22 Evidence for Evolution

Subject Outline terms and phrases	**comparative genomics, cytochrome, DNA-DNA hybridisation, DNA sequencing, phylogenetic tree, evolutionary relationships**

1. (a) What is meant by 'the universal presence of DNA'?

   (b) Explain how the universal presence of DNA provides evidence for the common ancestry of all living things.

2. (a) Explain the term **mutation.**

   (b) Explain how the sequence of amino acids in a protein is related to the genetic code in the nucleus of the cell.

   (c) State three factors that can induce mutations.

3. (a) State one piece of evidence that indicates that DNA on Earth has diversified over billions of years.

   (b) State the name of the process that has brought about this diversity.

4. Explain three sources of genetic variation in a species that reproduces sexually.

(1) _____

_____

(2) _____

_____

(3) _____

_____

5. (a) What is meant by the term **comparative genomics**?

_____

_____

_____

(b) Explain how comparative genomics can help establish the likely evolutionary relationships between different species.

_____

_____

_____

_____

6. Use the information in the following diagram to explain how the degree of matching of DNA strands from two different species in DNA-DNA hybridisation provides a clue as to how closely related the two species are.

_____

_____

_____

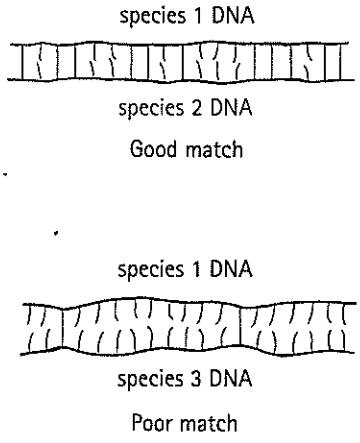
_____

_____

_____

_____

_____



7. Explain how the degree of similarity of the DNA sequences and the degree of similarity of protein sequences in closely related organisms provide evidence for the theory of evolution.

_____

_____

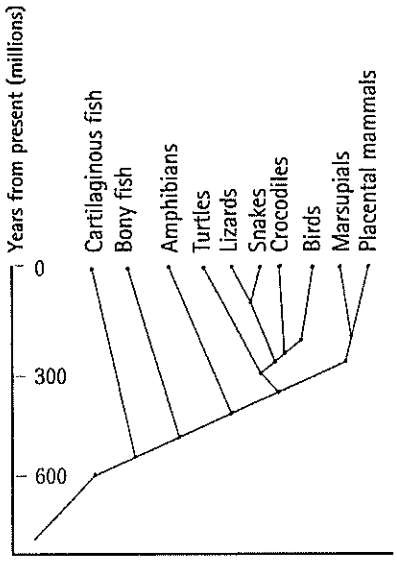
_____

_____

8. (a) Explain why the protein *cytochrome c* is useful for studying the relationship between different species.

(b) How can a protein provide this kind of information for comparison?

9. The phylogenetic tree below was constructed by comparing the nucleotide sequences of DNA in the different groups. Use the information in the diagram to answer the following questions.



Phylogenetic tree of vertebrates

(a) State which two groups of vertebrates are most likely to have separated most recently.

(b) Which group has DNA which is most dissimilar to that of mammals?