner Tip

Read questions carefully, twice if necessary, to ensure that you understand exactly what is expected.

Most one mark answers used all of the space available for the response and managed to include one correct factor affecting the length of the pods in the garden. This was, most often, more sunlight.

(ii) A pod was taken from a plant grown in a different area of this garden. The mean length of the seeds in this pod is greater.

Suggest reasons why the mean length of these seeds is greater.

(2)

ResultsPlus
Examiner Comments

This simple answer gained one mark for stating a correct factor affecting the mean length of the pods.

ResultsPlus
Examiner Tip

Always check the mark allocation for answers. State as many facts as there are marks in your response.

Question 5 (a) (ii)

A significant number of students were able to recall the actual term used to describe the shape of the DNA molecule and were credited with one mark for 'double helix'. However, a large proporation of candidates gave a description of the shape rather than state the specific term used to describe the shape of the DNA molecule. These desriptions included 'twisted ladder/spiral', 'spiral', 'coiled', amongst several others which were not credited.

(ii) State the term used to describe the shape of a DNA molecule.

(1)

Double Helix

ResultsPlus
Examiner Comments

A clearly written, succinct answer that gives no extra detail other than what has been asked for.

Candidates that failed to gain a mark for their answer generally wrote down related terms, just not the correct one. A vast array of incorrect answers were seen: twisted ladder, spiral strands, AGCT and other more random answers such as microscope or photosynthesis. Few students left the answer line blank.

(ii) State the term used to describe the shape of a DNA molecule.

(1)

gene

ResultsPlus
Examiner Comments

Although this candidate has given an answer that links to DNA the information given is clearly not the correct term to describe DNA structure.

One of the most common mistakes made by the candidates that failed to gain a mark was to describe the structure for DNA rather than state the term used to describe its structure. In these cases the familiar 'twisted ladder', 'two spirals twisted around each other', 'two helical strands wrapped around each other' and many other correct *descriptions* of the structure were seen but unfortunately did not obtain a mark as they did not answer the question.

(ii) State the term used to describe the shape of a DNA molecule.

(1)

spiraled ladder.

ResultsPlus
Examiner Comments

This candidate failed to gain a mark for describing the structure of DNA rather than giving the actual term to describe the structure.

ResultsPlus
Examiner Tip

Read the question very carefully. It is quite easy to read overlook a few words in this question to change what is expected of you.

Question 5 (b)

Of all the questions on the paper, this was the least successfully answered. The vast majority of responses seen were particularly poor in expressing how a DNA molecule is changed by mutation. Very few candidates were able to score marks for answers that implied a complete lack of understanding of what a DNA mutation actually is. A significant minority of students were able to gain one mark for referring, most frequently, to a change in a base but it was far more common to see responses that described the causes of mutation rather than how the DNA molecule itself was changed by mutation and many examples of these were seen including radiation, X rays, disease, alcohol, cloning, genetic modification and many others. Other candidates seem to read the questions as 'Describe two effects of DNA mutation' and discussed, poorly, how amino acids, chromosomes or proteins would be affected. Some responses described the effects on the organism such as cystic fibrosis or cancer. Candidates often described how bases would be paired incorrectly and would sometimes give examples of this which were scientifically impossible or discussed chromsome abnormalities, often including reference to downs syndrome which were not credited with any marks. Other common, incorrect responses included simply that the 'DNA would change shape' or made reference to chromosome abnormalities.

If a response referred to bases in the details provided it was usually in the context of incorrect base-pairing, often using examples such as A pairing with G. Several responses were seen where uracil was included in answers. None of these gained credit.

(b) Some chemicals can cause DNA mutations.

Describe two ways that a DNA molecule is changed by mutation.

(2)

If the pair bases pair up wrong and ~~~

ResultsPlus
Examiner Comments

This response failed to gain a mark for stating that bases pair up incorrectly.

Many responses showed confusion between bases, amino acids, proteins, chromosomes and what DNA was actually made up of. This led to answers that suggested these structures were mutated or that failed to focus on a change in DNA iself and instead discussed how proteins and/or amino acids would be affected.

(b) Some chemicals can cause DNA mutations.

