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Examiners' Report
June 2019

GCSE Biology 1BI0 2F

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Introduction

Paper 1BI0/2F is taken by candidates doing GCSE biology. It is taken as part of a linear assessment model at the end of the course. This was the second paper for this specification and it was pleasing to see that the mean mark had increased by 4.47 with some good detailed biology in responses, for example when explaining the role of auxins in phototropism. The grade 4 candidates performed in a similar manner and standard of English to those matched on the 2H paper on these crossover items which is encouraging. It is thought that this increase is possibly due to the good preparation by teachers for this cohort, particularly for the level 5 items which include most of the items that are common with the 2H paper. The paper consists of 100 marks assessed by a variety of questions including multiple choice, short answer and two extended answer questions worth 6 marks each. Candidates should answer all questions in a time period of 1 hour and 45 minutes. In the extended answer questions marks are also awarded for the ability to structure a response logically, these questions are marked with an asterix (*). In addition, the new specification assesses practical knowledge and mathematical skills in the papers. These requirements are given in the specification and there are 8 core practical investigations which candidates must complete prior to the exam. Aspects of working scientifically were also assessed in questions throughout the paper.

The paper contained questions assessing the content from topic 1 and topics 6-9. Topics tested included the water cycle and potable water, Hormones and the control of blood glucose concentration, Photosynthesis and phototropism, arteries and veins, exercise and anaerobic respiration, competition, energy transfer, plant cells and osmosis, human population and biofuels, sampling, food webs, the carbon and nitrogen cycles, respiration and structures and functions of the blood. The two, six mark, questions covered biofuels and the structure and function of red and white blood cells. Questions on practical work included: measuring, writing a plan for an investigation, drawing a plant cell from a photomicrograph, controlling variables, estimating population size, improving an investigation, and setting up a control.

The maths skills assessed included interpreting graphs and tables, as well as magnification, ratio and rate calculations.

The assessment of practical in examinations has replaced the controlled assessment component of the previous specification. Candidates were able to answer questions using their practical skills knowledge including questions on safety precautions and the identification of controlled variables. However, candidates need to ensure they use terms including volume and mass accurately. Candidates were able to recall practical methods including the use of quadrats to investigate populations and the elasticity of the artery although recalling accurately the reagent and result for testing for glucose was more challenging. Candidates also were successful in completing a method to test a hypothesis and suggesting variables that need to be controlled.

There were several questions where candidates needed to apply their knowledge to situations that may be new to them but in these cases, all the required information needed to lead candidates to the required responses was supplied in the stems of the questions and items. Candidates could benefit from practising reading the stem and considering which parts are key to stimulate the connections to areas of the specification covered. It was pleasing to see examples where candidates had underlined the command words and key words in the given information although the percentage of candidates who did this seemed to be consistent with last year. Another example of good practice seen was where candidates were writing relevant key words on diagrams and by the stem of the question. It was felt that these candidates gave a more logical, detailed and balanced response on average.

The more straightforward questions where marks could be gained by interpreting given information were answered well although it was pleasing to see some excellent, coherent answers accurately applying relevant scientific terminology to items that required extended prose. It was encouraging that some candidates used the scaffolding provided to guide their responses. Even when candidates scored low or no marks there was clear use by a reasonable number of candidates of using the diagrams, graphs and information in the stem of the question to guide their responses with many annotating the germane details. A good example of this would be Q09(a)(i) where annotating the statements and test tubes helped the candidates to formulate creditable responses. However, there were still too many candidates who could not develop their responses to fully answer the question. Lack of simple but accurate scientific terminology and detail stopped many candidates from developing the secondary and tertiary marks.

The number of blank responses was consistent with the previous year, however these were far more prevalent in grade 1 and 2 candidates compared to those in the grade 3/4/5 bracket. It was also noticeable that the number of candidates who stopped answering responses after question 5 and also after question 7 had dropped significantly compared to last year. Again this may be due to better preparation from the candidates' teachers.

The majority of candidates were able to describe trends in graphs and the mathematical items were answered well by many candidates although some lost marks by not being specific enough, eg stating when the concentration of blood glucose started to rise - item 2(d)(i) – or failed to look for a secondary aspect in the data, for example the amount of exercise from 8 hours to 10 hours a week has less effect on the ability to run at 3m/s compared to the difference seen between 0 and 2 hours exercise per week - item 4(c)(i).

The main reasons identifed for not scoring marks included not reading the instructions given in the stem of the question, confusion over the requirement for the command words explain and describe, lack of knowledge and the use of vague / inaccurate / unscientific terminology.

Question 1 (a) (i)

Almost all of the candidates accessed this item well with 33% attaining 1 mark and 56% of candidates being awarded both available marks. The common error was to put condensation for process G where as of course, the diagram states that the water vapour has already condensed and formed a cloud.

1 (a) Figure 1 shows the water cycle.

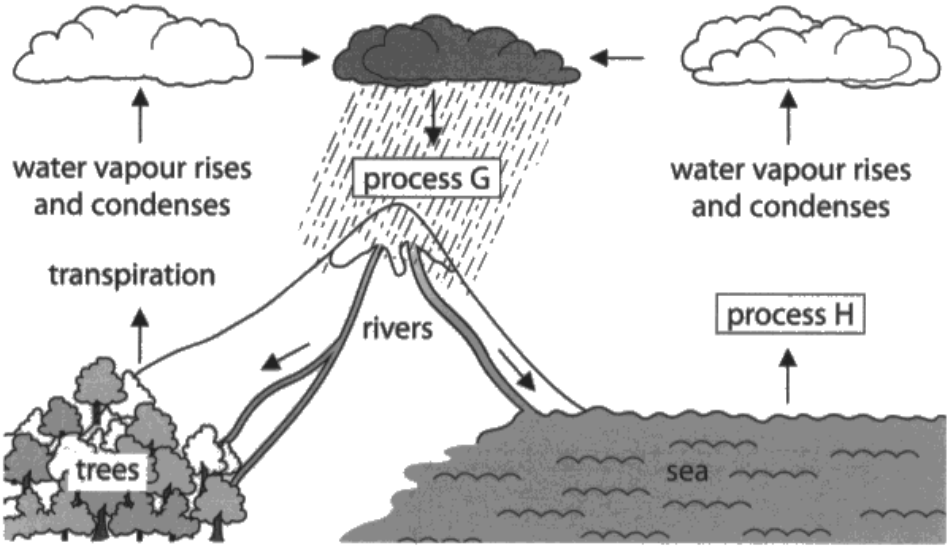

Figure 1

(i) Name process G and process H.

(2)

process G Raining

process H evapouration

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Examiner Comments

An example of a good answer that gained both available marks.

(i) Name process G and process H.

(2)

process G Condensation

process H Evaporation

ResultsPlus
Examiner Comments

This shows the correct answer for process H (evaporation) but also the most common error seen for process G (condensation).

This response scored 1 mark.

ResultsPlus
Examiner Tip

Use all the information given in the question to help you formulate your response. Here it shows on the diagram that water vapour has already condensed and forms the cloud before process G takes place.

Question 1 (b)

This "choose words from the box to complete the sentences" again was very accessible with 98.5% of all candidates gaining at least 1 mark and 85% of level 1 candidates scoring at least 1 mark. A few candidates chose fish for the second answer and although the chlorine would kill them, this is not why it is added.

Question 1 (c)

It was pleasing to see such a good understanding of the requirement for removing the salt to make potable water from sea water. Many candidates included filtering the water to remove – eg mud – which was a neutral response and used technical terms like desalination and reverse osmosis. The majority stated how to desalinate the water by heating the water / evaporating the water and then condensing the water vapour. A few lost the mark for heating as they gave the reason to kill pathogens which although true would not remove the salt. A few candidates also said filter the salt out of the solution, possibly because one of the words that could be chosen from the box to answer 1(b) was filtering.

(c) Figure 2 shows the Canary Islands.

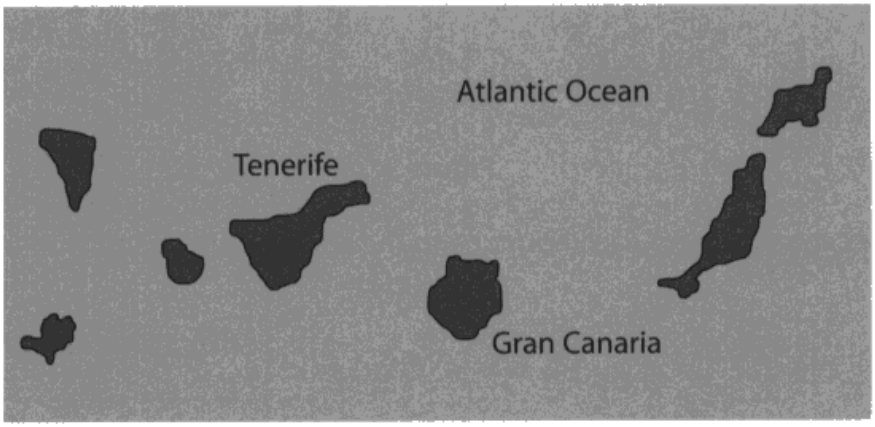

Figure 2

The Canary Islands do not have enough fresh water.

Describe how seawater can be turned into drinking water.

(2)

If you take a bowl of sea water and heat it till it evaporates, you can put ~~a~~ something on top to catch the evaporation and at all the sea salt will be on the side of the bowl, the evaporated water should condense and be pure.

