

PRELIM REVIEW 2013

02 OCTOBER 2013

Lesson Description

In this lesson we:

- Work through questions relating to Evolution from previous exam papers.

Questions

Question 1

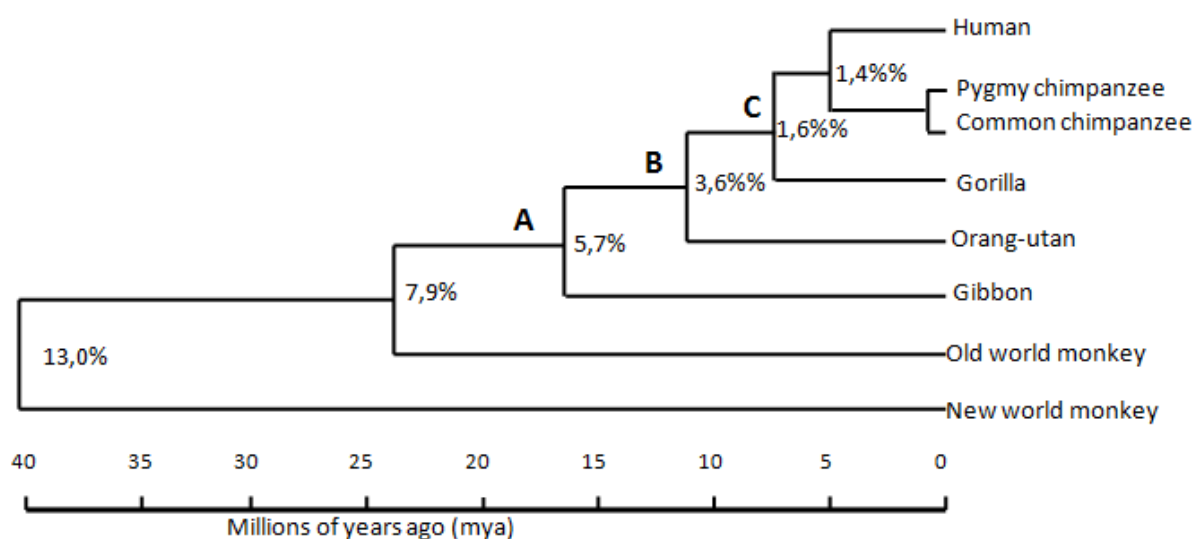
Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number.

- Formation of two or more species as a result of separation of the original species into different groups by a geographic (physical) barrier
- The process that enables organisms with desirable characteristics to survive and reproduce, whereas organisms with undesirable characteristics die
- The scientist associated with the book "On the Origin of species"
- The scientist associated with the principle of use and disuse.
- A group of organisms that share similar characteristics, having the ability to interbreed to produce fertile offspring
- The process by which animals or plants are selected and allowed to interbreed with selected animals or plants to produce desirable characteristics

Question 2

(Adapted from March 2012, Version 2, Paper 2, Question 3.4)

The diagram below shows a phylogenetic tree based on DNA similarities. The percentage next to each branch shows the number of differences in the genome (DNA nucleotide sequence) of the two groups being compared.



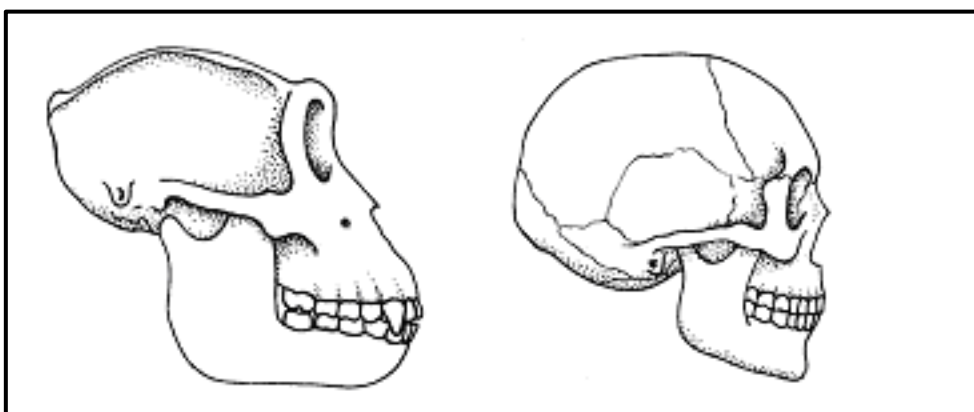
A phylogenetic tree based on DNA similarities