Describe two ways that a DNA molecule is changed by mutation.

(2)

because the DNA could have had changes in it like the amino acids inside it could have changed their pattern or ~~they~~ there could have been ~~these~~ added extra amino acids inside causing Mutations

ResultsPlus
Examiner Comments

This confused response failed to gain any marks for possibly misreading the question and describing the effect of a mutation on the order of amino acids in a protein. It also suggests that an amino acid itself is the cause of a mutation.

ResultsPlus
Examiner Tip

Questions must be read carefully to extract their precise instruction. Details given in answers should not deviate from this.

Very few candidates were able to score one mark for this item. These responses usually described a base change in some way but often the information given was poorly expressed.

(b) Some chemicals can cause DNA mutations.

Describe two ways that a DNA molecule is changed by mutation.

(2)

The geres get damaged inside the DNA molecule. The sequere of the bases could change. So the bases are in the wrong order.

ResultsPlus
Examiner Comments

This candidate mentions that a mutation causes a base change for one mark.

Two mark responses were exceptionally rare to see with only the most able students providing a clear description of how a mutation affects DNA. Only one or two of these responses were able to name a type of deletion e.g. insertion or deletion.

(b) Some chemicals can cause DNA mutations.

Describe two ways that a DNA molecule is changed by mutation.

(2)

A DNA molecule could either be changed by addition of bases, deletion of bases or substitution of bases

ResultsPlus
Examiner Comments

A clear, succinct response that uses good scientific terminology to describe the effect of a mutation on DNA for two marks.

Question 5 (c)

Many candidates were aware of at least one advantage of using an electron microscope with the majority of these answers providing details that implied a more clear or a more detailed image was seen. Surprisingly, less responses included information about magnification although where seen, these were inevitably correct. Some students used scientific terminology in answers that were too vague to award. For example, the electron microscope is 'more powerful' was frequently seen without further exemplification on how this 'extra' power provided an advantage. Use of the term 'resolution' was very rare and where candidates did correctly state that 'more detail' could be seen this was very infrequently expanded to provide examples of the organelles that might be seen. Some responses used less desirable terminology to describe the advantages of the electron microscope. 'Zoom in more' was frequently seen as an alternative to higher magnification although this was allowed as a minimum to the preferred response. There was some confusion evident in several answers where students discussed the effect of light on samples e.g. 'light levels interfere with the image' or included information about 'light telescopes' rather than microscopes.

Less than a quarter of students gained two marks for their answer and these responses generally covered marking points 2 and 3. Responses to this question were very simple - little scientific detail was noted with candidates preferring to use terms such as 'clear' rather than resolution and 'zoom in' rather than magnification.

(c) Explain why an electron microscope is more useful than a light microscope to study the structures inside a cell.

(2)

Because it can magnify much greater. This means that you can study cells in more detail. They magnify more than 1 million times.

ResultsPlus
Examiner Comments

This answer clearly covers marking points 1 and 3 - magnification and more detail.

ResultsPlus
Examiner Tip

Try to use scientific terms in answers rather than altenatives that could obscure meaning.

One mark answers either gave information about the image being more clear or being able to see more detail. A fair proportion of candidates discussed the difference in magnification although this term was not seen often. Students preferred to use the term 'zoom in' as an alternative although the meaning was generally clear and this was awarded.

(c) Explain why an electron microscope is more useful than a light microscope to study the structures inside a cell.

(2)

An electron microscope can zoom in much further than a light microscope with an electron microscope able to zoom into ove 7000 times.

ResultsPlus
Examiner Comments

This response gained one mark for making it clear that 'zoom in' refers to magnification.

Few answers included the terminology given in the markscheme and in some cases where it was used it was unclear which microscope was being referred to. These, however, were rare and most students gave a clear comparison of the two.

(c) Explain why an electron microscope is more useful than a light microscope to study the structures inside a cell.

(2)

It ~~than~~ 200 has greater magnifying than light microscope and it can see a cell better

ResultsPlus
Examiner Comments

This candidate gained one mark for using the term magnification correctly and using this with reference to the electron microscope. Although another reason why the electron microscope is more useful has been given, this was vague and did not meet the marking criteria.

