



Examiners' Report/  
Principal Examiner Feedback

Summer 2014

Pearson Edexcel International GCSE  
in Biology (4BI0) Paper 2BR

## **Edexcel and BTEC Qualifications**

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at [www.edexcel.com](http://www.edexcel.com) or [www.btec.co.uk](http://www.btec.co.uk). Alternatively, you can get in touch with us using the details on our contact us page at [www.edexcel.com/contactus](http://www.edexcel.com/contactus).

## **Pearson: helping people progress, everywhere**

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: [www.pearson.com/uk](http://www.pearson.com/uk)

Summer 2014

Publications Code UG038111

All the material in this publication is copyright

© Pearson Education Ltd 2014

**Chief Examiner's Report June 2014 International GCSE Biology –  
4BIO 2BR**

**Question 1**

Question 1 was on the passage about red and grey squirrels and most candidates were able to understand and apply their knowledge to this new context. Candidates did better on this comprehension than on some previous ones.

The topics covered were ecology, natural selection, genetic variation and experimental design. In question (a) almost all candidates could identify the goshawk as the secondary consumer. In part (b) most candidates gained 2 marks for suggesting that a larger body mass would help squirrels survive the winter by reducing their surface area to volume ratio and therefore reducing heat loss. Other creditworthy responses noted that increased body fat would provide insulation and act as an energy reserve.

In part (c), candidates were asked to give reasons why it is an advantage for the squirrels to produce their young in the spring and most responses could identify one reason as the abundance of food while the best responses also identified that the temperature would be warmer. In part (d) almost all candidates could give the meaning of habitat but fewer could give the meaning of population with some not clearly stating that it is the numbers of one species in an area.

In part (e) candidates were required to use the information in the passage to calculate the percentage of all squirrels in the UK that are red. Most candidates were able to do this and gain full marks, but a significant minority did not add the populations of red and grey together before calculating the percentage. In part (f) most candidates could, by using the information from the passage, give two reasons why grey squirrels are increasing in number. For part (g) candidates were required to suggest how scientists could collect data to test the hypothesis that grey squirrels have a greater effect on bird numbers than red squirrels. Most candidates scored 2 or 3 marks for describing using a similar area of woodland with red and another area of wood land with grey and counting the birds after a specified period of time.

In part (h) candidates had to suggest two methods by which the red squirrel might be saved from extinction and again most could gain two marks for suggestions such as using a captive breeding programme and supplying food or trapping grey squirrels.

## Question 2

Question 2 (a) gave candidates a table and they needed to indicate whether a breeding process would produce genetic variation or not. Most were able to score 2 marks out of 3, with only the best candidates gaining full credit. Often candidates indicated that self-pollination did not produce genetic variation. In 2 (b) candidates were asked to describe the events that take place at fertilisation and up to the production of the eight-celled human embryo. Many candidates scored full marks for describing how sperm and egg fuse to produce a zygote. This then divides by mitosis three times to produce the 8 cell embryo. Some weaker candidates wrote about meiosis or about egg and sperm meeting.

## Question 3

Question 3 showed the response of a plant shoot to gravity. In (a) (i) candidates were asked to explain the benefit to the plant of this response. Most candidates got the mark but a substantial number did not gain it as they did not link the growth towards light to photosynthesis. In (a) (ii) many students could gain one mark by identifying light as the variable to control but did not earn the second by describing how to do this. Only the best candidates gained two marks often by describing how to leave the plant in complete darkness. In part (a) (iii) again candidates struggled to express themselves sensibly. Only about half of candidates could describe using an upright plant or a plant on a clinostat as a suitable control. In part (b) (i) almost all could suggest how a plant benefits from closing its stomata when less water is available in the soil. In part (b) (ii) more than half the responses could explain the disadvantages to the plant of closing its stomata. The most common correct responses referred to the lack of carbon dioxide and reduction in photosynthesis, while others noted less cooling and less transport of mineral ions.

#### Question 4

Question 4 described an experiment to investigate the action of enzymes on protein. In (a) (i) most candidates could identify the length of egg white as the independent variable. In (a) (ii) most could earn one mark for stating that the results are reliable because the measurements were repeated. Only the better candidates went on to say that the repeated results followed the same pattern with no anomalies. In (a) (iii) almost all could identify a ruler as the best way of measuring length.

Part (b) (i) required candidates to explain the difference in the results obtained in distilled water compared to juice from the pancreas. About a third of candidates failed to earn credit as they merely describe the difference with no attempt to account for it. Explain items require a candidate to use biological knowledge and understanding to give the reasons for a result. In this case describing how pancreatic juice has protease enzyme while distilled water does not. Likewise in (b) (ii) some responses explained that in boiled juice the enzymes would be denatured but did not explain that this was due to heat or high temperature.

In (c) most candidates got one mark out of two for suggesting how you could modify this investigation to find out the effect of pH on protein digestion by pancreas juice. These stated that the pH needs to be varied but only the best candidates went on to describe using the same volume and concentration of pancreatic juice for each pH.

#### Question 5

Question 5 (a) required candidates to name the organ that produces insulin. Most candidates were able to get this correct. In (b) we expected candidates to describe the role of insulin as reducing blood glucose. Most candidates earned both marks but a few lost credit by referring to glucose rather than blood glucose.

Part (c) (i) required candidates to describe how bacteria can be genetically modified to produce human insulin. Many earned full credit with sixty per cent of candidates earning 4 or 5 marks for their detailed accounts. Some candidates who had not prepared for the examination failed to score any marks. In part (c) (ii) almost all could identify the modified bacteria as transgenic. Part (d) gave candidates a diagram of a fermenter, in part (i) candidates were asked to suggest how the air inlet helps the genetically modified bacteria to grow. Most gained both marks for explaining that this allows oxygen in to enable aerobic respiration. In part (ii) candidates had to explain the consequences to insulin production if the pH probe was to fail. This item enabled the best candidates to score full marks for linking the change in pH to enzyme action and departure from the enzyme's optimum conditions leading to denaturing of enzyme and reduced insulin production.

## Question 6

Question 6 required candidates to describe and explain the conditions needed to successfully grow large numbers of algae. Many candidates had no idea what algae were, yet they were told in the question that they were microscopic organisms that can carry out photosynthesis. This item discriminated well with candidates scoring right across the mark range. The best responses described the need for a suitable temperature to ensure enzyme action and light and a supply of carbon dioxide for photosynthesis. The best candidates went on to describe the need for mineral ions such as nitrate for amino acids and magnesium for chlorophyll.

## 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>