(Total for Question 1 = 7 marks)

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Examiner Comments

An excellent answer not only stating what to do with good scientific terminology but with added information regarding how to do collect the 'pure' water.

This response gained 2 marks.

ResultsPlus
Examiner Tip

Take care with adding extra information as if it is wrong, then you may lose marks; however, if you add details of how to do something, then it can only help the examiner award marks.

Describe how seawater can be turned into drinking water.

(2)

It can be heated at 100°C to make it's pure

ResultsPlus
Examiner Comments

An excellent start even including the boiling point of water. However this is only part of the method and so gets just 1 mark of the 2 available.

ResultsPlus
Examiner Tip

If you are answering a 2-mark question, make sure that you give two points or statements to answer the question.

Question 2 (a)

This join the boxes exercise was correctly answered for 2 marks by 59% of the candidates with a further 36% gaining 1 mark. The latter group tended to know that gland K was an ovary and correctly linked that to 'prepares the uterus lining for a fertilised egg', and linked gland L with 'increases glucose levels'.

Question 2 (d) (i)

This item required candidates to describe the trend in the graph. The term 'fluctuate' was seen commonly although many described this, for example 'it goes up and down a little bit at the start' would be enough for credit although just 'up and down' on its own would be insufficent on its own as we were looking for the idea of staying near to the 3 mmol per litre of glucose. 72% of candidates scored both marks available here.

(d) Figure 4 shows the concentration of glucose in the blood of a person.

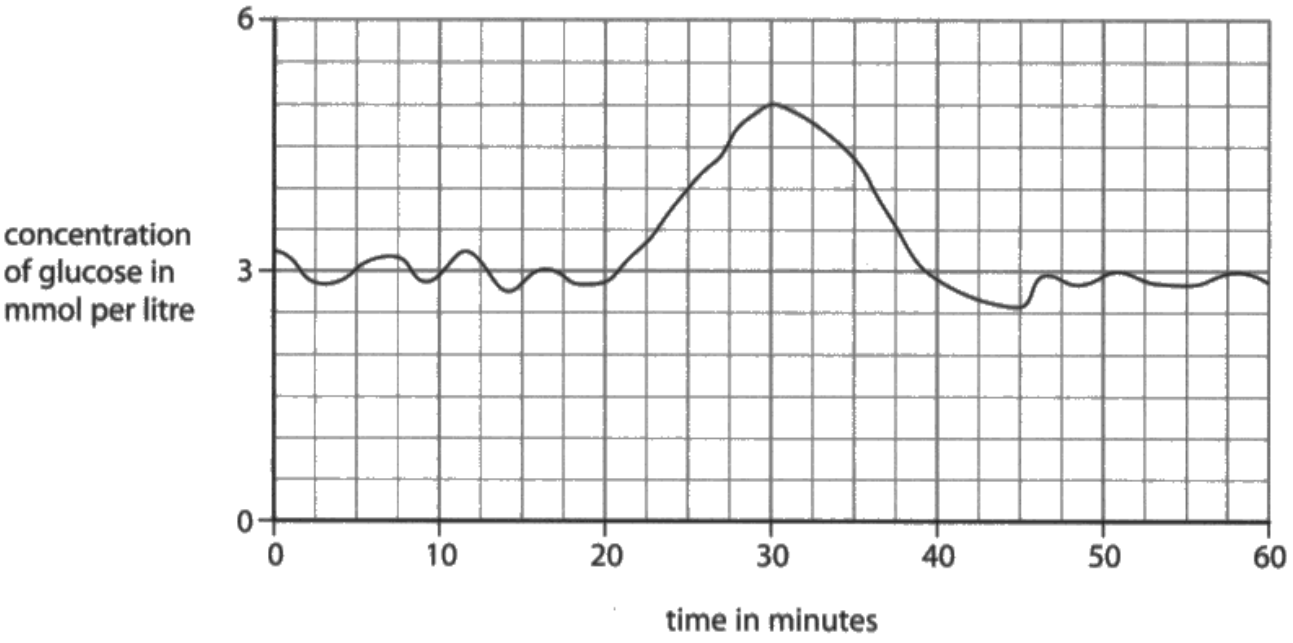

Figure 4

(i) Describe the trends shown in Figure 4 from 0 minutes to 30 minutes.

(2)

From 0 – 20 mins the concentration of glucose in mmol per litre stays around 3 but from 20-30 minutes concentration of glucose peaks at 5.

ResultsPlus
Examiner Comments

This is a good response with the candidate hitting all three marking points. From 0 to 20, from 20 to 30, 3 in the right context or 5 in the right context all hit marking point three. Stays around (3) was a common way of saying fluctuates and so marking point one is awarded. Staying (around 3) was a common way of saying it fluctuates (around 3) and peaks means it must have increased (marking point two). Both marks awarded.

Question 2 (d) (ii)

This item required candidates to explain why the concentration of glucose in the blood shown in the graph decreases between 30 and 40 minutes. It was disappointing that only 4.5% of candidates scored both available marks. These were those candidates that tended to hit all three marking points by saying insulin, makes the liver / cells / muscles absorb glucose and change it to glycogen. Although some of the 27% of the candidates who gained 1 mark stated insulin, the majority gained the mark for stating that the glucose is used up probably linked to for exercise / movement.

(ii) Explain why the concentration of glucose decreases from 30 minutes to 40 minutes.

(2)

The levels of glucose is above the normal concentration that should be in the human body. When this happens, the pancreas releases Insulin which brings the levels down and glucose is stored as glycogen.

(Total for Question 2 = 8 marks)

ResultsPlus
Examiner Comments

A good answer showing understanding that gains both available marks for: insulin (being released) and stored as glycogen.

ResultsPlus
Examiner Tip

Learn the key words related to each topic and work them into your answers to the questions.

As glucose in the blood rises the body releases insulin from the pancreas to reduce it down to prevent it from becoming too high, which can be dangerous.

ResultsPlus
Examiner Comments

This response is awarded 1 mark for insulin but fails to develop it to hit the effects of insulin to reduce the concentration of glucose in the blood.

Question 3 (a) (ii)

This was a simple magnification maths exercise. Examples have been on the specimen papers and on last year's exam and so candidates should have been familiar with the task and how to calculate the length of the image of the leaf cell. The vast majority of candidates gained both marks. It is in the nature of many of the maths items that candidates can do all of it or nothing and so very few gained just 1 mark, for the substitution without completing the multiplication. A few candidates left this blank but the majority of incorrect responses divided one of the numbers given by the other.

Question 3 (b)

This item required candidates to choose words to complete two sentences related to adaptations of leaves to xerophytic conditions. Candidates from across all levels accessed this item successfully with a large majority scoring both marks. There was no discernable pattern in the given answers that were not creditworthy suggesting that these candidates may have just chosen the words from the box at random.

Question 3 (c)

To score marks here, candidates needed to explain why a plant hormone causes shoots were growing towards the light. This is a higher order level thinking skill and it is therefore not surprising that just over 1/4 of candidates accessed it. Although, as already stated in the general introduction to the paper, some very good responses were seen that explained how auxins are made in the tip but are moved away from the light side to the shaded side of the stem by the plant which causes these cells to elongate thus causing the stem to bend towards the light. A significant number of candidates misinterpreted the question as why do the shoots grow towards the light and gave good answers encompassing to get more light for photosynthesis. Level 1 and 2 candidates tended to leave this question blank or give a very superficial answer restating the stem and saying the shoots are growing towards the light.

(c) Figure 5 shows young tomato plants growing in a glasshouse.

(Source: © adastra/Shutterstock)

Figure 5

The young tomato plants are growing towards the light.

Explain how a plant hormone causes these shoots to grow towards the light.

(2)

The plant hormone auxin causes the shoots to grow towards the light, through a process called positive phototropism. The auxin goes the ~~t~~ shaded side of the shoot, which then makes that side elongate, causing the shoot to bend upwards towards the light.

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Examiner Comments

A good response showing good understanding of phototropism even though there are a couple of minor inaccuracies.

This response gained 2 marks.

The plants grows towards the light because photosynthesis is causing them to, they feed of light and water.

ResultsPlus
Examiner Comments

A common misinterpretation of what is needed to be credited. The question is not what is the benefit to the plants but what causes the plants to bend towards the light. We carefully put the question as Explain how the plant hormone causes these shoots to grow towards the light. Candidates need to be trained to answer what is there and not what they want to read.

This response gained no marks.

ResultsPlus
Examiner Tip

Read the question carefully and underline the command word and the key words to ensure that you answer the question set. Here a key phrase is 'how a plant hormone causes'. This should make you realise that the question is not asking what do the shoots gain when they bend towards the light, but what is inside the plant making it bend towards the light.

Question 4 (a)

There was a discussion about the tolerance that could be allowed when measuring the width of the walls of the artery and vein where shown in figure 6. The final decision was that the tolerance should be the usual 0.5mm. This was influenced on the senior team measuring the widths independently and all agreeing that the width was 8mm and 4 mm respectively. This meant that a significant number of candidates just missed out on the measuring mark but were still able to be credited for a correct ratio from their measurements. The ratio had to be expressed in the form 2:1 or 2 to 1 although it did not have to be expressed in its lowest form. This did mean that a large majority of candidates accessed marks with a significant number of these gaining both available.

4 (a) Figure 6 shows a cross section of an artery and a vein.

(Source: © The University of Kansas Medical Center)

Figure 6

(i) Measure the length of line A and the length of line B in mm.

(1)

line A ..... 8 ..... mm

line B ..... 4 ..... mm

(ii) State the ratio of the thickness of the artery wall to the thickness of the vein wall.

