Version 2.0 22/08/2012

General Certificate of Secondary Education

Science A 4405 / Biology 4401

BL1HP Unit Biology 1

Report on the Examination

2012 examination – June series

Further copies of this Report are available to download from the AQA Website: www.aqa.org.uk

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334).
Registered address: AQA, Devas Street, Manchester M15 6EX

Science A / Biology
Higher Tier BL1HP

General

This was the first summer series of the BL1 examination. Many students had clearly studied the January paper and had hoped to learn from it. There were times though when the responses they gave would have answered the questions in the January paper, but were not correct for these questions.

Many students came well-prepared for the examination, yet there was a significant minority who were clearly unprepared or lacked the knowledge and skills required at Higher Tier. These students, who achieved less than ten marks out of the sixty, would clearly have been better served by entering the Foundation Tier examination. There appears to be a widely held belief that 'it is easier to achieve a grade C on the Higher Tier paper, than on the Foundation Tier paper'. This is not so and furthermore the low confidence with which they will have left the examination room may well have had an impact on other examinations they would have taken in this session.

Students are reminded that the use of black ink or ball-point pen is a requirement. There were far too many responses that created difficulty for examiners by being too faint. Poor writing let down some students, as even with two or more examiners looking at the script, it was impossible to decipher what had been written. Schools are reminded that the use of scribes is permitted. Furthermore some students sat this examination as an on-screen test. This report covers the on-screen test as well as the written paper.

The instructions on the front of the paper indicate that students should not 'write outside the box' around the questions. This instruction is repeated on every page. Unfortunately some students choose to ignore this instruction and there are times where this was done to such an extent that part of the answer cannot be read and thus could not gain any marks. Unless a continuation goes no further than a line beyond the printed lines students are advised to use additional pages. These pages should be labelled with all the relevant student details as the pages are separated from the rest of the script at the scanning centre. Students must indicate on the script when an answer has been continued on additional pages.

There are essential issues that students should concentrate on during the examination. The most significant of these is the need to carefully read the question and then answer what has been asked. Students should pay attention to the command words in the questions, particularly 'explain' and 'describe'. Students often confuse these words and this may have cost a considerable number of marks throughout the paper. Guidance on the use of command words used in Science examinations can be found in the Science area on the AQA website under the heading 'Command Words for GCSE Science'.

Some examiners also noted that there was an increase in the number of students who repeat the question as a preamble to their response. Not only is this a considerable waste of time, it will also mean that students need to continue their response on additional paper, or simply omit significant points in their answer. The number of lines printed on the paper should be more than sufficient for students with even the largest writing to fit in a full and complete response.

Question 1 *(Standard Demand)*

(a) Was a fairly straightforward introduction to this question about pain-killing drugs. The majority of students appreciated that these drugs 'do not kill pathogens' or that they '*only* reduce pain'. Weaker suggestions which were considered unacceptable without further qualification included phrases such as 'they are not strong enough to kill bacteria', implying that stronger pain-killers would do this. The reference to 'disease' or 'infection', rather than 'pathogen' or a named pathogen in this part and throughout the question was not credited. Weak alternatives to 'kill / destroy' were sometimes employed, for example 'attack', 'target' or 'remove' and these too were not credited. Students should practice using the correct terminology whenever possible.

(b) Some students appeared to be confused in this part, failing to recognise that the question was about the groups of volunteers, rather than the trials and suggested factors that should be matched once the trials had begun. Thus answers such as 'they should all feel the same decrease in pain' or 'take the same time to feel better' were clearly incorrect, while others believed that the 'temperature of the room' or 'light intensity' might be vital controls. The two most common correct answers were 'age', which could be all the same age (group) or the same age mix, and 'amount of pain' this being taken to mean the extent of pain at the beginning of the trial. There were few references to other medication that the volunteers may be taking.

(c) (i) It was evident that a considerable proportion of students misread or misunderstood the label on the y-axis, as the number of students who gave '25' rather than '75' was high, their figures were relatively rare, showing that at least the correct line and correct time had been chosen. These students had clearly taken the scale to represent the amount of pain reported by the volunteers, rather than its decrease. This might well have been expected to have had an impact on the responses for parts **(c)(ii)** and **(c)(iii)**, but oddly this was not usually the case.

