





Level 2 Biology, 2012

91157 Demonstrate understanding of genetic variation and change

2.00 pm Thursday 22 November 2012 Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of genetic variation and change.	Demonstrate in-depth understanding of genetic variation and change.	Demonstrate comprehensive understanding of genetic variation and change.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

TOTAL	
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You are advised to spend 60 minutes answering the questions in this booklet.

QUESTION ONE: 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.

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QUESTION TWO: MULTIPLE ALLELES

An example of multiple alleles is one that determines the feather pattern of mallard ducks. One allele M, produces the wild-type mallard pattern. A second allele M^R, produces a different pattern called restricted, and a third allele, m^d, produces a pattern termed dusky.

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Restricted	Mallard	Dusky
www.backyardchickens.co	m/t/410593/understanding-basic-colour-c	genetics-mallards-derivitive

In this series, restricted is dominant over mallard and dusky, and mallard is dominant over dusky:

 M^{R} (Restricted) > M (Mallard) > m^{d} (Dusky)

There are six genotypes possible with these three alleles to produce the three phenotypes.

Discuss why there is only one combination of parental genotypes which can produce offspring that show all three phenotypes in the F_1 offspring.

In your answer you should complete the Punnett square to show the cross, and clearly identify the genotype and phenotype proportions expressed as a percentage or ratio. Refer to your completed Punnett square in your discussion.



Genotype:		
Phenotype:	 	

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Question Three starts on the following page.

QUESTION THREE: CHANGES IN A GENE POOL

Changes occur in the gene pool of populations over time. Examples in New Zealand include tussock grasses and the Chatham Island black robin.

Discuss how genetic drift, natural selection and migration can contribute to these changes.

You should refer to the examples given, or any other New Zealand examples to help to clarify your answer.



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STION	Extra paper if required. Write the question number(s) if applicable.	
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