(1)

2 : 1

ResultsPlus
Examiner Comments

A clear 2 mark answer with the correct measurements and the ration given in the correct form in its lowest terms.

ResultsPlus
Examiner Tip

Make sure you take a ruler into your examination room.

(i) Measure the length of line A and the length of line B in mm.

(1)

line A ..... 9 ..... mm

line B ..... 5 ..... mm

(ii) State the ratio of the thickness of the artery wall to the thickness of the vein wall.

(1)

..... 9:5 .....

ResultsPlus
Examiner Comments

1 mark scored as the measurements are out of tolerance but the ratio is correct for their measurements.

Question 4 (b)

Q04(b) has two 1-mark parts. The first mark required candidates to state the function of valves in veins, with the second for them to name the artery that transports blood from the heart to the body. The part that let most candidates down was part 2, the aorta with a significant number of candidates, dissapointingly giving veins, eg the pulmonary vein as the name of the artery with one response seen saying the blood vessel was the heart. A reasonable number got 1 mark for stating that valves keep blood flowing in one direction / stop backflow.

(b) (i) Give a reason why veins have valves.

(1)

veins have valves to stop and put away the backflow of blood

(ii) Name the artery that transports oxygenated blood from the heart to the body.

(1)

aorta

ResultsPlus
Examiner Comments

A good response receiving both marks available.

Question 4 (c) (i)

This maths item asked candidates to interpret data in a table. Well over half of the candidates gained 1 mark for stating that the more exercise you do, the more likely you are to run at 3 metres per second for 20 minutes. A small percentage of candidates then went on to gain the second point, for example, stating that increasing the time spent exercising from 8 to 10 hours had less effect than increasing the time spent exercising from 2 to 4 hours, for example. There were other ways to gain that secondary mark. Many of the candidates who gained no credit made assumptions that could not be supported by the data given, eg if you exercise more you will be fitter / faster / able to run more.

(c) A scientist investigated the relationship between exercise and the ability to run at 3 metres per second for 20 minutes.

The scientist collected data from six groups of people.
Each group exercised for a different number of hours per week for six months.

There were 100 people in each group.

Figure 7 shows their results.

group	number of hours of exercise per week	number of people who could run at 3 metres per second for 20 minutes
A	0	9
B	2	20
C	4	33
D	6	52
E	8	61
F	10	62

Figure 7

(i) Describe the relationship shown by this data.

(2)

The data shows that the more number of hours of exercise per week someone does, the more people who can run at 3 metres per second there are. The more someone exercises, the easier it is to run for longer.

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Examiner Comments

This candidate has done the correct thing and taken the headings from the table and used them to describe the trend that as one goes up, the other also goes up for 1 of the 2 marks available.

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Examiner Tip

When quoting or using data from a table or a graph, always use the column headings / axis labels to give the figures which you use validity.

the data shows that people who do ~~more hours~~ 6 or more hours of exercise a week are more likley to be able to run at 3 metres per second for 20 mins. For example, Group A had no exercise hours per week and only 9/100 could run at 3m/s for 20mins. Whereas group E who did 8 hours of exercise per week had 61/100 who could run at 3m/s for 20mins. 52 more people than group A.

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Examiner Comments

2 marks are awarded here for stating the effect of more exercise on the number of people who could run at 3 metres per second for twenty minutes and the candidate has also used the data to give a simple comparison of the data between two of the areas.

ResultsPlus
Examiner Tip

There are sometimes marks for just quoting figures from the table or graph but also do a simple sum to express how much the data is different between groups / readings.

Question 4 (c) (ii)

Over half of candidates scored on this item with the majority of these getting 1 mark for stating that the people developed cramp in their muscles when exercising because they had not warmed up before their run. This was a low level response as it does not explain why cramps develop but can be a contributing factor. Once candidates had given this response they seemed unlikely to develop the answer and almost all of those candidates that were awarded 2 or 3 marks did so by following the other, more scientific explanation of not enough oxygen getting to the legs / muscles, so anaerobic respiration took place which makes lactic acid that stops muscles working / being able to relax.

(ii) Explain why some people's leg muscles tired quickly and developed cramp when they were running.

(3)

Because they did not warm up or stretch before there run allowing there muscles to be vunerable to cramps. Also not getting enough oxygen to the muscles can cause cramps.

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Examiner Comments

A rare example of where a candidate stated that cramps occur because you don't warm up before the run but went on to develop the answer to state that a lack of oxygen supplied to the muscles develop into cramp.

This response gained 2 marks.

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Examiner Tip

Ensure that, when you revise, you can answer each of the specification points to at least two good points so that you can answer an explain why or how question.

The people that developed cramp whilst running were the ones who most likely don't do much exercise because they are less fit, this is due to if you are fit your heart rate isn't as fast as someone who is unfit but your blood is being pumped around at a fast rate.

ResultsPlus
Examiner Comments

This does not gain marks as the idea of not being fit causing cramps is too far removed from the physiological reasons for cramp to develop. The last part is suggesting that blood is moving around the body of an unfit person faster than in a fit person which is the oposite of marking point two.

Question 5 (a)

The majority of candidates stated that the stinging nettles stopped grass growing near it by stinging them or that they grew in places that the grass didn't like, for example, in the dark. This last answer was disappointing as the nettles shown in figure 8 are clearly in the sunshine. Those that did score usually gave good answers regarding the stinging nettle leaves covering a large surface area which stops light getting through so the grass couldn't photosynthesise. Some candidates stated that the stinging nettles outcompeted the grass with examples of a factor other than light, eg nitrates.

5 Figure 8 shows an area of nettle plants.

(Source: © stevemart/Shutterstock)

Figure 8

Grass does not grow among the nettles.

(a) Explain why grass does not grow where there are nettles.

(2)

Because the nettles would stop sunlight ~~from~~ from entering the area of grass preventing photosynthesis and the roots would also be larger and would absorb all the water and mineral ions

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Examiner Comments

This candidate has a good understanding of competition although they do not actually use the words outcompete or competition. They get 2 marks as they have linked stop sunlight from entering the area of grass which in the context of the question means within the nettle patch and links this to preventing photosynthesis. The comments that the nettles would also absorb all the water mineral ions would also be creditable as we would ignore the 'all'. However these would only be given 1 mark as they are not linked to why that would stop grass growing amongst them.

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Examiner Tip

When you have a question like this, try to use the scientific terms – here we say that the nettles have outcompeted the grass for light.

Also explain, like this candidate has, why the lack of light stops the grass growing there.

because there ~~Nettle~~ grass will not be abble able to Compitbe with nettle. there is not enough light intensity not enough water, ion & minerals for the grass

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Examiner Comments

This candidate has got their 2 marks by saying what the nettles stop the grass from getting and by using the scientific term - compete.

Question 5 (b) (i)

This calculation item was a good discriminator with roughly equal numbers scoring 0, 1 or 2 marks. The candidates had to calculate that the caterpillars gained 1.5 grams and as this was 10% of the food eaten, they could multiply 1.5 by 10 to calculate the mass of food eaten as 15 grams.

(b) Figure 9 shows caterpillars eating nettle leaves.

(Source: © bbbb/Shutterstock)

Figure 9

A caterpillar has a body mass of 6.0 grams.
One week later, its body mass had increased to 7.5 grams.
Caterpillars convert 10% of food eaten into body mass.

(i) Calculate the mass of nettles that the caterpillar ate.

(2)

1.5 grams

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Examiner Comments

Even though the answer is incorrect this candidate has shown the answer to the first part of the process and so is awarded the 'working' mark.

Question 5 (b) (ii)

Roughly half of candidates scored at least 1 mark on this 2-mark question which required candidates to describe what happens to the food that is eaten, but not converted into body mass. The downfall for most candidates that did not score was the imprecise manner of their responses stating that is used or excreted or just lost. The most common answer seen was used to supply energy in a variety of ways although to produce was not credited as this is scientifically incorrect. Energy was often linked to how the energy was used, most commonly a form of movement. Relatively few stated that it was egested although some got this mark for saying removed as faeces.

(ii) Describe what happens to food eaten that is not converted into the body mass of the caterpillar.

(2)

It gets transferred into the surroundings by heat (thermal energy), or it used as kinetic or chemical energy to help the caterpiller ~~when~~ move or break ~~down~~ down foods.

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Examiner Comments

This was referred to as unreadable by a marker and illustrates the need to write neatly as it is worth 2 but almost was awarded 0. It gets transferred to the surroundings as heat (thermal energy) or used as kinetic energy to help the caterpillar move or breakdown foods. Although confused there are 2 marks here – energy and movement / used to move.

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Examiner Tip

Write neatly as each year a significant number of responses are given no marks as they are 'unreadable'.

Question 5 (c)

This question was, in some ways, a reasonable discriminator with candidates scoring across the range of marks, although with more scoring 0 than would be desirable. These responses that gained no marks were disappointing as to gain 1 mark the candidates merely had to say grow two nettles in places which were at different temperatures. Candidates needed to write a plan to investigate the effect of heat on the growth of nettle plants. Again some candidates lost marks because of vague descriptions of what to do. Some candidates were saying, for example, put a nettle in a room with a temperature and others were shooting themselves in the foot by saying put a plant in a hot well lit room and one in a cold dimly lit room. There has been concerns raised about candidates scoring lower on the assessment of practical skills and designing investigations. This question may show an improvement on the previous year but also shows that there is more work to be done on preparing candidates for this kind of question.

