

Assessment Schedule – 2007**Biology: Describe genetic variation and change (90459)****Evidence Statement**

Q	Achievement	Achievement with Merit	Achievement with Excellence
ONE (a)	A mutation is a permanent change in the DNA /RNA /genetic material/gene.		
(b)	Table accurately completed to show WwGg × WwGg cross. Gametes are WG, Wg, wG, wg.		
(c)	Follow on error is OK Number and descriptors needed Ratio should be: 9 long wing grey body 3 long wing black body 3 short wing grey body 1 short wing black body. Ideally expressed as a 9:3:3:1 ratio but may use fractions or percentages. (Correct use of NORMAL / MUTANT for phenotype acceptable.)		
(d)	Describes, State, Name ONE process of variation that is present: <ul style="list-style-type: none"> • crossing over • independent assortment • segregation. (Any ONE required.)	Explains any ONE of: What happens and ONE of HOW it leads to genetic variation Crossing over: (Homologous) chromosomes come together in pairs, (chromatids touch). There may be the exchange of segments of a chromosome. This leads to the recombining of genetic material of the two parents. Independent assortment: When (homologous) pairs of chromosomes line up, the arrangement is random, so the two chromosomes are randomly distributed. This leads to different combinations of chromosomes in daughter cells. Segregation: the separation of chromatids produces gametes with different allele combinations / gametes all being different.	Discusses TWO of the three key areas: crossing over and genetic recombination; independent assortment; segregation. Discussion should clearly show that the combination of variability leads to a large number of unique offspring /variety in offspring.

Q	Achievement	Achievement with Merit	Achievement with Excellence
TWO (a)	<p>The collective genetic information contained within a population of reproducing organisms. All the genes/alleles in a population/species.</p>		
(b)	<p>Describes, States, Name the source of alleles:</p> <p>Alleles are created and enter the gene pool through mutations.</p> <p>AND</p> <p>Alleles can enter a population through immigration/migration. (Must imply 'coming in' if they use emigrate.)</p>	<p>Explains the source of mutation, eg:</p> <p>+ How do NEW ALLELES lead to/ BECOME ESTABLISHED in a population.</p> <p>Inherited / passed on / mutations must be in gametes.</p> <p>(Gene flow adds new alleles when immigrants breed with individuals in the existing population.)</p> <p>AND</p> <p>Favourable alleles are selected for / gives advantage.</p> <p>(Become established in the gene pool due to the individual's chance of survival and successful reproduction being increased.)</p> <p>(An allele that is neutral will be established in the gene pool only by chance.)</p>	

Q	Achievement	Achievement with Merit	Achievement with Excellence
THREE (a)	Description of Genetic Drift OR Natural Selection (Change in allele frequencies) due to chance. (Change in allele frequencies) due to an environmental (pressure) / selection pressure / abiotic or biotic / competition / survival of fittest.	Achieved + Explains how these two processes work TO CHANGE ALLELE FREQUENCY: G.D. – lose some alleles (from <u>small</u> population) AND N.S. – individuals selected for increases allele frequency OR against decreases allele frequency.	
(b)	Correct description of founder effect OR bottleneck: Founder effect - when a small group (of individuals) breaks off from a larger population and establishes a new population. OR A population bottleneck is a significant reduction in the size of a population.	Explains how EITHER founder effect OR population bottleneck work. F.E. - The particular alleles may not be representative of the original population / fewer alleles in the founder population. OR P.B. - that causes the extinction / loss of alleles / variation.	Discusses the effect of BOTH, and clearly identifies WHY the blowfly is a case of founder effect and why it is NOT bottleneck (ie a small group of individual blowflies separated from the main population in Australia). Make comparison and justify based on (Geographical) isolation from Australia / introduced into New Zealand.

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
FOUR opportunities answered at Achievement level (or better).	FIVE opportunities answered including at least TWO at Merit level (or higher) and THREE at Achievement level (or better).	SIX opportunities answered including at least ONE at Excellence level and TWO at Merit level (or higher) and THREE at Achievement level (or higher).
Minimum of $4 \times A$	Minimum of $2 \times M + 3 \times A$	Minimum of $1 \times E + 2 \times M + 3 \times A$