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# **GCSE EXAMINERS' REPORTS**

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**GCSE (NEW)  
BIOLOGY**

**SUMMER 2017**

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**WJEC  
SCIENCE (DOUBLE AWARD)**

**GCSE (NEW)**

**Summer 2017**

**UNIT 1 FOUNDATION TIER**

**General Introduction**

Candidates at Foundation Tier score marks most freely on short answer questions, particularly with objective testing and Cloze comprehension exercises. The number of marks available on these types of question is now considerably less than previously and there are more questions calling for un-cued recall and longer answers. Most candidates at Foundation Tier struggle with extended writing as was evidenced on this paper, where many candidates often appeared hampered as a result of poor language skills and an insufficient body of knowledge and understanding necessary to answer direct questioning. It is for these reasons that almost all candidates had difficulties on several parts of the paper and particularly on the Quality of Extended Response (QER) question, which forms 10% of the marks available.

Throughout the paper, failure to use the comparative term (e.g. 'more/ less', 'higher/highest') frequently resulted in lost marks and many candidates seemed not to consider diagrams given in questions, which often provide substantial clues to the answer. Candidates would be well advised to avoid using the term 'amount' when a reference to a specific measurable quantity, such as volume, concentration or mass is required. The level of mathematical demand is higher on the new specification than previously and poor basic numeracy severely handicapped a substantial proportion of the entry.

Overall there is the impression that many candidates have done little practical work. Many also seem to be insufficiently prepared for the examination.

1. (a) Almost all candidates scored the mark for correctly identifying the instrument shown in the diagram as a microscope, though several other suggestions were also seen.
- (b) Very few candidates were aware of how to calculate the highest magnification of the microscope from the information given in the table. This is an explicit specification requirement. By far the most frequent response was to add up the magnification of each of the four lenses detailed in the table.
- (c) The use of iodine/stain in the preparation of temporary mounts of plant tissue is part of the method detailed in the Specified Practical for this section of the specification. Very few candidates were aware of this. Many candidates suggested that Rhys should add more structures to his drawing.
- (d) Many candidates did recall the function of the nucleus, although analogies to the brain were common and are to be discouraged.

2. (a) Many candidates scored at least one mark, generally for correctly linking lipid to lipase. Very few candidates showed a complete knowledge of the products of digestion. Most answers appeared to be random.
- (b) Almost all candidates correctly matched the enzyme with its substrate.
- (c) (i) The question based on the graph showing the effect of temperature on the rate of reaction was assigned three marks. Almost all scored the mark for pointing out that the rate rises (with increasing temperature) and many went on to add that the rate then falls. Very few picked out the peak/optimum temperature of 35 °C. A common error in this case was simply to state (the peak is) '35' – which did not gain credit.
- (ii) Candidates are asked to use their answer to part (b) to help in their explanation of why a denatured enzyme will no longer work. Several candidates realised that the shape of the enzyme would change and so the substrate would no longer fit but very few introduced the term 'active site'. As a result very few candidates indeed scored both marks. There were many answers simply stating that the lock and key would not work.
3. (a) The ability to work with percentage calculations must now be tested in the low demand section of the paper. This question required candidates to calculate 30% of 1615. Few candidates could do this. The correct answer of 458.5 should then have been rounded up to give the number of people, i.e. 459.
- (b) A large sample size is regarded as being an important element in increasing confidence in the conclusion that can be drawn from an investigation. Very few candidates were able to express this idea. The most common responses were to do with reliability, accuracy or fair testing.
- (c) Many candidates were perhaps thrown by the horizontal presentation of the bars in the chart and could not interpret the data shown. In (i), candidates often simply added all three components (brain, heart and muscles) to give the answer – 3, instead of interpreting the data to isolate the volume (dm<sup>3</sup>/min) supplied to the muscles.
- (iii) A few candidates were aware that the narrow blood vessels in question are capillaries. The most common answer was veins.
- (iv) Many candidates scored two of the three marks available and several correctly picked out all three results of an increased blood volume supplied to the muscles.
- (d) This question is the culmination of parts (a), (b) and (c) above and in particular the release of more energy during exercise. It asks why lack of exercise can result in obesity. The specification explicitly states that excess energy is stored as fat and that excess stored fat leads to obesity. Very few candidates picked up on the cues in the preceding parts of the question nor could they recall the required knowledge and simplistically discussed overeating/ too much fat/ not burning fat. Some realised that fat is stored, which gained one mark.

