

# **Scholarship**

## **2011 Assessment Report**

### **Science**

## COMMENTARY

This examination contains questions that integrate strands of Science in both familiar and unfamiliar contexts. Some candidates were not aware of the breadth and depth of responses required at this level. The candidates who were awarded the highest scores were able to show critical analysis of a wide range of information and showed comprehensive understanding of the application of scientific principles.

### SCHOLARSHIP WITH OUTSTANDING PERFORMANCE

#### **Candidates who were awarded Scholarship with Outstanding Performance typically:**

- read the questions carefully and thoughtfully
- covered most or all aspects of all questions
- clearly identified and applied the scientific principles relevant to each question
- expressed their ideas clearly and accurately, and justified their statements
- demonstrated scientific insight into most aspects of most, or all questions
- logically structured their answers in essay form, often using paragraphs to separate distinct aspects of the question
- consistently applied a broad base of knowledge and skills learned to unfamiliar contexts
- integrated a range of scientific knowledge in their discussions, so that their answers were broadly based
- reviewed and evaluated their answers and improved on some parts by adding additional paragraphs
- in Question One, identified that the extended propagation of sound waves associated with the DSC arises from the increase in velocity of the sound waves on the boundaries of the channel, causing the sound wave to be reflected back into the sound channel
- in Question Two, in part (a) identified that DNA samples needed to be taken from both the control and irradiated bacteria at realistic intervals to determine the rate and amount of DNA repair. In part (b), candidates reasoned that gamma and beta rays were not radioactive sources, and would not make the food radioactive
- in Question Three, in part (a) gave a complete answer showing excellent understanding and in part (b) candidates were able to discuss thoroughly the advantages of a gene being disabled
- in Question Four, in part (a) were able to work out a reason for the widening of the Havre trough and in part (b) thoroughly understand the formation of hydrothermal vents.

### SCHOLARSHIP

#### **Candidates who were awarded Scholarship but not Scholarship with Outstanding Performance typically:**

- showed evidence of reading the questions carefully and related the questions to their learning
- identified and applied most scientific principles relevant to each question

- expressed their ideas clearly, generally accurately, and covered most or all aspects of nearly all questions
- demonstrated scientific insight into aspects of many questions
- applied relevant knowledge and skills to unfamiliar contexts, enabling them to effectively answer the question
- reviewed their answers and improved on some parts by adding additional sentences
- structured their answers using paragraphs to separate aspects of the question
- in Question One, identified that scientists could make repeated measurements of the speed of sound between two points a long distance apart to determine whether the average temperature of the ocean was changing, or that an increase in temperature would lead to the depth of the DSC becoming greater. They also identified that the DSC would allow scientists to monitor from afar the presence of marine mammals
- in Question Two, in part (a) realised that a range of bacterial species relevant to food spoilage needed to be chosen and grown under identical conditions. In part (b), candidates recognised that operating personal needed something to monitor the cumulative dose
- in Question Three, in part (a) gave a complete answer showing good understanding and in part (b) were able to recognise the advantages of a gene being disabled
- in Question Four, in part (a) discussed thoroughly the factors forming caldera volcanoes and in part (b) showed understanding of the formation of hydrothermal vents.

## **OTHER CANDIDATES**

### **Candidates who were not awarded Scholarship typically:**

- showed no evidence of having read the questions carefully, or did not relate their answer to the question
- often just repeated statements in a different way, or generalised, even when they were on the right track
- identified only some of the scientific principles relevant to each question
- expressed their ideas with insufficient clarity and accuracy
- covered only some aspects of some questions, or focused on only a narrow aspect
- demonstrated only occasional scientific insight
- did not appear to understand what was required by the question
- did not apply information or skills learnt to a new context
- did not show evidence of either planning or reviewing their answers
- expressed their ideas with various degrees of clarity and accuracy, with some candidates writing poor English and in some cases almost illegibly
- Question One, concentrated only on the properties of low-frequency waves, which is a property that has relevance to propagation, whether or not there is a DSC
- Question Two, in part (a) generally mentioned only that a control was needed and that bacteria must be grown under the same conditions. In part (b), candidates recognised only that gamma rays are very penetrating and beta particles are less penetrating

- Question Three, in part (a) often did not identify which was the trans fatty acid and in part (b) candidates did not recognise any advantages of a gene being disabled, although some candidates did mention problems to do with the insertion of genes
- Question Four, in part (a) had an incomplete understanding of the factors forming caldera volcanoes and in part (b) had very little understanding of the formation of hydrothermal vents.

## **OTHER COMMENTS**

Correct examination technique is important for success. Responses must be constructed showing underpinning knowledge and skills as well as critical thinking required.