Question 5 (d)

This was the least successful of the two extended answer questions on the paper with nearly half of the candidates failing to score any marks for answers that implied very little understanding of the advantages and disadvantages of using genetically modified plants. Incorrect discussions ranged from details on insulin production by bacteria to cloning with a significant number of students providing vague information such as 'its expensive' without justifying why or incorrect information such as 'pesticide resistance' amongst others. Overall, the advantages given by candidates that did cover the indicative content to varying extents were far more likely to score marks than the disadvantages and this ultimately impacted on the number of students producing a level 3 response. Consequently, better candidates generally scored 4 marks rather than the 6 as valid disadvantages were not often seen. A range of different advantages were given by candidates, many of whom attempted to describe the advantages of Golden Rice and although details were sometimes confused these were often credited. Candidates producing a level 2 response inevitably mentioned greater yields as an advantage although rarely worded their answer in this way. These students understood that 'plants grow faster/bigger' or 'we get more plants' or 'bigger fruit' or another description that referred to greater yield gaining a level 1 (2 marks) for their response. Some candidates were able to discuss how modification made plants more resistant to extreme weather conditions although at times the information provided lacked detail in that some answers implied nothing more than a sunny day. Herbicide resistance was seen fairly often and sometimes paired with the disadvantage that it could produce 'superweeds'. Many candidates struggled with providing a valid disadvantage with responses implying that a significant proportion of the students were clutching at straws in order to find something to say. There were frequent mentions of more or less photosynthesis, sometimes linked to the oxygen production, carbon dioxide and global warming, as well as references to unknown health effects which did not gain credit. In responses that included disadvantages, a very narrow range was seen. It was likely that students who had given herbicide resistance as an advantage were also able to provide the corresponding disadvantage - spreading to weeds and producing superweeds. Most commonly, the cost of producing GM plants was given with most only just covering the indicative content as the justification for cost was often weak. The idea of monocultures or loss of biodiversity were particularly rare in answers as was dependency on GM companies. Overall, the percentage of candidates giving Level 1 and 2 responses were similar, together making up just over half of the cohort.

Significantly few candidates scored 6 marks. Although many were able to provide a long list of advantages, the majority of candidates struggled to provide more than one valid disadvantage. The most common disdavantages generally had something to do with cost with the other being herbicide resistance althought this was sometimes confused with pesticide resistance.

*(d) Describe the advantages and disadvantages of using genetically modified plants.

(6)

It will increase the Yeild of the ~~plats~~ plants. They can become herbiside resistant. They become pest resistant. You can make them stronger and to withstand certain climates. Goldan rice contains Beta carotine.

Genetically modified plants can be expensive to buy and ~~You have to~~ Some you have to buy every year because they are infertile ~~infertile~~. We don't know the long term health effects of Gm crops. The reduce the gene-pool and the can cause cross breeding with the non GM crops

ResultsPlus
Examiner Comments

This response provides two clear advantages and two clear disadvantages making it a level 3 answer.

ResultsPlus
Examiner Tip

Always balance arguments in questions like this. Where the question asks for advantages and disadvantages try to give equal numbers of both where possible.

Most level 2 answers were able to give at least two advantages but failed to provide valid disadvantages. This limited many responses to level 2 in that if disadvantages had been given, and only one more in the case of level 2 answers that had already provided one advantage and one disadvantage, then this would have upgraded the response to a level 3.

*(d) Describe the advantages and disadvantages of using genetically modified plants.

(6)

The advantages of having genetically modified plants is:
- you can produce more of it.
- you can put more nutrients in the plant like, Vitamind, which would help with malnutrion.
- you can make them so they are resistant to weed and pesticide killer.

The disadvantages would be:
- if made resistant to pesticide it could pass it on to the pests which means we wouldn't be able to kill them
- some people say it's ethically wrong.

ResultsPlus
Examiner Comments

This candidate has given two clear advantages to gain 4 marks. The third attempt at an advantage 'put more nutrients into the plant' is ambiguous and does not strongly imply that it will be more nutritious due to genetic modification although this does not affect the grading of the response. The disadvantages given are not creditworthy.

