

Examiners' Report  
June 2012

GCSE Biology 5BI1H 01

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## Introduction

This is the third examination in the series for the new specification and the first time that the GCSE Science certification is available. The inclusion of the 6 mark questions to test the quality of written communication, and the ability of candidates to communicate science effectively has proved to be challenging. The aim of the paper is to test the candidates' knowledge across the specification. The paper is designed to enable as many specification points as possible to be assessed, thus enabling the candidates to be able to communicate their scientific knowledge across a range of topic areas. In addition, the candidates are also expected to be able to apply the knowledge they have gained to new situations.

Both quantitative and qualitative data is included for candidates to interpret and evaluate, and mathematical skills such as the calculation of means, and percentage calculations are included to ensure that candidates are able to deal with data effectively. Approximately 35 - 40% of the marks are awarded for assessment objectives, including the recall and communication of candidates' knowledge of Science. Approximately 35 - 40% of marks are awarded for the application of scientific concepts and skills, including those in practical and other contexts. Approximately 25-28% of marks are awarded for the ability of the candidates to analyse and evaluate evidence, and make reasoned judgements based on scientific evidence.

The paper was designed to test this range of skills, and it is pleasing to note that candidates are improving in their ability to communicate science effectively. This was particularly evident in the 6 mark questions, which are now attempted well, with the vast majority of candidates scoring marks on this style of question. The analysis of graphical data continues to be good, with candidates better able to describe a trend and extract data from the graphs/bar charts included in the paper. The genetics question on the paper was answered extremely well, with the majority of candidates able to draw a correct Punnett square, and calculate the probability from it. The emboldened statements which are for higher tier candidates were fairly well understood, but some candidates need to show a more in-depth knowledge of topics such as neurones and neurotransmission, as well as the topic of eutrophication. Although, it was very pleasing to note that many candidates attained full marks on these more challenging areas. Questions requiring mathematical skills continue to be less well answered, with percentage calculations causing candidates some significant difficulties. The paper was well accessed across all of the mark ranges, showing that candidates were well prepared for the paper. Marks were often lost due to the candidate misreading the question and therefore going down the wrong path. This could be addressed by candidates highlighting the key words in the question, to focus their attention. The command words also are important, and in particular if a candidate is asked to explain something, they need to give a scientific reason in their explanation.

### Question 1 (a) (i)

The correct response for this question was homozygous recessive. However, examiners accepted either of these terms on their own for the mark, and this proved to be well accessed, with a large proportion of candidates gaining the mark for this question. A few responses confused homozygous and heterozygous, but generally the candidates understood the concept very well.

### Question 1 (a) (ii-iii)

Overall this question was accessed well with many candidates gaining all 3 marks for this question.

The mark points for this question were separate with 1 mark for the gametes in the correct place, and 1 mark for the offspring in the correct place. The mark for probability was acceptable whether expressed as a percentage, ratio or fraction.

(ii) A female with the genotype **ee** has attached earlobes and a male with the genotype **Ee** has detached earlobes.

Complete the Punnett square to show the gametes and genotypes of the offspring for this female and male. (2)

		female gametes	
		e	e
male gametes	E	Ee	Ee
	e	e	e

(iii) State the probability of the offspring having detached earlobes. (1)

$\frac{1}{2}$  with ~~det~~ have ~~det~~ detached earlobes



#### ResultsPlus Examiner Comments

This candidate has gained 1 mark for putting in the correct gametes, however they failed to complete the Punnett square correctly, so only attained 1 mark for the Punnett square here. The probability was acceptable as  $\frac{1}{2}$ .



#### ResultsPlus Examiner Tip

Plenty of practice doing various Punnett squares and a clear understanding of genetic terms will improve candidates ability to answer this style of question. Remember that Punnett squares are not the only type of genetic diagram, and different genetic diagrams may be tested in the future.

- (ii) A female with the genotype **ee** has attached earlobes and a male with the genotype **Ee** has detached earlobes.

Complete the Punnett square to show the gametes and genotypes of the offspring for this female and male.

(2)

	female gametes	
	e	e
male gametes	E	Ee
	e	ee

- (iii) State the probability of the offspring having detached earlobes.

$\frac{1}{2}$

(1)



**ResultsPlus**  
Examiner Comments

This is a clear correct response to the question with a correctly filled Punnett square and probability calculation.

## Question 1 (b)

Although a few candidates struggled with this question, generally the marks were accessible to the candidates. Nearly half of all candidates were able to gain all 3 marks for this question but common mistakes were the confusion between sickle cell disease and cystic fibrosis, which are the two genetic disorders mentioned in the specification.

This response shows a typical misunderstanding between sickle cell disease and cystic fibrosis, however the candidate was able to gain a mark as they mentioned breathing difficulties which is a symptom of both genetic disorders.

