



**Curriculum: Level 7**

**Living World**

*Students will:* Explain how the interaction between ecological factors and natural selection leads to genetic changes within populations

**Teaching and Learning in relation to literacy and language demands in writing:**

Students need to use writing to explain concepts, processes, and theories relevant to curriculum tasks. They need to express increasingly sophisticated ideas and information, incorporate specialized vocabulary, and structure their responses according to purpose and audience.

**Assessment task (written)**

Achievement Standard 91157 Demonstrate understanding of genetic variation and change

**Example sourced from 2012 external assessment question:**

New Alleles

Mutations can result in the formation of new alleles, but not all new alleles enter the gene pool of a population.

Discuss this statement, considering the following points in your response:

- What is meant by the terms: mutation and gene pool
- Differences between somatic and gametic mutation
- The factors that determine whether an allele enters the gene pool

The following is an example of a written response at Curriculum Level 7 that demonstrates the literacy and language skills students require.

<p><b>Structure</b> The writer has structured the response by firstly defining the terms, and then by providing reasons as to how or why genetic variation and change occurs.</p> <p>The response follows a logical sequence of points. (<i>The factors that would depend....If the mutation doesn't benefit.....But if the mutation is an asset...</i>).</p> <p>Viewing and analyzing exemplars of scientific writing can support students to identify the key features that they need to include in their own writing.</p>	<p>Exemplar of student work (Extract)</p> <p><b>Mutations can result in the formation of new alleles, but not all new alleles enter the gene pool of a population. Discuss this statement considering the following points in your response:</b></p> <ul style="list-style-type: none"> <li>• <b>What is meant by the terms: mutation and gene pool</b></li> <li>• <b>Differences between somatic and gametic mutation</b></li> <li>• <b>The factors that determine whether an allele enters the gene pool</b></li> </ul> <p><i>A gene pool is the allele frequency of a population of reproducing species. A mutation is a change in either the gene/genotype or the DNA sequence. A somatic mutation is a change in the DNA sequence and a gametic mutation is a change in the gamete. Gametic mutations are passed on to future offspring whereas somatic only affects the individual because it is acquired after birth. The factors that would depend on this mutation entering the gene pool is whether the phenotype is favoured by the reproducing species because it aids their survival and ensures that the specie doesn't die out. If the mutation doesn't benefit the species survival then natural selection will determine that the mutated specie doesn't reproduce or find a mate and the mutation will die out. But if this mutation is an asset to the specie and benefits its survival in the environment whether it be helping them escape predators, adapt to a new environment or get food (prey) easier then this mutation will become favourable and it is highly likely that this mutated specie will survive and be able to find a mate and reproduce, assuming that it is a gametic mutation. Natural selection is when a favoured phenotype is favoured because it aids the species survival. Similarly a mutation that aids the species survival will be selected as potential mate because it had the ability to survive in its environment. This is when a new allele or mutation enters a gene pool.</i></p>	<p><b>Audience and Purpose</b></p> <p>Language use and structure is appropriate for audience and purpose. This writing task required a reasoned explanation, incorporating the accurate use of subject-specific vocabulary.</p> <p>Links are made to the question throughout the response (A mutation is...<i>The factors.../This is when a new allele or mutation enters a gene pool</i>).</p>
<p><b>Ideas and Information</b></p> <p>The writer has <b>responded to all parts</b> of the question indicating that he/she has a sound understanding of the content.</p> <p>The information provided is <b>relevant</b> to the question.</p> <p>The <b>key concepts</b> are <b>defined and explained</b> (<i>mutation, gene pool, somatic and gametic mutation</i>).</p> <p><b>Supporting detail</b> is integrated into the response through examples (<i>...helping them to escape predators, adapt to new environment, or get food easier...</i>)</p>	<p><i>A gene pool is the allele frequency of a population of reproducing species. A mutation is a change in either the gene/genotype or the DNA sequence. A somatic mutation is a change in the DNA sequence and a gametic mutation is a change in the gamete. Gametic mutations are passed on to future offspring whereas somatic only affects the individual because it is acquired after birth. The factors that would depend on this mutation entering the gene pool is whether the phenotype is favoured by the reproducing species because it aids their survival and ensures that the specie doesn't die out. If the mutation doesn't benefit the species survival then natural selection will determine that the mutated specie doesn't reproduce or find a mate and the mutation will die out. But if this mutation is an asset to the specie and benefits its survival in the environment whether it be helping them escape predators, adapt to a new environment or get food (prey) easier then this mutation will become favourable and it is highly likely that this mutated specie will survive and be able to find a mate and reproduce, assuming that it is a gametic mutation. Natural selection is when a favoured phenotype is favoured because it aids the species survival. Similarly a mutation that aids the species survival will be selected as potential mate because it had the ability to survive in its environment. This is when a new allele or mutation enters a gene pool.</i></p>	<p><b>Language</b></p> <p>Relevant subject –specific vocabulary has been used in relation to the question (<i>phenotype, mutation, species...</i>)</p> <p>Language of reasoning /justification is used to support the discussion (<i>...if this mutation is an asset...then.../ ..it is highly likely that.../...will be selected...because...</i>)</p> <p><b>Accuracy</b></p> <p>Generally accurate writing in terms of grammar, punctuation and spelling assists in creating a clear explanation.</p>