

91157



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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SUPERVISOR'S USE ONLY

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

ASSESSOR'S USE ONLY

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.com/t/410593/understanding-basic-colour-genetics-mallards-derivative

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

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

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.

	F1 gametes	

Genotype: _____

Phenotype: _____