ResultsPlus
Examiner Tip

Remember that plants are not genetically modified to become resistant to pesiticides. However, they are genetically modified to produce a pesticide or chemical that kills pests.

A large number of candidates were unsuccessful in their response despite producing lengthy discussions of advantages and disadvantages which unfortunately held no value. Sometimes candidates touched on valid content e.g. cost but failed to justify why GM was expensive. Similarly some candidates came close to a level 1 response by suggesting that plants would be able to live in different weather conditions without any strong implication that these weather conditions were extreme. These answers could not be credited.

*(d) Describe the advantages and disadvantages of using genetically modified plants.

(6)

Advantages Of using genetically modified plants is that we our able to make them how we want them to be made. for an exampie if there are not many red roses in the world we can change this by changing the genes. This is for our benifit and the worlds because we are decreasesing the risk of not having red roeses in the world. We can also modifie them to make them more appealing and give them good genes, which will make a better plant, and plants that we want. Also if a plant keeps dying and is not surviving, we can modife it to make it stronger, and stop it from dying. Although ouch a disadvantage would be how essientinally we are

not making on a natural plant. Which can be seen as a very bad thing. Another thing is we run the risk of it going wrong and making the plant terribly wrong. It is also a benifit cause we can make a new plant! A cross Bread.

(Total for Question 5 = 12 marks)

ResultsPlus
Examiner Comments

The answer given by this candidate provides very vague advantages that do not cover the indicative content. Although they discuss the number of roses the candidate has not distinctly stated that we can produce more, which could have gained 2 marks as an alternative to greater yield. The disdavantages given are very random and imply a lack of knowledge in this area.

Level 1 responses generally gave one advantage rather than a disadvantage. These responses were, on the whole, poorly expressed but were likely to mention that a greater yield of plants could be produced. Although answers were not worded in this way, the details given made the inference clear enough to award.

*(d) Describe the advantages and disadvantages of using genetically modified plants.

(6)

Plants such as wheat has advantages because if you have a strong piece of wheat and you genetically modify it to make more you will be able to get strong wheat that doesn't blow away in the wind therefore you'll get more crop and more money. A disadvantage of this would be that we don't know the harms of genetically modifying modified plants and don't know if plants like that genetically modified wheat cause harm to humans after a certain length of time. or cause specific problems or illnesses.

ResultsPlus

Examiner Comments

This response is not particularly well written but does imply that more plants can be produced as a result of genetic modificaiton. This candidate gained 2 marks for their answer.

Question 6 (a)

Students that failed to gain marks for their answer to this question tended to just rewrite the question i.e. oxygen is carried around the body by the blood. Several mentioned the heart although omitted its 'pumping' action and therefore missed out on a mark. Many responses referred to blood vessels and although credited, a significant number named vessels incorrectly or incorrectly stated where they were carrying blood to or from. A number of candidates incorrectly stated that white blood cells carry oxygen or wasted time discussing how oxygen was collected at the lungs or how blood was 'oxygenated in the heart'. Others simply described the passage of blood through the heart, not always giving the correct pathway. Popular answers included correct reference to red blood cells and, less frequently, haemoglobin which was pleasing to see. Similarly, 'the heart pumps' was seen in a variety of ways for one mark as were descriptions of red blood cell adaptations which, although correct, did not answer the question.

Most one mark answers referred to red blood cells rather than any of the other marking points available. Along with this, candidates often repeated the stem of the question and were possibly deceived into thinking that this would gain further marks.

6 Living cells need a constant supply of oxygen and nutrients.

(a) Describe how oxygen is transported around the body by the blood.

(2)

Oxygen is ~~carried~~ transported around the body in red blood cells which are a dognut shape which allows the oxygen particles to sit in.

ResultsPlus
Examiner Comments

This response gained one mark for stating that oxygen is carried by red blood cells.

ResultsPlus
Examiner Tip

Never repeat the wording of the question in your answer. This will not gain any marks. You will need add further detail to show your understanding and knowledge of the topic being tested.

Some candidates scoring one mark referred to the heart pumping the blood rather than the more popular answer that included details about red blood cells.