(c) (ii) Most students could see that **A** was faster acting, and many went on to refer to the correct time period. Others simply stated that '**A** acts quickly' and were denied the mark as the question demanded a comparative answer. A number of students simply stated that '**A** is more effective' or 'relieves more pain' and did not appreciate that it was necessary to indicate that this was only in the initial stages or first hour and three-quarters.

(c) (iii) The majority of responses identified the greater and longer lasting pain relief of **B**. However, some simply stated that '**B** is better' or '**B** works the best' with no indication of which particular property of **B** makes it better than a students who suggested that 'Drug **B** is more effective (as a pain-killer)' did not gain credit unless they specified an appropriate time. A few students thought that the graph referred to percentages of people and wrote answers such as 'within an hour of taking drug B there are fewer patients in pain', which were not credited.

(d) Most students disagreed with the pharmacist's advice with some suggesting that s/he should be sacked, or worse. However, whether the advice was supported or not had little bearing on the marking of the question and was only a means of eliciting positive and / or negative explanations. Some students chose to give only supporting explanations; some chose the opposite tack and others gave a mixture of for and against arguments. All of these different approaches were acceptable. The suggestion that the mixture of drugs could result in 'side effects' was insufficient as all drugs cause side effects to some extent, further qualification was required here with reference to 'new' or 'more' side effects. Students could tackle the supporting evidence in terms of the effects of each of the drugs separately or their potential combined effect. Thus in the mixture drug **A** gives 'rapid pain relief', but the combination of **A** and **B** would be likely to give 'more rapid pain relief' than drug **X**. Those students who only suggested that **A** and **B** together would give the same pain relief as **X** were not credited as the graphs show no evidence for this equality at any point.

Question 2 *(Standard Demand)*

(a) Many students correctly identified both processes **X** and **Y**. 'Decomposition' or its equivalent was seen much more often than 'respiration' for process **X** and 'combustion' was the more common of the alternatives for process **Y**.

(b) Students were asked to interpret a carbon cycle diagram in terms of the part played by algae and their interaction with the atmosphere, animals and microorganisms. The diagram shows four of these interactions and correct description of any three of these

would each have gained full marks. There were a large number of very good responses showing good understanding of the processes involved. It was clear however, that a significant minority did not seem to have heard of algae or had little understanding of the carbon cycle, and so were unable to describe any sensible interactions. Responses such as 'algae turn into microorganisms (in the air)' and 'algae get energy from the air' were seen. It was disappointing that those who had not heard of algae did not recognise that algae were playing the same role as plants in cycles they should have been familiar with. There was much imprecise language leading to 'microorganisms eat algae' or in a few cases the reverse! Many knew that the algae interact with the atmosphere during photosynthesis and respiration but there was, in many cases, confusion as to whether carbon dioxide was absorbed or released and a few included both in the same process. Clearly in order to make the answer fill the lines available many students expanded the discussion on respiration and photosynthesis to include an irrelevant account of the use or emission of oxygen and / or energy, often with confusion as to whether energy is used or transferred.

(c) Students were expected to identify the reasons why process **X** is much faster in a tropical rainforest than in most other habitats. 'Warmth' and 'humidity' were popular, correct responses but some students included 'many microorganisms' and 'much material to decay' which were also both creditworthy responses. A small minority correctly realised that the warmth enabled faster enzyme activity. Commonly there were vague responses such as '...has the right conditions' or 'is more suitable' neither of which earned any marks. Less able students described animals using the oxygen produced by the many trees and often included reference to other parts of the carbon cycle, with combustion featuring highly in these responses.

Question 3 *(Standard Demand)*

Those students who did not get any marks at all for this question had usually misread or had only half read the question ignoring the requirement to confine responses to avoiding 'predation' and thus focussed just on the 'adaptation'. Thus there were many answers on the adaptations of plants and animals to heat and cold, deserts and the Arctic and also to genetics and natural selection. Much of this contained sound biology, but was totally irrelevant here. Students who launched into descriptions of every adaptation they had ever heard about achieved Level 1 answers almost by chance as they happened to mention camouflage or thorns in their descriptions.