(c) Devise a method a scientist could use to investigate how temperature affects nettle growth.

(4)

they can grow a nettle plants at different temperatures and whichever can record what temperatures make nettle growth faster

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A 1 mark response that is not developed.

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Examiner Tip

When asked to design an investigation:

- write how to set the investigation up as this candidate has done.

but then add:

- what you will keep the same, eg light intensity / volume of water
- how you will measure the change
- for how long will you run the experiment
- and finally say repeat the experiment so that you can compare the results with the first set to see if they are the same.

Question 6 (a)

This item tested part of the core practical skill of drawing and interpreting an image as seen through a light microscope as outlined in specification point 1.6.

Almost all candidates could access the item with very few blank responses seen and just over half the candidates scored 3 or 4 marks.

The instruction clearly stated to draw **this** plant cell and to label **three** parts of **this** cell. To be awarded the drawing mark, the candidate had to make a reasonable attempt at drawing the shape of the cell with a complete cell wall, the nucleus in roughly the correct position and some of the chloroplasts correctly shown.

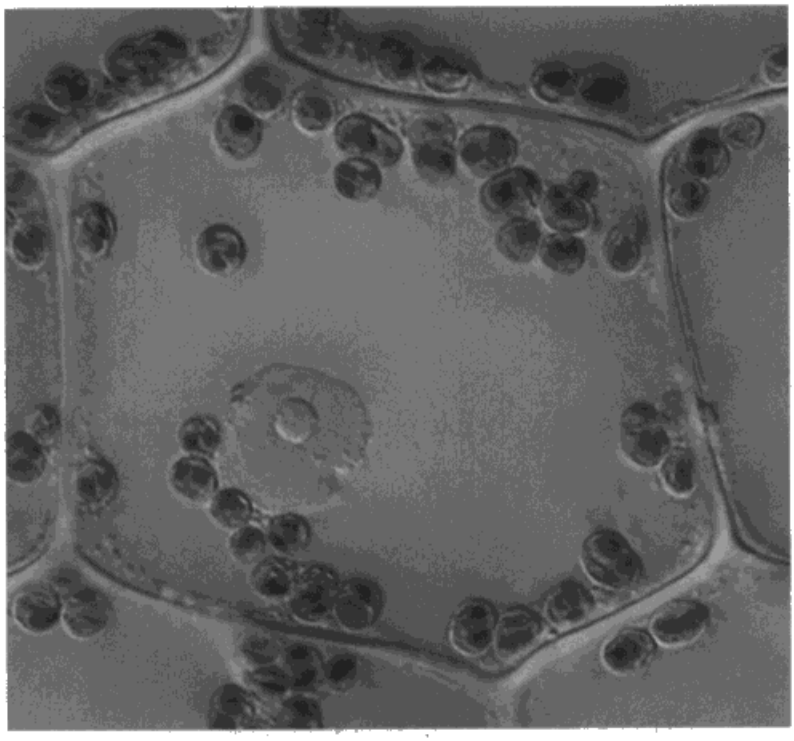
If the candidate's drawing did not gain this mark, then the 3 labelling marks could still be awarded.

If more than three parts of the image were labelled, then the list rule was applied with a significant number of candidates losing marks for incorrect labels being subtracted from those that were correct.

A small, but significant number of candidates drew and labelled a 'textbook' style diagram of a plant cell. These candidates were not awarded any marks as this item tested application of knowledge and not recall.

During examination preparation, candidates should be reminded to read the question carefully and follow the instructions in the stem of the questions.

6 Figure 10 shows a plant cell as seen under a light microscope.



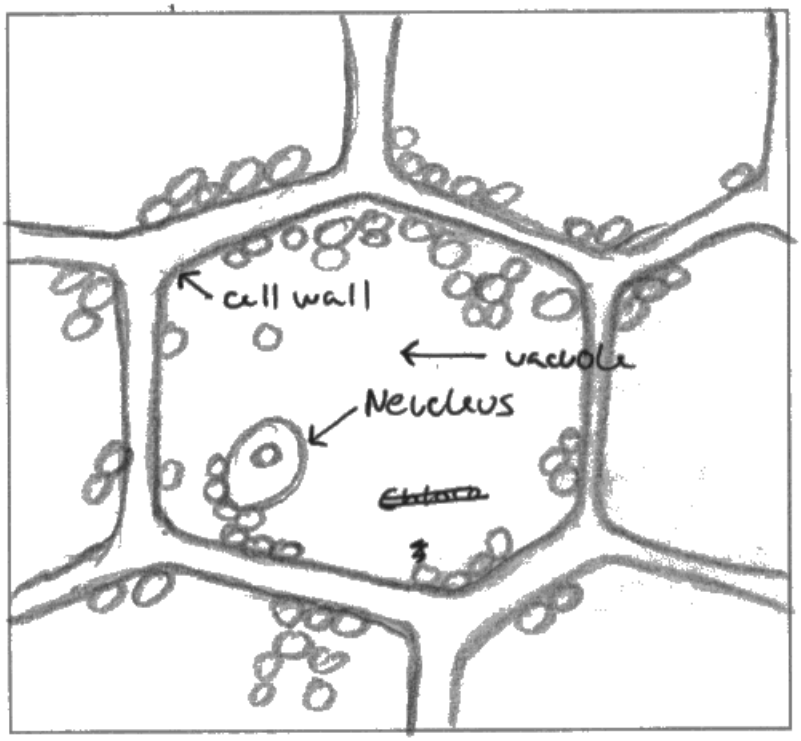
(Source: © HERVE CONGE, ISM/SCIENCE PHOTO LIBRARY)

Figure 10

(a) Draw this plant cell in the box below.

Label **three** parts of this cell.

(4)

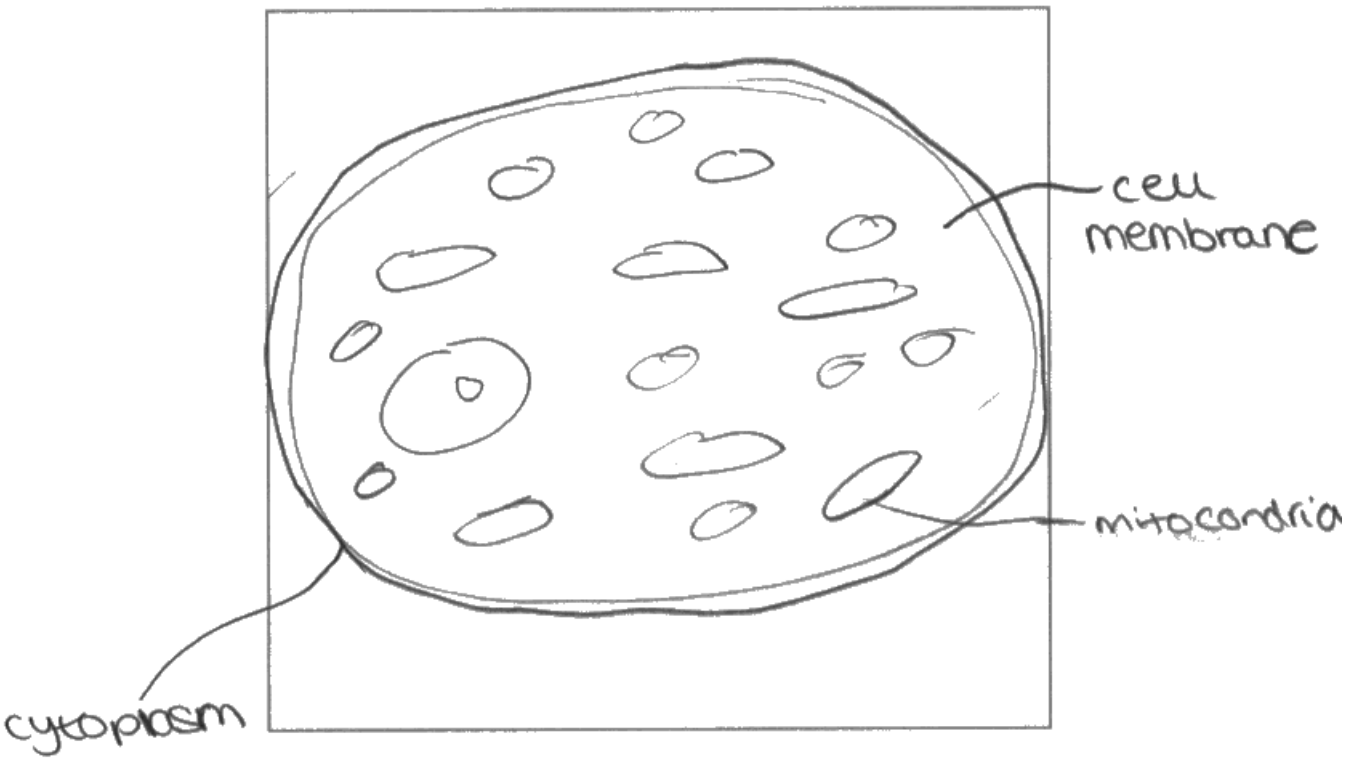


ResultsPlus
Examiner Comments

A clear 4 mark drawing of the plant cell shown in figure 10.

ResultsPlus
Examiner Tip

When asked to draw a microscopic diagram, make sure that it is roughly the correct shape and that details, here for example the chloroplasts are roughly in the right positions – eg that curve of chloroplasts just under the nucleus. If you are asked to label 3 parts of the cell just label 3 as this candidate has done.