6 Living cells need a constant supply of oxygen and nutrients.

(a) Describe how oxygen is transported around the body by the blood.

(2)

The blood contains oxygen which will get pumped around the body by the heart. Blood cells are also broard, flexible and they have a big surface area. This helps because the blood cells can carry a lot of oxygen around the body, they are also flexible to get through spaces in the body.

ResultsPlus

Examiner Comments

This response gained one mark for clearly providing details of the heart pumping the blood. Unfortunately, this candidate refers to blood cells rather than red blood cells which means that they have missed out on another mark. They have also provided some information on the structure of the blood cells and the information provided implies a description of the structure of red blood cells. However, this has not been stated so no mark can be awarded.

A minority of candidates were able to obtain the full 2 marks for their answer. Successful answers tended to include information about red blood cells and that blood was pumped by the heart although others, less frequently, did cover the information given by other marking points. Information on plasma was never seen and better candidates were able to correctly incorporate haemoglobin in their answers.

6 Living cells need a constant supply of oxygen and nutrients.

(a) Describe how oxygen is transported around the body by the blood.

(2)

Oxygen is carried by the red blood cells and is ~~pushed~~ pumped around the body by the heart.

ResultsPlus
Examiner Comments

This candidate has given a typical, two mark response. They have shown understanding of how oxygen is transported by stating that it is carried by red blood cells and pumped by the heart.

Question 6 (b) (i)

Transport in plants is a very poorly understood concept with the vast majority of candidates unable to score any marks for their response. Responses very frequently just described the passage of water through the plant - 'it goes into the roots, up the stem and out of the leaves' was hugely popular but unfortunately did not contain the detail necessary to gain any form of credit. There was a significant proportion of candidates that referred to xylem although several in the wrong context which negated marks and many references to modes of transport - active transport, diffusion and most commonly osmosis, but all occurring in the stem and/or roots rather than in the context stated in the markscheme. A few candidates stated transpiration or gave a description of the process for one mark although these were rare and even more rare was a description of how water moves from the stem into the leaves. A fair number of students gave a definition of osmosis and often referred to water moving into the roots by this method. One mark answers were obtained by candidates who were able to clearly state that water is transported through xylem vessels with infrequently seen two mark answers extending on this by providing a description of transpiration.

One mark answers inevitably included details of the xylem. Although some of these were in the wrong context, other responses included correct references along with information that tended to be extracted from the stem of the question.

(b) (i) Describe how water is transported up the stem and into the leaves of a plant.

(2)

Water is collected in the ~~roots~~ soil by the roots of a plant by osmosis. It then is sucked up a long vessle called the xylem vessle in the stem where it is carried to the leaves.

ResultsPlus
Examiner Comments

This candidate has correctly stated that water travels through the xylem vessels for one mark.

Most often, candidates that failed to score marks generally repeated the question.

(b) (i) Describe how water is transported up the stem and into the leaves of a plant.

(2)

The stem of the plant absorbs water up which then goes up the stem and into the leaves.

ResultsPlus
Examiner Comments

This candidate has gained no marks as their answer just repeats the question. There is no further information to show any knowledge or understanding of *how* water is transported through the plant.

Two mark answers were rare to see but most often included details that referred to xylem vessels and transpiration (or a description of the process).

(b) (i) Describe how water is transported up the stem and into the leaves of a plant.

(2)

water is transported up the stem through the xylem and diffuses into the leaves of a plant. through osmosis.

ResultsPlus
Examiner Comments

This is one of the few two-mark responses seen. The candidate has provided clear details of water travelling through the xylem vessels and then into the leaves by osmosis.

