

Examiners' Report
June 2012

GCSE Biology 5BI1F 01

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Introduction

This paper is the third live paper that has been sat by candidates in line with the new specification that has been in circulation for almost two years.

From classification to the nervous system and from ecology to pollution; this paper examines a range of skills and knowledge. The specification points vary and the assessment objectives allow candidates to score highly on basic biological content, but also allow some candidates to access the application marks that are available too.

The mark scheme is robust, yet flexible in its intentions to allow a candidate to suggest an answer in a varied manner.

Question 1 (a) (ii)

This item focuses upon specification point 1.4 and is targeted at the G-E grade range of accessibility.

The only answer that was acceptable here was the feature "backbone", "supporting rod" or "spine". Many candidates stated that all Chordata have a "hump on their back" or "four legs". This is technically untrue and scored zero.

Answer: Backbone, Spine, Supporting Rod.

(ii) State **one** feature that all members of the phylum Chordata have in common.

(1)

They all have a back bone.



ResultsPlus
Examiner Comments

This candidate has clearly highlighted the feature of a backbone.
Score: 1 mark



ResultsPlus
Examiner Tip

Ensure that if a question asks for one feature, only one feature is provided. A list of various features with the correct answer included in the list will not score credit.

(ii) State **one** feature that all members of the phylum Chordata have in common.

(1)

they have a hump on their back



ResultsPlus
Examiner Comments

This candidate has, unfortunately, assumed that a camel is called "the Chordata" and therefore stated that they all have a hump on their back. This is clearly untrue and thus awarded no credit.

Question 1 (a) (iii)

This item focuses upon specification point 1.5 and asked for a comparison between reptiles and mammals in terms of their thermoregulation processes. Many candidates did not score here simply because they did not compare the two or suggest they were different in some way. The use of the word "they" without any reference to either mammals or reptiles, could not be credited.

Answer: Reptiles use of environment / sun / shade etc and mammals use of internal processes. Candidates were also credited for stating that reptiles were cold-blooded and mammals were warm-blooded (1 mark maximum here however).

(iii) Members of the phylum Chordata can be further classified by how they regulate their body temperature.

Reptiles are poikilothermic and mammals are homeothermic.
Explain how reptiles and mammals regulate their body temperature.

(2)

Reptiles and mammals regulate their body temperature by sweating. If it is too hot sweat is produced which ~~falls~~ cools it down.



ResultsPlus
Examiner Comments

This candidate has not differentiated between reptiles and mammals and therefore it is unclear which statement is worthy of credit. If the first two words were ignored, then one mark could have been awarded. However, since this is not possible, no marks were awarded.

(iii) Members of the phylum Chordata can be further classified by how they regulate their body temperature.

Reptiles are poikilothermic and mammals are homeothermic.
Explain how reptiles and mammals regulate their body temperature.

(2)

Reptiles are cold blooded and they have to sit in the sun. Mammals are warm blooded therefore can heat themselves up without being in the sun.



ResultsPlus
Examiner Comments

This candidate has stated the blood condition of reptiles and mammals for 1 mark and also stated that reptiles can use the sun to regulate their temperature.
Score: 2 marks

Question 1 (b)

This item focuses upon specification point 1.2 and candidates were requested to draw a straight line from the description to the Kingdom it fits within. This is an item where candidates tend to do reasonably well. One mark is acquired per correct line drawn.

The descriptions have been formulated to be relevant only to one Kingdom. Unicellular with nucleus can only be a Protocists, while a photosynthetic organism that is multicellular will only fit into the Plantae kingdom.

(b) Scientists classify organisms into five different kingdoms.

Draw **one** straight line from each description to its correct kingdom. (2)

description	kingdom
unicellular with nucleus present	Animalia
unicellular with nucleus present	Plantae
unicellular with nucleus present	Fungi
unicellular with nucleus present	Protocista
unicellular with nucleus present	Prokaryotes
multicellular and photosynthetic	Animalia
multicellular and photosynthetic	Plantae
multicellular and photosynthetic	Fungi
multicellular and photosynthetic	Protocista
multicellular and photosynthetic	Prokaryotes



ResultsPlus Examiner Comments

This candidate has clearly misinterpreted the question requirement. The requirement for one line from each description box is clear, yet five lines have been drawn and no marks awarded.