Students offering Level 1 answers usually either gave very basic descriptions of adaptations, the most common being camouflage. Many of these referred to arctic environments, and the white fur of polar bears, arctic foxes or arctic hares. A small number then went on to discuss how the bears' camouflage allowed them to hunt, rather than avoid being hunted. However they failed to explain how white fur increases the chances of survival, by 'making them less likely to be seen by predators'. A few students gave very clear accounts of camouflage, and other defence mechanisms in animals, but completely ignored plants, despite the direction in two of the three sentences in the question. Cacti were by far the most commonly quoted plant, reference to spines often being mixed in with a general account of how cacti survive in the desert. Answers based on plants alone were very rare. There were many other examples, chameleons, were quite common, as were desert animals, camels being frequently quoted. The number of students who believed that plants were green in order to 'camouflage themselves with the background' was surprisingly high.

Level 2 answers were along similar lines, but the explanation of the mechanism was better, and animals and plants were included in the answer. There were a number of students who just managed to get into this range by giving numerous descriptions, then, almost accidentally it appeared, giving a clear explanation of a mechanism. Camouflage in polar bears and camels, and spines in cacti again formed the basis of most answers. There was more variety in these Level 2 answers, warning colouration and mimicry becoming more frequent, though the explanations of these were rarely clear, wasps, bees, and tree frogs were the more common examples used. Students should be aware that the colouration does not in itself provide

warning, it is necessary for the potential predator to have some previous experience of the consequence of attempting to eat an animal or plant with these colours and learning from this experience.
Level 3 answers were not very common, but there were a few extremely well-written accounts, with numerous named examples clearly explained. Once again, polar bears, camels, and cacti were well represented, but these answers reflected a wider knowledge of a greater range of adaptations.

Question 4 *(Standard / High Demand)*

(a) Students were asked to name two variables that should be controlled during an investigation into tropisms in plants. Several different choices were possible and many students gained both available marks. The most common correct responses referred to light intensity, species or type of plant and volume of water provided. References to the 'amount of light / water' were accepted as equivalent to light intensity and volume of water, respectively, however students should always be encouraged to use appropriate scientific vocabulary whenever possible. Other creditworthy answers that were seen included age or size of shoots, temperature and soil type. Suggestions such as 'time', 'direction of light', 'type of box' and 'black plastic used' gained no marks. Students should always be as specific as possible in answers – responses such as 'type of conditions' and 'surroundings they are grown in' were clearly weak and gained no credit.

(b) Many answers to this part were excellent and displayed a sound understanding of tropisms. Explanations such as 'more auxin is found on the dark side and this causes the cells here to grow' were succinct and accurate, gaining all four marks in one sentence. Despite this students often then felt the need to elaborate or repeat in order to fill the space provided. Some students, however, were a little less certain of their ground. 'Hormone' was an acceptable alternative for 'auxin' but a variety of other, incorrect terms were used as well, including 'enzyme', 'oestrogen', 'aphid', 'atom', 'axon' and 'toxin'. Many picked up the idea of unequal distribution of the hormone but then gave the wrong side or described it as 'going down to the root', often 'sinking due to gravity'. Some hedged their bets and just said it was found on 'one side'. When writing about the effect of the hormone, students gained credit for terms which clearly implied 'growth' such as elongation or cell division but not for weaker references like 'bending' (which was in the question stem), 'leaning', 'tilting' or 'stretching'. Some students had clearly revised tropisms in terms of geotropisms of shoots placed horizontally. These students often discussed 'auxin concentration increasing on the lower side' or the effects of gravity on the movement of auxin, thus failing to apply their knowledge to the particular situation presented in the question. Students were asked to 'explain *how*' not to 'explain *why*' the plant responded in this way. Weaker students continue to misinterpret questions and, consequently, fail to gain credit. Quite a few, therefore, answered in terms of the shoot bending towards light 'for more photosynthesis' and failed to address how this had happened.

(c) (i) Students were asked to draw conclusions from the results about the detection of the light stimulus. Quite a few, however, answered only in terms of the response by the shoot while some discussed the advantages of this response to the plant. A number of students also appeared to have misread "detection" and described the 'direction' of the light stimulus. Credit was given to any reference to the tip or top of the shoot detecting the light but not to 'the part where the response occurs' or 'the side facing the light'.

