

# ResultsPlus

Examiners' Report  
June 2011

GCE Biology 6BI04 01

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at [www.edexcel.com](http://www.edexcel.com).

If you have any subject specific questions about the content of this Examiners' Report that require the help of a subject specialist, you may find our **Ask The Expert** email service helpful.

Ask The Expert can be accessed online at the following link:

<http://www.edexcel.com/Aboutus/contact-us/>

Alternatively, you can contact our Science Advisor directly by sending an email to Stephen Nugus on [ScienceSubjectAdvisor@EdexcelExperts.co.uk](mailto:ScienceSubjectAdvisor@EdexcelExperts.co.uk).

You can also telephone 0844 576 0037 to speak to a member of our subject advisor team.



## Get more from your exam results

### ...and now your mock results too!

ResultsPlus is Edexcel's free online service giving instant and detailed analysis of your students' exam and mock performance, helping you to help them more effectively.

- See your students' scores for every exam question
- Spot topics, skills and types of question where they need to improve their learning
- Understand how your students' performance compares with Edexcel national averages
- Track progress against target grades and focus revision more effectively with NEW Mock Analysis

For more information on ResultsPlus, or to log in, visit [www.edexcel.com/resultsplus](http://www.edexcel.com/resultsplus).

To set up your ResultsPlus account, call 0844 576 0024

June 2011

Publications Code UA027477

All the material in this publication is copyright  
© Edexcel Ltd 2011

## Introduction

This paper contains a variety of question styles which demand the full range of assessment objectives. Some answers are straightforward testing knowledge and understanding. However, the demands of this paper will require candidates to apply knowledge in situations where they may be presented with data and information which may be unfamiliar. This means that these questions will require careful reading. There was no evidence that the time allocation for this paper was insufficient. Most candidates completed all sections of the questions. There were very few sections where no attempt had been made.

On most of the questions where longer answers involving discussion or explanations, the full range of marks was used. There were very few occasions where available mark points were never awarded.

An important aspect of this A2 unit is the expectation that knowledge and understanding from the AS units can be used. Candidates should be reminded of this. It was noticeable that on some of these questions, where the required answer was straightforward, many candidates were unable to give precise, accurate answers. This applied equally across the range of ability. Indeed it has meant that some of the candidates who performed well on the more demanding questions have not necessarily achieved an overall mark which reflects this.

At this level, HSW is an important component of assessment. This means that many questions will be based on the use of data. It also means that questions will be set where candidates must evaluate or comment on how scientists use or consider ideas. During revision, it is advised that candidates use past questions to practise this type of question. It was noticeable that the use of vague or inaccurate terminology meant that, on some questions, credit could not be awarded. In addition to this, many candidates include repetitive or reworded comments in their answers. Some examples are given in this report of this type of answer.

In this report comments on the achievement on individual questions have been given together with examples where appropriate.

### Question 1 (b) (i)

This question proved to be more discriminating than was expected. The majority of candidates suggested that a graph would be the most suitable format. There was less certainty about which type of graph should be used. Most candidates gained further credit for describing the axes to be used.

- (i) Suggest how these results could be displayed in order to compare the effect of temperature on the growth of seedlings of these two species.

(3)

These results should be displayed in a line graph so it is easier to see comparisons. The graph would make it clear whether there is a positive or negative effect ~~effect~~ <sup>or</sup> correlation for both species. In this experiment there would be a positive correlation for both species as temperature increases the ~~ra~~ growth rate.



**ResultsPlus**

**Examiner Comments**

The correct format is clear for 2 marks. However, the question only requires a suggestion for the display of the data. This candidate has given irrelevant information about what the graph might show.



**ResultsPlus**

**Examiner Tip**

Make sure you concentrate on what the question requires. Here more credit could have been gained by describing the axes or suggesting the use of separate lines for each temperature.

### Question 1 (b) (ii)

This part to question 1 also proved to be more discriminating than was intended. Most candidates realised that the investigation was concerned with growth rather than germination and some attempt was made to follow up this concept. All of the mark points were seen but it was relatively rare to see a candidate who gained credit beyond their first idea. The terms accuracy and reliability were often confused with validity or given as part of general lists.

(ii) Suggest why all of the seeds were germinated at 18 °C before being placed in the temperature-controlled rooms.

