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Examiners' Report
June 2012

GCSE Biology 5BI2F 01

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June 2012

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Introduction

This is the first of the 5BI2F papers for the new specification. The subject content differs quite significantly from the previous specification, and is clearly more demanding in its structure. Candidates are expected to show knowledge and understanding of a much wider range of topics that were not covered in the predecessor qualification, and to present skills in mathematics that are relevant to many aspects of this course. However, the responses to this paper from the cohort has indicated that all students have been able to gain access to all questions, and although success has varied, the paper has given a clear indication of where strengths and weaknesses in the candidates' knowledge and understanding lie.

Overall, candidates made a good attempt at answering all questions on the paper, with very few making no attempt at any individual item. Some responses showed very good subject knowledge, and this was common across the whole cohort, although there are clearly pockets of misunderstanding in some topic areas. Interpretation of graphical and tabular data, and using subject knowledge to provide explanations for trends and patterns, was carried well by many candidates. However, in a large number of cases, the actual wording of the responses given meant that some students did not gain full credit for their answers.

The extended writing questions proved to be a challenge to some candidates. Many of the responses to both of these questions indicated not so much a lack of understanding of the topic areas, but more an issue with understanding what the question expected from them. Similar problems arose with other questions on the paper, where candidates lack understanding of command words, and seem unable to distinguish between, for example, 'describe' and 'explain'. It was unfortunate for these candidates that they gained no credit for a very good scientific account of why, for example, glucose concentration in plant cells increases and decreases throughout the day, when they only needed to describe a trend in the glucose concentration.

This report will provide exemplification of candidates' work, together with tips and/or comments, for a selection of questions. The exemplification will come mainly from questions which required more complex responses from candidates.

Question 1(b)

The majority of candidates gained 2 marks out of the possible 3 marks available for this question. A smaller number gained all 3 marks. The main error was in candidates' understanding of the vessel carrying mineral ions. Many candidates opted for 'phloem' vessels with the correct answer being xylem vessels.

Question 1(c)(i)

The majority of students interpreted the data in the table well, and were able to make a correct comparison of the mineral ion content in the two plants. A large number of candidates manipulated the data correctly and were given credit for this, although there were a few that carried out calculations incorrectly. Nearly two thirds of the candidates gained full marks for their response to this question, with the most common error being a general statement to say that the ion content was highest (or lowest), but without specifying whether it was wheat, sunflower or total ion content.

Candidates were expected to make a comparison between the mineral ion content of the sunflower and the wheat. The majority of candidates did this well.

(c) Magnesium and nitrates are two mineral ions that are absorbed by plants.

The table shows the amount of magnesium ions and nitrate ions in the tips of sunflower and wheat plants.

type of plant	mineral ion content / arbitrary units	
	magnesium ions	nitrate ions
sunflower	0.730	0.147
wheat	0.225	0.226

(i) Compare the mineral ion content in the tips of these two plants.

(2)

In the sunflower it has more magnesium ion than the wheat, but the wheat has more nitrate ions than the sunflower.

ResultsPlus
Examiner Comments

This response gained 2 marks for making two correct comparisons using the data in the table. The majority of students made the same comparisons for full marks.

ResultsPlus
Examiner Tip

Some responses did not imply a comparison between the two plants, and these failed to gain credit. Here, the candidate has clearly given a comparison between the sunflower and the wheat.

(c) Magnesium and nitrates are two mineral ions that are absorbed by plants.

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(i) Compare the mineral ion content in the tips of these two plants.

(2)

In Sunflower's the magnesium ions ~~[illegible]~~ level is higher than in wheat which has 0.225 ions therefor that shows that sunflower use more photosynthes than wheat does.

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Examiner Comments

This response gains 1 mark for correctly stating that the level of magnesium ions in the sunflower is greater than in the wheat. A further mark could have been achieved by adding another comparison, such as the wheat containing more nitrate ions than the sunflower.

Question 1(c)(ii)

Many students gained 1 mark for this question by giving the role of chlorophyll in photosynthesis, or by stating that the chlorophyll absorbs light energy. However, many of these candidates failed to extend their answer to give further details of the role of chlorophyll, and therefore failed to gain maximum credit. More able students were linked photosynthesis with the production of glucose, although some students confused glucose with food, which was not an adequate alternative. A large number of candidates gave a simple description of chlorophyll and discussed green pigments, which did not gain any credit.

Question 2(a)(i)

Question 2(a)(i) was answered well by nearly three quarters of the candidates, who each gained full marks for their response. The most common error arose in the first statement, where less able candidates failed to correctly identify that the heart rate increases to supply muscles with more oxygen. These candidates instead gave either fat or protein as their response, but many gained 1 mark out of the 2 allocated to this question for stating that the breathing rate increased to remove excess carbon dioxide.

Question 2(a)(ii)

Just over one third of candidates recognised that carbohydrates provided energy, for 1 mark. The majority of students, however, failed to mention that to release this energy carbohydrates had to be broken down by enzymes to glucose and that this happened during respiration. Consequently, only a very small number of students gained full marks for their answer to this question. More candidates gained 2 marks for their response, by not only stating that carbohydrates provided energy, but that the energy was needed for the horse to run. Alternatively, some of these candidates stated that carbohydrates contained glucose for energy. Many students gave answers that implied a clear lack of understanding of the nutritional value of carbohydrate foods. Some common misconceptions were that carbohydrates provided protein and/or oxygen and some candidates also discussed why Casper needed to go on a generic 'diet'.

(ii) Explain why Casper needs a diet containing an increased amount of carbohydrate.

(3)

Carbohydrates, ~~or~~ when broken down by amylase, contain alot of energy. This energy is needed for Casper to run. The energy is transported to the ~~heart~~ heart through red blood cells, and used to help pump heart all around his body causing him to run faster and have more energy to do things.

ResultsPlus
Examiner Comments

This is a clear 3 mark response, where the candidate has recognised that carbohydrates must be broken down before the energy can be released. Although there is some inaccuracy in the response, this does not link directly to the marking points and therefore has not stopped any of the marks awarded.

