

AQA, OCR, Edexcel

A Level

A Level Biology

**Genetic Diversity and
Adaptation Questions**

Name:

M M E

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Total Marks: /39

Genetic Diversity & Adaptation

Genetic diversity is the term used to describe the variation of alleles in a species or population.

1. a) Genetic diversity is a product of evolution which enables species to adapt to their changing environment.

i) What is the difference between genetic diversity within a species and genetic diversity between species? (2 marks)

ii) Explain genetic diversity in the context of blood type in humans. (2 marks)

iii) Identify two mechanisms that increase genetic diversity? (2 marks)

iv) Explain how a mutation can be positive? (3 marks)

b) Events can occur that reduce genetic diversity, these could be natural or as a result of human interaction.

i) Give one example of a natural event that reduces genetic diversity and one event linked to human interaction. (2 marks)

ii) How do genetic bottlenecks occur and reduce genetic diversity? (3 marks)

iii) How does the founder effect differ from a simple genetic bottleneck? (1 mark)

iv) Why is a reduction in population size genetically disadvantageous? (2 marks)

2. Having a larger gene pool means that there is more variation. If there is more variation it means that species have a better chance of being adapted to their surroundings.

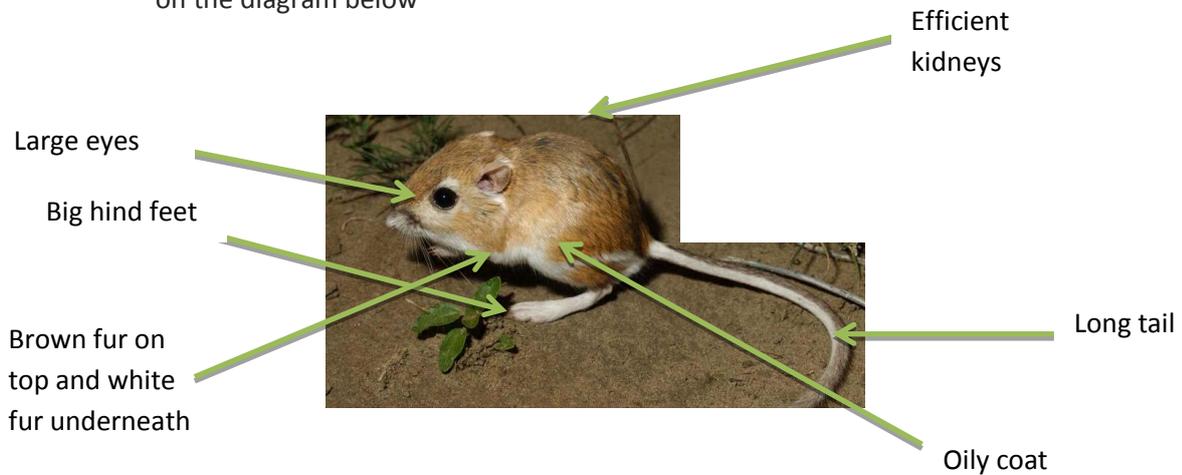
a) i) What is meant by the term 'survival of the fittest'? (2 marks)

b) Adaptations in organisms can be classified as behavioural, physiological or anatomical.

i) What is the definition of a behavioural adaptation? (2 mark)

ii) What is the difference between anatomical and physiological adaptations? (2 marks)

c) The *Dipodomys deserti* otherwise known as the desert kangaroo rat, because it lives in an environment where water is hard to find, the rat has had to develop adaptations to increase its chance of survival. Some adaptations of the kangaroo desert rat are labelled on the diagram below



i) Identify one physiological adaptation and one anatomical adaptation that helps the desert rat survive in such a dry environment, and suggest how they are advantageous. (4 marks)

3. Evolution is a process of change in the genotype and phenotype of an organism that increases the frequency of an allele or alleles in a population.

a) i) Why for many years was the theory of evolution not widely accepted? (1 mark)

b) Evolution suggests that all life on earth evolved from a common ancestor.

i) How would DNA evidence support this claim? (4 marks)

ii) How does antibiotic resistance provide strong evidence of evolution? (1 mark)

iii) Trimethoprim is an antibiotic used to treat kidney and bladder infections usually caused by strains of the bacteria *Escherichia coli*. Explain how some strains of *Escherichia coli* have become resistant to trimethoprim by natural selection? (5 marks)

iv) Is antibiotic resistance an example of stabilising or continuous selection? (1 mark)