(2)

Seeds have an optimum temp for germination. ~~without~~  
This is where enzymes work fastest to ~~at~~ speed up  
reactions allowing the seeds to germinate. They also  
need light ~~and light~~ which can create heat.  
Acts as a control.



**ResultsPlus**

**Examiner Comments**

The candidate has gained a mark for the reference to the optimum temperature. However, there is not enough to credit the idea that this will ensure that they germinate. The final statement about a control is too vague.



**ResultsPlus**

**Examiner Tip**

Try not to leave answers incomplete or vague. Here it would be better to give an example of the controlled variable e.g. time taken for germination.

### Question 1 (b) (iii)

Most candidates chose the sea plantain and many were able to follow this with some comment about the faster rate of growth at all of the temperatures. A large number of candidates only referred to differences in the final masses. It was also common for candidates to quote rather than manipulate figures to compare the rates of growth. Where manipulation was attempted, some candidates did not give precise comparisons. Answers such as 'sea plantain grows about 10 times faster' were fairly common. Some candidates attempted to justify a choice of the bog sedge by comments about it being less affected by changes in temperature.

(iii) Use the data in the tables to suggest which of the two species is better adapted for growth at a wide range of latitudes (distance from the equator).  
Give reasons for your choice.

(4)

The sea plantain is better adapted to grow at a wide range of latitudes. This is because they had the highest dry mass over all 3 temperatures. This shows they are more adaptable and better suited to growth in a variety of temperatures.



**ResultsPlus**

**Examiner Comments**

Although this candidate has chosen the sea plantain, the reference to a wide range of latitudes in the first sentence is not linked clearly to the idea of different temperatures in the last sentence. They have also referred to 'had the highest mass' which needs to be more specifically linked to rate of growth.

## Question 2 (a) (i)

This was intended to be a reasonably straightforward question. Most candidates realised that extremes of temperature outside of this range would affect enzyme activity and gained some credit. The better answers followed this up with good details about the effects on the enzyme molecules. Many candidates did not distinguish between denaturation of enzymes as temperatures increase and inactivation as temperatures decrease. Use of vague terminology when referring to metabolic reactions also penalised many candidates.

2 Many scientists think there is a link between global warming and increased levels of carbon dioxide and methane in the upper atmosphere. Most organisms are found in regions where the temperature range is between 0 °C and 40 °C at the Earth's surface.

(a) (i) Suggest why temperatures below 0 °C or above 40 °C would be unsuitable for most organisms.

(2)

Most organisms wouldn't be able to survive as their enzymes wouldn't be able to catalyze metabolic reactions effectively. At temperatures below 0°C it is likely that there isn't enough kinetic energy for the enzymes and substrates to collide. Above 40°C could denature the enzymes.



**ResultsPlus**

**Examiner Comments**

This is a good example. The candidate has stated clearly that metabolic reactions could be affected and has followed this up with explanations related to the two temperature extremes.

2 Many scientists think there is a link between global warming and increased levels of carbon dioxide and methane in the upper atmosphere. Most organisms are found in regions where the temperature range is between 0 °C and 40 °C at the Earth's surface.

(a) (i) Suggest why temperatures below 0 °C or above 40 °C would be unsuitable for most organisms.

(2)

Most enzymes become denatured past 0°C and 40°C therefore if an organism was exposed in these temperatures its internal processes would slow down or stop all together.



**ResultsPlus**

**Examiner Comments**

Here the candidate has linked the idea of denaturation to both lower and higher temperatures. The reference to 'internal processes' is too vague.



**ResultsPlus**

**Examiner Tip**

Be careful about attention to detail and the use of precise terminology. Reference to denaturation of enzymes should only be linked to increasing temperatures. Using 'metabolic' processes rather than 'internal' shows that it is the cell activity that is affected by enzymes.

### **Question 2 (a) (ii)**

The full range of marks was given on this question. Most candidates gained some credit for stating that these gases are involved in the greenhouse effect. There was a reasonable number of excellent answers with precise terminology and detail gaining full credit. Describing the effect of greenhouse gases in the upper atmosphere was expected to be a straightforward and familiar topic to candidates. However, many descriptions lacked clarity or included inaccurate knowledge. Vague statements about carbon dioxide and methane keeping heat in the atmosphere like a blanket were fairly common. It was also noticeable that many candidates are confused about UV and IR radiation and the involvement of ozone.