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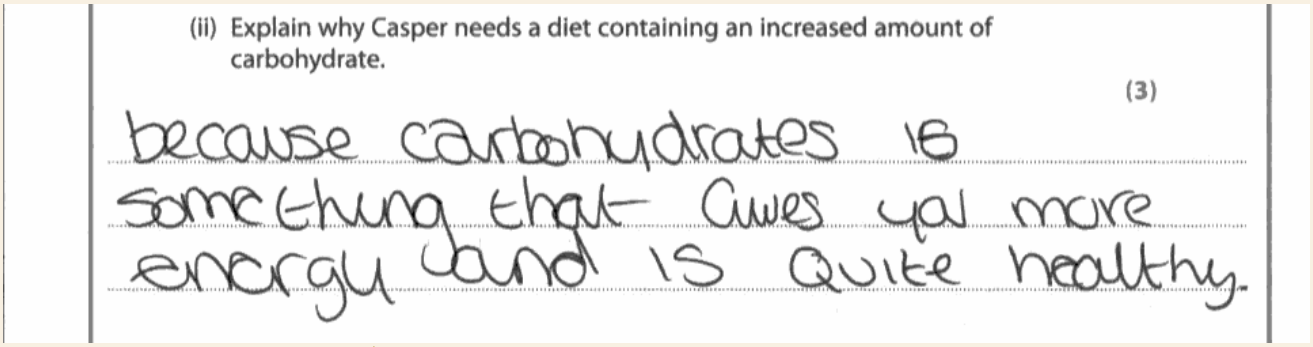
Examiner Tip

Make sure that responses given do not contain unnecessary detail that could lose marks.

Candidates are expected to know that carbohydrates are broken down into glucose by enzymes to release energy.


(ii) Explain why Casper needs a diet containing an increased amount of carbohydrate.

(3)

because carbohydrates is something that gives you more energy and is quite healthy.

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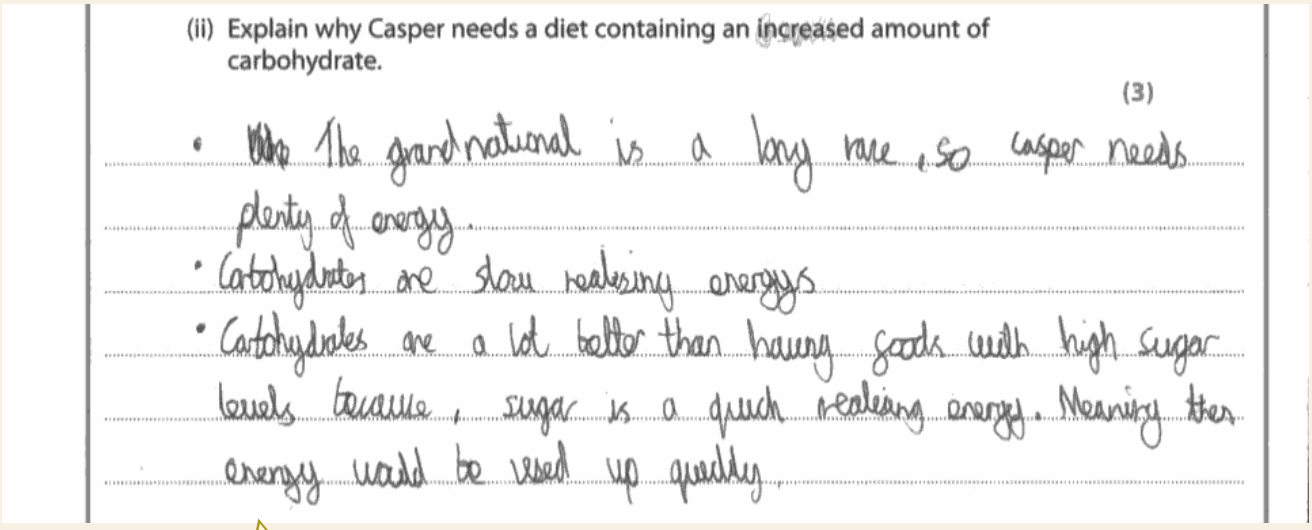
Examiner Comments

This response clearly states that carbohydrates contain energy for 1 mark although it has failed to include further details to gain more credit.

Most candidates gained 1 mark for this question by understanding that carbohydrates were 'energy-giving' foods.


(ii) Explain why Casper needs a diet containing an increased amount of carbohydrate.

(3)

- The grand national is a long race, so casper needs plenty of energy.
- Carbohydrates are slow releasing energys
- Carbohydrates are a lot better than heavy foods with high sugar levels because, sugar is a quick releasing energy. Meaning the energy would be used up quickly.

ResultsPlus
Examiner Comments

This response is an example showing the two most commonly used marking points. Here the candidate has stated that energy is needed for the race and that carbohydrates themselves provide this energy. Although the response does mention sugar, the context that it is written in is incorrect and therefore is not awarded a mark. Overall this is answer was awarded 2 marks.

Question 2(b)(ii)

Many candidates failed to apply the correct theory to explain the data shown by the graph for this question. Less able students stated that the increase in lactic acid was due to an increase in blood flow, or that more lactic acid was needed to provide energy as the speed of the horse increased. Only the most able candidates realised that less oxygen was being delivered to muscles, and that the 'extra' energy required by the horse was supplied by anaerobic respiration, hence the increase in the concentration of lactic acid. The most common answer, for 1 mark was for anaerobic respiration, and although these responses on the whole contained further detail, most of it was irrelevant and did not answer the question.

(ii) Explain why the concentration of lactic acid in Casper's blood changes as his speed increases.

(2)

The faster casper runs the quicker the blood flow around the body so the ~~xxxxxxxx~~ amount of lactic acid is increased.

ResultsPlus
Examiner Comments

This response contains no details that is worthy of credit, although the content reflects a common error made by many students in answering this question.

(ii) Explain why the concentration of lactic acid in Casper's blood changes as his speed increases.

(2)

When his speed increased his muscles work harder and need more oxygen if his body can't take in enough oxygen the lactic acid starts being produced to tell his body it working too hard

(Total for Question 2 = 8 marks)

ResultsPlus
Examiner Comments

This is a clear 2 mark response. Although the details do not directly state that muscles lack oxygen, the information given is enough to imply this.

(ii) Explain why the concentration of lactic acid in Casper's blood changes as his speed increases.

(2)

The concentration of lactic acid increases because his body would be performing aerobic respiration which creates lactic acid and energy.

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Examiner Comments

This response has confused anaerobic and aerobic respiration. If this error had not been made, this candidate would have gained 1 mark for their response.

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Examiner Tip

Make sure that candidates fully understand the differences between aerobic and anaerobic respiration and are able to apply these in an unfamiliar context. Aerobic respriation needs 'air' which may prompt students into remembering that oxygen is required for this process.