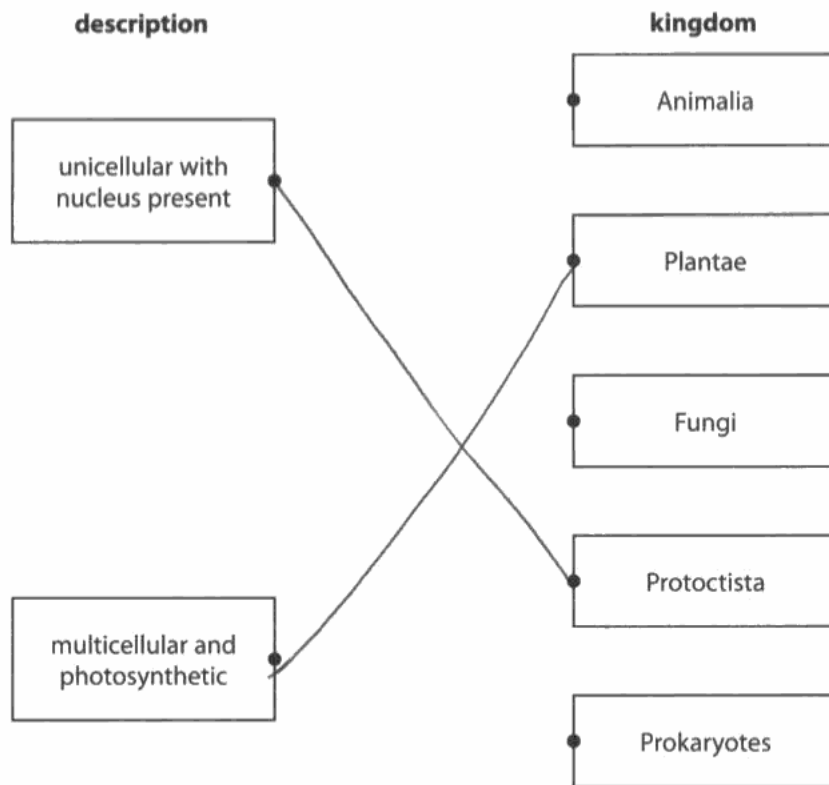
ResultsPlus Examiner Tip

Read the instructions in a question carefully. Here candidates must only draw one line from each left handed box to a right handed box.

(b) Scientists classify organisms into five different kingdoms.

Draw **one** straight line from each description to its correct kingdom.

(2)



ResultsPlus
Examiner Comments

This candidate has scored maximum marks here and responded to the instructions in the question well. One line is drawn between each of the two descriptions and the kingdom to which they belong.

Score: 2 marks

Question 1 (c)

This item focuses upon specification point 1.3 and asks candidates to think more in depth about the topic of classification. Many candidates scored the first marking point and suggested that a virus was a non-living particle. Some also made an attempt to suggest that a virus cannot exist without the reliance of a host. Candidates rarely made any comment upon the lack of cellular existence or a lack of cell organelles.

(c) Viruses are not classified into any of the five kingdoms.
Suggest reasons for this. (2)

Viruses are not classified because scientists believe they aren't living and they need a host to survive



ResultsPlus Examiner Comments

This candidate has scored well by making a comment upon the fact that a virus is non-living and that a virus requires a host to survive. This is a very well worded response and scores maximum marks.

Score: 2 marks



ResultsPlus Examiner Tip

Check the number of marks available for each question.

(c) Viruses are not classified into any of the five kingdoms.
Suggest reasons for this. (2)

They are not classified because scientists believe they are not living organisms. If they want to survive they have to transfer them self to a living cell.



ResultsPlus Examiner Comments

This candidate has scored well by making a comment upon the fact that a virus is non-living (by stating it is not a living organisms) and that a virus requires a host to survive (by stating that if they want to survive they have to transfer themselves into a living cell). This is a very well worded response and scores maximum marks.

Score: 2 marks



ResultsPlus Examiner Tip

This is a good example of the different ways that candidates can express themselves. Be clear, concise and explain yourself with confidence.

Question 2 (a) (ii)

This item focuses upon specification point 3.3 and asks candidates to view a list of athletes and their reaction times and race times. Candidates are asked to find the athlete that has the fastest race time. The majority of candidates were awarded the single mark available for stating Usain Bolt was the quickest athlete.

(ii) Name the athlete who finished the 100 metres sprint in the fastest time.

(1)

* Powell: ASofa



ResultsPlus
Examiner Comments

This candidate has clearly misread the information in the table. This is unfortunate as it is a basic skill that was tested.

(ii) Name the athlete who finished the 100 metres sprint in the fastest time.

(1)

Bolt: Usain



ResultsPlus
Examiner Comments

This candidate has used the information in the table effectively.



ResultsPlus
Examiner Tip

Candidates should write the names in the correct order and although they will not lose the mark for writing "Usain Bolt" it is a better idea to keep consistency between the question information and answer.

Question 2 (a) (iii)

This item focuses upon a mathematical specification point and asks candidates to calculate the difference between the fastest and the slowest athlete.

The difference between the times of 10.03 and 9.69 seconds gives the answer 0.34.

Examiners will award one mark for the identification of the two times (regardless of the sum provided). The answer 0.34 without any working scored two marks. A mark was awarded as an error carried forward for the correct answer of an incorrect substitution.

(iii) Calculate the difference between the overall race time of the fastest athlete and slowest athlete. (2)

~~9.69~~
~~10.03~~

10.3 - 9.69

answer = 0.61 s



ResultsPlus Examiner Comments

A clear example of where a candidate has not identified the correct times to use, but has scored one mark for 0.61 as 10.3 minus 9.69 is indeed 0.61.

Score: 1 mark



ResultsPlus Examiner Tip

Always show your working in calculations. If this candidate had not done so, then no marks would have been awarded, since the examiner would not have been able to see if the calculation was correct.