ResultsPlus
Examiner Comments

A stylised / textbook type diagram, even with correct labels gets no marks as this is an application task not a recall question. In this case, all three labels are incorrect anyway, but even if they were correct they still would not have scored any marks.

ResultsPlus
Examiner Tip

If you are asked to draw the cell shown in the image then make sure that you at least draw that cell. Your diagram does not have to be perfect but at least do what you are instructed. Make sure that you get the shape roughly correct and some of the parts inside in the roughly correct place and roughly the right size.

Question 6 (c) (i)

Candidates find the idea of a control as part of an experiment hard. Although this was the easier of the two ways controls were used as part of questions in this examination paper, relatively few candidates scored the available mark. To score here, candidates had to say that the potato chips in the 0% sodium chloride solution were used to compare to see how much the potato chips in the other concentrations had changed. This item was left blank by a larger number of candidates than most other items and candidates found it hard to express what the role of the control was in an investigation. The most common error was to say to see how the chips changed in it.

(c) A student wanted to investigate the movement of water into and out of cells in potatoes.

The student had the equipment shown in Figure 11.

Figure 11

The test tubes in the rack contain different concentrations of sodium chloride solution.

The solutions were 0.1 M, 0.2 M, 0.3 M, 0.4 M and 0.5 M sodium chloride solution.

The test tube in the beaker contains distilled water.

There are three potato chips in each of the six test tubes.

(i) State why the test tube in the beaker only contains distilled water and three potato chips.

(1)

Because its our controlled one so we can compare it to the others.

ResultsPlus
Examiner Comments

A good 1 mark answer.

ResultsPlus
Examiner Tip

When setting up an investigation, we often set up one part of the equipment to use as a baseline. We then compare the results in the other parts of the investigation with this baseline. Make sure you know this use of a control.

Question 6 (c) (ii)

We insist that in experiments we refer to volume of liquids and so amount of sodium chloride solution was not credited here. This is true across all three of the sciences. This has been stated and stressed in past examinations and so it was disappointing that many candidates wrote amount of sodium chloride solution thus not gaining a mark. Even so, half of the candidates gained 1 mark with a further third gaining 2 marks. Some candidates stated that a variable to control was the concentration of sodium chloride which was the independent variable and therefore had to be different whilst common creditable responses included volume of sodium chloride, mass /size / length / surface area of potato chip at the start of the investigation (as mass was the dependent variable) and time the chips were left in the solution. Many candidates added that these should be kept the same which is true, but not required for the mark in this case due to the way the question was phrased.

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

(2)

1 Same amount of wate

2 Same amount of potatoe chips

ResultsPlus
Examiner Comments

This scores no marks as amount of water needs to be volume of solution and same amount of chips is not creditworthy as the investigation set up states that there are three chips in each tube.

ResultsPlus
Examiner Tip

Read the question carefully, underline key facts and then do not use parts that are stated as the same as something to control as it already has been.

1 The temperature of each test tube.

2 They all need to be left in for the ~~same~~ exact same amount of ~~time~~ time.

ResultsPlus
Examiner Comments

2 marks here for marking points one and five.

ResultsPlus
Examiner Tip

Make and learn a list of things that can affect an investigation and then write about two that are not already controlled or are the independent variable.

Question 6 (c) (iii)

Less than one third of candidates managed to score any marks with very few scoring all three here where candidates had to explain why the potato chips in 5% sodium chloride solution lost mass. Many candidates just talked about because there were different concentrations inside the chip to the solution but as they did not state the concentration of water could not be credited with a mark. Many of those that talked about water moving across the membrane but did not say out of the potato / into the solution to hit marking point two. The most common marking point seen was osmosis. Candidates need to be trained better into stating which way the water is moving and stating the concentration of either the water or the solute in their responses.

(iii) Explain why the chips in the 0.5 M sodium chloride solution lost mass.

(3)

They lost mass because the water moved out of the potato chips through osmosis because there was a lower concentration outside.

ResultsPlus
Examiner Comments

2 marks here for water moving out of the potato and by stating that this was due to osmosis. Lower concentration is not creditable as it does not specify that the concentration referred to concentration of water.

(iii) Explain why the chips in the 0.5 M sodium chloride solution lost mass.

(3)

water could not defuse in and out of it due to the high concentration of sodium chloride. The sodium chloride allowed reverse osmosis to happen. The liquid molecules travelled from the low concentration in the potato chip, to the high concentration of the sodium chloride solution, This caused the potato chip to loose mass.

(Total for Question 6 = 11 marks)

ResultsPlus
Examiner Comments

This is not very clearly written but worth 2 marks for osmosis (ignoring the reverse) and liquid molecules (as the only liquid there is water). We may be tempted to read into the relative concentrations that they are writing about from a low solute concentration to a high solute concentration. The problem with that is other candidates are talking about it in the same way and referring to from the high concentration in the chip to the low concentration in the sodium chloride solution and if we read into this response one way and read into the other the other way, then these candidates will get a mark for giving an opposite response.

ResultsPlus
Examiner Tip

When talking about water moving into / out of cells:

- state by osmosis
- state clearly which way way the water is moving
- state what concentrations you are talking about, eg from a **high** concentration of **water particles** to a **low** concentration of **water particles**.

Question 7 (a)

Candidates were required to extrapolate the line on the graph to estimate the human population in 2030 if the current trend continues. The correct answer is 72 but as the candidates could take the trend to be the average for the entire period from 1960 then the extrapolation could be as low as 69. Allowing for one small square on the graph tolerance gives a range of 68 million to 73 million. The majority of candidates fitted into this range and scored the mark. Many candidates who did not score, d=forced the line up in a curve to get to the corner of the graph paper and gave the answer of 75.

7 The increasing human population is affecting farming and the habitats of animals.

Figure 12 shows the human population of the UK from 1960 to 2018.

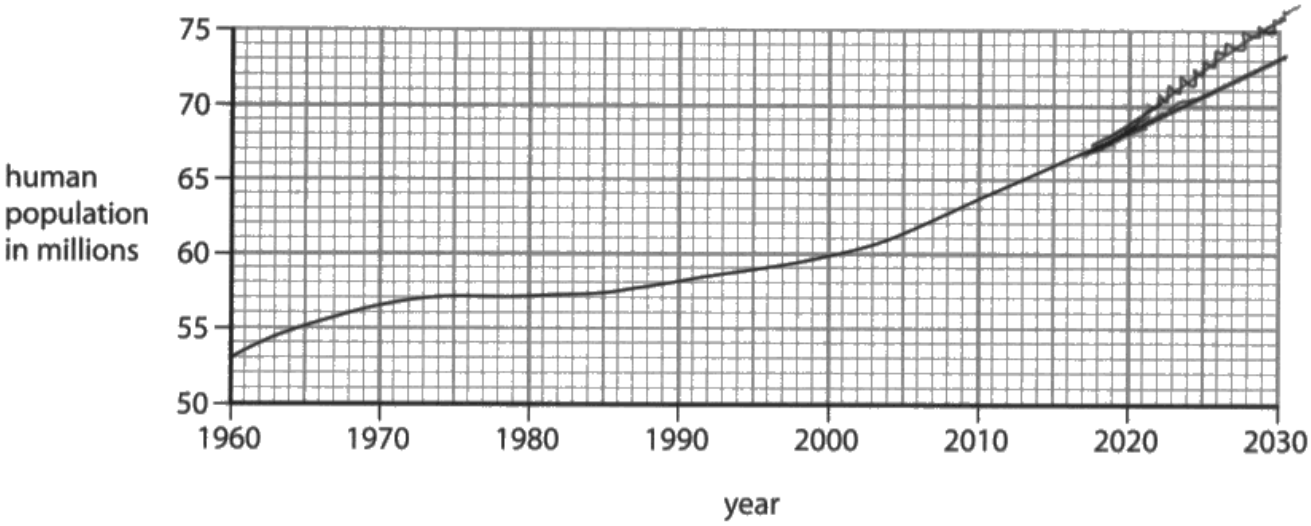


Figure 12

(a) Extend the line to estimate the human population of the UK in 2030 if this trend continues.

(1)

73 million

ResultsPlus
Examiner Comments

This candidate realised their error in forcing the line up to the corner of the graph paper and redrew the extrapolation and scored 1 mark by coming in at the top of the creditable range.

ResultsPlus
Examiner Tip

If asked to continue the trend of a straight line use a ruler and make the extension as smooth a continuation as possible.

Whenever you read off a graph, put a straight edge down / draw a line with a ruler to ensure that you are at the correct level.

Question 7 (c) (i)

Roughly one quarter of candidates correctly identified starch as the food group in sample E as it had turned iodine black. Candidates only have to learn four food tests in this core practical and they have been on previous practice examinations as well as last year's examination. It was even more disappointing that many candidates gave food groups including meat, fruit and vegetables.

Question 7 (c) (ii)

This was slightly more complicated than Q07(c)(i) as candidates were supposed to write down the two food groups, (reducing) sugars and proteins in food sample F. However, due to the way the question was written it was fair to award the mark for either protein or (reducing) sugar. Again this was disapointing as about one third of candidates managed to score here with many again putting food groups including meats, fruit and vegetables, and fish.

(ii) Name the food groups in sample F.

(1)

Fruits & vegetables

ResultsPlus
Examiner Comments

Fruit and vegetables may be food groups in the world but in science they are not. No mark awarded.

ResultsPlus
Examiner Tip

In science papers make sure your answers are scientific.

Question 7 (c) (iii)

To score marks in this item, candidates had to describe how fats are digested in the body. The vast majority of candidates could not answer this question with many stating the wrong enzyme, commonly amylase and even the small percentage that said enzyme or lipase usually gave the wrong product - usually starch.