(b) Cystic fibrosis is a genetic disorder that is caused by the inheritance of two recessive alleles.

Describe the symptoms of cystic fibrosis.

(3)

The symptoms for cystic fibrosis can vary but are mostly problems with breathing and blood flow which can cause the person with the cystic fibrosis to become tired very easily and are unable to move for long periods of time.



**ResultsPlus**

**Examiner Comments**

It was pleasing to note that three quarters of all candidates were able to gain 1 or more marks for this question. The common answers seen were the symptoms described on the specification. However as the symptoms of cystic fibrosis are many, credit was given to any symptom that was defined medically. In this case, the expected marks were for build up of mucus, the area where this mucus causes a problem and also a medical difficulty due to the build up.

This response shows that the candidate has not read the question clearly and has given the genetic pedigree for the inheritance of cystic fibrosis rather than the symptoms.

(b) Cystic fibrosis is a genetic disorder that is caused by the inheritance of two recessive alleles.

Describe the symptoms of cystic fibrosis.

(3)

Cystic fibrosis is a genetic disorder that is caused by two recessive alleles. It's a genetic variation from the mother and father. It's how they inherit eye colour, nose from either parent.



**ResultsPlus**  
Examiner Comments

Candidates need to be clear that the question they are answering is the one which is set.



**ResultsPlus**  
Examiner Tip

Getting candidates to highlight the keywords in the question in this case symptoms would focus their mind on what the question is asking.

## Question 2 (a) (i)

Candidates mathematical skills are improving but they still need to work on interpreting data effectively. Just over half of the candidates gained both marks here.

This is an example of where the candidate has not selected the correct information, but has managed to calculate an answer from the data selected. Therefore, they gained 1 mark for the correct substitution.

(a) (i) Calculate the number of people who admitted using marijuana illegally. (2)

$$\frac{2.7}{100} = 0.027$$
$$0.027 \times 56 = 1.492$$

answer = ..... 1.492 ..... million people



**ResultsPlus**  
Examiner Comments

Always show working for any mathematical question.



**ResultsPlus**  
Examiner Tip

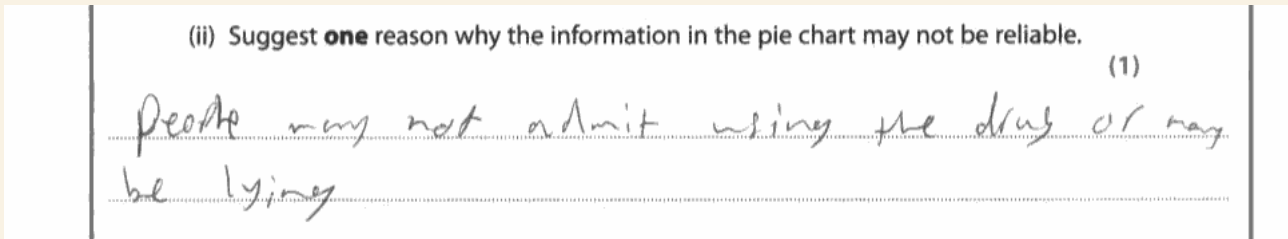
Always get candidates to show their working, and to attempt a calculation, it is disappointing to see blank answers to calculation questions.



## Question 2 (a) (ii)

This question elicited many and varied answers. The mark was given for a reasonable suggestion about why the data may not be correct. Pleasingly, just over two thirds of the candidates gained the mark for this question.

This was by far the most common response by candidates, with some inference being made that the people questioned may not be telling the truth for a variety of reasons.



### ResultsPlus Examiner Comments

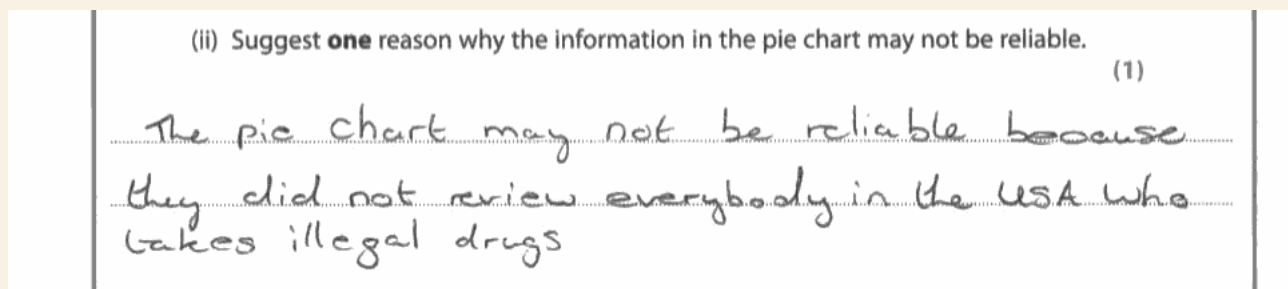
This type of question lends itself to candidates applying scientific knowledge and skills to new situations. It was well accessed by the majority of the candidates.