### **Question 2 (a) (iii)**

Most candidates gained full credit on this question. It should be emphasised that corrections to ticks should be made clearly.

### **Question 2 (b)**

The full range of marks was given on this question and every point in the markscheme was used. It was pleasing to see a large number of candidates who were able to consider more than one reason why scientists might have doubts about the link between global warming and the use of fossil fuels. There were some very good answers where the available evidence from the past and the difficulties of future modelling were considered. Sound references to correlation and causal relationships were seen in the answers by many candidates.

### Question 3 (c)

There were some very good answers to this question where candidates explained clearly how each seral stage would have an effect on the soil which would lead to the possibility of successive communities being able to outcompete them. The full range of marks was given with candidates spread fairly evenly and every mark point was used. Where lower marks were given, it was usually because candidates described rather than explained the changes in the communities.

\*(c) With reference to the information in the table, suggest why the type of plant community growing on a bing changes over time.

(5)

It is because of succession  
→ lichens and mosses are pioneer species that colonise a given area. These species leads to soil development.  
- Grass and small herbs outcompete over pioneer species and start growing. Therefore grass and small herbs existed after lichens and mosses.  
- ~~Then grass and small~~ and large herbs outcompete and start growing after small herbs. That is why the approximate age is greater than small herbs  
- ~~Large trees, small trees~~ shrubs are form climax community by forming constant and self sustaining community. As a result



**ResultsPlus**

**Examiner Comments**

After making the first point about pioneer species, this answer does little more than repeat the idea that successive communities are able to eventually colonise as a result of successful competition. More detail about the effect that each seral stage are needed. If the reference to soil development had been linked with increase in mineral and humus content as the lichens and mosses decomposed, far more credit could have been given.



**ResultsPlus**

**Examiner Tip**

When a questions asks 'why' something happens, make sure you give detailed explanations rather than vague descriptions.

### Question 3 (d)

Most candidates gave the term, climax community, correctly. The ideas that there would be a dominant species and a high biodiversity were also credited for one or two marks in many answers. Explanations for the stability of this community were very varied. Many answers stated that it was stable because it does not change without any further comment.

(d) After 100 years, the community on a bing becomes stable.  
State the term used to describe this type of community and explain why it is stable.

(4)

The climax community is the largest community the environment can support. It has the dominant species that is most abundant and top competitor. It is stable because it will not change, unless the conditions change.



**ResultsPlus**  
Examiner Comments

Although the candidate has named the climax community and referred to a dominant species, the rest of the answer is too vague. Stating that it is stable because there will be no change in the species and being more specific about environmental conditions would have enabled full credit to be given.

## Question 4 (a)

This question was very discriminating. Very few answers were seen where a clear, accurate distinction was made. Full credit was rarely awarded. Confusion of proteins with polysaccharides and nucleic acids was common. Whereas the 3D shape has a special distinction in globular proteins that are enzymes, many candidates stated that fibrous proteins do not have a 3D shape.

- 4 Muscle contraction in mammals involves two fibrous proteins, actin and myosin. These slide over each other to reduce the length of the muscle.

(a) State **two** differences between fibrous proteins, such as actin and myosin, and globular proteins, such as enzymes.

(2)

- 1 Fibrous proteins are insoluble  
Globular Proteins are soluble.
- 2 Fibrous proteins ~~are long~~ <sup>have</sup> a strand like structure, globular proteins have a spherical structure.



**ResultsPlus**  
Examiner Comments

A good example where two distinctions are made clearly.



**ResultsPlus**  
Examiner Tip

Make sure that your AS knowledge is sound on the A2 papers.