(iii) Calculate the difference between the overall race time of the fastest athlete and slowest athlete.

(2)

$$9.69 - 10.03$$

answer = 0.3 s



ResultsPlus
Examiner Comments

This candidate has been awarded one mark for the identification of the correct times to use in a mathematical sum. However, this candidate has not scored the second mark as they have placed the incorrect answer to their times.

Score: 1 mark

Question 2 (b) (i)

This item focuses upon specification point 2.21 and asks candidates to state which sense organ detects sound. Many candidates scored here, however, there were a significant number of candidates who named the brain as the sense organ.

(b) The athlete starts to run when a gun is fired.

(i) State the athlete's sense organ that detects this stimulus.

(1)

hearing



ResultsPlus

Examiner Comments

Unfortunately, this candidate has stated the function of the sense organ, rather than the sense organ itself. This was just too far away from the answer "ear" to gain a mark.

(b) The athlete starts to run when a gun is fired.

(i) State the athlete's sense organ that detects this stimulus.

(1)

~~Brain~~ Ears



ResultsPlus

Examiner Comments

It can be seen here that the candidate had written the word "brain" initially and then reread the question to correct themselves with the required answer.



ResultsPlus

Examiner Tip

If a candidate is to correct themselves it is important to identify the answer that has been replaced. This is a good example. It is important to clarify that if a candidate is unsure of an answer and cannot think of an alternative then do not merely leave the answer space blank.

Question 2 (b) (ii)

This item focuses upon specification point 2.21 and is one of the questions worth three marks. If a candidate was aware of the use of neurones in a nerve pathway, then they performed well on this question. If a candidate named all three neurones in the correct context and order, then they could score all three marks here very simply. The most popular marking point seen was the use of the brain in receiving information from the sensory neurones. The synapse marking point reference was seen least often.

(ii) Describe the nerve pathway a nerve impulse will take from where it is received to where it will cause a response to take place.

(3)

The stimulus will detect the reflex which will then send the impulse to the sensory neurone and then to the central nervous system which is the spine and the brain, which the impulse then goes to the relay neurone to the motor neurone and then to the effector which is the muscle.

(Total for Question 2 = 8 marks)



ResultsPlus
Examiner Comments

This candidate has scored well with maximum marks awarded. They have actually made comments on five of the marking points, and only left any reference to a synapse out. This is a very promising and impressive answer.

Score: 3 marks

(ii) Describe the nerve pathway a nerve impulse will take from where it is received to where it will cause a response to take place.

(3)

First the stimulus is picked up by the ~~re~~ receptor cells which sends a nervous impulse to the spinal cord, triggering a reaction that send impulses along axons back to whatever the result of the stimulus is.



ResultsPlus
Examiner Comments

This candidate has been able to score 1 mark, as they have mentioned the use of the spinal cord (mp2). Unfortunately they have not stated the use of any specific neurones or the use of the muscles as an effector.

Score: 1 mark

Question 3 (a) (ii)

This item focuses upon specification point 3.26 and asks candidates to simply name the process in which plants can provide their own nutrition. Candidates scored well on this item and examiners were asked to award marks based around recognisable spelling of the word 'photosynthesis'.

(ii) The mistletoe plant also gains energy from sunlight to produce glucose.

State the name of this process.

(1)

~~photosyn~~ photosynthesis ~~photosynthesis~~



ResultsPlus

Examiner Comments

This is an example of where a candidate was just too far away from the word 'photosynthesis' as the word 'photospysis' is not a recognisable alternative to the answer. Indeed, the other two attempts that have been crossed out were also too far away in terms of spelling.

Score: 0 marks

(ii) The mistletoe plant also gains energy from sunlight to produce glucose.

State the name of this process.

(1)

photosynthesis



ResultsPlus

Examiner Comments

This candidate has spelt the word well and it is very easily legible.

Score: 1 mark

Question 3 (b) (i)

This item focuses upon specification point 3.17 and asks candidates to show the interlinked relationship for survival between a bird and a tree. The question asks how a bird can aid the seed dispersal of a tree to another tree and the mark scheme is split into 'collection' and 'transfer'. Many candidates stated that the bird eats the seeds (mp1) and egests them onto a new tree (mp2).

(b) The mistletoe plant produces fruit that contains seeds.
The Mistle Thrush is a bird that spreads these mistletoe seeds to other trees.

(i) Suggest how the Mistle Thrush spreads the mistletoe seeds to other trees. (2)

The mistle thrush bird would spread the seeds onto other trees by carrying some in its mouth and dropping them onto trees.



ResultsPlus
Examiner Comments

This candidate has only scored 1 mark. No marks were awarded for "carrying seeds in the bird's mouth". Consuming the seeds is acceptable. The candidate did score for the dropping of the seeds onto a new tree however.

Score: 1 mark

(b) The mistletoe plant produces fruit that contains seeds.
The Mistle Thrush is a bird that spreads these mistletoe seeds to other trees.