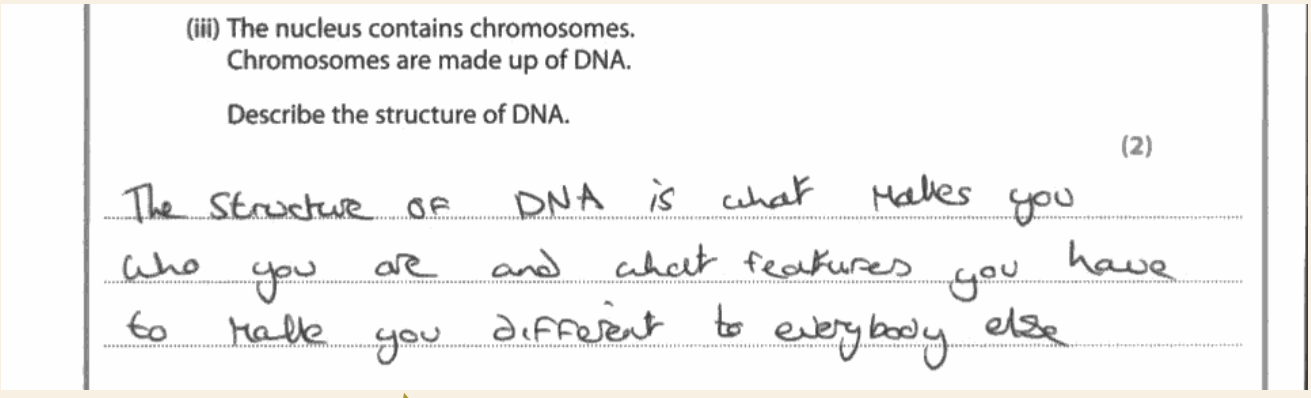
Question 3(a)(ii)

The majority of candidates scored 1 mark for question 3(a)(ii), most commonly for stating that the cell wall provided support to the plant, or that it helped the cell to keep its shape. Candidates that successfully gained 2 marks did so by giving both of these points. Some candidates also spoke about the cell wall keeping contents inside. A large number of candidates failed to gain credit for giving 'protection' as their answer, as they did not qualify this with either bacteria or microorganisms. Similarly, many candidates incorrectly described the function of the cell wall as deciding what goes in and out of the cell.

Question 3(a)(iii)

The majority of students were clear in their understanding of the structure of DNA with a good number of candidates successfully gaining full marks for their response. Although most students made a good attempt at answering this question, some were clearly confused about the components of DNA, with responses mixing bases with either amino acids, proteins or chromosomes, and others giving a vague description of bonds without being specific about which type of bond. The most common correct answers included 'double helix' and 'bases', or a description of the bases with 'hydrogen bonds' infrequently mentioned. Candidates gaining one mark did so by describing the structure as a double helix, or giving an acceptable alternative to this. It appeared that some candidates misread the question to give details of the function of DNA rather than its structure.

A large number of candidates misinterpreted the question, giving the role of DNA rather than the structure.



(iii) The nucleus contains chromosomes.
Chromosomes are made up of DNA.

Describe the structure of DNA.

(2)

The structure of DNA is what makes you who you are and what features you have to make you different to everybody else

ResultsPlus
Examiner Comments

This answer makes an attempt to describe the role of DNA rather than the structure.

ResultsPlus
Examiner Tip

Make sure that the question is read properly and fully understood before attempting an answer.

Question 3(b)(i)

Nearly three quarters of the candidates successfully gained full marks for question 3(b)(i), by carrying out a simple subtraction calculation to arrive at the correct answer of 16.

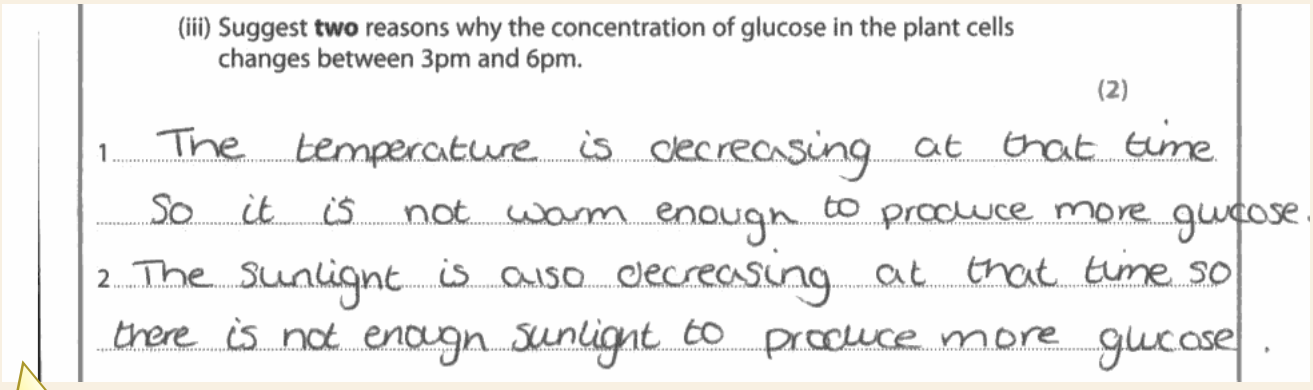
Question 3(b)(ii)

Nearly half of the candidates successfully gained full marks for question 3(b)(ii), by describing the increase to midday, and then the decrease to midnight. Students that did not gain full marks were more vague in their answers, with the most common responses in this category stating briefly that the concentration of glucose increases and then decreases. Some candidates tried to explain the data by giving information about how the intensity of light influences the amount of glucose produced, and although their scientific knowledge was generally impressive, this detail unfortunately did not gain any credit. This was a fairly common error made by candidates who appear unaware of the difference between 'describe' and 'explain'.

Question 3(b)(iii)

The majority of candidates gained 1 mark for this question, with the most common responses being a decrease in temperature, or a decrease in light. Some candidates were very vague in their answers, stating that it was 'sunset' or 'the Sun has gone' for example, without clarifying that this causes a decrease in light intensity. Other candidates just provided a list of limiting factors e.g. light and temperature, but failed to link this to a time of day and whether there was an increase or a decrease. Nearly a third of the candidates scored two marks for this question, for stating both a decrease in temperature and a decrease in light, with very few students mentioning a lack of water.

Candidates are expected to be able to describe the factors that limit the rate of photosynthesis, or in this case glucose production, which is synonymous. A good number of candidates were able to do this although some students just gave a list of factors which was insufficient for the marks.



(iii) Suggest **two** reasons why the concentration of glucose in the plant cells changes between 3pm and 6pm.