### ResultsPlus Examiner Tip

Candidates should always try to give a response to these type of questions as they can gain marks easily by showing their ability to critically analyse information and comment on it, which is an essential skill in Science.

This was not considered to be an acceptable response as the numbers involved here were very large so sampling further people is unlikely to change the reliability of the data.



### ResultsPlus Examiner Comments

Candidates need to be careful that they make a valid statement about the data collection.



### ResultsPlus Examiner Tip

When large numbers of people have been sampled it is unlikely there will be an improvement in reliability if you sample a few more. Many responses also stated that the data was only sampled in USA so was not reliable. This is not an answer to the question as the data was about the USA.

## Question 2 (b)

Candidates were very clear about the dangers associated with smoking and in particular about the role of nicotine as an addictive substance which causes individuals to want to smoke more. Three quarters of the candidates managed to gain both marks for this question, with the most common answer by far being that tobacco contains nicotine which is addictive.

This was by far the most common response and was sufficient to gain both marks in this question.

(b) Marijuana is often smoked with tobacco.

Suggest why combining tobacco with marijuana makes it more difficult to give up smoking marijuana.

(2)

Tobacco has nicotine in it which is an addictive drug.



**ResultsPlus**

**Examiner Comments**

There is a considerable section in the specification about drugs including tobacco and alcohol, and it is pleasing to note that candidates were well versed in the adverse effects of each of these drugs.

This response does not link the addictive substance with the nicotine in the tobacco smoke but they still managed to gain 1 mark for stating the addictive nature of tobacco even without the knowledge of the individual chemical.

(b) Marijuana is often smoked with tobacco.

Suggest why combining tobacco with marijuana makes it more difficult to give up smoking marijuana.

(2)

Tobacco is an addictive substance and so is marijuana so smoking them together will make them twice as much addictive, resulting in it difficult to give up.



**ResultsPlus**

**Examiner Comments**

Candidates need to try to include scientific knowledge in the answers as well as common knowledge if they are to gain maximum marks.

## Question 2 (c) (ii)

Over half of the candidates were able to gain one of the two marks available for this question with the majority able to explain that reaction times are faster when stimulants are taken. It would have been good to see a few more responses explaining why this was the case, although nearly a quarter of candidates were able to give the scientific reasons for this decrease in reaction time or alternatively the increase in the speed of the reaction. Several candidates confused an increase in reaction time with an increase in the speed of reactions and therefore lost the mark.

This is an excellent response showing clear understanding of the process of how stimulants affect reaction times.

(ii) Explain how stimulants affect reaction times. (2)

*Stimulants increase the speed of reaction times by speeding up the neurotransmitters as they go along the synapse between neurons.*



**ResultsPlus**  
Examiner Comments

Candidates need to understand that when a question asks them to explain something, their answer needs to display scientific knowledge to explain the effect. Also, it is important to note that in order to achieve 2 marks, candidates need to make at least two points.

The candidate here does not have the correct science as they talk about electrical signals speeding up which is not the case. They have also confused an increase in reaction time, which actually means that the reaction is slower which is not the case.

(ii) Explain how stimulants affect reaction times. (2)

*They increase reaction time by speeding up the electrical impulses to and from the brain, making muscles work faster.*



**ResultsPlus**  
Examiner Comments

Candidates need to understand that stimulants act at the synapse and increase transmission rather than affect electrical impulses.

### Question 3 (a) (i)

This question was less well accessed than others, as candidates were often not specific enough in their responses. The question required candidates to identify what the trend in blood glucose was. In order to do this they had to link the increase with a time when that increase occurred, or do the same for a decrease in blood glucose levels. Fewer than half of the candidates gained both marks for this question.

This candidate is not describing the trend in the glucose concentration. To gain the marks they have to mention increasing or decreasing the concentration and the time period during which this occurs.

(a) (i) Describe the trend in blood glucose concentration for this seven-hour period. (2)

There ~~is~~ is no trend in the concentration, as there is no pattern between the concentrations. But it shows that the level can only be between 76 and 130 mg per 100 cm<sup>3</sup> of blood glucose concentration.

(iii) Suggest reasons for the changes in blood glucose concentration



#### ResultsPlus Examiner Comments

When describing a trend in data for graphs, or data interpretation, 'increase' or 'decrease' are good terms to use, or even 'levels out' may be appropriate. It is then important to state when this trend starts or finishes - preferably both, for the marks.