## Question 4 (b) (ii)

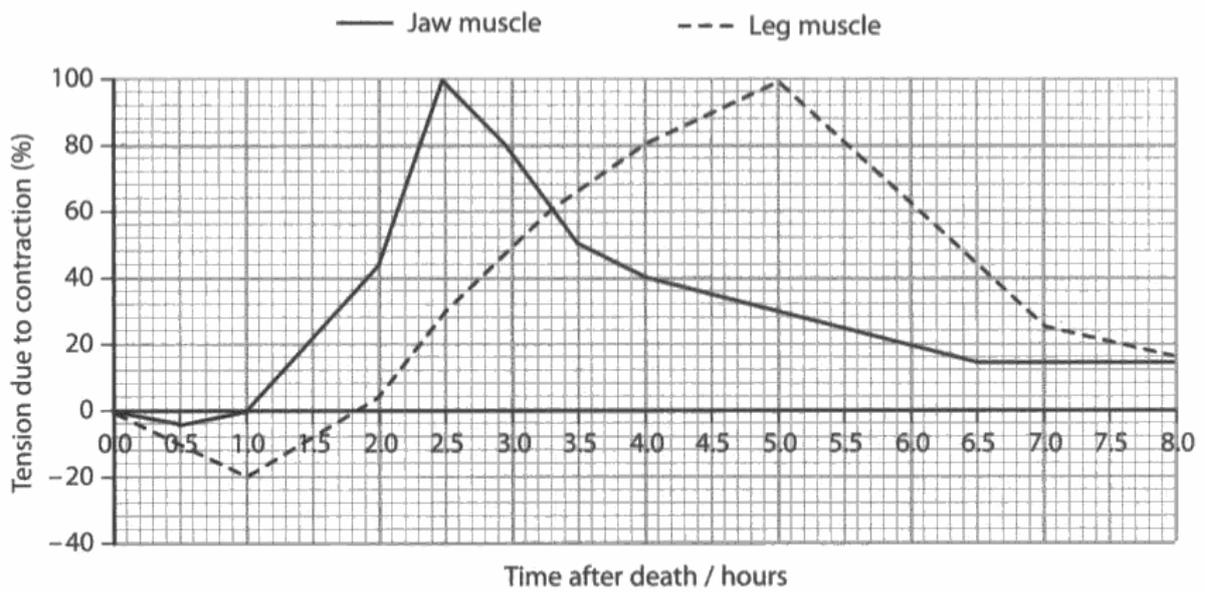
Temperature was the factor suggested by most candidates. Some candidates missed the reference to 'environmental' in the question and gave internal factors. Very few candidates were able to suggest two factors.

### Question 4 (c)

The majority of candidates were able to gain credit by general references to different muscles contracting or reaching full contraction at different rates or times. A large number of these candidates could then give a comparative description of the difference in rate of contraction in the jaw and the leg muscles. Where attempts were made to use data from the graphs, relatively few candidates calculated differences with many going no further than quoting times. Finer distinctions from the data, such as different starting times for contraction or the idea of the jaw muscle relaxing before the leg muscle had finished contracting, were rarely seen.

(c) In an investigation of rigor mortis in rats, the tension due to contraction was measured in leg muscles and jaw muscles at intervals of 30 minutes after death. The tension was recorded as a percentage of the normal full contraction of each muscle in the live animal.

The graph below shows the results of this investigation.



Using the data in the graph, suggest why a forensic scientist would need to consider rigor mortis in several muscles of a body when estimating the time of death.

(4)

A forensic scientist would need to consider rigor mortis in several muscles of a body when estimating the time of death as different muscles have different amounts of tension due to contraction. Looking at the graph the jaw muscle reached 100% contraction after ~~at~~ approximately 2.5 hours and the leg muscle reached 100% contraction after 5.0 hours. This shows that the bigger muscles take a longer time to have 100% tension due to ~~mus~~ contraction.



### ResultsPlus

#### Examiner Comments

A straightforward answer. Reference to the jaw muscle contracting to full tension before the leg muscle can be credited. This would also gain the general point about different contraction rates in different muscles. There is no manipulation of the data or reference to any other difference.



### ResultsPlus

#### Examiner Tip

If you are comparing events at different times, manipulate data to give some indication of the magnitude of the difference. Here subtracting the time for full contraction in the jaw muscle from that in the leg muscle would have gained more credit. Also use all of the information in the graph, such as starting time for contraction or jaw muscle relaxing while leg muscle is still contracting.

### Question 5 (a) (i)

Relatively few candidates were able to give acceptable answers to what was expected to be a straightforward test of knowledge from the specification for this unit. Vague references to competition without any qualification or competition for resources were seen in many answers. Many candidates did not read the question carefully enough and gave ways in which the epidermis is a barrier.

5 The skin has an important role in protecting the body from infection by pathogenic bacteria. Human skin has a community of microorganisms, called the skin flora, living on it. Most of these microorganisms are harmless bacteria that feed on dead skin cells and secretions.