(2)

1 The temperature is decreasing at that time so it is not warm enough to produce more glucose.

2 The sunlight is also decreasing at that time so there is not enough sunlight to produce more glucose.

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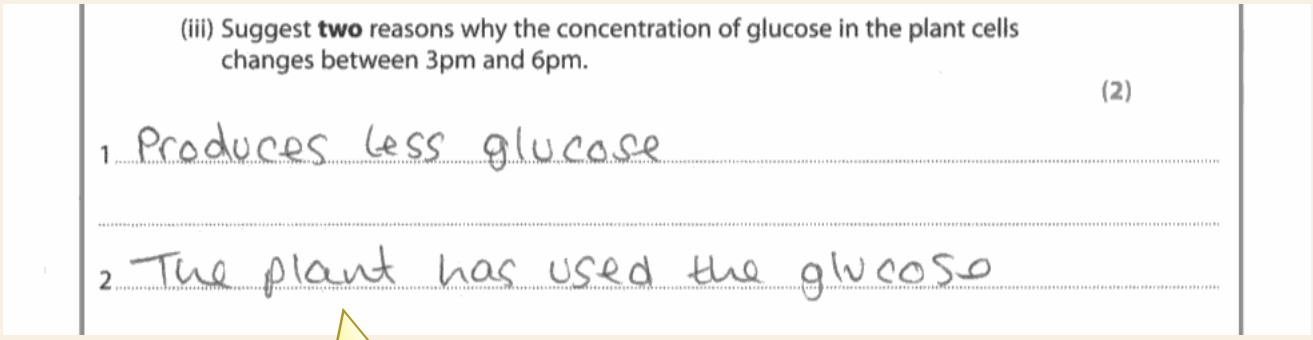
Examiner Comments

This response gives two factors that could influence the glucose concentration in the plant cells and goes beyond just giving a list. In this case the temperature decreasing and the light intensity decreasing are sufficient.

ResultsPlus
Examiner Tip

Unless a question asks a candidate to 'state' or 'list' the response will need to give more detail than just one or two words.

This is an example of a response that could have gained 1 mark if they had extended their answer slightly to give a use of glucose.



(iii) Suggest **two** reasons why the concentration of glucose in the plant cells changes between 3pm and 6pm.

(2)

1 Produces less glucose

2 The plant has used the glucose

ResultsPlus
Examiner Comments

The response has failed to score any marks. If the candidate had given more detail on how the glucose had been used, for example during respiration or to produce starch, then they could have gained 1 mark.

Question 4(a)(i)

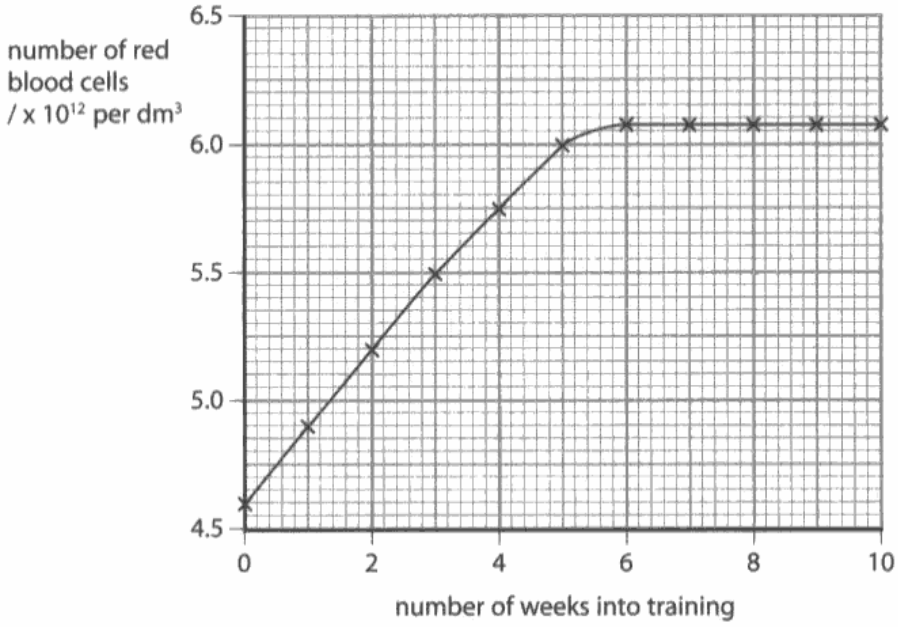
Candidates are expected to analyse graphical data and to use information from such sources to compile their response. Question 4(a)(i) was generally answered very well, although it was particularly frustrating that many candidates quoted incorrect figures from the graph, which lost them marks. In this case, the increments on the scales of the graph were not particularly straightforward and it appeared that some candidates gave an approximate value, rather than working out the true value from the y axis of the graph. However, the majority of candidates that did obtain marks for this question were able to gain full credit for their response, by correctly stating that the number of red blood cells increases to 6 weeks, and then levels off. Of the candidates that were unsuccessful in this question, the majority described the number of red blood increasing but failed to state that they increased to six weeks. As with other questions in the paper, many candidates gave reasons for the increase with some showing very good subject knowledge, but this is not what the question demanded.

Many candidates correctly stated that there was an increase in the number of red blood cells but failed to state that this increase was only seen up until 6 weeks.

Altitude training

4 Some athletes train at high altitudes (over 2000 m above sea level). There is less oxygen in the air at high altitudes.

(a) The graph shows the number of red blood cells in the blood of an athlete training at high altitudes, over a ten-week period.



(i) Describe the change in the number of red blood cells during this ten-week training period.

(2)

The longer the athlete had been training for the more red blood cells were produced.

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Examiner Comments

To gain 1 mark here the candidate needed to add that the red blood cells only increased until six weeks. To gain a further mark, the candidate also needed to recognise that the number of red blood cells levels off after six weeks.

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Examiner Tip

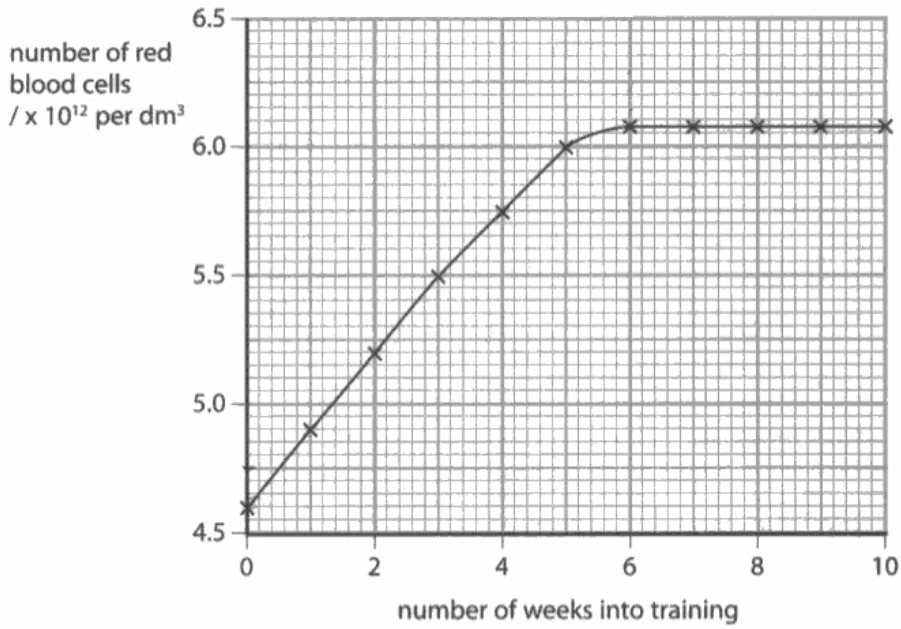
When asked to 'describe' the data shown in graphs, make sure that the shape of the whole graph is described, linking the shape of the with the information given in the axes of the graph.