(iii) The emulsion test shows that food sample G contained fat.
Describe how fat is digested in the body.

(2)

Fat is broken down in the body by enzymes and your BMI is regulated by the pancreas which is regulated.

ResultsPlus
Examiner Comments

1 mark is awarded here for enzymes. The rest of the response does not match the question.

ResultsPlus
Examiner Tip

Make sure you learn all the basic statements as laid down in the specification.

fat is broken down by lipase to produce fatty acids and glycerol

ResultsPlus
Examiner Comments

A rare correct answer scoring both available marks.

Question 7 (d)

This 6-mark extended prose item asked candidates to describe the advantages and disadvantages of growing biofuels. Advantages and disadvantages were listed as stated advantages and stated disadvantages with their concommitant details. The level was determined by the stated advantages and disadvantages. The mark within the level was determined by the linkage of the details to the stated advantages / disadvantages. To gain level 3, a candidate had to include at least one advantage and one disadvantage. To gain level one a candidate had to mention one stated advantage or one detail of an advantage / disadvantage. The main advantage that candidates stated was that it gave jobs / you can sell the biofuel so it is a source of income although few developed this to faster development of the local area. The advantages of renewable was often seen but rarely developed and the idea of less carbon dioxide produced was seen but again rarely linked to its stated advantage of being carbon neutral. The disadvantage stated by candidates was that growing biofuel used up land linked to the detail that this meant that less food is grown / has a deleterious effect on food security. The need to use water to grow the biofuel crop was also seen, sometimes being linked to its detail that this meant that there is less drinking water.

Candidates had clearly been taught about biofuels but few knew enough detail to develop answers to get to the top of level 2 or to get into level 3 with most candidates accessing level 1 and 2.

Many candidates stated the misconception that biofuels caused no harm to the environment and produced no carbon dioxide when burnt. A few of these also contradicted their statement that growing biofuels do not harm the environment by saying that forest is cleared to make the fields which kills wild animals.

*(d) Figure 14 shows a field of a crop in one area of Africa.

The crop cannot be eaten by people.

The crop is used to produce biofuel.

(Source: © KAMBOU SIA/Stringer/Getty Images)

Figure 14

Describe the advantages and disadvantages of growing this crop to produce biofuel.

(6)

One advantage is that when biofules are used instead of fossil fuels they are better for the enviroment, as they produce less Co_2, another advantage is that it is renewable and relable

On the other hand a disadvantage is that it takes up land that could be used for edable crops, it also takes farmers and workers away from traditional crop and livestock farms.

ResultsPlus
Examiner Comments

A common response stating that an advantage is that the biofuels are renewable and that land is used to grow the biofuel crops that could be used for food farming. Two stated advantages / disadvantages so level 2 is awarded. Only one of these is linked to its detail so 3 marks are awarded.

ResultsPlus
Examiner Tip

In the six marker items, try to develop each point you make a little so that each idea is detailed.

Question 8 (a) (i)

Q08(a)(i) was a simple calculation of multiplying the number of earthworms by their mean biomass for 1 mark with the answer of 2108(g).

The vast majority of candidates scored the mark here.

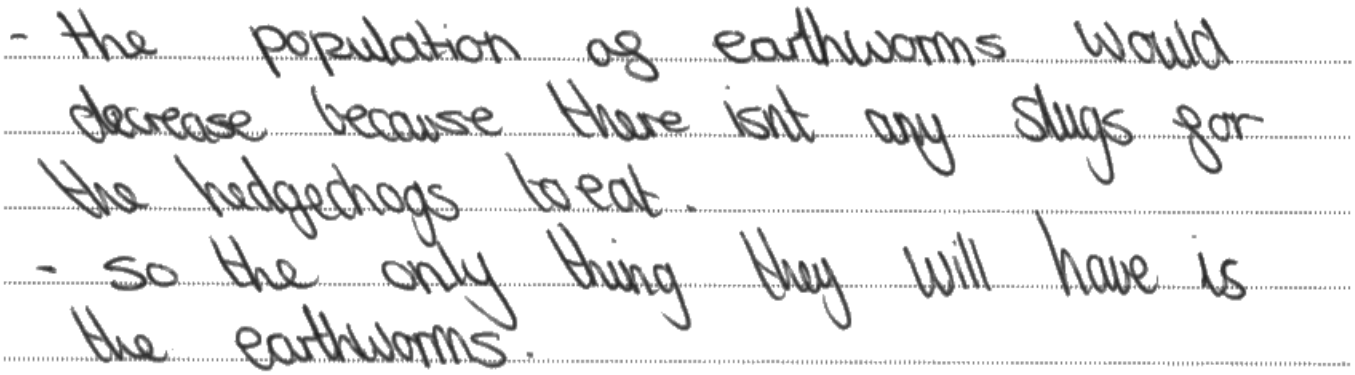
Question 8 (a) (ii)

Candidates had to apply their knowledge of how food webs are interlinked to work out and explain the effect that a reduction in one population affects another. The majority of candidates stated that the number of earthworms would decrease as hedgehogs would eat more of them (as their other food source had diminished). This latter mark could be awarded for simply saying because hedgehogs had only earthworms to eat. Fewer candidates stated that there would be more food for the earthworms and so the population of earthworms would increase. Either of these written fully would gain the 2 marks available. Over half of the candidates obtained 2 marks with a small but significant number just gaining 1 mark for stating that the earthworm population would decrease but without giving a reason to explain why this would happen.

(ii) Hedgehogs eat slugs and earthworms.
Slug pellets were used to kill the slugs.

Explain how killing the slugs would affect the population of earthworms in this garden.

(2)



ResultsPlus
Examiner Comments

This response gained the 2 available marks. The earthworm population decreasing is clearly stated, the reason is less succinctly phrased but still clear enough to award mark point two.

ResultsPlus
Examiner Tip

For any explain question you will need a reason to support your idea(s), often using the word '**because**'. Try to get used to writing because in your response, when you have 'explain' as the command word, this will help you access the secondary marks.

killing slugs will affect the population of earthworms because the hedgehogs will only be able to live off of earthworms

ResultsPlus
Examiner Comments

This reponse only gets one mark as the candidate has hit the reason, marking point two, without saying what the effect on the earthworm population will be.

ResultsPlus
Examiner Tip

This candidate says it will affect the population of earthworms. The question asks how it will affect the population but the candidate has not said how it is affected. Make sure that you reread the question and your response to make sure that you have answered the question.

Question 8 (a) (iii)

This question is a higher level cross over question so it is felt that with over half the candidates scoring between 1 and 3 marks and with the percentages for each, being similar that this is a good discriminator for the level 4 / 5 candidates. To gain credit, candidates had to describe a method to estimate the population of the slugs in a garden. Although most candidates that scored here used a quadrat, counting the number of slugs within the quadrat / quadrats and then multiplying that number / mean number by the number of quadrats that would fit in the garden, a significant number used a capture, mark, release recapture method. Either method being able to generate all 3 marks available. Those candidates that missed a mark usually did so by not being able to describe the final mathematical stage of the process accurately and succinctly. Candidates who scored just 1 mark usually did so by saying use a quadrat or describing a quadrat.

(iii) Describe a method that could be used to estimate the population of slugs in the garden.

(3)

Pouring salt onto
Randomly place a quadrat multiple times and record the number of slugs work out the mean/average of slugs per square and multiple by the number of times the quadrat fits into the garden (garden's area).

ResultsPlus
Examiner Comments

All 3 marks awarded for this response.

You could randomly place a square grid all around the garden and count how many slugs are in each area. To see what the population of slugs are in the garden.

ResultsPlus
Examiner Comments

This candidate starts off well but loses the thread of his plan and ends up answering a different question to the one set.

This response gained 2 marks.

ResultsPlus
Examiner Tip

As already said: reread your response and make sure that you have answered the question set.

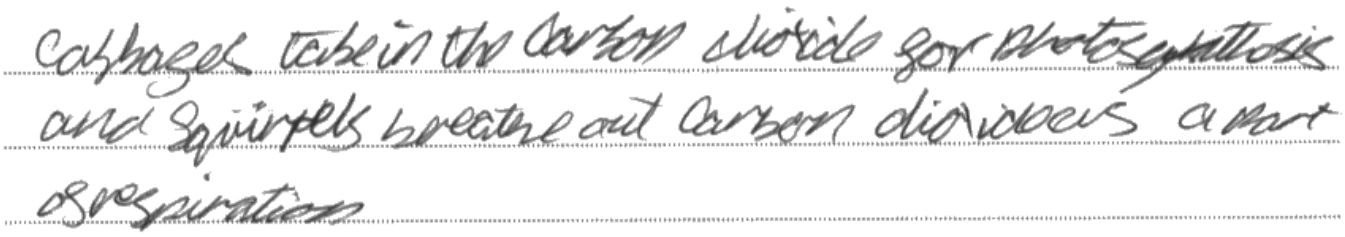
Question 8 (b)

This was a hard explain item for foundation candidates to access. This made it a good discriminator for the higher levels available on this paper with a small but significant percentage of the candidates sharing 1, 2 and 3 marks.

Many candidates knew the carbon cycle or at least parts of it but to gain the marks they had to clearly state where and how the carbon was involved. For example, just stating that dead animals decompose was insufficient, to gain credit the candidate had to say that as the dead animals decompose the decomposers release carbon dixide.

(b) Explain how cabbages, earthworms and squirrels contribute to the carbon cycle.