4. (a) Most candidates scored the mark here by correctly selecting the small intestine as the site of absorption of digested food, though all other labelled parts were also seen.
- (b) This question tested the understanding that only small molecules can pass through the pores in Visking tubing. Many candidates scored at least one mark for correctly applying this understanding to the table in (i) and several went on to point out that only glucose could pass through the membrane (ii). However, the question requires candidates to show their knowledge of the size of both glucose and starch (molecules), which many did not and the idea that there must be pores in the tubing was very rarely seen.
5. (a) Most candidates correctly recalled that cancer is the disease caused by carcinogens
- (b) (i) Plotting points on a grid
- (I) is routinely well done by most candidates and this year was no exception. Considerable care in plotting accuracy was in evidence in most cases and joining the plots
- (II) was also generally well done. While there is a tolerance of +/- half a small square on plotting, there is no tolerance in connecting the plots, with a ruler.
- (ii) Most candidates correctly gave the evidence that there was no immediate effect on the percentage of adults who smoke.
- However, a common error was to equate percentage with number (or amount) of people, which was not credited.
- (iii) (I) Candidates were expected simply to extend their straight line on the grid to give the expected % of adults who will be smokers in 2020. Many candidates followed the instruction and scored the mark. A common error (inexplicably) was to deviate from the straight line, introducing an angle into the line. Others repeated the pattern of the preceding line from 2009 onwards. Many candidates appeared not to understand the wording of the question.
- (II) Many of those who did, confined their answer to a vague response, such as 'the percentage will continue to fall'. Only a very few stated that the prediction was based on the assumption that the rate of decline will be constant (or by 1% each year).
- (iv) There were many acceptable answers seen here as a further step to reduce the percentage of adults who smoke.
- (c) In the new specification, the QWC becomes the Quality of Extended Response (QER) and at Foundation Tier now appears in the Low Demand section of the paper, rather than at Standard Demand, as was hitherto the case. This changed location is significant in as much as the challenge to the candidate is now less demanding than previously. In this case, candidates

were asked to plan an investigation to answer the question: 'Is the breathing rate of smokers different from that of non-smokers?'. The candidates were given 100 volunteers, of which 50 were smokers and 50 were non-smokers. They were told how to measure breathing rate. A bottom band response would essentially involve merely putting the above statements into their own words. Access to middle and top band required candidates to introduce the ideas of a repeat, mean and comparison, plus two factors to keep the same, as was asked for. A large proportion of the entry decided to ignore the question set and to answer an entirely different (and more complex) question, and planned a comparison of the effect of exercise on the breathing rate of smokers and non-smokers. Many others appeared not to understand the question at all and wrote at length on the hazards of smoking and perhaps why these should result in breathing difficulties. Many candidates were severely hampered by very poor literacy and often poor legibility.

