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90948



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Mana Tohu Mātauranga o Aotearoa  
New Zealand Qualifications Authority

## Level 1 Science 2023

### 90948 Demonstrate understanding of biological ideas relating to genetic variation

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of biological ideas relating to genetic variation.	Demonstrate in-depth understanding of biological ideas relating to genetic variation.	Demonstrate comprehensive understanding of biological ideas relating to genetic variation.

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

If you need more room for any answer, use the extra space provided at the back of this booklet.

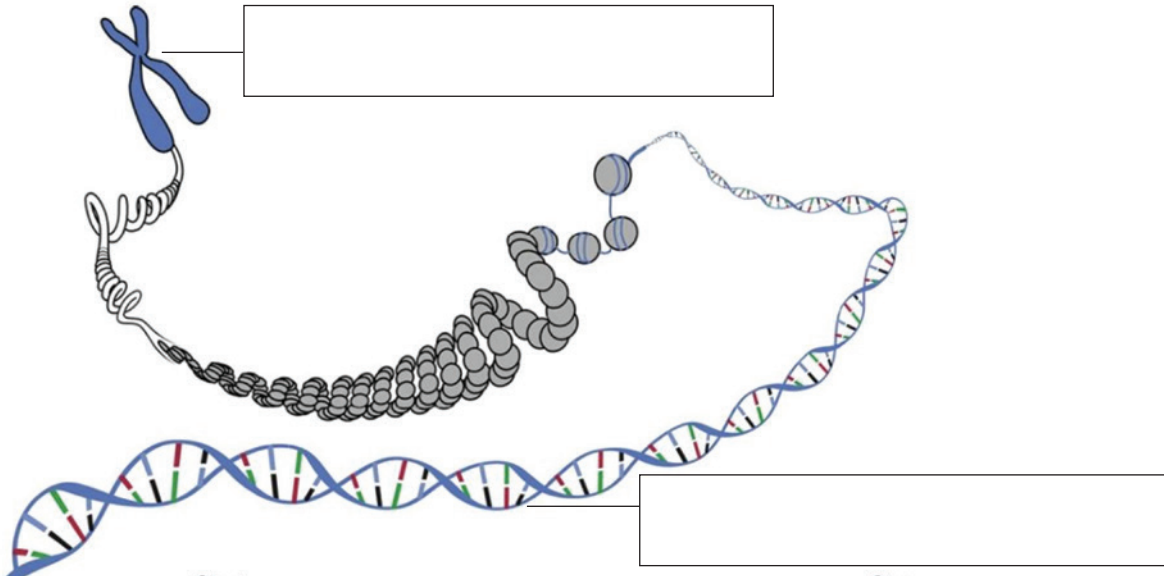
Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

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

## QUESTION ONE: PINK MANTA RAYS

(a) Complete the missing labels in the following diagram.



Adapted from: [https://upload.wikimedia.org/wikipedia/commons/b/b4/0321\\_DNA\\_Macrostructure.jpg](https://upload.wikimedia.org/wikipedia/commons/b/b4/0321_DNA_Macrostructure.jpg)

(b) Define the term mutation.

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## QUESTION TWO: STRIPES

In sheep, a recessive allele (b) causes offspring to be born striped. The dominant allele (B) leads to solid black offspring.



Source: [www.colouredsheep.org.nz/wp-content/uploads/2020/02/Lyn-Hansens-Transverse-stripes-cropped.jpg](http://www.colouredsheep.org.nz/wp-content/uploads/2020/02/Lyn-Hansens-Transverse-stripes-cropped.jpg)



Source: [https://stock.adobe.com/search?k=%22black+lamb%22&asset\\_id=456206583](https://stock.adobe.com/search?k=%22black+lamb%22&asset_id=456206583)

(a) State the possible phenotypes for the following genotypes.

Genotype	Phenotype
BB	
Bb	
bb	



- (d) Discuss how a farmer could use crosses (breeding) to find out if a solid black sheep has a pure breeding genotype for this trait.

In your answer you should:

- define pure breeding and genotype
- state the possible genotypes of the black sheep
- use the Punnett squares provided.