#### ResultsPlus Examiner Tip

Candidates should try to be as detailed as possible when describing trends and include data from the table or graph.

The candidate has described what is happening to the data - increased and when this occurred - 8.00 and 13.00 so gains both of the marks.

(a) (i) Describe the trend in blood glucose concentration for this seven-hour period. (2)

Blood glucose concentration has increased at 8.00 hours and at ~~12.00~~ 13.00 hours compared to ~~the~~ the other times of day.  
It went from 77 ~~mg~~ at 7.00 hours to 124 at 8.00 hours.  
Also, it went from 79 ~~to 130~~ at 12.00 hours to 130 at 13.00 hours.



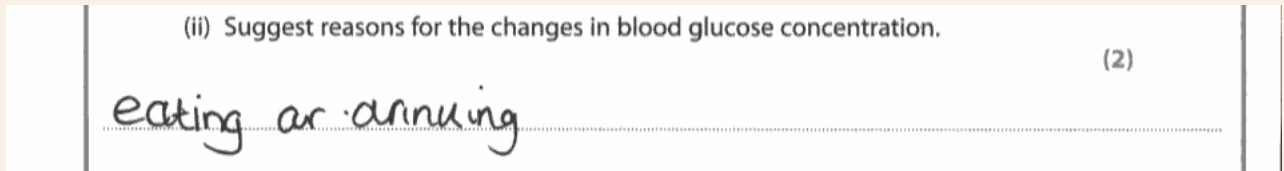
#### ResultsPlus Examiner Comments

Candidates need to include as much detail as possible when describing trends. Remember to quote where possible from the graph.

### Question 3 (a) (ii)

Overall most candidates gained 1 mark here for linking the increase to food intake, but they need to be specific here, as there is more than one change to talk about. It is important when looking at data to give all the detail, and not just focus on one part. It was a little disappointing to note that only a quarter of the candidates managed to get both marks for this question.

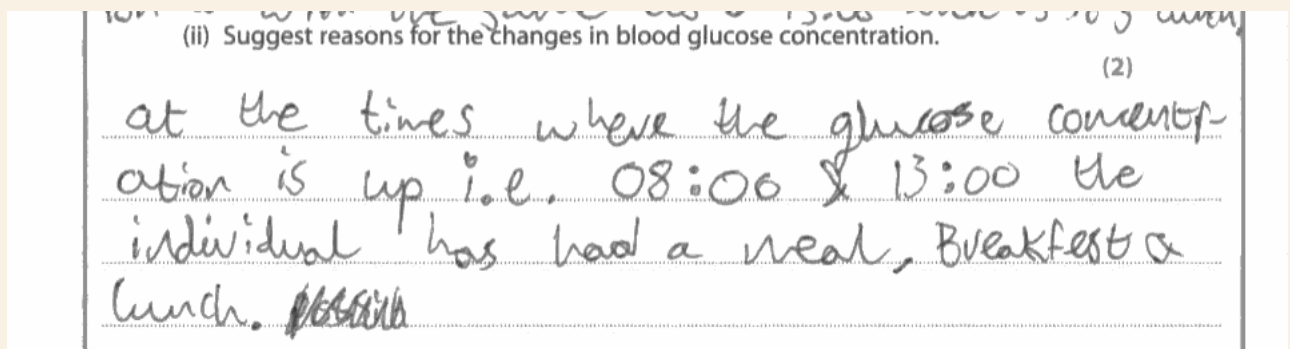
This was a fairly typical response but the candidate has not linked what is happening to the blood glucose levels at all so cannot gain any of the marks.



#### ResultsPlus Examiner Comments

Once again note that there are 2 marks for the question and the candidate is asked to suggest reasons, so there must be more than one. They must also link the reason to what is happening to the blood glucose levels.

The candidate has gained 1 mark here for linking the increase to eating. To gain the second mark they must give a reason for the decrease as the question asks for reasons for the changes in concentration.



#### ResultsPlus Examiner Comments

Candidates need to ensure they are answering all of the question. If the question refers to changes, then there must be more than one mentioned.

### Question 3 (b) (i)

The calculation using the equation given was fairly straightforward and over two thirds of the candidates managed to gain both marks. It is important to note that although the equation for BMI was given on this occasion, it is a specification point and may not be given in a higher demand question.

Clear working is shown here, and the question is calculated correctly.

(b) (i) Scientists have discovered that a high body mass index (BMI) is a risk factor that may cause Type 2 diabetes.

Calculate the BMI for a female who has a mass of 67.5 kg and a height of 1.50 m.

$$\text{BMI} = \frac{\text{mass in kg}}{(\text{height in metres})^2}$$

(2)

$\frac{67.5}{1.50^2} = \frac{67.5}{2.25} = 30$

answer = 30



#### ResultsPlus Examiner Comments

It is essential always to include the working in an answer, as this may enable the candidate to gain at least 1 mark.