ResultsPlus
Examiner Tip

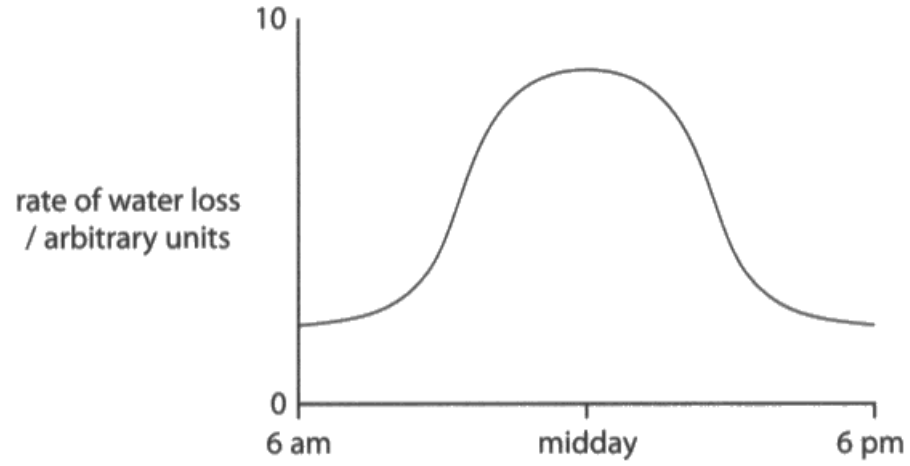
Make sure you are able to distinguish between the three methods of transport in plants and whereabouts in a plant they occur.

Question 6 (b) (ii)

Many candidates lost marks for the details that they provided simply because they were unable to express their understanding of the graph clearly. A significant number of students referred to the Sun at its 'peak' or stated that the Sun is at its 'highest' at midday which did not necessarily imply that there was more light or a higher temperature. There is a clear lack of understanding of transpiration and although a good number of candidates understood that water was lost due to evaporation answers were not always expressed in this way. Most often candidates were referring to water or the plant 'drying up' for no mark or described how water was lost because the plant was photosynthesising more. Some candidates referred to stomata (marking point 2) but then only to state that these were where water left rather than making reference to there being more stomata open. The most frequent correct explanations of water loss during the time specified in the question was that there was 'more Sun' or that the 'temperature increased' and this caused 'more evaporation'.

Frequently, students mentioned that the Sun was at its 'highest' or 'peak' at midday without actually mentioning that there was *more* Sun or a higher temperature or more light. This lost candidates marks. However, some of these responses did include this information with the most common one mark answer providing relevant details about the Sun.

(ii) The graph shows the rate of water loss from the leaves of a flowering plant during a 12-hour period on one summer's day.



Explain why the rate of water loss changes in the flowering plant from 6 am to midday.

(2)

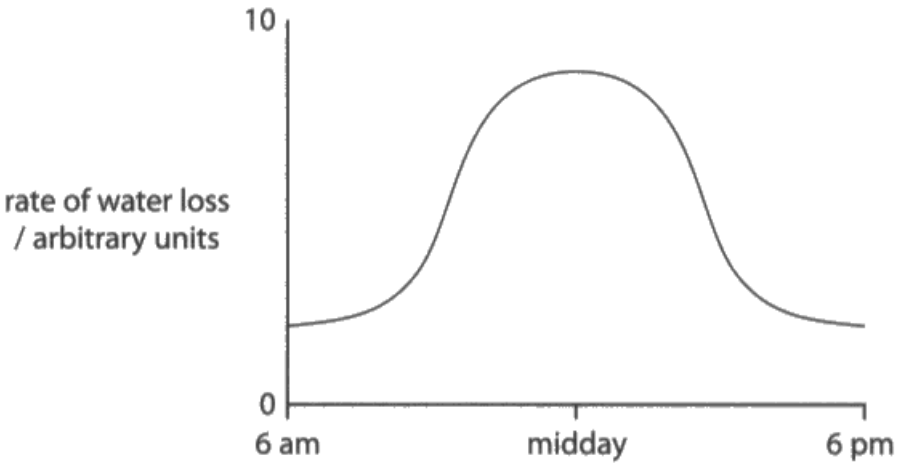
because the plant will be receiving more sunlight at midday.

ResultsPlus
Examiner Comments

This candidate mentioned more sunlight at midday for one mark although has not given a reason why this might increase water loss.

Candidates scoring two marks generally included details about the Sun or temperature and linked this to the amount of water loss by providing further information on evaporation.

(ii) The graph shows the rate of water loss from the leaves of a flowering plant during a 12-hour period on one summer's day.



Explain why the rate of water loss changes in the flowering plant from 6 am to midday.