(i) Suggest how the Mistle Thrush spreads the mistletoe seeds to other trees. (2)

The thrush must eat the seeds then excrete onto other trees to spread the seeds



ResultsPlus
Examiner Comments

This candidate has been concise, clear and scores 2 marks for their comment on "seeds being eaten" and then excreted onto new trees. Excrete was accepted as an alternative for egestion in this answer.

Score: 2 marks

Question 3 (b) (ii)

This item focuses upon specification point 3.17 and asked candidate to use mathematics to secure 2 marks. It was very clear from the food chain and the question stem which numbers were required for the calculation and it was disappointing to see so many candidates using other numbers. It is clear that percentage calculations are an area where candidates need practice.

Examiners were asked to award 2 marks for an answer of '20%' without working. Examiners were also asked to look for any division of two numbers from the food chain boxes; namely 1000/200, 1000/20, 200/20 and vice versa related to these. This would score 1 mark.

(ii) Sparrowhawks are birds that are predators of the Mistle Thrush.

The diagram shows the energy values in the food chain for these organisms.

```
graph LR; A[mistletoe plant  
1000 J] --> B[Mistle Thrush  
200 J]; B --> C[Sparrowhawk  
20 J]
```

Calculate the percentage of energy that was passed from the mistletoe plant to the Mistle Thrush. (2)

$\frac{20}{200} \times 100 = 40$

answer = 40 %



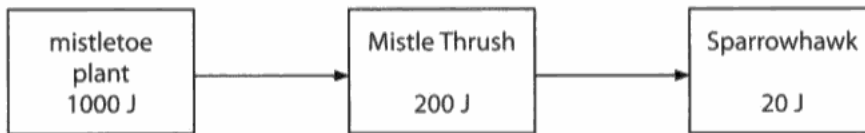
ResultsPlus Examiner Comments

This candidate has been awarded 1 mark for the division of two numbers from the food chain; 20/200. These are not the correct numbers to use to calculate the correct answer and so only 1 mark could be awarded.

Score: 1 mark

(ii) Sparrowhawks are birds that are predators of the Mistle Thrush.

The diagram shows the energy values in the food chain for these organisms.



Calculate the percentage of energy that was passed from the mistletoe plant to the Mistle Thrush.

(2)

answer = 20 %



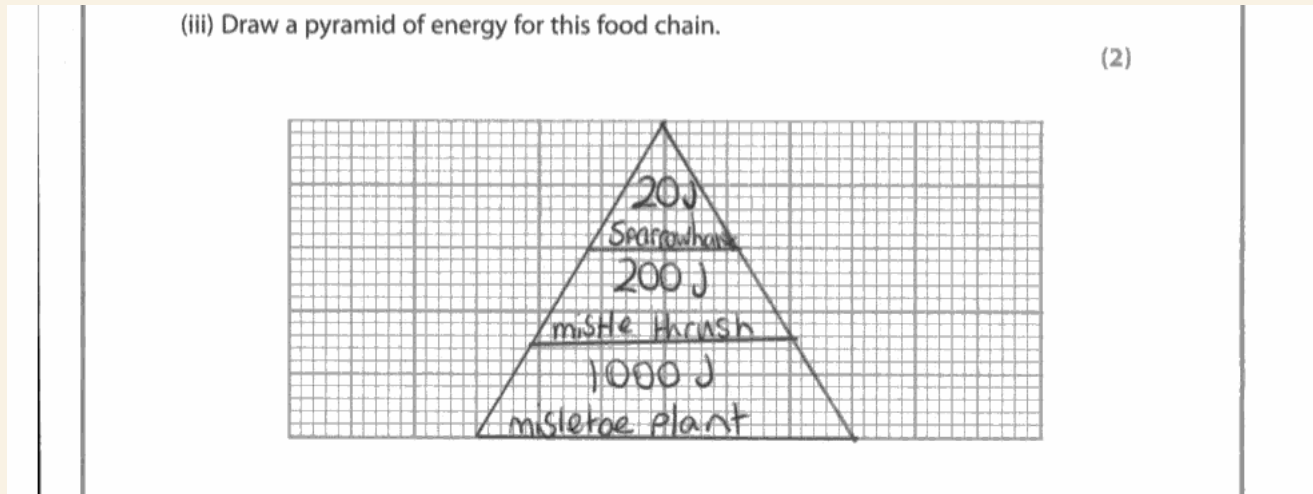
ResultsPlus
Examiner Comments

2 marks were awarded here for the correct answer. However, it is good practice for candidates to show their working in calculation questions.

Score: 2 marks

Question 3 (b) (iii)

This item focuses upon specification point 3.18 and asks candidates to draw a pyramid of biomass for the numbers provided in each trophic level. It is clear candidates are weak on this part of the specification. A grid with adequate space has been provided for candidates to draw the pyramid in proportion. Many candidates scored one mark here for a pyramid blocked shape or a triangular shaped pyramid being drawn. The second mark was awarded very rarely, as the pyramid blocks were not drawn in proportion to the biomass figures given.



ResultsPlus Examiner Comments

This candidate has scored 1 mark for a triangular pyramid being drawn, which is acceptable. The candidate did not score the second mark, as it is clear that the triangular format cannot show proportionality with the biomass figures.