6. (a) (i) Many candidates were able to interpret the data as far as realising that stream 1 had a high pollution level but only a very few could correctly assign a pollution level to all three streams.
- (ii) The concept of pollution is poorly known and specifically nitrate pollution, even less so. Thus, commonly seen answers included 'rubbish, plastic and litter' which are not examples of pollution at all and 'factories and cars' which are wrong. The question requires the source of nitrate pollution. Some candidates scored one mark here, usually for either sewage or fertilizer, though very few scored both.
- (b) The indicator of air pollution being sought was 'lichen'. It was rarely seen. Most incorrect answers were drawn from the table of stream dwelling animals, which are irrelevant, or a reference to an organism drawn seemingly at random, such as 'bird' or 'flower'.
7. This question is based on the standard practical for investigating the factors necessary for photosynthesis, including testing a leaf for starch as detailed in the specification.
- (a) (i) Several candidates correctly realised that the requirement for light in the process of photosynthesis was being tested in A but very few were able to progress beyond that. The purpose of sodium hydroxide to absorb carbon dioxide was almost unknown.
- (ii) Very few candidates recognised flask B1 as the control, or how to improve its function as the control. Many suggested adding sodium hydroxide to the control flask and a very popular suggestion was to replace the cotton wool with a rubber bung.
- (iii) Very few candidates had any knowledge of the de-starching procedure or the importance of de-starching the leaves before setting up the apparatus for the investigation. A common response was that the plant would not photosynthesise in the dark.
- (b) Three marks were available for four correct responses. Some candidates scored here, usually for two correct references to water in steps 1 and 3, or one water reference and iodine in step 4. A few candidates scored two marks, and three mark responses were also seen occasionally.

**WJEC  
SCIENCE (DOUBLE AWARD)**

**GCSE (NEW)**

**Summer 2017**

**UNIT 1 HIGHER TIER**

**General comments**

The design of some of the questions on this paper forces candidates to think a little deeper than some of the questions on the legacy papers. Question number 2 (a)(iii) informs the candidates that the plant in the experiment had been kept in the dark for 48 hours. Candidates were asked to explain the reason for this. The almost universal response was ‘to stop photosynthesis’. This is a correct answer but it doesn’t gain credit. We would like the candidate to ask him/herself the question – ‘Why do we need to stop photosynthesis?’ That is, to think a little deeper and always ask why? The answer of course is that stopping photosynthesis for 48 hours forces the plant to use up its reserves of starch – i.e. the reason is to de-starch the plant. Then the candidate needs to explain why the plant is de-starched. There will be many examples of questions on the new double award biology papers where candidates are going to have to think a little deeper in order to come up with the correct answers.

1. (a) (i) Generally well answered with most gaining 1 of the 2 marks available. Stream 2 was the most problematic – slight pollution was often given as an incorrect answer.  
(ii) Fertilizer was the most commonly given correct answer but few candidates gained both marks. Incorrect answers often included cars, oil, petrol and farms. Inexplicably “pollution” was given as a source of nitrate pollution.
  - (b) Poorly answered. Most named an indicator from the chart on page 2 even though the question informed the candidates that these were aquatic indicator species. Only a few candidates named lichen.
- Q2. (a) (i) A Most answered light. Light intensity was not accepted.  
B Carbon dioxide was frequently seen. Carbon dioxide concentration or levels were not acceptable. Neither was CO<sub>2</sub>, Co<sub>2</sub> or CO<sub>2</sub>  
C Chlorophyll was very rarely seen.- (ii) It was hoped that the candidates would realize that Flask B1 was the control for Flask B and that they would understand that a control should differ from the experimental apparatus in one factor only. In fact, Flask B1 differed in two ways. It did not contain a liquid and so the volume of gas it contained was greater than in Flask B. Very few candidates referred to improving the experimental procedure by adding water to Flask B1. Those who did made no reference to adding a volume of water equal to the volume of sodium hydroxide solution in

Flask B. The most common answers related to the use of bungs instead of cotton wool in the neck of the flasks. Some stated that the concentration of the sodium hydroxide solution in Flask B should be increased whilst others stated that equal volumes of sodium hydroxide solution should be added to both flasks. Some candidates mentioned adding sodium hydrogen carbonate to Flask B1 but to gain credit this had to be sodium hydroxide solution.