The candidate has managed to gain 1 mark here for a correct error carried forward even though the answer is incorrect.

(b) (i) Scientists have discovered that a high body mass index (BMI) is a risk factor that may cause Type 2 diabetes.

Calculate the BMI for a female who has a mass of 67.5 kg and a height of 1.50 m.

$$\text{BMI} = \frac{\text{mass in kg}}{(\text{height in metres})^2}$$

(2)

$67.5 \div 1.50$

answer = 45



#### ResultsPlus Examiner Comments

It is always good practise to ensure that candidates show their working in all calculation style questions.

### Question 3 (b) (ii)

Nearly half of the candidates managed to attain 2 marks for this question and it was generally accessed well across all of the mark range, with nearly a quarter gaining all 3 marks. Candidates did show some confusion between type 1 and type 2 diabetes, but far less so than in previous sessions, showing that they are becoming more aware of the similarities and differences between the two types.

This is an excellent answer. Although it must be noted that insulin is rarely given to a type 2 diabetic, as they are resistant to insulin, but various types of similar medication are often administered by doctors for type 2 diabetes, and so examiners have allowed a medication mark here.

(ii) Explain how a Type 2 diabetic can regulate their blood glucose concentration. (3)

doctors suggest that type 2 ~~diabetic~~ diabetics have an inject themselves with insulin 3-4 times a day. Insulin should be injected into the layer of fat just under the skin straight after a meal causing the liver to be prompted <sup>about the</sup> ~~glyca~~ almost immediately. Also doctors recommend a balanced diet and some exercise every few days however this isn't as effective as insulin.

(Total for Question 3 = 10 marks)



**ResultsPlus**

**Examiner Comments**

Blood glucose regulation seems to be well understood by candidates and they seem to be able to distinguish well between the two types of treatment for diabetes.

This was by far the most common answer with candidates quoting exercise and maintaining a healthy diet as the two methods.

(ii) Explain how a Type 2 diabetic can regulate their blood glucose concentration. (3)

A type two diabetic can have a low carb healthy diet to make sure there isn't too much glucose and can exercise more to help get rid of any extra glucose.



**ResultsPlus**

**Examiner Comments**

Note the candidate has highlighted the type 2 to ensure that they focused on the correct point.

### Question 4 (a) (ii)

There was a general spread of marks across this question enabling it to serve as a good differentiator for the higher grades. Many candidates just wrote down everything they knew about the carbon cycle and did not focus the answer on what the question required. In this case the diagram was there to help candidates, although many failed to use it.

This is a good answer, related back to the diagram and includes all three ways in which carbon dioxide is returned to the atmosphere.

(ii) Describe the numbered processes that return carbon dioxide back into the atmosphere.

(3)

The plant respiration ~~to~~ returns carbon dioxide into the atmosphere. Animal respiration returns carbon dioxide into the atmosphere. Also bacteria respiration returns carbon dioxide back into the atmosphere. The ~~is~~ combustion of fossil fuels returns carbon dioxide into the atmosphere.



**ResultsPlus**

**Examiner Comments**

Please note although it would be good if the candidates had linked the various parts of the cycle to their numbers it was not essential to gain the marks.



In this case the candidate has attained 2 of the 3 marks available. They have also given extraneous information. The question required how carbon dioxide was returned to the atmosphere not how it was removed. Candidates need to focus on the question which is asked rather than write down everything they know on the carbon cycle.

(ii) Describe the numbered processes that return carbon dioxide back into the atmosphere.

(3)

At number 1 photosynthesis is taking place. The plants then use the carbon dioxide to create carbohydrates (fats and lipids) and sugars. The animals then eat the plants and the carbon is transferred into the animals bodies and when they respire they release carbon dioxide into the atmosphere. When ~~the~~ the animals die they are decomposed by fungi and bacteria in the soil which respire (3).



**ResultsPlus**  
Examiner Comments

Candidates often write information that is not required. In this case it was not penalised, as it does not impinge on the answer, but candidates need to be aware that they need to answer the question that is asked, rather than give all the knowledge they have in the hope that they hit a mark point. A more focused answer will generally gain a better mark.

## Question 4 (b)

Over a third of the candidates gained 1 mark on this question and nearly half gained 2 marks. The most common mistake was not mentioning how the carbon dioxide concentration changed, but just saying how it is produced, which only gave them 1 mark.

The first mark here is given for the fact that carbon dioxide levels would increase and the second mark for reasons why they may increase, such as burning fossil fuels or respiration, as well as many others.

(b) The human population is increasing.

Explain how this could change the concentration of carbon dioxide in the atmosphere.