(3)



ResultsPlus
Examiner Comments

A good 3 mark response with the candidate hitting four of the marking points listed in the mark scheme.

ResultsPlus
Examiner Tip

To learn the carbon cycle trace the cycle with your finger stating what form the carbon is in and where it has come from and where it is going.

Do the same for the nitrogen cycle.

The cabbages are a plant which uses carbon dioxide for photosynthesis. When the earth worms then eat this they are consuming some of the carbon dioxide produced. The Squirrels then eat the earthworms and also consume a little bit of the carbon dioxide

ResultsPlus
Examiner Comments

This candidate gains 2 marks for saying that cabbages absorb carbon dioxide (marking point three) which they use for photosynthesis (marking point four).

The candidate does not get credit for the rest as they say the carbon dioxide is passed on when eaten and by then it will be in a different form.

Question 8 (c)

Candidates were asked to apply their knowledge of the nitrogen cycle to list three ways that the concentration of nitrates in soil could be increased.

All four answers on the mark scheme were regularly seen with adding fertilisers / manure / nitrifying bacteria being seen most often.

(c) State **three** ways the concentration of nitrates in soil can be increased.

(3)

1 By use of fertiliser.

2 By planting peas and plants like it that produce nitrate and add it to the soil.

3

ResultsPlus
Examiner Comments

2 marks awarded.

1 more compost

2 less fertilisers

3 more trees

ResultsPlus
Examiner Comments

Just 1 mark here is awarded for more compost (marking point two).

Although fertilisers are listed, less fertilisers would reduce the nitrates in the soil.

ResultsPlus
Examiner Tip

Reread your answers and check that what you have written will have the desired effect to answer the question.

Question 9 (a) (i)

This is the second question where candidates are asked to look at a method to compare respiration in organisms. However, this time they are asked to improve the method so that the results are more comparable. This required the candidate not to just state what variables had to be controlled but state that they had to be the same. The **volume** of indicator solution was creditable whereas the amount was not as per the earlier item. Again we are at the higher level end of the paper so we are not expecting a large number of points being scored here. About one quarter of candidates did manage to gain credit with the vast majority of these just gaining 1 mark from the 2 available. Again some candidates repeated the instructions, for example saying they had to have the same number of organisms in each tube when it clearly stated that there was four of each organism in each tube and the diagram showed four in each.

9 (a) A student investigated respiration in three different organisms.

Red hydrogencarbonate indicator was placed in each of three test tubes.

Gauze was placed in each test tube to hold the organisms.

In test tube 1 the student placed four germinating peas.

In test tube 2 the student placed four dried peas.

In test tube 3 the student placed four mealworms.

Bungs were added to each of the test tubes.

The three test tubes were left for one hour.

The equipment used is shown in Figure 16.

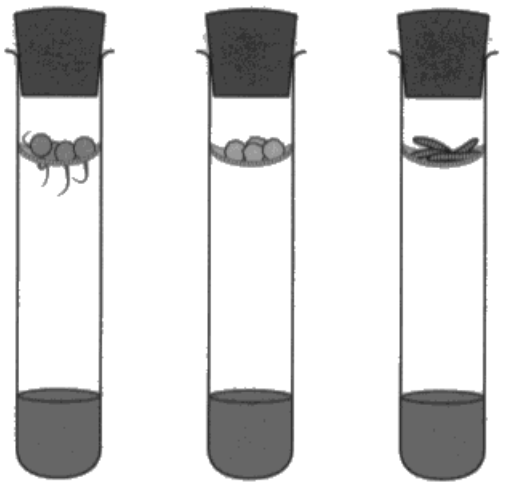


Figure 16

(i) State **two** ways this method could be improved to make the results for these three organisms more comparable.

(2)

1 ~~The same organisms were placed in each of the~~ temperatures. The temperature of each tube was the same.

2 The amount of oxygen accessible to each tube was the same otherwise it will be an unfair test.

ResultsPlus
Examiner Comments

This candidate states that the tubes should be kept in the same temperature (marking point four) but their comment regarding the same amount of oxygen is irrelevant as they are in tubes with bungs in them.

This response gained 1 mark.

ResultsPlus
Examiner Tip

Look carefully at the information given when asked to improve an investigation and make sure that the points you make are not already covered in the diagram or in the description of setting the equipment up.

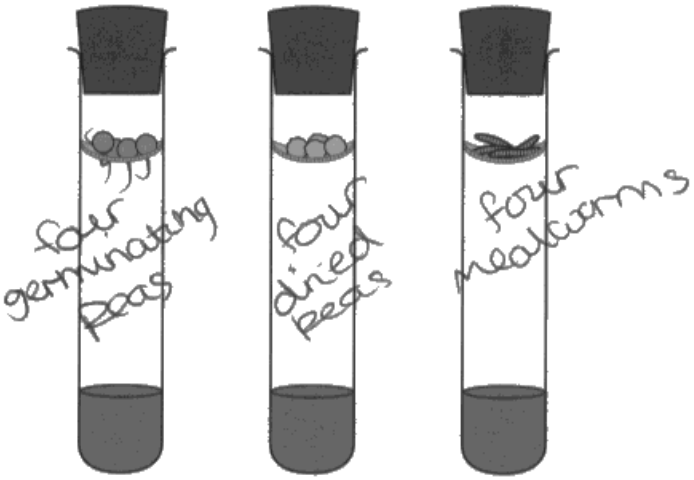


Figure 16

(i) State **two** ways this method could be improved to make the results for these three organisms more comparable.

(2)

1 Leave them all for a longer amount of time. Add

2 Do more than one of each. Use the same amount of red hydrogencarbonate indicator in all of them.

ResultsPlus
Examiner Comments

Although this candidate has not scored any of the marks as their reponses are too vague for credit, they do exhibit good practice by writing key points from the written introduction on the diagram.

Question 9 (a) (ii)

This item was very poorly answered by the foundation candidates and also the higher candidates who were, on the whole, unaware of what a control means. Most that did attempt an answer stated a variable to control rather than what was needed to be in a control part of the investigation.

(ii) Describe a suitable control for this investigation.

(2)

Same amount of time for it to be tested for two make the control as easy as possible

ResultsPlus
Examiner Comments

Not many candidates scored here with most, like this one, setting out what to control, rather than say what you need to do to set a control for an investigation. This response gained no marks.

Question 9 (b) (i)

This was another hard question for foundation candidates to access although many candidates clearly understood the question but failed to score because they stated that there was more carbon dioxide in the tube rather than the germinating peas produced carbon dioxide. About one fifth of candidates managed to score here showing good evidence of level five ability.

(b) Hydrogencarbonate indicator changes from red to yellow when more carbon dioxide is present.

The results for this investigation are shown in Figure 17. G O C D W

organisms	colour of hydrogencarbonate indicator
germinating peas	yellow
dried peas	red
mealworms	yellow

Figure 17

(i) Explain why the result for the germinating peas is different from the result for the dried peas.

(2)

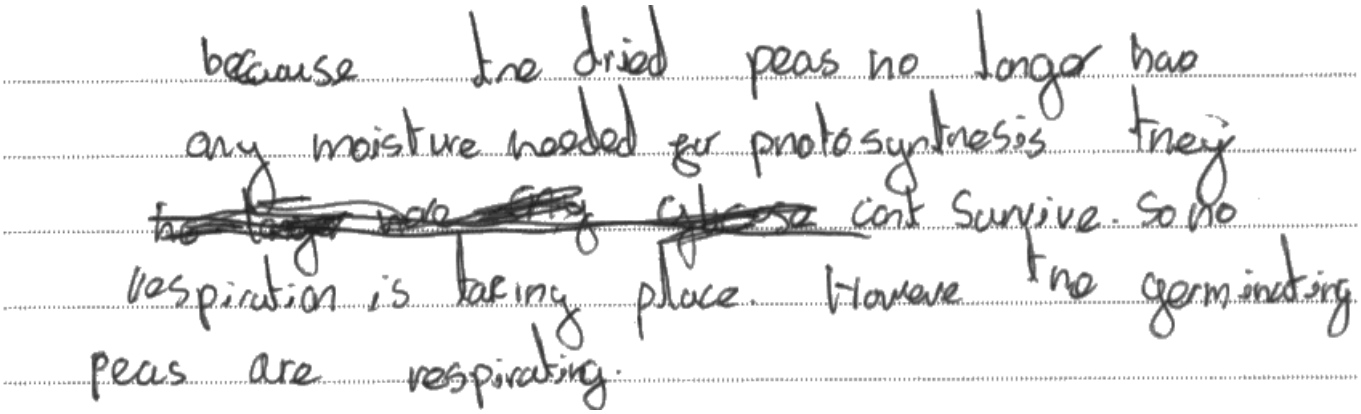
As the germinating peas are alive and are still able be produce carbon dioxide through respiration, but the dried peas can't as they are no longer alive.

ResultsPlus
Examiner Comments

2 marks are awarded here for clearly stating that the germinating peas are producing the carbon dioxide and that the gas is a product of respiration.

ResultsPlus
Examiner Tip

When confronted with an involved situation like this you have to say what is causing the difference and then extend that to why is the difference there to answer the explain part of the question.



ResultsPlus
Examiner Comments

1 mark is awarded here for stating that respiration is taking place in the germinating peas. N.B. we would not credit respirating at this level as it is not a word.

ResultsPlus
Examiner Tip

There is only a small step from this response to link it to carbon dioxide produced. When you have a set of information given to you like this, underline the key words in the stem of the question. If information is given, it is there to help you answer the question, so use it.