- From the diagram, determine how long ago humans and chimpanzees shared a common ancestor. (2)
- Which common ancestor (**A**, **B** or **C**) is shared by gibbons and gorillas? (1)
- Which organism is most closely related to humans? (1)
- What is the DNA similarity between the genomes of the chimpanzee and the human? (2)

Question 3

(Adapted from March 2012, Version 2, Paper 2, Question 3.2)

The diagrams below represent the skulls of two organisms, a modern human and a gorilla. Each arrow indicates the position of the foramen magnum. Study the diagrams, which are drawn to scale, and answer the questions that follow.

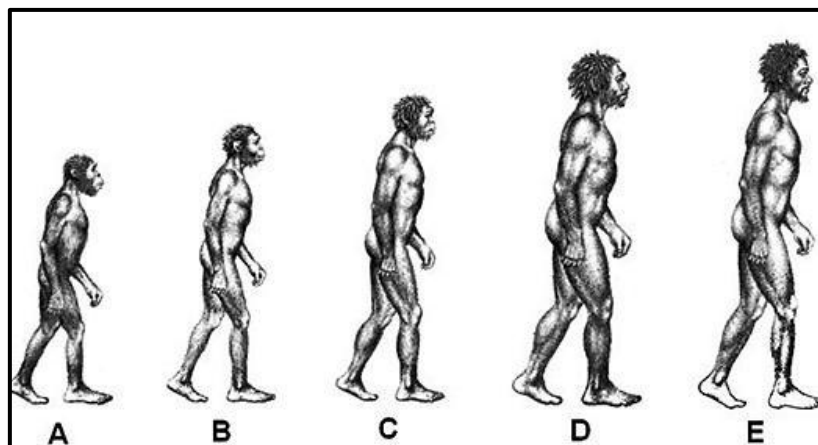


- Identify each of the organisms that are represented by **A** and **B**, respectively.
- Tabulate FOUR observable differences between the skulls of organisms **A** and **B**.
- Which organism is bipedal for most of its adult life?
- Explain TWO possible advantages of bipedalism for the organism referred to in QUESTION (c.).
- Name any ONE similarity between organisms **A** and **B** which is a characteristic of primates.

Question 4

(Adapted from Eastern Cape Prelim 2013, Paper 1, Question 3.1)

The diagram below shows the progression of human evolution. Study the diagram of some early hominids A, B, C, D and E which represent *Homoerectus*, *Homo sapiens*, *Australopithecus*, *Homo habilis* and *Homoneanderthalensis*, not stated in any particular order.