(a) (i) State **two** ways in which the skin flora can help to protect a person from infection by pathogenic bacteria.

1 If our competitors foreign bacteria on the skins surface. (2)



**ResultsPlus**  
Examiner Comments

A very vague reference to competition.



**ResultsPlus**

Examiner Tip

Be specific when describing competition between organisms. Give examples such as food or space.

5 The skin has an important role in protecting the body from infection by pathogenic bacteria. Human skin has a community of microorganisms, called the skin flora, living on it. Most of these microorganisms are harmless bacteria that feed on dead skin cells and secretions.

(a) (i) State **two** ways in which the skin flora can help to protect a person from infection by pathogenic bacteria.

1 The skin flora take up space, so there is no room for pathogenic bacteria to stay and establish itself. (2)

2 When pathogenic bacteria gets on the skin, the skin flora compete with the pathogenic bacteria for a place on the skin.



**ResultsPlus**  
Examiner Comments

Although the candidate has qualified the idea of competition, both statements consider this idea.



**ResultsPlus**

Examiner Tip

Try to give separate and clear ideas when asked for more than one example.

## Question 5 (b)

Where candidates concentrated on the use of antibiotics in the treatment of bacterial infections, some credit could usually be given. However, many candidates ignored the fact that antibiotics are not usually able to be effective against viruses. References to the possibility of opportunistic or bacterial infections being more likely was given by a number of candidates. Many candidates then gave vague references to antibiotics 'fighting' 'attacking' or 'treating' these infections which meant that full credit was rare.

(b) Influenza (flu) is caused by a virus.

Sometimes antibiotics are used as part of the treatment for a person with influenza.

Suggest why antibiotics may be used as part of the treatment for influenza.

(2)

To prevent bacterial growth of pathogenic bacteria while the body's immune system is trying to deal with the virus.

Boost the immune response



**ResultsPlus**

**Examiner Comments**

The candidate has recognised that antibiotics are used for bacterial infection but has not been specific. There needs to be a clearer reference to the increased likelihood of a bacterial infection. However, the first sentence does qualify as the equivalent to inhibit bacterial growth.

(b) Influenza (flu) is caused by a virus.

Sometimes antibiotics are used as part of the treatment for a person with influenza.

Suggest why antibiotics may be used as part of the treatment for influenza.

(2)

Influenza may contribute to bacterial infections. ~~therefor~~ for example if the immune levels are low, the person is more susceptible to infections. Antibiotics will help destroy symptomatic bacterial infections and keep the person's immune levels as high as possible. Antibiotics



**ResultsPlus**

**Examiner Comments**

Although the first sentence uses the word 'contribute', the rest of the answer is clear for full credit.

### Question 5 (c) (i)

Most candidates were able to complete the calculation. Very few candidates could not perform any stage.

### Question 5 (c) (iii)

Most candidates gained some credit for references to the possibility of resistance in bacteria. The potential to pass on resistance genetically was only given by a few candidates. MRSA as an example was given by a noticeable number of candidates. However, some common confusions were apparent. The use of examples, such as immunity rather than resistance, antibiotics causing the mutations and resistance to antibiotics by patients, were often given in explanations. Some candidates included the idea that resistance to antibiotics by viruses would develop.

(iii) Suggest why health authorities in the USA are encouraging the reduction in the number of prescriptions of antibiotics.

(2)

Due to overuse of the drugs pathogens are now developing an immunity to them which causes the ~~drugs~~<sup>antibiotics</sup> to become ineffective overtime.



#### ResultsPlus Examiner Comments

The use of the term 'immunity' and the vague reference to 'pathogens' do not qualify for any credit.



#### ResultsPlus Examiner Tip

Do not confuse antibiotic resistance in bacteria with the term immunity. Avoid using vague terms such as 'pathogens' when a more specific reference is needed.

(iii) Suggest why health authorities in the USA are encouraging the reduction in the number of prescriptions of antibiotics.

(2)

There is an evolutionary war between antibiotics and low level pathogenic bacteria. Bacteria are developing resistance against antibiotics as gene mutations occur that ~~make the~~ give them resistance. ~~As the gene is~~ As these resistant bacteria succeed they pass on the gene mutation and a new resistant bacteria evolves. Reducing the use of antibiotics reduces the rate at which ~~gene these~~ bacteria become resistant.