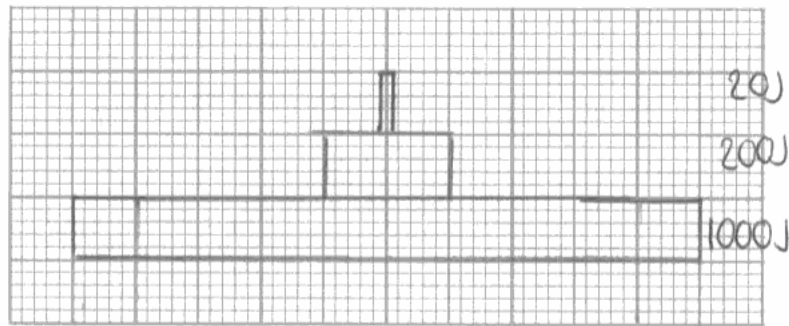


ResultsPlus Examiner Tip

Candidates must attempt these as part of their revision and use a blocked format rather than a triangular one.

(iii) Draw a pyramid of energy for this food chain.

(2)



ResultsPlus
Examiner Comments

This candidate has scored the maximum marks as they have used a three tiered pyramid of blocks that are all in proportion to the biomass figures provided in the food chain.

10 blocks have been used for the bottom tier representing 1000 J, 2 blocks have been used to represent 200 J and 1 single block (a tenth of previous) used for 20 J.

Score: 2 marks

Question 3 (b) (iv)

This item focuses upon specification point 3.18 and invites candidates to simply suggest two methods of energy loss within the food chain. Many candidates recognised that energy is lost through the movement of organisms. Candidates were awarded one mark when they have described an example of movement instead of literally stating the word; for example "flying" or "chasing prey". The mark scheme was flexible to allow for the wide variety of ways in which candidates express themselves. Nevertheless this item did not score well.

(iv) Suggest **two** ways in that energy is lost from this food chain. (2)

1 The Birds flying e.g. mottle Cuckoo
flying.

2



ResultsPlus

Examiner Comments

This candidate has scored 1 mark as they have simply suggested that energy can be lost through the flight of the bird. Unfortunately they have not suggested a second method (or attempted this). This is disappointing as it limits the marks that can be awarded.

Score: 1 mark

(iv) Suggest **two** ways in that energy is lost from this food chain. (2)

1 energy has been lost through
movement

2 energy has been lost through
respiration



ResultsPlus

Examiner Comments

This candidate has scored well here and provides a simple, concise and well structured answer. This is also a good example of where an acceptable answer has been credited also. Respiration was an acceptable alternative to heat production (mp2).

Score: 2 marks

Question 4 (a) (i)

This item focuses upon a mathematical skill and asks candidates to calculate a mean average for a set of numbers. This item scored well with many candidates recognising the need to add all numbers and then divide by six. Although there was no mark available for showing working, there was a space provided for candidates to calculate the mean value.

(i) Calculate the mean volume of urine produced on the hot day. (1)

$$430 + 350 + 270 + 560 + 400 + 390 = 2400$$
$$2400 \div 6 = 400$$

answer = 400 cm³



ResultsPlus Examiner Comments

This candidate showed their working to get the correct answer of 400.
Score: 1 mark

(i) Calculate the mean volume of urine produced on the hot day. (1)

$$\begin{array}{r} 430 \\ 350 \\ 270 \\ 560 \\ 400 \\ 390 \\ \hline 2400 \end{array}$$

answer = 800 cm³



ResultsPlus Examiner Comments

This candidate has added all the numbers required and therefore was half way through to the correct answer. However, the division has been by 3 and not 6.
No marks were awarded.

Question 4 (a) (ii)

This item focuses upon specification point 2.2 and asked candidates to analyse either their answer to 4a(i) or analyse the data in the table for every individual identified. The idea of more urine being produced on a cold day (or the reverse argument / statement) was required to score the mark. If candidates had provided a mathematical answer (600 cm^3) then this was also acceptable, even if there was no indication of which type of day was being commented upon.

(ii) State the difference between the mean volume of urine produced on the hot day and the mean volume of urine produced on the cold day.

(1)

there is alot more urine produced on a hot day than
a cold day.



ResultsPlus
Examiner Comments

This candidate has, unfortunately, mixed the type of day and scored no marks.



ResultsPlus
Examiner Tip

Candidates must re-read their answers to ensure that what is written is what they want to convey. Inaccurate statements can very easily be made.

(ii) State the difference between the mean volume of urine produced on the hot day and the mean volume of urine produced on the cold day.

(1)

The colder the day is, the more urine
is produced.



ResultsPlus
Examiner Comments

This candidate has scored 1 mark as they have concisely stated that the colder the day the more urine produced. Despite this not being strictly true as the question does not state the temperatures specifically, this was most acceptable for an answer.

Question 4 (a) (iii)

This item focuses upon specification point 2.3 and candidates were expected to state why less urine is lost from the body on a hot day. Candidates accessed the first marking point well which states that water is lost in the process of sweating. Examiners were looking for the idea that on a hot day the body sweats more. Any reference to the use of water to stop dehydration was also regarded as credit-worthy.