Many candidates misread the y axis scale and therefore lost marks as a result.

Altitude training

4 Some athletes train at high altitudes (over 2000 m above sea level). There is less oxygen in the air at high altitudes.

(a) The graph shows the number of red blood cells in the blood of an athlete training at high altitudes, over a ten-week period.



(i) Describe the change in the number of red blood cells during this ten-week training period.

(2)

at the start of the week it was quite low (just above 4.5) and as the weeks went on it grew until it got to a constant number of 6.1

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Examiner Comments

This candidate has given what appears to be an estimate of the value given on the y axis. To gain a mark for this response, the candidate should have stated that the number of red blood cells increased to 6.075 x 10^{12} dm^3

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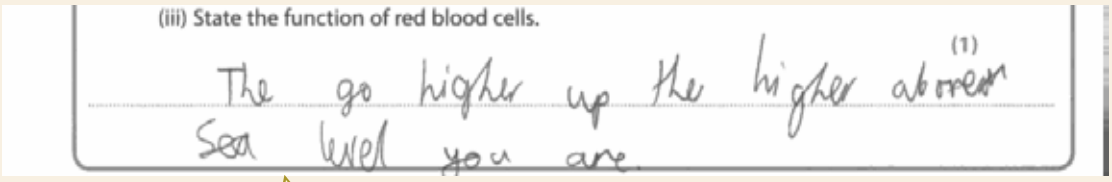
Examiner Tip

When interpreting information from graphs, make sure that figures quoted are accurate. If a candidate is unsure of the values shown by the axis increments then look for another way to answer the question. In this case, the x axis is much easier to interpret and the values on this axis could have been included in the response rather than those shown on the y axis.

Question 4(a)(iii)

The majority of candidates arrived at the correct answer for this question by correctly stating that the red blood cells carry oxygen. Nearly two thirds of the candidates were successful here, with some mentioning that they contain haemoglobin that carries oxygen. Of those that failed to gain the mark, many stated that red blood cells carry blood, or that they 'pump blood around the body'.

Some candidates were mistaken in thinking that this question was linked to the graph and made another attempt at describing the pattern shown in the graph.


(iii) State the function of red blood cells.

The go higher up the higher above Sea level you are. (1)

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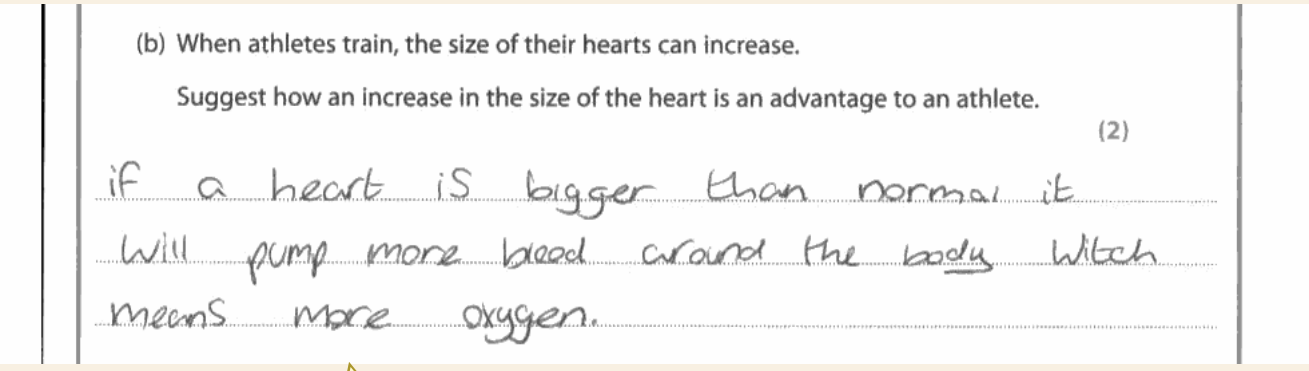
Examiner Comments

This response failed to gain marks for describing the function of red blood cells. It reflects the content of many responses made by candidates that misunderstood the question.

Question 4(b)

Half of the candidates gained 2 marks for their response to this question. Candidates gaining one mark generally stated that the heart 'pumped more blood', rather than providing details about oxygen.

The majority of students gained credit for stating that a larger heart will result in more blood being pumped, resulting in more oxygen. Although many of these answers could have been made more succinct i.e. more blood pumped per beat and therefore more oxygen to muscles, the majority gave just enough to gain full marks.



(b) When athletes train, the size of their hearts can increase.

Suggest how an increase in the size of the heart is an advantage to an athlete.

(2)

if a heart is bigger than normal it will pump more blood around the body which means more oxygen.

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Examiner Comments

Although this response is brief, it gains 2 marks for correctly stating that more blood is pumped and which results in more oxygen being transported.

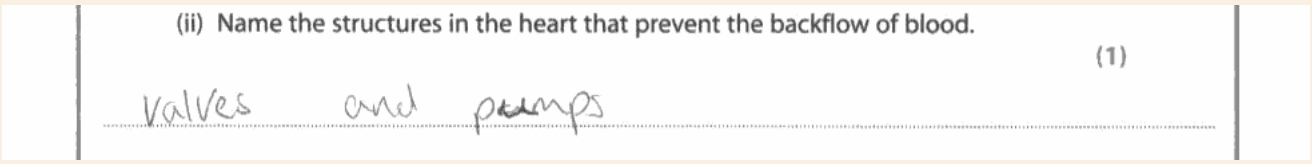
Question 4(c)(i)

The most able candidates successfully gained 2 marks for question 4(c)(i) with nearly a third gaining full marks. Half of the candidates gained 1 mark for their response, with many gaining credit for recognising the pulmonary artery as one of the vessels transporting blood away from the heart. A sizeable proportion of candidates failed to gain any marks for their answer.

Question 4(c)(ii)

Surprisingly, well over half of the candidates were unable to name the structure that prevented the backflow of blood in the heart for question 4(c)(ii). Of these candidates, responses included nearly every part of the circulatory and respiratory system imaginable, from vena cava, to capillaries, to lungs. Candidates that were successful in answering this question clearly stated valves, although some were more specific giving named valves such as the tricuspid or mitral valves.

Few students gave a list of structures in their response to this item. Fortunately, many of these lists contained named structures that were all correct, although some didn't and this, in some cases, lost them the mark.


(ii) Name the structures in the heart that prevent the backflow of blood.

(1)

valves and pumps

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Examiner Comments

This response unfortunately gained no marks, despite including the correct answer in the detail given. As the candidate had provided a list of structures, with one being incorrect, this stopped the mark being given for the correct answer.