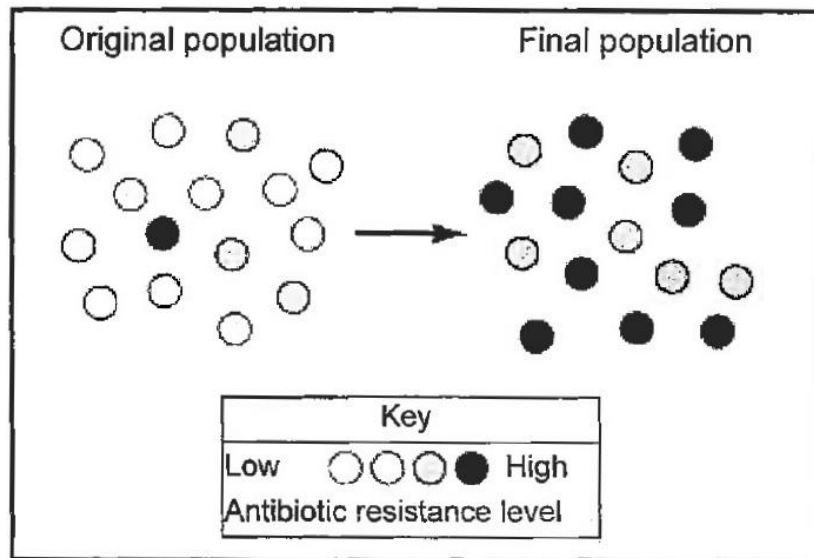


- Identify each of the above hominid members (A–E) correctly from the list given above. (5)
- Mention any FIVE common characteristics which are shared by the members represented in the above diagram. (5)
- Name the family to which the above group belongs. (1)
- Supply any THREE characteristics that make the organism, labelled E different from other primates. (3)

Question 5

(Adapted from Gauteng Prelim 2013, Paper 1, Question 3.2)

Antibiotic resistance can vary within a population of bacteria. The diagram below represents the changes in a population of bacteria as a result of exposure to an antibiotic over time.