- (iii) Most answers referred to preventing photosynthesis from occurring – because if this wasn't done "it wouldn't be a fair test". This was almost a knee-jerk answer, there is no light and therefore it must be to stop photosynthesis. Very few candidates referred to the removal of starch and of those that did, the reason was not known.
  - (b) Generally well answered with most candidates gaining 2 of the 3 marks available although there were some disappointing attempts where no marks were awarded.
- 3.
- (a) A surprisingly large percentage of candidates could not name the four trophic levels, with many incorrect answers being given. "Thirty consumers" appeared for tertiary consumers as did "third party consumers".
  - (b)
    - (i) Many gained both the marks available for this calculation. If the answer given was incorrect then 1 mark was available if the correct method of calculation was shown.
    - (ii) Very poorly answered. The relationship between Trophic Level 1 in the pyramid of numbers and in the pyramid of biomass, for the same food chain, is not understood. The most commonly seen incorrect answer was – "because the pyramid of numbers shows numbers and the pyramid of biomass shows weight".
    - (iii) Not very well answered. Where a mark was gained it was for heat or occasionally faeces.
- 4.
- (a) Generally well known but the answer was frequently spoiled by referring to the movement of 'something' or 'things' from a high concentration to a low concentration. Any reference to a selectively permeable membrane in the meaning of the term diffusion negated the answer.
  - (b)
    - (i) Generally well answered although some responses were a little vague as to what was being washed off the outside of the Visking tubing. Some answered to soften the tube even though they were informed (in the list of instructions) that the tubing had already been soaked to soften it. Some suggested that it was washed under running water to "unblock the pores in the tube wall".
    - (ii) Most candidates were familiar with the Benedict's test for glucose and the Biuret test for protein. What candidates were less confident in doing was explaining how glucose was able to leave the Visking tubing but protein could not. Very few candidates discussed the relative sizes of the glucose and protein molecules or the fact that there are pores in the Visking tubing wall. Another knee-jerk response was for some candidates to inexplicably discuss the action of an enzyme in the Visking tubing.

5. (a) The majority of candidates were unaware of the method of calculating the magnification of the microscope. Few could use the term objective lens. Many thought that the answer involved the calculation of drawing size and the difference between size of the specimen and the size of the drawing.
- (b) (i) Only better candidates were able to give phagocyte.
- (ii) Generally the measurement of the line was accurate. The calculation to find how much bigger the drawing was compared to the actual size presented difficulty. The conversion from mm to  $\mu\text{m}$ , or vice versa, was beyond the ability of some of the candidates.
- (c) (i) Very little knowledge of staining was evident. Iodine was mentioned occasionally as was Benedict's solution and 'blue-ink'. When staining was mentioned, the reason for the technique was often stated as 'to see the cells' rather than to see the cells more clearly or to distinguish between different cell types.
- (ii) Generally well answered although some candidates really struggled with the mathematics involved in  $57000 \div 500$ .
- Q6. (a) Generally well answered, with bile duct presenting more difficulty than the pancreas. More often than not the gall bladder was labelled as the bile duct. In questions where the candidates are asked to label structures it is essential that the arrowhead touches the structure and is not left floating in 'mid-air'. It is a very rare occurrence to see the labelling line drawn with a ruler.
- (b) (i) Only the better candidates understood that the amylase had digested the starch. Broken down was accepted for digestion but 'the amylase has cleared the starch' or 'the amylase has made the starch disappear' were unacceptable answers.
- (ii) Most realized that Tube E contained the greatest concentration of enzyme at 2% and this in fact would digest the most starch and therefore produce the greatest clear area around Hole 2.
- (iii) Most candidates knew that boiling would denature the enzyme and therefore it could no longer digest the starch and, that this was the reason for no clear area around Hole 5.
- (c) The need for an experimental control was not known.
7. (a) (i) Generally well answered with most candidates realising it was Paul who was the least fit because he had the lowest fitness index. The answer here had to be comparative. Some candidates seemed a little confused by the fact that the fitter you are the higher your fitness index. Some seemed to feel that this should be the other way around and incorrectly answered accordingly. If time had been taken to read the information provided then they would have realised their error.
- (ii) Better candidates worked out the relationship and gained the mark. Some however seemed to answer by stating the relationship between Heart rate 1 min after exercise and Fitness index – probably because the data for these two columns were adjacent to one another. Careful reading of the question would have avoided this error.