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Examiner Tip

Be sure that all answers in a response are correct, especially when giving a list. Do not add more detail than necessary just in case the extra detail is incorrect. This could lose you marks.

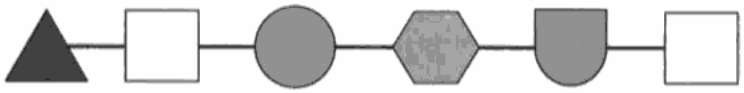
Question 5(b)

This question posed a real challenge to the majority of students who were unable to relate the information given to them about the sequences of amino acids to the diagrams shown in the question. Very few candidates gained full marks for this question with the majority failing to gain any credit at all. A third of the candidates were able to gain 1 mark for the first part of the question by stating that the sequences differed, although many were vague and failed to state that the sequences were, in fact, different amino acids. A tiny minority of candidates gained 3 marks for their response, with the majority of these gaining 2 marks for the first part of their answer - different amino acids and in a different order. The minority gained credit for realising that each of the proteins would have different shapes, but failed to extend their answer to state that each would have a different substrate.

Responses to both parts of this question were generally very vague, where students failed to identify with the information given to them in the introduction.

(b) The diagrams show two sequences of six amino acids.

Sequence 1 is found in an enzyme called catalase.



Sequence 2 is found in an enzyme called amylase.

(i) Suggest how the structures of the enzymes, catalase and amylase, are different from each other.

(2)

The Structures of the enzymes, catalase and amylase are different because they do different things.

(ii) Suggest why the action of these two enzymes will be different.

(2)

The action of the two enzymes will be differe-nt ~~because~~ as they are diffent shapes and orders so they do spacific things.

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Examiner Comments

This response gains 1 mark for correctly stating, in the second part of the question, that the shape of the enzymes would be different.

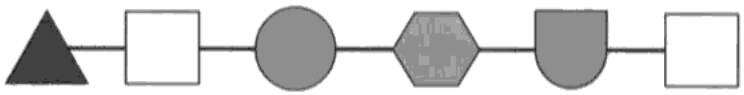
ResultsPlus
Examiner Tip

Read the information in the introduction to a question carefully before tackling the question itself.

Many students were vague in their answers to both parts of the question. Some responses were almost there, but needed a little more detail to be worthy of credit.

(b) The diagrams show two sequences of six amino acids.

Sequence 1 is found in an enzyme called catalase.



Sequence 2 is found in an enzyme called amylase.

(i) Suggest how the structures of the enzymes, catalase and amylase, are different from each other.

(2)

They are ~~fact~~ born made up different.

(ii) Suggest why the action of these two enzymes will be different.

(2)

because they are made up differently

ResultsPlus
Examiner Comments

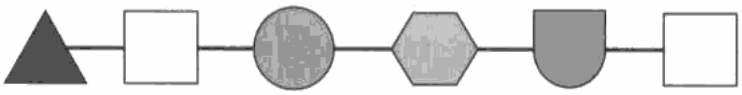
This response would have benefited from using the information in the introduction and the diagrams to state what made each of the enzymes different.

ResultsPlus
Examiner Tip

Use information from the introduction and any other information given to help structure a response.

(b) The diagrams show two sequences of six amino acids.

Sequence 1 is found in an enzyme called catalase.



Sequence 2 is found in an enzyme called amylase.

(i) Suggest how the structures of the enzymes, catalase and amylase, are different from each other.

(2)

The amino acids in the enzyme "catalase" are in a different sequence to the amino acids in the enzyme "amylase"

(ii) Suggest why the action of these two enzymes will be different.

(2)

the two actions of the enzymes are different because the amino acids are in a different order their DNA is coded differently so they function differently

ResultsPlus
Examiner Comments

The first part of this response is very clear in stating how the two enzymes are structured differently. This has gained the candidate 1 mark. The second part of the response just repeats what has been stated in the first part of the response, so no credit has been awarded here.

ResultsPlus
Examiner Tip

Giving the same answer for two different questions will never be expected in an examination.

Question 5(c)

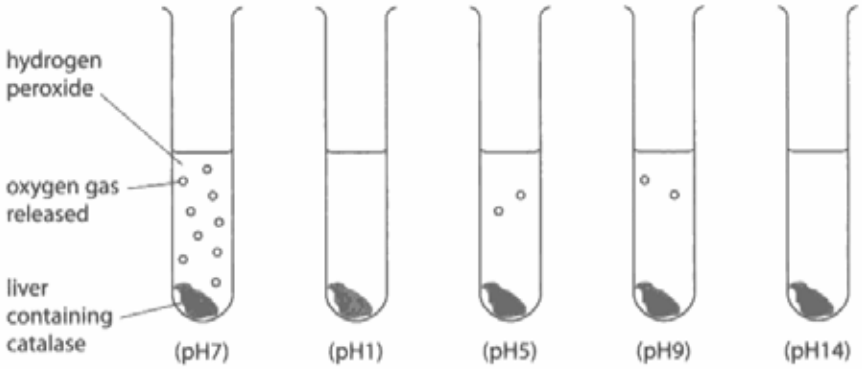
The majority of candidates did very well to recognise when reactions were taking place and how vigorous the reactions were at each pH in this investigation, although many failed to link their observation with enzyme activity. This limited the marks that many candidates could gain for this question, which has resulted in the majority achieving level 1, 2 marks for the first of the extended writing questions on this paper. Nearly a quarter of the candidates correctly identified the optimum pH for the enzyme, giving details in their response that linked the extent of oxygen production to enzyme activity, which consequently gained 4 marks. A very small proportion of candidates gave a level 3 response, by adding further detail that explained why no reaction took place at an extreme pH. In these cases, candidates were clear in their understanding of why enzyme activity was affected by pH, and the majority of these candidates were awarded 6 marks. Most responses were written very clearly and the quality of written communication mark was rarely deducted.

Responses that failed to gain any credit were very vague and did not link clearly to what was happening at each pH. Some candidates were confused in general about what was happening in each of the test tubes, misunderstanding what was being broken down and what was producing the oxygen.

*(c) A student carried out an investigation to study the effect of pH on the activity of catalase.

In the presence of catalase, hydrogen peroxide breaks down to release oxygen gas.

The student set up five test tubes, as shown in the diagram, and observed the amount of oxygen gas released.



Explain the effect of pH on the enzyme catalase in this investigation.

(6)

the effect of pH on the enzyme catalase is that the ~~liver~~ hydrogen peroxide will break down to oxygen gas. So if there is anything that contains catalase like liver and there is also hydrogen peroxide will ~~the~~ have oxygen gas as catalase and ~~pea~~ hydrogen peroxide will always produce oxygen gas.

