





2 The pigment melanin affects fur colour in mammals, such as rabbits.

As a result of polygenic inheritance, some breeds of rabbit may have fur that ranges in colour from light brown to black.

(a) Explain what is meant by the term **polygenic inheritance**.

(2)

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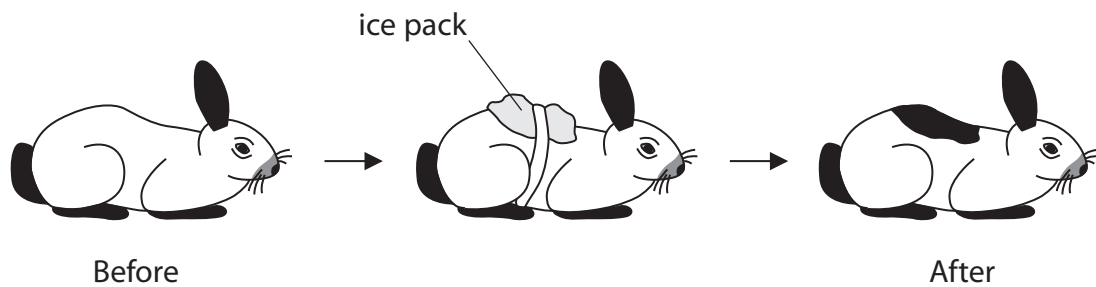
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(b) Himalayan rabbits are white with black fur on their ears, tails and feet.

An experiment was carried out to investigate the effect of temperature on the fur colour in Himalayan rabbits. An area of fur was shaved from the back of a rabbit and an ice pack taped to the area until the fur grew back.

The fur that grew back was black.



(i) Suggest a control for this experiment.

(1)

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(ii) Suggest how this cross-cultural study could be carried out to make sure that the results are valid.

(2)

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**(Total for Question 3 = 8 marks)**

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- 4 The photograph below shows a cleft iris, a rare condition in humans. Cleft iris may be due to the inheritance of recessive alleles.



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- (a) Explain the meaning of the term **recessive allele**.

(3)

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(b) (i) In the space below, draw a genetic diagram to show the genotypes and phenotypes of a man with cleft iris and a woman who is heterozygous for this condition, and all their possible children.

(4)

(ii) State the probability that the first child of these parents will have a cleft iris.

(1)

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**(Total for Question 4 = 8 marks)**

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5 Cystic fibrosis is an inherited condition.

(a) Read through the following passage about cystic fibrosis then write on the dotted lines the most appropriate word or words to complete the sentences.

(4)

Cystic fibrosis is a disorder caused by one of a number of gene mutations.

The symptoms of the disorder are seen only in an individual who is

..... for the recessive allele. The gene codes for

a ..... protein called CFTR. This protein is responsible for the

movement of ..... ions across the cell membranes. Cystic fibrosis

impairs the functions of the gaseous exchange, digestive and .....

systems in the body.

(b) Explain why people with cystic fibrosis can have breathing difficulties.

(4)

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