- (iii) I. Calculating the percentage decrease in the heart rates of John and Lucy presented a great deal of difficulty for many candidates as did correctly rounding their answers. Incorrect rounding lost marks.
- II. Most candidates gained the mark by relating the answer to the person with the higher % decrease in heart rate. ECF was accepted here.
- (b) Many candidates struggled to give two relevant factors which should be controlled.
- (c) This question was very poorly answered. The factor that is not known about Paul is his height. It may be that his low fitness index is not related to obesity but to the fact that he is very tall. All sorts of incorrect answers appeared here including “he might be ill”, “muscle weighs more than fat” and he could have “bad breathing”.

Q8. Candidates were required to deal with all the elements of the question:

- naming each of the equations
- explaining when each type of respiration occurred
- referring to any advantages/disadvantages of each type of respiration

A full range of performances were seen in the responses to this QER question; from candidates with scores in the top band of marks to candidates who scored zero or left the question un-attempted.

Most candidates were able to name each of the equations. A common error was for candidates to then go on and talk about the reactants and products of each of the equations. This was not asked for or needed.

Generally candidates were good at explaining when anaerobic respiration occurs and they understood the disadvantages particularly in respect of lactic acid production, oxygen debt and the attendant muscle fatigue. Less was understood about the advantages of anaerobic respiration. They knew that anaerobic respiration occurred in the absence of oxygen but they could not state the advantage of this – in that energy release can still occur even if the blood stream could not supply sufficient oxygen to working muscles.

Candidates were less sure about stating when aerobic respiration occurred – the simple answer looked for was, not just that it occurred when oxygen was available, but that it occurs all the time. There is a misconception that when anaerobic respiration occurs in the body, aerobic respiration stops.

Better candidates gave good accounts of energy release per glucose molecule. They knew that during aerobic respiration the glucose molecule is completely broken down and therefore releases more energy than when it is incompletely broken down during anaerobic respiration. This complete breakdown of the glucose molecule is an advantage of aerobic respiration. Some candidates discussed this in terms of the relative ATP output of both types of respiration, often correctly quoting the number of molecules of ATP produced.

**WJEC  
BIOLOGY  
GCSE (NEW)  
Summer 2017  
UNIT 1 FOUNDATION TIER**

**General Points**

This was the first year for examinations on this specification. Many of the candidates coped well with the new format for the examination paper with its longer timing and higher mark values in comparison with the previous (legacy) specification. There were a significant number of candidates, however, who struggled with the questions where a high proportion of the marks required recall of factual detail. They appeared to be ill-prepared in terms of revision and failed to read the wording of questions with sufficient care. Many of these candidates achieved very low scores with script totals in single figures.

The questions requiring extended writing were well answered by some candidates but difficulties arose, in longer answers, with the selection and sequencing of relevant information. The greater emphasis on mathematical skills did not cause too much difficulty and candidates generally carried out the various types of calculations accurately.

As in previous years, examiners noted many instances of poor quality handwriting which undoubtedly lead to valuable marks being lost.

1. Almost all candidates could identify the cell membrane and vacuole on a diagram of a plant cell as well as the functions of the nucleus and chloroplast. Difficulties did arise, however, in stating the role of the mitochondrion in respiration. The majority had no difficulty in calculating the magnification of an image seen under the microscope although very few recognised that the material had been stained.
2. This was generally well answered with most candidates able to show their understanding of the terms producer, first, second and third stage consumers. The organisms in a food chain were correctly recognised although problems did occur when candidates were asked to draw a pyramid of biomass and lost marks because they confused this with a pyramid of numbers.
3. Whilst candidates generally scored well on the multiple choice and reasoning elements of this question they encountered difficulty when asked to complete a diagram of the carbon cycle and needed to recall information from their own knowledge. Many could not identify starch as a storage compound in plants or name photosynthesis as the process taking in carbon dioxide.
4. Candidates were required to identify features on a diagram of a section through the human thorax. Almost all could draw in the position of the diaphragm at the end of inspiration but some were not able to indicate the pathway of air from the trachea to a bronchus. The most common error was to extend the line into an alveolus. When asked about the adaptations of the alveolus for gas exchange, many candidates could not name the process of diffusion although they did understand the significance of the thin walls and large, moist surface area.