(iii) Explain why, on a hot day, less water is lost from the body as urine.

(2)

Because water is lost in other ways
such as when sweat is produced.



ResultsPlus Examiner Comments

This candidate has recognised that water is vital in the sweating process and therefore has been awarded one mark. It is a shame that they only went this far and the next logical statement would have been that "and we sweat more on a hot day".

Score: 1 mark



ResultsPlus Examiner Tip

When writing an answer it is advisable to consider the total marks available. Is the answer written making two separate points for a two mark question?

Question 4 (b) (ii)

This item focuses upon specification point 2.6 and asked candidates to state the fate of glucose after the use of a hormone (regardless of which answer they had provided for 4b(i).)

The mark scheme states that glycogen was made and this would be involved or stored in the liver. Other organs that store glycogen were accepted, namely the muscles, kidneys and the brain. This question scored well but some answers lead to the suggestion that candidates need to differentiate between glucagon, glycogen and glucose.

(ii) Explain how the glucose content of the blood can be decreased by this hormone.

(2)

Because when the glucose and insulin enter the liver it turns ~~the~~ the ~~to~~ glucose to glycogen.



ResultsPlus

Examiner Comments

An excellent response from this candidate to secure both marks available. The candidate has stated that in the liver the glucose is converted to glycogen. This response is worded well, concisely and is detailed enough to be awarded two marks.

Score: 2 marks

(ii) Explain how the glucose content of the blood can be decreased by this hormone.

(2)

because the pancreas turns the glucose into glycogen when the insulin which we use ~~the~~ it or gets rid of it.



ResultsPlus

Examiner Comments

This candidate has secured the first marking point available despite suggesting that it is the pancreas that converts glucose to glycogen. It is the conversion that was important rather than the location for the first marking point on the scheme.

Score: 1 mark

Question 4 (b) (iii)

This item focuses upon specification point 2.8 and 2.9 and asks the candidate to state what a type 1 diabetic can do to lower their blood glucose. There were two marks available for the use of insulin as the second marking point was acquired by stating the location of insulin injections. External methods were also credited as exercise and diet were also expected for full marks.

Many candidates were able to suggest that a type 1 diabetic would require an injection of insulin, however the subcutaneous fat location was rarely seen. The use of exercise was also seen, however candidates were getting somewhat confused about the dietary control as they stated that a diet low in fat was a method of glucose control.

(iii) People with Type 1 diabetes cannot produce the hormone needed to control the glucose content of the blood.

Explain how a Type 1 diabetic can control the glucose content of the blood.

(3)

- you can inject insulin at meal times.
- you should eat a healthy diet.
- eat food low in sugar.
- exercise regularly.



ResultsPlus

Examiner Comments

This candidate has listed the methods of glucose control which is perfectly acceptable. The three methods have been highlighted, namely the injection of insulin, the consumption of less sugary food stuffs and also the use of regular exercise.

Score: 3 marks

(iii) People with Type 1 diabetes cannot produce the hormone needed to control the glucose content of the blood.

Explain how a Type 1 diabetic can control the glucose content of the blood.

(3)

type 1 diabetes can control the glucose by injecting insulin into a layer of fat underneath the skin. which ~~that~~ insulin ~~can~~ is added to reduce the amount of glucose in your body.



ResultsPlus

Examiner Comments

This candidate has been able to score 2 marks for only stating one method of control. Indeed, it is surprising to see a rarely seen comment without other more simple statements (diet and exercise). Nevertheless it was pleasing to see that the "layer of fat" comment has been credited here.

Score: 2 marks

Question 5 (a) (i)

This item focuses upon specification point 1.20 and asks candidates to place words from a box into the spaces provided.

The answers gene and alleles were required in this order and it was pleasing to see many candidates scoring well on this item.

(i) Use words from the box to complete the sentences.

(2)

alleles	DNA
gene	
phenotype	genotypes

Chromosomes have sections which code for specific characteristics.

Each characteristic is coded for by a gene. These exist in alternative forms called alleles.



ResultsPlus
Examiner Comments

This candidate has clearly read all of the words in the box and highlighted the two that they wish to use. These have then been placed in a legible fashion into the spaces provided.

Score: 2 marks

(i) Use words from the box to complete the sentences.

(2)

alleles	DNA
gene	
phenotype	genotypes

Chromosomes have sections which code for specific characteristics.

Each characteristic is coded for by a gene. These exist in alternative forms called Dna.



ResultsPlus
Examiner Comments

This candidate has only managed to secure the first marking point here for stating 'gene' for the first missing word. Unfortunately, the more difficult element to the item has not been secured despite the sentence being in the specification.

Score: 1 mark

Question 5 (b) (i)

This item focuses upon specification point 1.22 and asks the candidate to show that they are aware of the genetic terms recessive, dominant, heterozygous and carrier. Candidates were asked to draw one line from the genotype to its description. This item scored relatively well, despite historically, this being a difficult topic area for candidates.