(2)  
With human population increasing we burn more fossil fuels which puts CO<sub>2</sub> back in the atmosphere (O<sub>2</sub>)  
And we cut down and burn trees for places to live which stops trees taking out CO<sub>2</sub> and when burnt releasing CO<sub>2</sub>.



**ResultsPlus**

**Examiner Comments**

This candidate has been focused in their answer. The question asks how concentration would change, so it is vital for the first part of the answer that the candidate states whether it would increase, decrease or remain the same. Several candidates missed this point.

In this case the candidate has gained 1 mark for more carbon dioxide but just stating more cows is insufficient for the second mark.

(b) The human population is increasing.

Explain how this could change the concentration of carbon dioxide in the atmosphere.

(2)  
It could change it because if more people are in the population it means more cows which leads to more CO<sub>2</sub>.



**ResultsPlus**

**Examiner Comments**

The candidate must explain how the cows could increase the amount of carbon dioxide.


### Question 4 (c)

Most of the candidates gave the expected answers of the indicator species, but several candidates confused air and water indicator species, and therefore lost the marks. This confusion resulted in only half of the candidates getting the mark for this question. It should be noted that other common air quality indicators such as algae and moss were accepted as correct answers.

This is too vague a response for an indicator species, as birds in general are not a species.

(c) Air quality can be monitored using indicator species.  
Name an indicator species used to monitor air quality. (1)

Bird




**ResultsPlus**  
Examiner Comments

Examiners were looking here for the indicator species, black spot fungus and lichen but other common indicator species were also allowed as correct answers such as moss, algae and peppered moths.

This was a common mistake with water indicator species such as bloodworm, freshwater shrips quoted but the question was specific about air quality so no marks could be awarded.

(c) Air quality can be monitored using indicator species.  
Name an indicator species used to monitor air quality. (1)

mud worm



**ResultsPlus**  
Examiner Comments

It is essential that the role of living indicators is understood and that the candidates are specific as to what type of pollution is being indicated.

### Question 4 (d)

This question was aimed at the higher level candidates and proved to be a good discriminator for the B - A grades. The process of eutrophication is a clear specification point and candidates need to be able to describe the stages which result in anoxic conditions in lakes and rivers. References to aquatic animals suffocating should really be avoided. A quarter of the candidates gained all 3 marks in this question but over a third of the candidates failed to get any marks at all and there were several blank scripts for this question.

This is a common mistake that candidates make in this style of question, where they repeat the question being asked without actually answering it.

(d) The overuse of fertilisers can cause eutrophication.

Explain the effects of eutrophication that may lead to the death of aquatic animals.

(3)

When farmers overuse fertiliser on plants, it gets washed away into the lakes and rivers. This is harmful to the aquatic animals because it should not be consumed by them.



**ResultsPlus**

**Examiner Comments**

The candidate has failed to answer the question asked which is about the effects of eutrophication.

In this case the candidate has gained 1 mark for the growth of more algae. Please note that it is the **more** which is important as algae grows even without excess nitrates. The reference to algae taking up oxygen is incorrect so the lack of oxygen mark cannot be given. The lack of oxygen in the aquatic environment must be linked to the respiration of the decomposers to gain the marks.

(d) The overuse of fertilisers can cause eutrophication.

Explain the effects of eutrophication that may lead to the death of aquatic animals.

(3)  
Eutrophication causes things like algae to thrive. Algae grows more <sup>often</sup> and ~~gets bigger~~ grows bigger taking up more space and oxygen. This causes a lack of oxygen causing aquatic animals to suffocate.



**ResultsPlus**

**Examiner Comments**

Candidates should try to be as specific as possible when answering this style of question and not make vague statements.

### Question 5 (a) (i)

The majority of the candidates were able to answer this question successfully, with the overwhelming majority gaining the mark for a correct response and with homeostasis being far and away the most popular answer.

This is one of the three acceptable answers for the mark. Also acceptable were thermoregulation and osmoregulation.

5 (a) (i) Conditions in the human body must be regulated to maintain a stable internal environment.

Name the process that maintains a stable internal environment. (1)

homeostasis



**ResultsPlus**  
Examiner Comments

This was well answered with the majority of candidates able to correctly identify homeostasis.

The candidate has misread the question here and believes it to be about the external environment rather than the internal one.

5 (a) (i) Conditions in the human body must be regulated to maintain a stable internal environment.

Name the process that maintains a stable internal environment. (1)

Conservation.



**ResultsPlus**  
Examiner Comments

Highlighting the important information in the question would have avoided this.

## Question 5 (b)

This question is another good discriminator for the higher grades. Candidates needed to focus on the question rather than write generally about nerve pathways. The question was specifically about how the information was sent to the brain, and therefore needed a focused response. Only a small number of candidates gained all 4 marks but nearly half of the candidates managed to get 2 or more marks.