5. Candidates were asked to name a cell found in blood, other than a red blood cell. The majority of candidates correctly gave white blood cell as the answer but then went on to produce drawings of very poor quality. Frequently the function was given in vague terms such as “fighting illness” which did not gain credit. Most candidates could name plasma and substances which it transported and correctly calculated the volume in a given blood sample. Few appeared to understand the role of platelets in clotting blood.
6. Many very good graphs were drawn, with accurate plotting and good lines. Where marks were lost this tended to be because lines were drawn too thickly or where they did not pass through the centres of plotted points. Errors also occurred because of unnecessary extrapolation. When asked to describe the graph most candidates were able to comment on the pattern of increase and subsequent decrease in the rate of respiration. Very few however, could explain the increase in the rate in terms of greater likelihood of collisions between enzyme and substrate molecules as the temperature increased. Most candidates knew that limewater could be used to identify carbon dioxide and stated the positive result correctly but answers to the final part of the questions which asked for improvements to the experimental method were too vague. Frequently the “amount” of yeast or sugar was referred to, rather than the volume, mass or concentration.
7. Candidates were required to write an extended answer dealing with a comparison of structure and function in arteries and veins. In most cases the structure of the vessels was adequately described and consistent with the diagrams given in the question although the functions of the vessels were treated less thoroughly. It was only in the higher-scoring answers that functions were related to structures and this was often confined to relating the thick muscular walls of arteries to transport of blood under high pressure. Few candidates referred to the presence or the importance of valves in veins. The most common error was for the direction of blood flow to be wrongly described with a significant number of candidates thinking that veins carried blood away from the heart. The quality of language was generally satisfactory but spelling errors did occur even with words already given in the question. The information included in higher-scoring answers was well sequenced and in some cases phrased in a comparative style.
8. In the first part of question, dealing with transpiration from two leafy shoots, most candidates took accurate readings from the curves on the graph and calculated the difference in loss of mass correctly. Many went on to give the number of leaves as a reason for this difference and gained credit. The rest of this question proved more problematic for candidates and many did not identify the purpose of the layer of oil on the surface of the water as a means of preventing transpiration.
9. Nearly all candidates could identify the small intestine from the diagram and, again, most candidates carried out the calculation correctly. The rest of the question did present much more challenge to them with few candidates scoring high marks. Using their own wording, most could give digestion and absorption as two functions of the small intestine but were not able to relate these accurately to structures. In the last part of the question they were asked to explain observations on the action of protease from pineapple on gelatine at different temperatures. It was pleasing to see that most candidates were able to refer to the enzyme being denatured even if many were not able to go on to explain the significance of the effects on the active site.

**WJEC  
BIOLOGY  
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Summer 2017  
UNIT 1 HIGHER TIER**

**General**

This is the first attempt at assessing the progress of students who are following the new specifications in biology. Candidates should have been prepared for the new style of assessment by being made aware of the longer time allocated to the paper and the increase of available marks compared with the previous specification. A smaller proportion of marks is allocated to the question which assesses the quality of extended response i.e. 7.5% compared with 20% for the quality of written communication in previous years. The questions involving the use of mathematics to solve problems in a biological context are more demanding and the interpretation of data to form conclusions is used in questions which assess understanding rather than recall. The rationale depends on the premise that students can recall facts without necessarily understanding concepts but they cannot understand concepts without recalling facts. Emphasis is placed on applying knowledge and understanding to a range of techniques and apparatus in practical contexts. In this assessment, those who had carried out the relevant practical work, or who had seen practical work in demonstrations, were at an advantage. Those who had mastered linear memory and the ability to write continuous prose were able to cope with the more demanding questions.