(b) Sickle cell disease is a genetic disorder that affects human red blood cells. Individuals with sickle cell disease have the genotype **dd**.

(i) Draw **one** straight line from the genotype to the correct description. (1)

genotype	description
dd	homozygous recessive
	homozygous dominant
	heterozygous
	carrier



ResultsPlus Examiner Comments

This candidate has clearly shown they know that this genotype is homozygous recessive.



ResultsPlus Examiner Tip

Candidates must be aware that they have to draw the line from the genotype box and not the actual word 'genotype' at the top. This mistake was, surprisingly, seen on a few occasions.

Question 5 (b) (ii)

This item focuses upon specification point 1.25 and asks candidates to describe the symptoms that are associated with the genetic disorder sickle cell disease. Many candidates stated that red blood cells become sickle shaped. This was not a marking point as it is not a symptom but a structural change that produces the symptoms. It was also recognised that some candidates were becoming confused between cystic fibrosis and sickle cell disease, and therefore suggestions that the breathing difficulty was due to mucus were not awarded marks.

(ii) Describe the symptoms of sickle cell disease.

(2)

The body's red blood cells cannot carry as much oxygen therefore the person who has sickle cell disease gets out of breath easy.



ResultsPlus

Examiner Comments

This candidate has secured marking point 2 for the breathing difficulty point. They have suggested why the breathing difficulty occurs, although not a specific point of credit.

Score: 1 mark

(ii) Describe the symptoms of sickle cell disease.

(2)

The symptoms of sickle cell disease is that you usually get out of breath more, more tired, losing more weight.



ResultsPlus

Examiner Comments

This candidate has stated marking points 1 and 2 well and concisely. They have clearly made an error with "losing more weight" as this is a symptom of cystic fibrosis however, it has not negated the answer.

Score: 2 marks

Question 5 (b) (iii)

This item focuses upon specification points 1.23 and 1.24 and asks candidates to draw and analyse a genetic cross between a mother suffering from sickle cell disease and a father who is homozygous dominant for the disease. Candidates scored well on the Punnett Square they were asked to supply, but the explanations that followed were somewhat weaker.

It has to be remembered that the mark scheme to the 6 mark items are not a definitive requirement. The indicative content does not have to all be seen for all 6 marks to be awarded.

Candidates here were asked to supply a Punnett Square and this, if correct, allowed them to score 4 marks alone. This is a high level skill. The use of genetic terms in the explanation were expected to secure all 6 marks.

To secure the higher mark of each band, a candidate had to communicate their answer with the use of good grammar and spelling.

*(iii) A father with the genotype **DD** and a mother with the genotype **dd** for sickle cell disease had a number of children.

Explain why none of their children will have sickle cell disease.
Use a Punnett square or genetic diagram to help your explanation.

(6)

	D	D
d	Dd	Dd
d	Dd	Dd

~~Ans~~ Each child will receive a gene from each parent. As the father has the dominant non sickle cell alleles, this will always be passed on to the child, along with the mother's recessive gene. This will make the children heterozygous, with different alleles. Although the children will be carriers of sickle cell, they will never suffer from it.



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Examiner Comments

This candidate has provided a correct Punnett Square and therefore was already awarded 4 marks as it is communicated well. The candidate has also provided a very good explanation for why no children will suffer from the disease by using terms such as heterozygous, recessive and dominant correctly, and in the correct context.

Score: 6 marks

*(iii) A father with the genotype **DD** and a mother with the genotype **dd** for sickle cell disease had a number of children.

Explain why none of their children will have sickle cell disease.
Use a Punnett square or genetic diagram to help your explanation.

(6)

	D	d
D	DD	Dd
d	Dd	dd

Their children will not have sickle cell disease but they will be carrying the cells for sickle cell disease so the children's children may be at risk of having the disease.



ResultsPlus Examiner Comments

This candidate has only be able to access the first band of the mark scheme as they have not provided a correct Punnett Square; however they have stated one piece of correct information in their explanation (carrying comment).

The answer is communicated well with little occurrence of spelling errors or grammatical inaccuracies.

Score: 2 marks

Question 6 (a) (ii)

This item focuses upon specification point 3.21 and asks the candidates to state how acid rain is formed. This is an application style item that aims to give candidates an opportunity to display their knowledge of pollutants in another, more chemical, topic area. Candidates have scored well on this item with the identification of the pollutant sulfur dioxide that is released into the air / atmosphere. The marking point "mixes with rain / dissolves in rain" was also seen on many occasions. However, marking point 4 was largely unseen.

(ii) Describe how acid rain is formed. (2)

When fossil fuels or coal is burnt it releases the gas sulfur dioxide this then reacts with water vapour causing the water to become acidic therefore the rain is acidic.



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Examiner Comments

This candidate scored both marks available for stating that the pollutant is sulfur dioxide and that this reacts with the dissolved water vapour. This answer is well thought out and concise.

Score: 2 marks

(ii) Describe how acid rain is formed. (2)

Acid rain is formed from pollution from things like fossil fuels which burn off into the clouds and when it rains acid rain will form.