This response gained 1 mark due to the reference to sensory neurones. Note that the question asks for how the information is transmitted to the brain. In this case the motor neurones are not involved. The candidate here has explained a voluntary response rather than answering the question set.

(b) Receptor cells in the skin detect temperature changes in the external environment.

Explain how this information is transmitted to the brain.

(4)

When you detect a stimulus sensory neurones pass on to the motor neurones. The information is sent to the brain.

You can detect the temperature change and you pull off.



**ResultsPlus**  
Examiner Comments

An understanding of the way in which transmission of impulses around the body occurs is essential, both in terms of method of transport and the direction of travel.

This answer shows good scientific understanding of the nervous system and explains in detail how the message is sent from the skin to the brain. 4 marks here for an excellent response.

(b) Receptor cells in the skin detect temperature changes in the external environment.

Explain how this information is transmitted to the brain.

(4)

receptors in the dermis detect low temperature and send it to the dendrites the dendrites then take the impulses to the dendron and then to the axon. The axon will transfer the impulses to the axon endings and eventually the neurotransmitter will diffuse across the synapse to the receptor cells in the dendrites of the relay neurone in the CNS which will take transmit the impulses to the brain.



**ResultsPlus**

**Examiner Comments**

An understanding of the way in which transmission of impulses around the body is essential both in terms of method of transport and the direction of travel.

(b) Receptor cells in the skin detect temperature changes in the external environment.

Explain how this information is transmitted to the brain.

(4)

When your body ~~can~~ senses a change in the temperature your ~~rep~~ receptor cells send signals to your brain to tell you about the change in temperature.



**ResultsPlus**

**Examiner Comments**

There is no scientific detail in this response and therefore it gains no marks. The question also asks about the transmission rather than how the body receives a stimulus, more focus on the question is needed.



### Question 5 (c)

It was very pleasing to note how well the candidates did in this session on both of the 6 mark questions, with the majority of candidates gaining 4 of the 6 marks available, which is appropriate for the cohort. Candidates are much better able to write in continuous prose and put coherent thoughts down in a logical order. Please note that all the indicative content is not needed for the candidate to gain full marks, as these questions are not marked on a point by point basis, but from the generic marking grid with the level of detail and the coherent and logical communication being paramount.

This was a very typical response to the question with a simple explanation of two methods of raising body temperature. The answer flows well, and there is very good evidence that the candidate clearly understands the mechanisms of thermoregulation.

\*(c) In the UK, the external temperature can drop below 0 °C.

Explain how the human body maintains a stable internal temperature when the external temperature is 0 °C.

(6)

At 0°C the body keeps its self warm by shivering, this causes friction between the skin generating heat. Vasoconstriction is also used, this narrows the pores upon the skin causing less heat to escape the body, the hair receptor muscles cause bodily hair to stand on end, this helps to insulate the body. Also when the body gets cold the first things to be cool to the touch are the hands & feet, this helps to contain a warm core temperature.



**ResultsPlus**

**Examiner Comments**

This candidate has gained 4 marks here and has produced a well rounded answer. To increase the marks, another method of thermoregulation should be mentioned with a little more detail on at least one of the methods.

\*c) In the UK, the external temperature can drop below 0 °C.

Explain how the human body maintains a stable internal temperature when the external temperature is 0 °C.

''

(6)

Vasoconstriction takes place. This means that capillaries near the skin become narrow, which means that not much blood can flow through them meaning not much heat is lost. ~~Also~~ Erector muscles on the skin erect hairs meaning that air can be trapped between the hairs. The air acts as insulation meaning that less body heat is lost so the body stays warm. Very little or no sweat is produced which means that no heat is lost during evaporation, meaning the body stays warm.



**ResultsPlus**

**Examiner Comments**

This is a clear example of an answer in level 2. Some good detail of the methods of thermoregulation is included and the answer flows coherently. Grammar and spelling is used to good effect so 4 marks here.

Marks are not deducted for minor spelling errors but rather for the overall quality of the work.

### Question 6 (a) (i)

This was generally well answered with three quarters of the candidates gaining the mark for contact, or touch, or contact with surfaces which have the fungal infection.

This is enough for the mark here, just contact, or direct contact gained the mark here, with most candidates being able to access this question.

6 (a) Athlete's foot fungus is a pathogen.  
(i) Describe how athlete's foot fungus is spread. (1)

athlete's foot is spread through contact.



**ResultsPlus**  
Examiner Comments

This was well accessed with the majority of candidates gaining the mark.

### Question 6 (a) (ii)

This question was extremely well answered with the vast majority of the candidates able to correctly identify antifungal or antibiotic treatment.