ResultsPlus

Examiner Comments

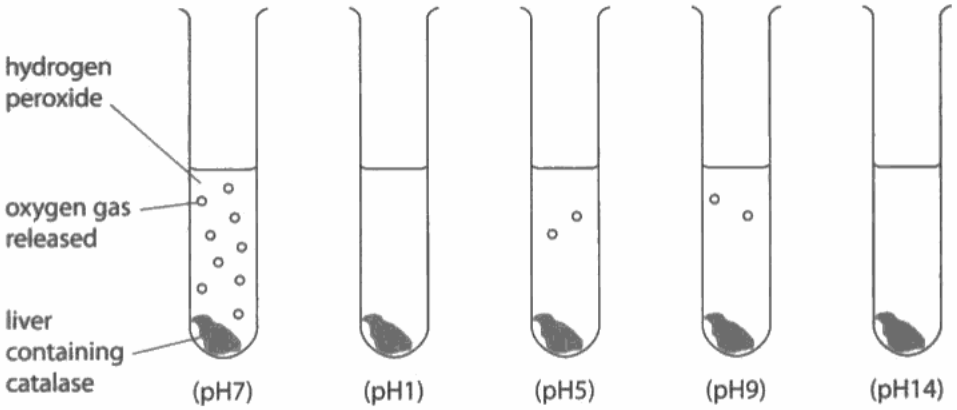
This is an example of a response that failed to gain marks. None of the content here gives clear detail about the reactions taking place, or the effect of pH on enzyme activity.

The question asks for the effects of pH on enzyme activity, although few students linked the reactions taking place, or not taking place, with enzyme activity. This response is very succinct, providing only the necessary details that link directly to the question, and gaining the candidate full marks.

*(c) A student carried out an investigation to study the effect of pH on the activity of catalase.

In the presence of catalase, hydrogen peroxide breaks down to release oxygen gas.

The student set up five test tubes, as shown in the diagram, and observed the amount of oxygen gas released.



Explain the effect of pH on the enzyme catalase in this investigation. (6)

The level of pH effected the enzyme catalase when it change from PH 7. This enzyme catalase work better at a neutral PH 7, but when it starts becoming to acidic or alkalen the enzyme catalase starts to denature so it don't work as effective. The enzyme will carry on denaturing until it stops working as shown in the diagrame. PH 1 has no reaction so does PH 14 but when the PH is never near to PH 7 the reaction still take place but at a slower rate.

ResultsPlus
Examiner Comments

This response states clearly that the enzyme works best at a neutral pH which puts it initially into level 2. However, the detail continues to mention the effect of pH on the enzyme, stating that the enzyme denatures at more acidic or alkaline pH's. This information gains the candidate a further 2 marks to give them an overall 6 marks for their answer.

ResultsPlus
Examiner Tip

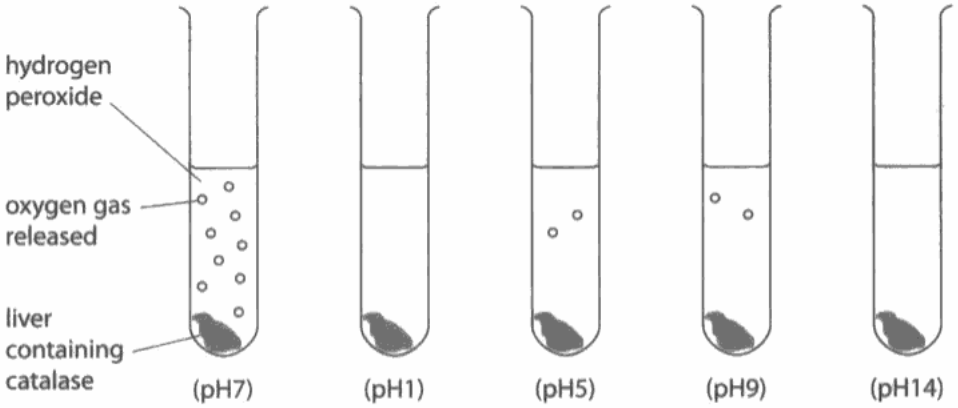
Extended writing answers need to be structured carefully. They must be written clearly and focus on the topic of the question. The quality of written communication mark will be deducted for responses that are incoherent, or where grammar, punctuation and spelling are particularly poor.

This response provides clear details that link pH with enzyme activity providing enough information to gain 4 marks.

*(c) A student carried out an investigation to study the effect of pH on the activity of catalase.

In the presence of catalase, hydrogen peroxide breaks down to release oxygen gas.

The student set up five test tubes, as shown in the diagram, and observed the amount of oxygen gas released.



Explain the effect of pH on the enzyme catalase in this investigation.

(6)

The results show that the neutral pH 7 produced the most oxygen gas whereas as the alkaline PH14 produced no oxygen gas. The results also show that the enzyme Catalase works as its best under neutral conditions. Also the results show that pH Level changes the effectiveness of the enzyme Catalase. The results also show that acidic conditions slow down the activity of Catalase and also alkaline conditions also slow down the activity of Catalase.

ResultsPlus
Examiner Comments

This is a good level 2 response that details how the pH affects enzyme activity. It states clearly that the best pH for catalase is neutral, and the candidate has recognised that the extreme pHs slow down enzyme activity. To move up to level 3 the candidate would have to mention why enzyme activity is reduced as the pH deviates from 7.

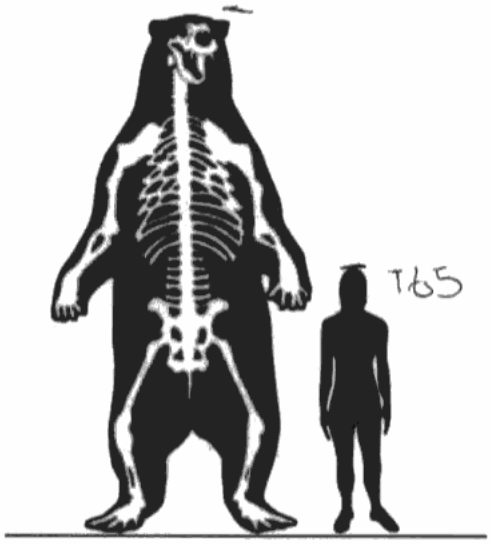
Question 6(a)(i)

A very significant majority of candidates gained full marks for their answer to this question, showing good skill in estimation. Many candidates just gave the answer, rather showing how they arrived at the answer by showing their working.

Bears

6 A small number of fossil bones from a very large bear was found in South America in 1935.
The bones were estimated to be about one million years old.
Scientists used these bones to predict the shape and size of the bear.

The diagram shows the bear and a person who is 165 cm tall.



(a) (i) Estimate the height of the bear.