Question 9 (c)

This 6-mark question was accessed better than Q07(d) and asks candidates to relate the structure of blood cells to their function.

The indicative content was split into four sections: the functions and structures for red blood cells and for white blood cells. The number of functions placed candidates into a level and their ability to link the function to a structure decided the mark within the level. To access level three, there had to be at least one function of both a red blood cell and a white blood cell. Candidates were relatively good at stating functions of red blood cells and relating them to the relevant structures but not so good with linking white blood cells functions to their structure. As a result, there were more 1, 3, and 5 mark responses. It was disappointing that a large minority of candidates could not even state that red blood cells carry oxygen.

*(c) Carbon dioxide is carried in blood plasma.

Human blood also contains red blood cells and white blood cells.

Explain how the structure of red blood cells and white blood cells is related to their function.

(6)

Red blood cells cally oxygen to the rest of our body and contain ~~haemoglobin~~ haemoglobin. They have a laige Sulface aiea, aie hollow inside, and have no nucleuse ~~Ng~~ in oidei to maximise theii efficiency of callying oxygen.

White blood cells help aie bodies fight off infection and disease. They contain antbodies ~~xiv~~ which Suiiound and destioy haimful pathogens.

ResultsPlus
Examiner Comments

A typical 5 mark response accessing functions of red blood cells and linking them to structures but only able to describe the functions of white blood cells.

Question 10 (a)

This is the third question that looks at experimental set up and again candidates are asked to state the variables that would be needed to be controlled in this investigation. Common answers seen include the thickness / type of tissue paper, the volume of hot water put into each flask and the same size flask. Again amount of hot water put into the flask was not credited. Although a similar shape to the performance of candidates here compared to Q06(c)(ii), less candidates slightly under half gained 1 or 2 of the 2 available marks. This may be due to a combination of the number of candidates that had stopped answering any question by this stage and that the way the investigation was set up gave less options for variables to be controlled.

10 A student was investigating the effect of sweating.

The student set up two conical flasks each with a thermometer as shown in Figure 18.

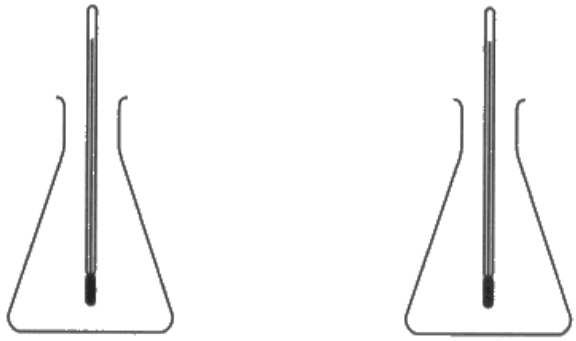


Figure 18

Flask 1 was covered in **wet** tissue paper.

Flask 2 was covered with **dry** tissue paper.

Hot water was added to each of the flasks.

The temperature of the water in each flask was recorded every minute for 10 minutes.

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

(2)

1 To That the temperature of the water was the same when placed into the 2 flasks.

2 use the same amount of tissue ~~paper~~ paper when covering the flasks.

ResultsPlus
Examiner Comments

Two clear variables stated for both marks available to be awarded.

1 The volume of hot water added in each flask involved in the experiment.

2 The temperature of the water invaved, is the same for both flasks so it's a fair and comparable invesngation.

ResultsPlus
Examiner Comments

This only gets 1 mark awarded for the same volume of hot water added. The reference to temperature of the water has to be clearly stated as starting temperature as this is the dependent variable that is being measured.

ResultsPlus
Examiner Tip

Identify the dependent and independent variable and don't then state that these have to be the same.

1 The difference between wet tissue and dry tissue paper

2 if there the same time for either of them

ResultsPlus
Examiner Comments

No marks are awarded here as the first variable is too vague for credit and the second is irrelevant as the instructions say that the temperature is taken every minute.

ResultsPlus
Examiner Tip

Make sure that the variable you are keeping the same has not already been covered in the introduction to the question.

Question 10 (b) (i)

This mathematics calculation item was well accessed by the foundation candidates with over half of candidates gaining at least 1 of the 2 marks available with most of these gaining the 2 marks. Rate was not well addressed in the past and the significant number that only scored 1 mark correctly calculated the difference in temperature but failed to then divide this by the time taken.

(b) The results of this investigation are shown in Figure 19.

time in minutes	flask 1 (wet tissue paper) temperature in °C	flask 2 (dry tissue paper) temperature in °C
1	98	98
2	82	91
3	71	84
4	60	76
5	50	69
6	39	61
7	31	56
8	22	49
9	22	42
10	22	37

Figure 19

(i) Calculate the rate of temperature change in flask 1 from 1 to 8 minutes.

(2)

98 − 22 = 76

76 °C per minute

ResultsPlus
Examiner Comments

A 1 mark response where the candidate has correctly worked out the change in temperature but has not worked out the rate by dividing the 76 calculated by 8.

ResultsPlus
Examiner Tip

Rate means 'per time' so when asked to calculate a rate, divide your difference in eg temperature by the time it has taken for the change to occur.

98 - 22 = 76

76 ÷ 8 = 9.5

9.5 °C per minute

ResultsPlus
Examiner Comments

A good 2 mark response nicely phrased.

ResultsPlus
Examiner Tip

Always show your working, as this candidate has done. If you make a mistake, you can still get credit for the first part of your calculation.

Question 10 (b) (ii)

This was a relatively easy interpretation of the trend shown in the table task with the majority of candidates gaining both marks with a further reasonably sized group gaining 1 mark. This latter group tended to state that the temperature of the water in both flasks decreased but did not say that flask one cooled faster or that it stopped falling after seven / eight minutes.

(ii) Compare the trends shown in the data for flask 1 and flask 2.

(2)

both are going down but one is slower than the other because one is dry while the other isn't

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1 mark here for saying that both flasks lose temperature.

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Be specific! This candidate states that one flask is cooling faster but does not say which one.

For flask 1, as the time increased, (from 1 - 10 mins) (2)
the temperature decreased by 76°c,
flask 2, as the beaker and for flask
2, the as the time increased, the
(from 1 - 10 mins)
temperature decreased by 61°c.

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This response gained 1 mark.

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When referring to data from a table or graph, do not just quote the data, make even a simple comparison. Here for example to gain the second mark the candidate could have said that this means that flask one decreased by more than flask two. Even better would be to substract the smaller from the larger decrease and state that flask one decreased by 15°C more than flask one.

Question 10 (c)

Candidates were asked to explain how sweating cools down the body. This was accessed by a reasonable minority of candidates who clearly showed a good understanding of this quite complex biological process. The candidates who did not score often did so because of a poor ability to express themselves. For example, stating that we are cooled by sweat because water / sweat leaves the body. If they could just have said that water / sweat is released on to the surface of the body and then evaporates they would score both marks available. It was disappointing that a significant number of candidates still talked about you selecting the cold sweat from inside your body and releasing it which cools you down.

(c) **Explain how sweating helps to cool the body.**

(2)

Sweat glands produce sweat to control the body temperature in the process of thermoregulation. Sweat appears on the surface of the skin and starts to evaporate. This is an exothermic reaction, so releases heat in the environment which will reduce the body temerature.

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Not a perfect answer as evaporation is not an exothermic reaction which would, of course, heat the body up. However this does not disqualify the marking points credited of released on to the skin and evaporates. The exothermic reaction disqualifies the last marking point losing heat from the skin but as this is a 2-mark question both marks can be awarded for marking point one and two.

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In an explain like this try to tell 'the story': start with sweat being produced, where it goes and what happens to it using scientific terms like evaporation where you can.

Question 10 (e)

(e) Explain why it is important to control the internal temperature of the human body.

(2)

to ~~ensa~~ ensure your enzymes are working properly because if they get to cold their rate of reaction decreases but if it gets to hot ~~the~~ they will denature

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This receives both available marks as they have not just said that the temperature is controlled to ensure enzyme action takes place but also for the reference to that enzymes will denature if they get too hot.

Because the average body temperature is 37°C and our bodies maintain that to let our enzymes work at their optimum

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This scores both available marks as the candidate has stated that the body temperature is 37°C, but continued to state that this allows enzyme activity to be at the optimum rate.

Paper Summary

Based on their performance on this paper, to prepare for next year's examinations, candidates are offered the following advice:

- Recognise that the word 'explain' means that additional scientific information is needed that is linked to the answer given.
- Recognise that to describe the trend between set times, eg between 10 and 20 minutes, candidates should mark those times and restrict their comments to that area of data.
- Recognise that a 2-mark describe question requires two bits of information, eg increases and levels off, or manipulates / uses key bits of data for example how much the increase is or when a change in the trend occurs.
- Use all the information given in the question to help them construct their answer but do not repeat the information which has already been given nor give vague responses.
- Consider the context of the question to ensure they apply their scientific knowledge to the situation they are being asked about.
- Know the difference between controlling a variable and setting up a control to use as a baseline with which to compare other data.
- Check the number of marks given for the question and ensure that they have included enough facts to match the mark awarded.
- Use scientific terminology accurately where possible in responses, for example using volume of liquid rather than amount of liquid.
- Always show the working when doing calculations as a mark can be awarded for correct stages and can be awarded for errors carried forward.
- Think about the structure of the answer before starting to write when tackling the extended answers to ensure that the answer shows clarity of writing and flows, while remembering to develop answers linking pieces of information to give a more full response.

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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