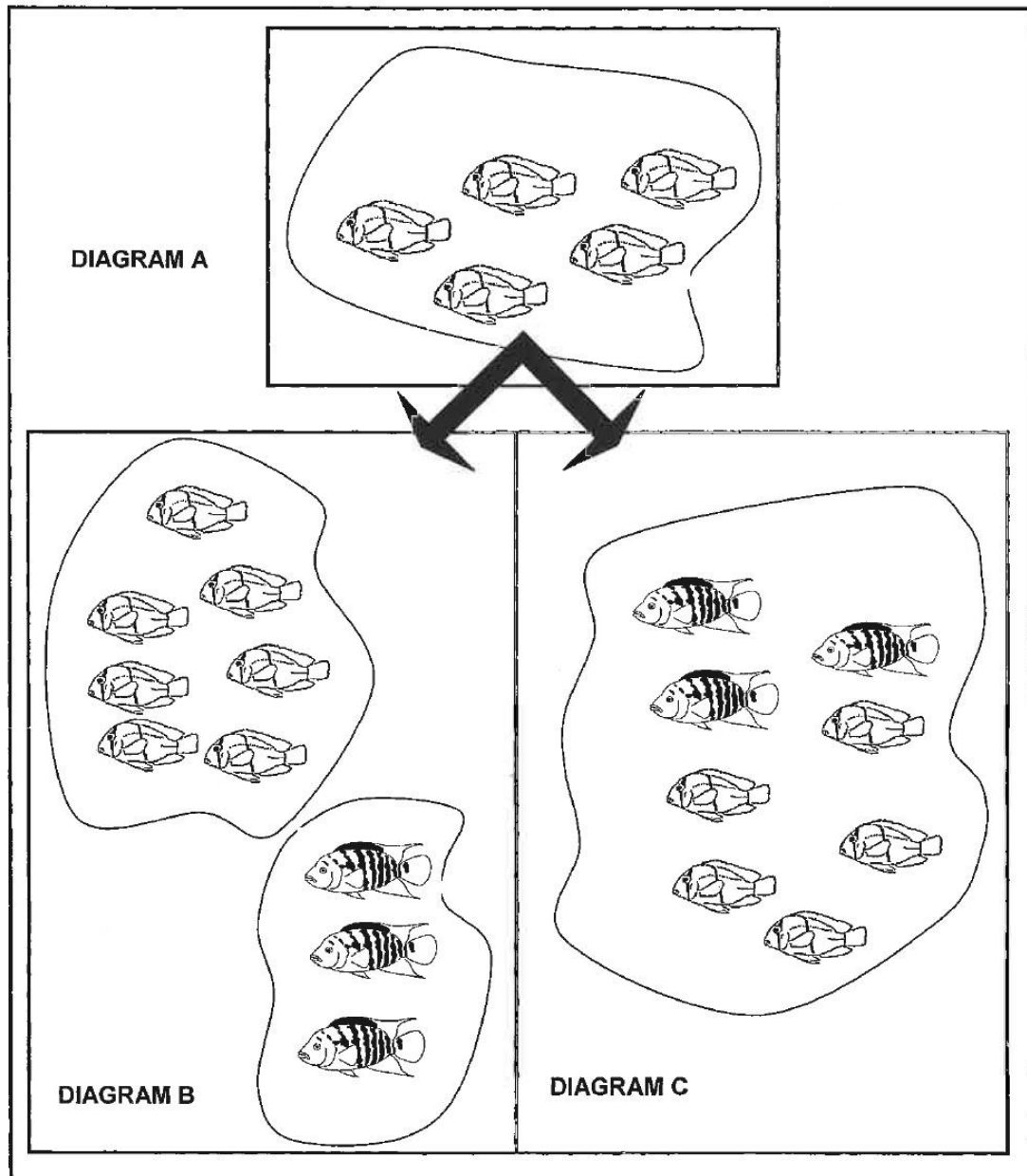


Explain, in terms of natural selection, the shift in the resistance level of the bacteria as illustrated above. (5)

Question 6

(Adapted from Gauteng Prelim 2013, Paper 1, Question 4.1)

The following diagrams illustrate the process of speciation. Study the diagrams and answer the questions.



- Define the term species. (3)
- Gene flow can be interrupted in two main ways. Use the three diagrams to explain the two types of speciation. (10)

Question 7

(Adapted from Gauteng Prelim 2013, Paper 1, Question 3.1)

The following table indicates the position of the foramen magnum, the skull capacity and the approximate age of various hominin species. Study the table and answer the questions that follow.

Name of hominin	Foramen Magnum: (Under or to the back of the skull)	Skull capacity (cm ³) (approximate average)	Age (mya) (Approximate)	Location of fossil find
<i>Australopithecus africanus</i>	Under	490	2,5	Southern and East Africa
<i>Homo habilis</i>	Under	780	2	Africa
<i>Homo erectus</i>	Under	919	1,8	Africa, Asia, Europe
<i>Homo sapiens</i>	Under	1 390	0,2	Not applicable here

- a.) Which species has
 - i. The smallest brain capacity? (1)
 - ii. The largest brain capacity? (1)
- b.) Calculate the difference in brain capacity between the species mentioned in your answers to QUESTION (a.) above. (3)
- c.) Explain how the position of the foramen magnum of the species mentioned above would differ from that of a chimpanzee. (2)
- d.) Explain the significance of this difference. (2)
- e.) How do scientists use the information under the column "location of fossil find" as evidence for the Out of Africa hypothesis? (2)
- f.) Name TWO other types of evidence used for Out of Africa hypothesis. (2)
- g.) List FOUR similarities between *Homo Sapiens* and other primates. (4)
- h.) Draw a bar graph to compare the skull capacity of the different hominins over time. (8)

Question 8

(Adapted from Eastern Cape Prelim 2013, Paper 1, Question 3.2)

There are different alternative views with regard to the study of science and evolution. The two main alternatives are the scientific and the creationist view.

- a.) Distinguish between the scientific view of inquiry and the creationist view. (4)
- b.) State TWO ways in which the reliability of results which are obtained during scientific inquiry can be improved? (2)
- c.) Explain why the results of a scientific research are published in a scientific journal. (2)
- d.) Scientists base their theories of evolution on facts. Name any THREE other fields of study which provide evidence to support the theory of evolution. (3)

Question 9

(Adapted from Eastern Cape Prelim 2013, Paper 1, Question 4.3)

Write a short essay explaining what the “out of Africa” hypothesis is and supply genetic evidence and fossil evidence to support the hypothesis.

Content: (17)

Synthesis: (3)



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