(2)

165x2=

answer = 330 cm

ResultsPlus
Examiner Comments

This is an example of a response that shows both the working and the correct answer. If the student had failed to carry out the calculation correctly but had shown the correct working, they would have still obtained 1 mark.

ResultsPlus
Examiner Tip

When carrying out calculations that are worth more than 1 mark, always give the sum to show how the answer was calculated.

Question 6(a)(ii)

Only a quarter of the candidates were able to recall the process that occurs in animal cells that results in growth. Of these candidates, the majority mentioned mitosis, although variations from this included differentiation and cell division.

Question 6(b)

Many candidates understood that only predictions can be made when working from fossil evidence, due to the fact that bones are missing or may be broken. This gained a large number of candidates one mark for their response. Many candidates failed to add further relevant detail to gain more marks for this question, although some touched on the fact that muscle, skin or body organs were not present to give a clearer picture of size and shape of an animal. Very few candidates mentioned that soft tissue decays, with an even smaller number indicating that fossils do not always form. Candidates missed out on marks for stating that predictions were necessary because no one was around at the time, or because live animals were too dangerous to work with. Other incorrect responses discussed how fossils were formed, which didn't relate to the question. Overall, this question provided challenge to all but the most able, with only a very small number of candidates successfully gaining full marks for this question.

Candidates are expected to know that there are gaps in the fossil record and the reasons for these gaps. The majority of candidates made a fair attempt at answering this question, although many struggled to apply their knowledge in this context.

(b) Explain why scientists can only make predictions about the size and shape of animals when working from fossil evidence.

(3)

Because fossils are only a shape of the bone. It also can't be sure because there could be more fossils that aren't yet found. It can also turn out to not even be like what you think.

ResultsPlus
Examiner Comments

This response gains 1 mark for stating that some bones may be missing. Further marks could have been gained by stating that some bones may have broken or that the soft tissue of the animal decays.

ResultsPlus
Examiner Tip

Dont be put off by the context of the question. The science underlying a context does not deviate from what should be taught from the specification.

(b) Explain why scientists can only make predictions about the size and shape of animals when working from fossil evidence.

(3)

because they may not of found every part of the animals structure. or over millions of years part of the bones have broken down which will cause them to decrease in length.

ResultsPlus

Examiner Comments

This response gains 2 marks for bones missing and bones broken. A further mark could have been gained by extending the answer to provide details such as soft tissue decays, or that fossils do not always form.

Question 6(c)

Candidates were able to relate to this question more successfully than the previous extended writing question on this paper. Many showed good subject knowledge in relation to the structure of the leaf, although some limited their response by giving details of only one structure and how this adapted the leaf for photosynthesis. The majority of candidates gave a level 4 response for this question and, like the previous 6 mark question, very few lost the quality of written communication mark. This was apparent across all levels. Nearly a fifth of candidates gained full marks, giving a range of structures and describing clearly how these structures adapted the leaf for photosynthesis. Candidates giving a level 2 response limited details to just one structure or function that was related to photosynthesis, without providing any explanation about how this structure adapted the leaf for photosynthesis. Some candidates failed to focus on structures found in the leaf, and gave details of how the roots absorb water and xylem vessels which transport water through the stem, or gave the word equation for photosynthesis, which was irrelevant in this case.

Candidates should understand how a leaf is adapted to carry out photosynthesis, and are expected to recall all relevent structures in the leaf that help this process to take place.

*(c) Some species of bears eat leaves.

Describe how the structure of a leaf is adapted for photosynthesis.

(6)

it has a large surface area to capture as much sunlight possible, chlorophyll captures it.

ResultsPlus

Examiner Comments

This response states that both chlorophyll and the large surface area of the leaf capture as much sunlight as possible. This clearly links two structures to a function, although the information given for chlorphyll is vague.

ResultsPlus

Examiner Tip

In planning a response to a 6 mark question it might be wise to consider brainstorming structures involved in photosynthesis and then adding detail to describe how these structures help the leaf to carry out photosynthesis. Try to avoid giving details on just one structure.

Candidates are deducted a quality of written communication mark for a response that is incoherent or presents spelling, punctuation and grammar that is particularly poor.

*(c) Some species of bears eat leaves.

Describe how the structure of a leaf is adapted for photosynthesis.

(6)

the leaf has a large surphace area so it can attract the sun light easyer. also it is thin so gas eastange can happen mor aficently and quiker. The Cloroplasts ar close to the surphace area alowing protene to get t where it is neede. as well as that it has a waxy layer on the out side to present the loss of water. The axons are placed in the shaded sid of the plan allowing the plant to grow towards the sun light and increase the rate of Photosynthesis.

(Total for Question 6 = 12 marks)

ResultsPlus

Examiner Comments

In this case, there is some incoherence in the response, although the candidate has correctly identified several structures and linked these to their role in photosynthesis. This is a level 3 response, although due to some confusion the quality of written communication mark has been deducted. This response therefore gains 5 marks rather than 6.

*(c) Some species of bears eat leaves.

Describe how the structure of a leaf is adapted for photosynthesis.

(6)

A large surface area so more light can hit the leaf. A thin outer layer so the light can easily pass through. Chlorophyll inside containing chloroplasts are close to the surface to gain as much light energy as possible. Also a cell has small holes in it called stomata which open and close allowing gases in and out. It also opens and closes for water to pass through.

ResultsPlus

Examiner Comments

This response gives details of several structure and provides information on how they adapt the leaf for photosynthesis. The spelling, grammar and punctuation are accurate. This response gains 6 marks.

Paper Summary

Although many candidates clearly displayed a fair understanding of the topic areas covered in this paper, many failed to gain full marks for several reasons. Some responses were very vague and failed to specify particular details that would have been awarded credit. This was evident in questions such as 2(a)(ii) and also the extended writing questions. Graphical interpretation was attempted well, and despite the majority of candidates understanding what the data was showing, many lost marks by quoting incorrect figures, illustrated by some responses given for question 4(a)(i). Some students failed to provide adequate detail in their interpretation of graphs, with their responses describing only what part of the graph showed. This was also evident in some responses given for question 4(a)(i).

The main points to highlight in this paper are as follows:

- Candidates must be able to distinguish between the different command words, particularly 'describe' and 'explain'.
- Data that is extracted from graphs must be correct if used in a response.
- Candidates must read all information given to them in a question, and avoid jumping straight to the answer.
- Where a list is given as an answer to a one mark question, all items given in the list must be correct or marks may no be awarded.
- Where a calculation is necessary to reach an answer, candidates should be encouraged to show how they carried out the calculation.
- When asked to describe a pattern or trend in data, candidates should make sure that all of the data, whether in tabular or graphical form, is described, not just part of it.
- Plan answers to 6 mark questions by drawing up a concept map of key points, and then expand on these to cover the detail needed to gain full credit.

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