1. Students were at an advantage if this practical investigation was within their experience as a demonstration or if they had carried out a similar experiment. The interpretation of data was usually accurate enough to gain full credit as was the necessary recall of facts. Marks were often lost in part (c) where candidates were expected to understand that roots provide an increase in surface area for the intake of water.
2. Parts (a) - (d) tested knowledge and understanding of the structure and functions of the small intestine. Absorption and digestion should have been known as functions. A large surface area, rich blood supply, and a single celled lining can be observed in the drawing. Also, digestive glands are labelled and could be linked to the function of the small intestine as a digestive organ. The experiment in part (e) was probably new to most candidates but the knowledge of protein digestion to soluble amino acids should be within the experience of all candidates. Incomplete answers did not mention the solubility of amino acids in (e) (i) or reference to active site destruction in denatured enzymes in (e) (ii).
3. Candidates often did not state the link between a high fat/carbohydrate intake and the production of cholesterol in part (a). Also, many did not understand the need to release energy from fat/carbohydrate during exercise. Some stated that energy or calories were burned. Part (b) required knowledge of statins. Answers to part (c) were often vague. Candidates were expected to know that blood clots in coronary arteries prevent oxygenated blood from reaching heart muscle.

4. The understanding of the concept of osmosis in an ecological context has been assessed many times in previous years. Many candidates had been well prepared for this type of question and gained full marks. The main errors that were seen, included answers stating that water passed into the eel when it was in sea water or that salt passed through the selectively permeable membrane.

Many knew the chemical requirements for active transport. All that was needed were oxygen and glucose but if ATP was mentioned it was given credit as an alternative to glucose. In the previous specification, knowledge of ATP was not required. In the new specifications students are expected to equate it to energy release in respiration. They are not required to understand the complex biochemistry of the significance of phosphate bonds. All they need to know, is that ATP is a high energy compound found in cells and used for energy storage and energy transfer. Therefore, in the context of this question ATP could be equated to glucose.

5. Candidates usually coped well with this question. It was unusual to see fewer than four marks awarded. Part (b) (i) sometimes caused a problem because candidates did not state that most of the energy released in a 100m sprint is from anaerobic respiration. In part (c) many failed to add energy or ATP to the equations for respiration.
6. The knowledge of the structure and functions of mitochondria was not included in the previous specifications but is in the new specifications. Those who were prepared for this did well in part (b) and almost all gained the mark for conclusions and (c). Part (d) required candidates to interpret data to form conclusions and to demonstrate an understanding of how science works in medical trials. Those who could apply logic to the information did well.
7. This assessed mathematical skills applied to biological data. Those who could follow instructions and who could calculate percentages gained most of the marks. Full marks were allowed for correct calculations using the numbers on the lines but some credit was also given for correct calculations using the numbers representing biomass. Those who understood the significance of pyramids of numbers gained marks for (b). Pyramid C has 3 trophic levels and a larger number of producers than consumers.
8. If candidates understood the principles of photosynthesis, they did well. It was disappointing to see some who confused respiration with photosynthesis. In order to gain full marks for (a), candidates needed to recognise that when photosynthesis is at its maximum, oxygen production is at its maximum and carbon dioxide intake is at its maximum. Only the very best candidates gained full marks but some credit was given for recognising that oxygen is released during photosynthesis and that carbon dioxide is taken in.
9. The quality of extended response depends on the skill of linear memory allowing candidates to recall and apply the principles of the nitrogen cycle. Written prose should be used to record facts in the correct order and without irrelevance. The better candidates succeeded at this and gained top band marks (5-6).
10. If candidates understood how blood is circulated through the heart they gained full marks. Minimum recall and maximum understanding were required to appreciate how valves regulate the direction of movement of blood through the chambers of the heart.