Assessment Specifications

General information

Domain	Biology
Level	3
Mode of Assessment	Written Examination
For Year	2012
Standards	90715, 90716, 90717, 90719

Format of the assessment

All questions will provide opportunity for candidates to demonstrate all levels of performance: Achievement, Achievement with Merit, and Achievement with Excellence.

Candidates should attempt all questions.

Papers may contain resource-based questions.

Candidates may use annotated diagrams to show evidence where appropriate.

Specific information for individual external achievement standards

Standard	90715
Title	Describe the role of DNA in relation to gene expression
Version	2
Number of Credits	4

Special notes

Molecular components for the structure of DNA are the nucleotides (deoxyribose, a phosphate group, and a base, where the bases are Adenine, Thymine, Guanine, Cytosine).

The term *genetic code* refers in this context to the sequence of bases on the DNA molecule.

DNA replication comprises unwinding the DNA molecule, breaking the bonds between the strands, replication, and repackaging. Candidates should understand the roles of key enzymes in this process, including RNA and DNA polymerases, DNA ligase, and DNA helicase.

The significance of DNA replication to gene expression is that it is a semi-conservative process that maintains and transmits the genetic code with a high level of accuracy.

The role of DNA in determining protein synthesis includes codons and anticodons, and the redundant

nature of the code.

The determination of phenotype includes not only visible features, but also physiological and behavioural characteristics that are determined by the outcome of interactions between the genotype and the organism's environment.

Genotype and phenotype frequencies may be expressed as a ratio, fraction or percentage.

Control of gene expression includes:

- control elements, including the promoter region, enhancer region, the transcription factors (proteins) that must bind to both regions before transcription can occur, and the terminator region for eukaryotes
- the role of operons in control of gene expression in prokaryotes.

Standard	90716
Title	Describe animal behaviour and plant responses in relation to environmental factors
Version	2
Number of Credits	4

Special notes

Questions will cover both plants **and** animals. Candidates are encouraged to answer all questions.

Candidates should be familiar with graphical methods of presenting behavioural data, including the use and interpretation of actograms.

Standard	90717
Title	Describe processes and patterns of evolution
Version	2
Number of Credits	3

Special notes

There will be an emphasis on groups that contain New Zealand examples. However, the examination may also include contexts and examples from elsewhere in the world.

Candidates may be required to show understanding of:

- the significance of environmental changes, such as glacial / interglacial periods and associated changes in sea level, and their effects on speciation
- the concept of natural selection and its role in speciation
- directional and stabilising selection.
- evolutionary change at the population and species level which reflects underlying changes in allele frequencies of the evolving populations.

Standard	90719
Title	Describe trends in human evolution
Version	2
Number of Credits	3

Special notes

Resource material may use the names of currently recognised species. If candidates use named species in their answer, then any information they produce must be consistent with those species named.

Trends are limited to those exhibited by early bipedal hominins onwards and may involve comparison with other living hominids (apes). Refer to http://sci.waikato.ac.nz/evolution for definitions.

Any discussion of the causes of hominin evolution should consider the selection pressures that would lead to evolutionary change.

Cultural evolution covers the period between the first evidence of tool-making through to the development of agriculture (10 000 years ago). Cultural evolution focuses on the trend of increasing behavioural complexity relating to use of tools, fire, shelter etc.

Dispersal of hominins covers the period up to 10 000 years ago. Candidates should be able to demonstrate understanding of the ecological / evolutionary changes that could drive such dispersal.

Scientific evidence relating to Human Evolution may include skeletal remains, nuclear and mitochondrial DNA, tools, evidence from scientific and comparative dating.

Answers must be based on scientific evidence.