(c) (ii) Students were directed to identify a 'part of the shoot'. Most did this and there were many correct answers. However, it was clear that having decided that 'the tip' was their answer here, many students went back to part **(c)(i)** and crossed out the correct answer, presumably thinking that the two could not be the same. The mark scheme to this question was quite generous, allowing virtually any reference to a region in the

upper half of the shoot and many gained the mark here as a result. Incorrect ideas ranged through all other parts of a plant - even seed, stigma and stomata. Some students, again, misread the question - in this case the key word 'where' - and answered in terms of 'when' or 'how' instead.

Question 5 *(Standard / High Demand)*

(a) This part required students to identify which part of a vaccine stimulates the body's defence system. The ideas that a 'pathogen' is involved and that this is 'dead' or 'inactive' were required for two marks. Alternatives such as 'bacterium', 'virus' or 'microorganism' were acceptable alternatives for 'pathogen' but weaker references to 'germs' or the 'disease' commonly seen were not. Similarly, students who identified the importance of the 'antigen' or 'protein' on the pathogen picked up the first mark. Many answers were excellent but others were either too vague, e.g. 'a small dose of the disease', or simply incorrect. A number of students, usually having gained both marks in the first line of their response, clearly saw the need to fill up the rest of the space and went on to describe how the vaccine triggers the immune response but could, of course gain no additional credit.

(b) This part discriminated well on two levels. Firstly between students who had read the question properly and those who had not and secondly between those who knew the response to re-infection and those who had only vague ideas. Students were asked to explain why a person who had been vaccinated against measles would not catch the disease when they came in contact with the pathogen later on. A considerable proportion of students used up most of the available space describing the primary response to the vaccination, including details about white blood cells, antibodies and the destruction of the inactive pathogen. They only gave a brief 'so the body knows what to do next time' in the last couple of lines. These students had clearly not recognised that the question was asking for details of the secondary response and frequently gained no marks at all. Three points were required in relation to the secondary infection, 'that white blood cells would produce antibodies', that these 'antibodies would be produced quickly' and that they would then proceed to 'destroy the pathogens'. Some students understood the process very well and gave excellent answers. Inevitably, some responses were too vague, examples were 'the body remembers so when the disease enters again it won't catch it' or 'because the person is immune to it' or referred to the body's 'defence system' rather than the 'white blood cells' making antibodies; antibodies 'kill measles' or the 'infection' rather than killing the 'pathogen' and 'fights / attacks' the pathogen rather than 'destroys' it. 'Memory' and 'remember' were other words that were often used too loosely. 'Memory cells produce antibodies' was quite acceptable for the first point but 'memory cells remember how to resist the pathogen' was not. Ideas that were obviously incorrect, including the inevitable confusion between antibody and antigen, were also seen. A significant minority of students believed that large numbers of antibodies remain in the blood after vaccination and these were then 'ready to attack the pathogen'.

(b) (i) The first mark was given for appreciating that there are still (live) bacteria in the body after four days' treatment with antibiotics. Students should be encouraged to look carefully at labels on graph axes and to use the specific terms included when answering questions. A surprisingly high number of students quoted an incorrect value for the number of live bacteria; fortunately for them, the examiners ignored specific numbers and looked only for the idea that there were still (living) bacteria in the body. The second mark was for an understanding that these remaining bacteria can then go on to reproduce. Some students failed to pick up on this idea and some, again, failed to gain credit due to poor use of language. Answers such as 'the disease will come back again' or 'the bacteria will grow', which gave examiners images of giant bacteria, were clearly insufficient. Some students focused on bacteria 'mutating' or on the fact that the immune system 'wouldn't be working' but neither of these ideas gained this mark.

(b) (ii) The context of disease being treated with antibiotics continued here in (b)(ii). Marks were awarded for the idea of the antibiotic treatment now being ineffective, allowing these pathogens to then reproduce and increase their population. Students often managed to gain at least **2** marks here, but they sometimes failed to then imply that 'reproduction' would lead to a clear increase in population size, a factor that is obviously relevant to the idea of the new strain "spreading rapidly". Some students discussed methods by which the pathogen might be spread, such as 'via droplets', but as these focused on 'how' rather than 'why', as asked in the question no marks were credited. Others spent time writing about how the resistant strain had emerged in the first instance rather than addressing the question of why the new strain may *spread* rapidly. Language used in answers was often weak and repetitive where students were struggling to express their ideas. Some students had incorrect ideas such as 'the more antibiotics are given, the more resistant the strain becomes', 'they are stronger now and harder to kill with other antibiotics' Others talked about the person's immune system being inefficient either through lack of time or because they had not been vaccinated. These ideas sometimes meant that the first point about antibiotics being unable to kill the pathogens was not gained but this did not preclude the other marks from being awarded.

