NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

Assessment Report

Scholarship, 2008

Science

COMMENTARY

The best performing candidates most commonly demonstrated the following skills and/or knowledge:

- ability to identify, from their knowledge of science, those aspects that were relevant to an unfamiliar scientific context
- ability to apply that relevant knowledge in a meaningful way that enabled them effectively answer the question
- ability to express their discussions clearly, succinctly and logically
- ability to integrate a range of scientific knowledge in their arguments, so that their answers were broadly based
- ability to draw upon a broad base of knowledge to consistently address a wide range of scientific contexts to a high level
- ability to give, in Question 1, reasons for disposing of radiation carefully, and to include a brief discussion of the types of radiation and their effects on living tissue; they demonstrated understanding of the three methods of disposal, and related these methods to the two types of radioactive waste; in doing this, they drew upon their knowledge of physics, biology and, to a much lesser extent, geology
- ability to show, in Question 2, a very good understanding of optical properties; they had to consider a broad range of factors to score well; some candidates explained how the path length of the light rays to the Secchi disc would be increased when the Sun was low in the sky due to the larger change in angle through refraction when light rays are incident on the water surface at more oblique angles; others considered total internal reflection, and the effect this has on visibility of the disc if it is being viewed at an angle rather than from overhead
- ability to identify, in Question 3, flexing as the root cause of much sound, and to consider the relative sizes of these effects on the three moons due to the size of Jupiter (relative to Earth) and the fast orbits of Io and Europa (relative to the Moon)
- ability, in Question 4, to think in three dimensions and to give an answer based on the understanding of what happens when oceanic crust subducts under oceanic crust; they also accurately described the role of sediment and water in the formation of volcanoes; they understood that the Pacific plate, being much older and therefore denser, was already very deep before it started to subduct beneath the Australian Plate
- understanding, in Question 5, of how foreign genes could be transferred to other organisms; they were also able to weigh up the risk of this against the benefits of Golden Rice and reach a conclusion
- thorough understanding of, in Question 6, and ability to apply, the implications of different types of bonding between polymer chains to novel uses of polymers.

Candidates who did NOT achieve scholarship lacked some or all of the skills and knowledge above, and in addition they:

- simply repeated the question in their answer
- focused on a narrow aspect of the question
- often “dumped” knowledge because they did not understand what was required by the question
- could not apply information or skills learnt to a new context - this was especially seen in Question 3

- had rote-learnt application of skills and information from previous examination questions, but they were unable to adapt to new questions and contexts
- made far too many generalisations, even if they were on the right track
- were repetitive in their arguments
- wrote in a vague manner
- did not plan their answers or review them
- poorly understood, in Question 1, the implications of "diluting and dispersal" of radioactive waste
- poorly understood, in Question 2, light penetration in water
- did not consider, in Question 3, the effects of the size of Jupiter and the fast orbits of Io and Europa
- said, in Question 4, that the Australian plate was made of continental crust instead of oceanic crust; they also discussed formation of volcanoes in general instead of relating the principles to the Kermadec volcanoes
- misunderstood Question 5, and wrote about competition with other rice species, or even discussed the effect of inserting a gene to give resistance to certain weedkillers; they also confused the processes of fertilisation with the production of seeds, and did not realise that eating bacteria is safe unless they are species that cause food poisoning
- did not understand, in Question 6, the importance of bonding between polymer chains; they also confused elasticity with stretching.