(Total for Question 5 = 12 marks)



**ResultsPlus**

**Examiner Comments**

Although this could have been more concise, the candidate understands this topic.

### Question 6 (b) (iii)

Candidates who have had experience of this core practical were able to score reasonably well on this question. It was pleasing that very few candidates seemed to have no knowledge of the procedure at all. Generally, where full credit was not awarded, attention to detail was needed rather than confusion or lack of knowledge.

(iii) Describe how gel electrophoresis can be used to analyse DNA.

(3)

The DNA is placed into a positively and negatively charged gel with a scale on. The DNA will move one way or the other to show which ~~charge~~ it is more like. The faster or more further it moves the bigger the difference in DNA.



**ResultsPlus**

**Examiner Comments**

Although the candidate seems to know the procedure, there is a general lack of detail.

(iii) Describe how gel electrophoresis can be used to analyse DNA.

(3)

Collect DNA sample, use the PCR (polymers chain reaction) to amplify the DNA samples. Take a ~~the~~ sample and place in a well slab with gel on top of it so, that with electric current the short fragment of DNA move further away from the ~~positive~~ negative electrode. Then compare the bands of the sample ~~and~~ in the slab and the one with fluorescent light (UV light) compare and analyse the DNA.



**ResultsPlus**

**Examiner Comments**

Although some details are not quite clear, there is enough to show the candidate has a clear knowledge of the procedure.

## Question 6 (b) (i-ii)

(i) Candidates who recognised that the sequence for the chimpanzee and human indicates that these two species are more closely related to each other than they are to the orang utan or gorilla, tended to score reasonably well. Further marks were usually gained by pointing out the differences in the other two sequences or by giving the likely rank order of the ape relationships. The full range of marks was given. Many candidates misread the data. A noticeable number of candidates made general and vague references to the relationship between humans and apes rather than to the specific examples.

(ii) The most common mark given was for a reference to the closeness of a relationship being indicated by similarities in DNA. Very few candidates made the link between DNA and genes that code for proteins.

(b) (i) Using the data in the table, suggest with reasons what conclusions scientists might make about the ancestral relationships of humans and apes.

(4)

Humans are quite closely related to apes since they have very similar DNA. <sup>in their bones</sup> Chimpanzees are the most closely related since they share the same <sup>1st</sup> 20 amino acids. Orang utans are the next closely related, with one different amino acid. Gorilla's have the furthest related ancestry with 2 different amino acids.

(ii) Suggest how DNA analysis could give further evidence for their conclusions.

(2)

The closer the <sup>total</sup> DNA is in similarity, the less time since the species evolved away from each other, and the more closely related the species are.



### ResultsPlus Examiner Comments

In part (i), the answer is straightforward and just satisfies the maximum mark, it does not actually state the differences from the table. Doing this would ensure the marks where doubtful descriptions cannot be credited. In part (ii), there is a clear statement about the similarity of DNA from closely-related species.



### ResultsPlus Examiner Tip

Refer to the data as much as possible to guarantee credit.

### **Question 7 (a) (i)**

Most candidates were able to draw structures that could be recognised as grana. Only candidates who labelled those structures alone, or who annotated to indicate which structures are involved in light-dependent reactions, could gain full credit.

### **Question 7 (a) (ii) 1**

Most candidates gave a correct response.

### **Question 7 (a) (ii) 2**

Most candidates gave a correct response.

### **Question 7 (a) (iii)**

Most candidates gained full credit.

### **Question 7 (b) (i)**

Although understanding of the information and data can be judged in the response for 7bii, many candidates did not follow the instructions in the question and used more than one tick in each column. There were more correct responses for *Schizymeria* than for *Ulva*.

### Question 7 (b) (ii)

This question asked candidates to use the data in the table. Candidates who compared the rate of photosynthesis in each seaweed at different wavelengths with the rate for that seaweed in red light, usually scored two marks. Further credit was gained by some who could relate the best wavelength for photosynthesis in each weed to the place where that wavelength was likely to be available during submersion. Although comparisons between the seaweeds were not required, many candidates attempted these and their answers became overcomplicated and confused. Many answers stated that the data show that the absorption, rather than the rate of photosynthesis, was higher or lower in certain wavelengths even though there is no data for absorption. However, credit was gained by some who stated that red seaweeds will reflect red light or that green seaweeds reflect green light. This question required careful reading and understanding.