Question 6 *(High Demand)*

(a) Generated many bizarre suggestions, Suggesting that a relatively high proportion of students had little idea of the Genetically Modified process. This was further compounded by reference to 'zebras' rather than zebra fish and to 'jellies' rather than jellyfish. So confused were some students that descriptions included double fertilisations between gametes from fish, jellyfish and zebras! It was evident that many students had carefully revised the process of adult-cell cloning, which had been the subject of the QWC question in the January examination. And so many explanations involved simply removing the nucleus from a zebra fish egg cell and replacing it with that from a jelly fish skin cell. Those students who recognised what they were being asked to describe were often let down, by weak use of terminology. Genes were often 'removed' rather than being 'cut out' and reference as to how this is achieved, 'by enzymes' was sometimes omitted. The gene was then often simply placed into a (mature) zebra fish. Most students were unaware that the transfer has to be into a zebra fish at an early stage of its development, as described in the specification section B1.7.2e, in order to ensure that the gene will be present in all, or at least most, of the cells in the adult fish. There were frequent references to 'plasmids' in responses, where students were presumably confused with bacterial insulin production. Examiners were sometimes able to award all three marks, despite such errors, providing the essential points had been made. Students were expected to relate their knowledge of the concerns of the use of GM crops to this situation. The question also required focus on the concerns of "scientists", rather than the layman. Although some scientists may well have concerns about the 'morality' and 'ethics' of genetic manipulation, vague responses that did not explain why these concerns might be held were not accepted. Frequent references to 'playing God' or being 'unnatural' gained no credit. Those students who realised that concerns might involve the possible transfer of this gene to other (fish) species, often only got as far as 'transfer to other fish', leaving examiners unsure as to whether this was merely normal sexual reproduction or was indeed between species and thus this mark was rarely awarded. The most frequently awarded mark, here, was the idea that the GM fish might affect food chains, perhaps being selectively consumed by predators as more / less easily spotted by them. Students are not expected to be aware of the size of zebra fish, nor that they are rarely food-fish for humans, so examiners accepted the idea that the GM fish might affect humans, if consumed. The idea that the GM fish might out-compete the non-GM variety, often leading to 'the extinction of the non-GM fish' was often seen, and awarded. Zebra fish, modified in this way are also usually infertile, as a result of difficulties in meiosis, so this idea was also credited. However many suggestions of the

development of 'Frankenstein fish' were also seen. References to the GM zebra fish being able to 'sting people to death' or that the gene would 'cause zebra fish to live in the sea' were far beyond being reasonable concerns of scientists, as would be the idea that this is only one step away from 'cloning humans'. In this question students were expected to identify more than one concern of scientists, however the majority confined themselves to just one idea, as such the award of two marks was rare. At this level students are expected to read the question carefully enough to pick up on "reasons", rather than 'a reason' and / or the availability of "2 marks" for their response.

Question 7 ***(High Demand)***

(a) Students were asked to "describe" changes. A considerable proportion of students decided, instead, to attempt to 'explain' the changes. Many answers discussed the advantages of one particular beak size over another and frequently referred to changes in the size of seeds between the two years. Indeed a significant minority of answers would have gained two or three marks, had they been in response to part **(b)**.