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Examiner Comments

This is a fairly weak answer but it credit worthy due to fact that the candidate has stated that the pollution will be released into the clouds. This is the limit to what would have been credible for this item.

Score: 1 mark

Question 6 (a) (iii)

This item focuses upon specification point 3.21 and asks candidates to suggest the damage that acid rain can cause to an environment. There was scope here for candidates to suggest many effects of acid rain, but the main suggestions were the damage to plant life, aquatic life and the demise of carbonate structures, all of which were acceptable.

(iii) Suggest **one** effect acid rain has on the environment.

(1)

It can cause buildings/houses to erode/wear-
away.



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Examiner Comments

This candidate has used the correct chemical terminology to state that buildings can be eroded due to the presence of acid rain.

Score: 1 mark

(iii) Suggest **one** effect acid rain has on the environment.

(1)

It can pollute rivers causing fish and other
creatures which live there to die.



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Examiner Comments

This was a more typical answer conveying the fact that fish will die if acid rain pollutes a river. The candidate has expressed the effect well and descriptively.

Score: 1 mark

Question 6 (b)

This item focuses upon specification point 3.24 and asks candidates to identify how an environment could be analysed and to provide an example. The use, specifically, of the word "indicator" was required to secure the first marking point. It was decided that the comment "see what lives there" was out of context and not credit worthy. The inclusion of examples of indicator species were also required for marking points 2 and 3.

(b) Explain how the quality of a river can be monitored by studying the organisms present in the water.

(2)

You can use indicator species for example if there is fresh shrimps in an lake it means it's not polluted but if there are blood ~~leaves~~ ^{worms} in a lake it means it's polluted.



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Examiner Comments

This example highlights that one would use an indicator species (this is marking point 1) and also states that the abundance of freshwater shrimps would provide evidence for a clean area whereas the bloodworm's presence suggest a polluted lake. This candidate scored full marks.

Score: 2 marks

(b) Explain how the quality of a river can be monitored by studying the organisms present in the water.

(2)

Because if they are healthy organisms in the water it means the water is healthy but if there is unhealthy organisms it means the water is unhealthy.



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Examiner Comments

This is an example of where a candidate has not been specific with their comments and suggested that organisms that are healthy would show that the area is also healthy. This was too vague and thus not credit worthy.

Score: 0 marks

Question 6 (c)

This item focuses upon specification point 3.22 and asks candidates to supply an account of eutrophication and how it can affect the environment. Candidates were asked to comment upon how eutrophication occurs and the problems that follow. The mark scheme, again being indicative, allowed candidates to make a comment about either eutrophication occurrence or eutrophication problems for level 1. Candidates who made more effort with their comments (two correct comments on either eutrophication occurrence or eutrophication problems accessed level 2. Level 3 was only accessed by candidates who showed a detailed explanation of both eutrophication occurrence and eutrophication problems.

It was seen that many candidates' answers lacked any comment on decomposers being responsible for the anoxic conditions. It was pleasing to see, however, that many candidates scored well on the more basic elements of eutrophication.

*(c) Eutrophication can cause problems in an aquatic environment such as a lake.

Explain how eutrophication occurs and the problems it can cause in an aquatic environment.

Some plants will grow very big⁽⁶⁾ and will block the sun light for the small plants which means they will die. After they die bacteria will feed on the dead plants. Bacteria will take oxygen so ~~so~~ fishes will die because there will not be much oxygen.



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Examiner Comments

This candidate has scored 4 marks as they have only made comments about the problems associated with eutrophication, rather than also adding comments about its occurrence. There have made five correct statements on the problems (plant growth, sunlight blocking, bacteria feeding, oxygen use, death of fish) and have communicated very well, consequentially and with good use of spelling and grammar.

*(c) Eutrophication can cause problems in an aquatic environment such as a lake.

Explain how eutrophication occurs and the problems it can cause in an aquatic environment.

(6)

Eutrophication is when too much fertiliser is applied to a plant & the fertiliser washes into the rivers & seas. The fertilisers affect the plants causing a rapid growth of algae. ~~Micro-organisms then begin to form.~~ This leads Plants start to grow which means more competition for sunlight. Plants then start to die resulting in a rise in micro-organisms which then leads to competition for oxygen between the decomposers & the animals present. Animals then will start to die due to lack of oxygen-Suffocation. Rapid Growth. Rapid ~~decease~~ death. Rapid decay.



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Examiner Comments

This candidate has secured all 6 marks as they have stated both the eutrophication occurrence and eutrophication problems with good detail, spelling, grammar and communication. Every point of the indicative content mark scheme has been highlighted to some extent and this is considered to be a very impressive answer at foundation level.

Paper Summary

In summary, it is clear that candidates have taken advice from the examiners' reports from previous series, as common misconceptions seem not to be highlighted so largely. This paper has been written to allow access to a range of biological processes; to allow candidates to explore all elements of the biological world and to provide the opportunity to show what they know and have learned. It is evident that candidates enjoy the suggestion items and the more factual items, but do not always score well on the ecology elements and pyramid topics.

It must be remembered that any topic from the specification can be asked, but there are common themes also requiring revision by candidates.

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