(2)

Submerged	Position on shore	<i>Ulva lactuca</i>	<i>Schizymenia dubyi</i>
Short -	Top of the shore		✓
	Middle of the shore		
Long -	Lower down the shore	✓	
	All regions		

(ii) Give reasons for your answers.

(4)

*Ulva lactuca* is a green seaweed, meaning it reflects green light, and this is the type of light it uses least during photosynthesis. Also *Schizymenia dubyi* is a red seaweed so it reflects red light, and absorbs green light, and green light is the light it uses most of during photosynthesis.



**ResultsPlus**

**Examiner Comments**

The candidate has used the information to make a comment about the rate of photosynthesis in each of the seaweeds. There is also a reference showing understanding of why a pigment is red or green.

Position on shore	<i>Ulva lactuca</i>	<i>Schizymenia dubyi</i>
Top of the shore	✓	
Middle of the shore		✓
Lower down the shore	✓	✓
All regions	✓	✓

(ii) Give reasons for your answers.

(4)

The fastest rate was for the red wavelength; therefore this must have been in the deepest water: Both absorbed the ~~most~~<sup>most</sup> here.

The *S. dubyi* absorbed most in green wavelength there for as green is after yellow on a light spectrum it must have been in the middle.

*Ulva L* absorbed more than *S. dubyi* in blue; this is at the other end of light spectrum therefore must be lower shore. All absorbed light.

(Total for Question 7 = 12 marks)



### ResultsPlus Examiner Comments

A very confused answer. The candidate has not realised the significance of the rate shown for red light. They have also referred to absorption rather than rate of photosynthesis.

### Question 8 (a) (i)

Most candidates gave an acceptable response.

### Question 8 (a) (ii)

Most candidates gave an acceptable response.

### Question 8 (a) (iii)

Most candidates gave an acceptable response.

### Question 8 (b) (i)

The full range of marks was given. Most candidates referred to changes in base and/or DNA with the better ones giving a full definition.

### Question 8 (b) (ii)

Candidates who concentrated on the rapid mutation rate leading to new strains of HIV developing tended to gain further credit. Many answers were general accounts of resistance to various drugs rather than to a particular drug. References to the value of use of a mixture of drugs being used in the treatment was only considered by a few candidates. Immunity was confused with resistance by a number of candidates.

(ii) Suggest why effective treatment of HIV in human populations will require the continual development of a mixture of many new drugs.

(4)

: HIV when reproducing it can form many new strains of HIV in a short amount of time.

• As a consequence mutations increase and most likely for a resistance to a new drug.

• This can mean very quickly a HIV strain cannot be affected by antibiotics



**ResultsPlus**

Examiner Comments

Although this answer is brief, it covers several points clearly. There are references to a rapid reproduction rate, the formation of new strains and the likelihood of resistance to a particular drug.

(ii) Suggest why effective treatment of HIV in human populations will require the continual development of a mixture of many new drugs.

(4)

As the mutation rate in HIV is very high it mean that drugs that were once effective begin to become less effective as a new mutation becomes more prevalent. This means that new drugs will need to be continually developed in order to keep up with the rate of mutation in HIV. If new drugs are effective in killing many of the virus's it may slow down the rate of mutation allowing more effective drugs to be made.



**ResultsPlus**

**Examiner Comments**

Although this answer reads well, only a reference to a rapid mutation rate can be credited.

## **Paper Summary**

Overall the paper allowed most candidates to demonstrate their knowledge and ability in most areas of the unit that were assessed.

As in previous years, candidates who have prepared carefully with reference to previous papers, the specification and available resource material and who read questions carefully, tend to write concise and accurate answers to achieve high marks. However, it is a concern that relatively few candidates are able to maintain a high level of achievement throughout all sections of the paper.

## **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>

Further copies of this publication are available from  
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467

Fax 01623 450481

Email [publication.orders@edexcel.com](mailto:publication.orders@edexcel.com)

Order Code UA027477 June 2011

For more information on Edexcel qualifications, please visit

[www.edexcel.com/quals](http://www.edexcel.com/quals)

Pearson Education Limited. Registered company number 872828  
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Ofqual  
.....



Llywodraeth Cynulliad Cymru  
Welsh Assembly Government