(b) Unfortunately, when these students came to answer this part they often only half answered or came up with alternative suggestions, presumably thinking they had already answered this and so needed a different answer. Slightly more astute students realised their error and now wrote the answer to **(a)** in the space for **(b)** and used arrows to reverse the answer. This is an acceptable way of dealing with errors of this kind, although students must ensure that their intentions are crystal clear, however this technique saves more time than crossing out and starting again. The question required students to describe *both* changes in population *and* changes in beak size and many did this. Weaker students however often omitted reference to population, and concentrated only on changes in beak size. Description of changes to the number of finches with specific beak sizes were ignored as students could not be expected to read values accurately from a chart with no grid. However students ought to have noticed the change to the scale on the y-axis between the two years and recognised that this represents a (large) decrease in population size. Despite this, weaker students often described there being 'more birds with 10mm beaks in 1978', simply based on the relative heights of the bars in the two charts. Many students gained two marks for describing the reduced range of beak sizes in 1978; 'a range of only 8 – 11.5 in 1978' was worth these two marks. Students did not have to quote the units here, but incorrect units were penalised, for example the candidate who described a beak size of '8 metres' clearly had difficulties with scale! The final marking point, referring to an increase in mean / average beak size was rarely seen. Weaker answers such as 'beaks got bigger' were considered insufficient without reference to mean size. Students frequently either omitted any reference to mutation point in part **(b)** or stated categorically that 'changes in seed size *caused* mutation'. This is a clear misconception that students should be encouraged to avoid in future questions of this kind. There was also a considerable number of students who explained why seed size and number had changed or why the population of the finches had decreased. In both cases, students had clearly misread the question, although those who explained the change in population often redeemed themselves by also explaining changes in beak size. Descriptions of the changes in the seeds often occupied the first four or five lines, leaving little space to complete a full answer to the question asked. There were not frequent errors in scale and dimensions by students, with references to 'seeds that were $2.8m^2$', such error are not acceptable at GCSE level especially at Higher Tier. Students were often confused about how the changes were brought about. It was very common for descriptions of 'beaks growing' between the two years, giving the impression that the birds had somehow purposely enlarged their own beaks in some Lamarckian fashion. Despite this many students gained two or three of the marks available, often referring to the relative ability of birds with larger or smaller beaks to feed, leading to their survival or death and the reproduction of the survivors. Descriptions of genes or alleles for large beak being passed on were not common. In this question, it was essential for students to read the

question carefully and this was the critical difference between those students who scored well and those who did not.

Question 8 *(High Demand)*

(a) (i) The 'Mathematical and other requirements' in the specification show that Higher Tier students are expected to understand and use standard form in calculations. It was evident, in part (a)(i), that many students knew how to use this, however the range and variety of calculations shown was great, with relatively few arriving at the correct answer '0.6'. A surprisingly high number who showed 0.6 in clearly laid out calculations, then multiplied this by 100, for a second time and were rewarded with only the one mark for showing the correct initial calculation. Other students omitted to multiply by 100 at all, and again scored only the one mark for '0.006'. Only a very small minority of students gave their answers in standard form, '6×10^{-1}'. The majority of students showed an understanding of standard form, expanding their calculations to include '4 000 000' and '24 000', although the latter was sometimes incorrectly expanded to '2 400'. The most common error here was to invert the calculation, an error which cost both marks, or to carry out the incorrect calculation, such as '4000000 – 24000'.

(a) (ii) Misinterpretation of the diagram, led to many students giving incorrect suggestions. Answers referring to energy being 'absorbed by clouds', 'spreading out around the universe' or 'missing plants' were clearly incorrect as the diagram showed the energy incident on green plants, thus excluding other losses between the sun and the green plants. Consequently there were few 2-mark answers. Some students again offered only one idea when they had been asked to "suggest reasons", rather than 'a reason' along with the added clue of the "2 marks" available. There were a few good answers, most commonly referring to 'reflection from the leaf', 'not being absorbed' by the leaf, being of the 'wrong wavelength' or 'passing through' the leaf. Further misinterpretations of the diagram or the question included reference to losses due to 'animals eating the plants' or 'energy being absorbed by other plants' making it clear that students must be encouraged to take time to read the instructions carefully before they begin their response.

(b) Two of the marks here should have been quite easy to gain. The causes of energy 'losses' through a food chain ought to be well known and understood by Higher Tier students. However, this was by no means the case, as students often failed to focus on the two energy transfers indicated in the question, discussing losses between plants and insects or insects and their predators, which were, of course, not accepted. Students often gave all of the alternatives for the second marking point but then lost the mark by describing energy being 'used' for respiration, rather than being 'released' or 'transferred' via respiration. This is a perennial problem and it is clear that students' language skills or lack of clear understanding continue to let them down. Only a very small minority of students approached the final marking point which required the idea of comparison of the proportion of the uneaten components of the food of the two birds. Some got half way, by explaining that the insect-eating birds were not fully eaten, but only rarely was there any attempt to compare this with the whole insect been eaten by its predator.

Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA website

UMS conversion calculator www.aqa.org.uk/umsconversion