(2)

The water loss gets greater between 6am to midday because Theats when it's most hot because the sun is out and the water is evaporating.

ResultsPlus
Examiner Comments

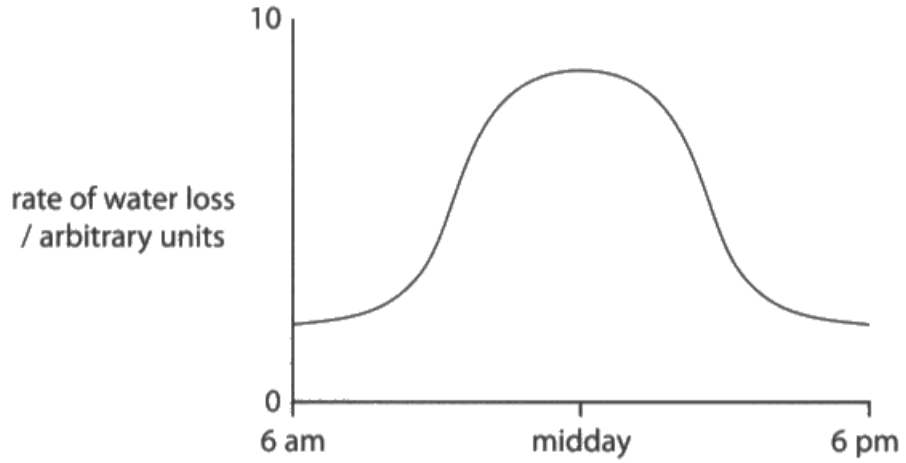
This response scored two marks for identifying an increase in temperature and linking this to the evaporation of water. If this candidate has not mentioned temperature then their mark would have been reduced to one. There would be no mark for 'the Sun is out' as the Sun could be out at all times between 6am and midday - there needs to be some implication that there is more sun as the day goes on.

ResultsPlus
Examiner Tip

It is correct to say that there is *more* Sun or a *higher* temperature at midday but this does not fully answer the question. You then need to extend your answer further by explaining *why* these factors increase water loss. This is what the question is asking for.

Many students were unable to interpret the graph to show their own understanding of why water loss increased during the time period specified. The vast majority of these just repeated the question by stating that more water was lost at midday.

(ii) The graph shows the rate of water loss from the leaves of a flowering plant during a 12-hour period on one summer's day.



Explain why the rate of water loss changes in the flowering plant from 6 am to midday.

(2)

The rate of water loss ~~increases~~ increased at ~~noon~~ midday

ResultsPlus
Examiner Comments

This response failed to gain marks for just repeating the question.

ResultsPlus
Examiner Tip

Remember to add more information that is in the question and that the mark allocation is a guide to the number of points required in the explanation.

Question 6 (c)

More candidates were able to access 6 marks for their response than the previous extended answer question. However, there were fewer students who obtained 4 or 2 marks for their answer. It appears that candidates do not understand the term 'techniques' and focussed their discussion on reasons for sampling rather than how to carry out different sampling methods. Similarly, a vast majority of students were unable to use the term 'quadrat' and instead preferred alternatives such as grid, box frame or square which were seen frequently. Many responses described invalid methods of sampling that did not cover the indicative content and failed to provide the depth and clarity required to award. For example, taking soil samples, measuring abiotic factors across the field, placing insects on plants or describing how to distribute insects and plants evening across a field were just some that were seen. Some candidates described techniques involving pollution indicators or gave reasons why the number of insects and plants would vary in different areas of the field. Few responses focussed on eutrophication and some discussed the effect of the Sun, chemicals, soil and noise level. There were several good, accurate and detailed descriptions, mainly of quadrat sampling that failed to cover the 'process' content for 4 marks and other 4 mark answers that described various, valid techniques in less detail. Pitfall traps, pooters, sweep nets and quadrats were seen often in answers, many linked to their correct use but others either failing to provide a use or linking their use incorrectly. 6 mark answers varied from 'only just' being awarded to those that were good, solid responses well worthy of the level awarded. Clear and detailed mention of random sampling and methods of calculation were given in some responses where it was very evident that candidates had actually carried out practical work in this area.