One mark here for the correct response. Also accepted as a correct response were antibiotics or named products for treating athletes foot, such as nystatin.

(ii) State the type of medication that can be used to treat this pathogen. (1)

antifungal tablets



**ResultsPlus**  
Examiner Comments

This question was very well answered although antibiotic was allowed for a marking point.

## Question 6 (b) (ii)

This question proved to be a discriminator for the higher grades with fewer than a third of candidates gaining 3 marks for the question, and only approximately half of the candidates gaining 1 or more marks. The question was specific about requiring chemical defence mechanisms, but many candidates talked about the role of blood, or the physical barriers such as the skin.

This is a good example of how to gain all the marks for this question. The main chemical barriers candidates are expected to know are hydrochloric acid and lysozymes. To gain all three marks these should be linked with the areas in the body they are found and also their role in killing bacteria.

(ii) Explain how chemical defence mechanisms in the body reduce the chance of infection.

(3)

Chemical defence mechanisms in the body reduce chances of infection as chemicals in the body destroys bacteria so bacteria is unable to leave infections. Such as hydrochloric acid in the stomach which kills bacteria on food.



**ResultsPlus**

**Examiner Comments**

It is essential that candidates do not confuse the physical barriers such as skin and cilia with the chemical barriers in this style of question.

The candidate has gained 1 mark here for the mention of stomach acid we do not penalise candidates for mentioning mucus here.

(ii) Explain how chemical defence mechanisms in the body reduce the chance of infection.

(3)

Well the body ~~has~~ has many barriers against infection such as mucus, stomach acid and diarrhoea



**ResultsPlus**

**Examiner Comments**

If the candidate had stated hydrochloric acid found in the stomach they could have achieved 2 marks here.

(ii) Explain how chemical defence mechanisms in the body reduce the chance of infection.

(3)

We have chemical defence mechanisms in the body such as physical and chemical barriers. Physical barriers prevent infections entering the body in the first place. Antibodies form in the body against bacteria which work against the bacteria to kill/prevent growth.



**ResultsPlus**

**Examiner Comments**

This was a common misconception when answering this question but the question was specific about the chemical defence mechanisms which is a specification point. Many candidates went on about the role of white blood cells and antibodies, unfortunately this is not a correct response to the question.

The candidate has misunderstood the requirements of the question.

### Question 6 (c)

In this case the candidate has given a good description of the graph which puts the candidate into level 1. As the answer flows well, and is logically ordered, with most spellings and grammar correct, this is worth 2 marks.

Explain the trend in the graph, even though the patients were treated with antibiotics.

(6)

In 1993 the ~~people~~ with MRSA was 1900 in 1996 it increased to 60,300 another increase in 1994 the total was 108600 another increase. In ~~2001~~ 2002 it was 207900 another increase. In 2005 the total was 368600. The graph suggest that the number of patients with MRSA will continue to increase and ~~it~~ may not stop.



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**Examiner Comments**

There were 2 parts to this question, the first part about the graph and the trends and the second part about why the trend is as it is. This candidate has not managed to access the second section.

This candidate has given a good description of the graph and also has attempted to give reasons for the increasing trend in MRSA, this has put them into level 2. As the answer uses good English and grammar and flows coherently this is awarded 4 marks.

Explain the trend in the graph, even though the patients were treated with antibiotics.

(6)

The graph peaks at ~~38~~ 368,600 in 2005 which was the most recent date. Common sense would say it should be less people than ~~in~~ during the 90's ~~with~~ with the advances in medicine, however, genes and infections mutate. An infection can become immune to the drug used to treat it, this is a bad thing as they are advancing quicker than the drugs are. The graph backs this up. The graph's lowest point is 1900, 366,700 people less than in 2005. This shows that the infection had not successfully mutated at speed and antibiotics had the upper hand.



**ResultsPlus**  
Examiner Comments

To gain 6 marks here the candidate would need to give details as to how antibiotic resistant bacteria came to evolve.

## Paper Summary

Based on the performance in this paper candidates should:

- Ensure they have a clear understanding of the two genetic diseases listed in the specification. These are sickle cell disease and cystic fibrosis.
- Work on their maths skills, particularly when calculating percentages or reading off graphical data. This is a skill in itself, and is awarded marks accordingly.
- Ensure that they have a detailed understanding of the higher tier topics, as these tend to be the areas where the higher marks are allocated, and are often discriminators for the higher grades.
- It is essential that candidates look to the number of marks allocated to the question, and answer the question with the relevant number of points. If the question is allocated 3 marks, then the candidate needs to make 3 separate points.
- Candidates should work on the way in which they answer the 6 mark questions. If the question is based around a graph, then information from the graph should be quoted alongside an explanation of the answer, to gain full marks.



## **Grade Boundaries**

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

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