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90163



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA



National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TĀEA

Level 1 Biology, 2004

90163 Describe the transfer of genetic information

Credits: Three

9.30 am Thursday 25 November 2004

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 answer ALL the questions in this booklet.

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

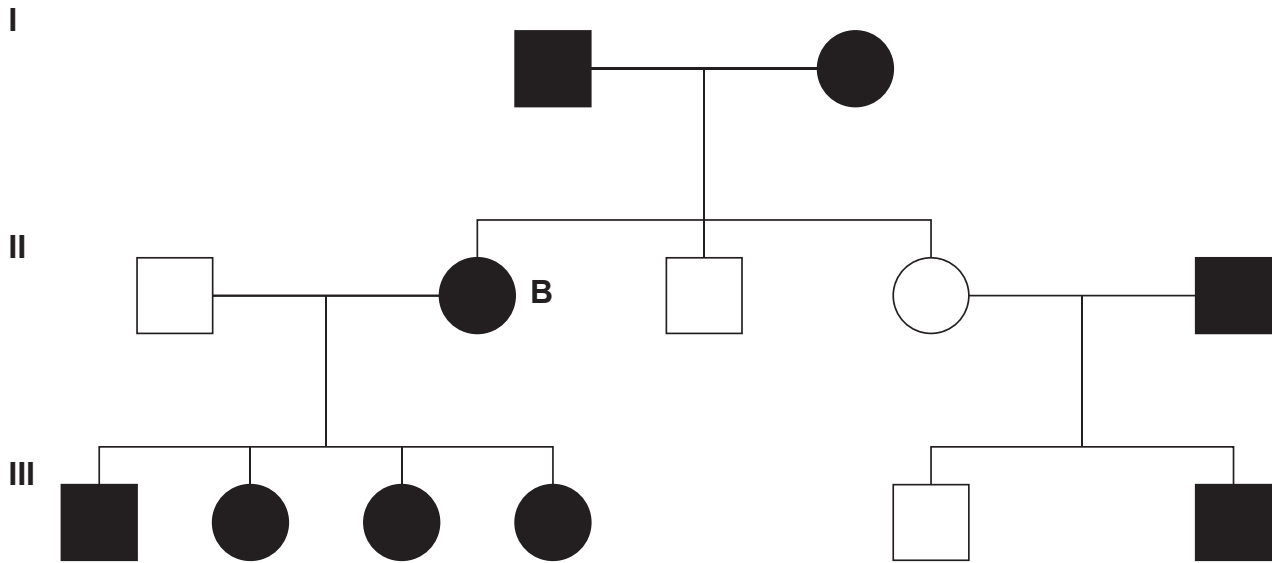
Check that this booklet has pages 2–11 in the correct order and that none of these pages is blank.

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

Achievement Criteria			<i>For Assessor's use only</i>		
Achievement		Achievement with Merit		Achievement with Excellence	
Describe biological ideas relating to transfer of genetic information.	<input type="checkbox"/>	Explain biological ideas relating to transfer of genetic information.	<input type="checkbox"/>	Discuss biological ideas relating to transfer of genetic information.	<input type="checkbox"/>
Overall Level of Performance					<input type="checkbox"/>

You are advised to spend 40 minutes answering the questions in this booklet.

QUESTION ONE: A TIGER'S COAT



In tigers, a recessive gene codes for white fur. Most tigers have orange-brown fur that is coded by the dominant gene.

The pedigree diagram above, shows three generations of tigers. The black shapes indicate dominant genes. The white shapes indicate recessive genes. Male tigers are shown by squares, females by circles.

Use the information in the pedigree chart to answer the following questions:

- (a) **Describe** the gender and fur colour in the third generation of tigers.

- (b) **Explain** why, if both of the original tigers have orange-brown fur, some of their cubs have white fur.

QUESTION TWO: PEAS PLEASE

Gregor Mendel is often referred to as the 'Father of modern genetics'. His work in the 19th century involved many thousands of breeding experiments using the garden pea.

In pea plants, round seeds (R) are dominant to wrinkled seeds (r), which are recessive. Yellow seed colour is dominant to green seed colour.



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- (a) **Describe** what is meant by the terms **dominant** and **recessive**.

- (b) In a genetic cross of two pea plants that are heterozygous for seed shape, what **fraction** of the offspring should have **round** seeds? (Use the punnet square to help with your answer.)

The fraction of offspring with round seeds is:

- (c) Use the example of pea plant seed shape to **explain** the difference between **phenotype** and **genotype**.

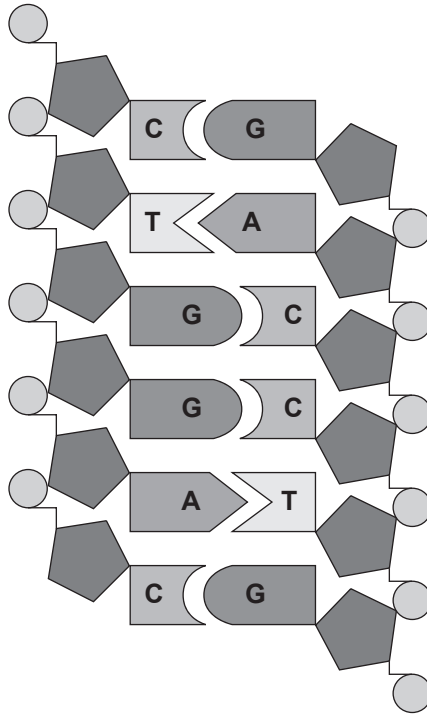
- (d) Yellow seed colour is dominant to green seed colour in the garden pea. Marika has a yellow pea.

Discuss how she could determine whether the pea is heterozygous for the dominant allele.

QUESTION THREE: THE ALPHABET OF LIFE

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- (a) Describe the **three** main components of a DNA molecule. You may use the diagram to help you.



- (b) (i) The sequence of DNA shown above was repeated in a larger section of DNA, and it was found that Adenine (A) occurred 300 times.

How many times would Cytosine (C), Thymine (T) and Guanine (G) occur?

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