Answers failing to gain marks often gave reasons for sampling rather than focussing on a description of how to carry out different sampling techniques. Although these reasons were not completely random, they did not answer the question and therefore could not be awarded.

*(c) Describe how sampling techniques can be used to investigate the distribution of plants and insects in a field.

(6)

~~you can see how~~ you can see how many plants have bee polanated and how long they have been there some could or how good the soil is for nutrients and growing and then you can see whether the soil is right for them the insects

ResultsPlus
Examiner Comments

This candidate has misunderstood the question and given reasons for sampling rather than describing sampling techniques.

ResultsPlus
Examiner Tip

Read the question at least twice before answering and draw up a plan of what you will include in your answer or how you will structure it before you attempting to write your answer.

Some 6 mark answers were only just a level 3 response. These tended to lack detail in areas that although met the criteria to reach this level. Some level 2 responses bordered on 6 marks, providing good descriptions of several sampling methods but omitting details of a 'process' to move their answer up and over the higher mark boundary.

*(c) Describe how sampling techniques can be used to investigate the distribution of plants and insects in a field.

(6)

you could use ~~a~~ s pitfall traps under the ground around different parts of the ~~a~~ garden leave them for a few days and see which one has the most insects

To find out the distribution of plant use a quadrat and randomly throw it around the garden count the amount of plants and multiply it by the size of the garden.

ResultsPlus
Examiner Comments

This is a weaker level 3 response that only describes two sampling techniques. However, both are clear descriptions and there is a mention of randomly throwing a quadrat and how to carry out an estimation to gain an idea of the number of plants in a given area.

ResultsPlus
Examiner Tip

For extended answer questions that don't specify how many factors should be mentioned, or in this case sampling techniques, discuss as many as possible. You will not lose marks if you include some that are incorrect.

Level 2 responses either gave a very good description of one sampling method, most often quadrat sampling, or less detailed but good descriptions of several methods. Some of these bordered on 6 marks and would have gained the extra marks if they had included just a little more detail such as how to scale up or the need to carry out repeats.

*(c) Describe how sampling techniques can be used to investigate the distribution of plants and insects in a field.

(6)

Sampling techniques can be used to investigate the distribution of plants and insects in a field by using a quadrat. This enables you to easily count all of the insects and plants in the area that the quadrat lands. The quadrat is made up of 100 little squares in one big square. You are then able to get an accurate amount of plants and insects because, you are able to count what is in each little square very accurately.
However a quadrat only covers a small area of the full area, so you would have to do it loads of times to get a rough idea of what was there.

ResultsPlus
Examiner Comments

This is a good 4 mark response that describes, in detail, how to use a quadrat to carry out sampling. The details include a reference to repeats but fails to provide information on any further sampling techniques. This limits the mark awarded to 4.

ResultsPlus
Examiner Tip

This question asks for a response that describes sampling *tecniques* not *tecnique*. Be sure to include more than one example for questions like this.

The detail covered by level 1 responses was varied although many lists of equipment were seen or brief information was given that implied limited knowledge of sampling.

*(c) Describe how sampling techniques can be used to investigate the distribution of plants and insects in a field.

(6)

you can select a paton of grass in the feild by measurements of your choice then count ecah plant and othr organisms that are in the paton of grass. you then times this by how big the feild is to get a close estimate of the distribution of plants and insects in the feild.

ResultsPlus
Examiner Comments

This response meets the criteria for a level 1 response. It is clearly written so gains the QWC mark for a total of 2 marks. The student has provided information that covers two areas of the indicative content although the depth of informaiton provided is not worthy of 4 marks.

Paper Summary

Based on their performanceon this paper, candidates are offered the following advice.

- There is a serious lack of understanding in some areas of the specification including DNA mutation and transport in plants.
- Not all candidates are showing working out to answers which has cost some students marks.
- Some candidates are extracting incorrect information from graphs and using this in their answers. Data used to support written information must be accurate.
- Students should plan answers to extended writing questions prior to providing a response.
- Some students are providing nothing more in responses other than the wording of the question.
- A fair number of candidates fail to read the question properly and provide a response that is unrelated to the topic being tested.

Grade Boundaries

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

http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

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