REVISE: EVOLUTION 17 SEPTEMBER 2014

Lesson Description

In this lesson we revise:

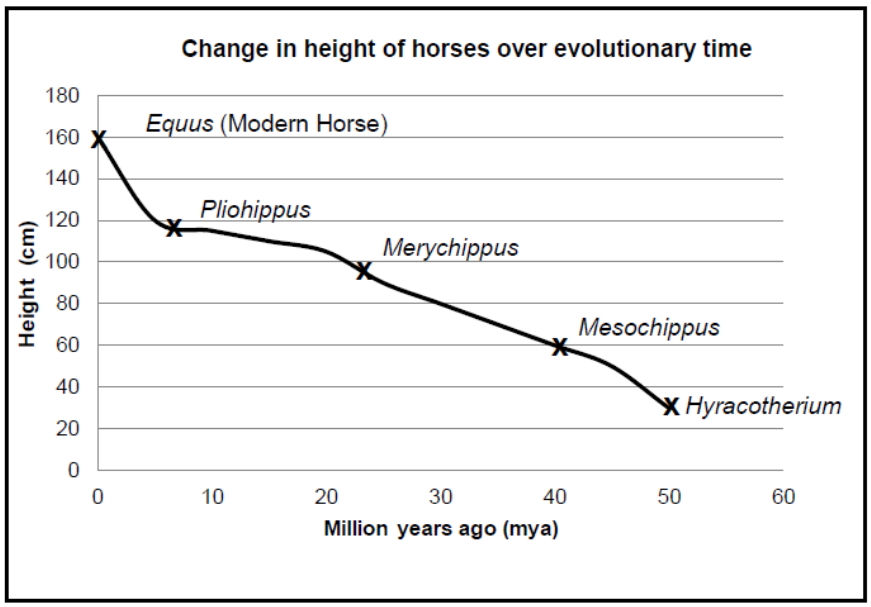
- Evolution by Natural Selection
- Human Evolution

Evolution by Natural Selection

Improve your Skills

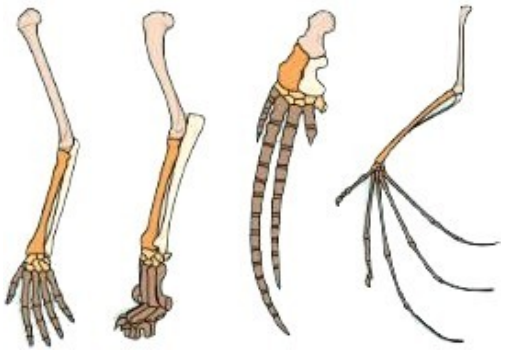
Question 1

The graph below shows the changes in the height of horses over evolutionary time.



[Adapted from *Biology*, Jones and Jones, 1993]

1.1 Distinguish between the terms evolution and biological evolution.
1.2 How would scientists have made observations about the different heights of these horses?
1.3 Calculate the difference between the height of *Equus* and *Mesochippus* according to the available data.
1.4 How would Lamarck have probably described the change of the height of horses over time?
1.5 Explain why we cannot be sure that the evolutionary information displayed in the graph are absolutely correct.
1.6 Study the following diagrams and answer the questions that follow:



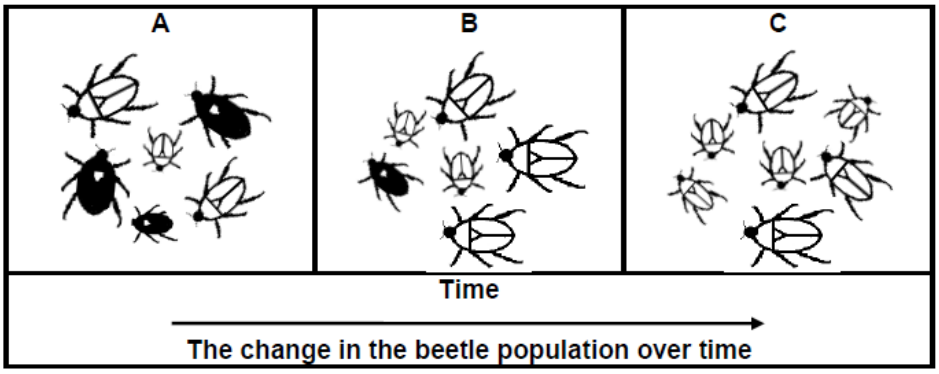
Explain why the above are considered to be homologous structures.

1.7 How do scientists use the above example as evidence for evolution.

Question 2

(Adapted from March 2013, Paper 2, Version 2, Question 2.1)

Study the three diagrams (**A**, **B** and **C**) below that show how a population of beetles changed over a long period of time.



2.1 By comparing diagrams A and B, state the characteristic of the beetles that have enabled their offspring to survive.

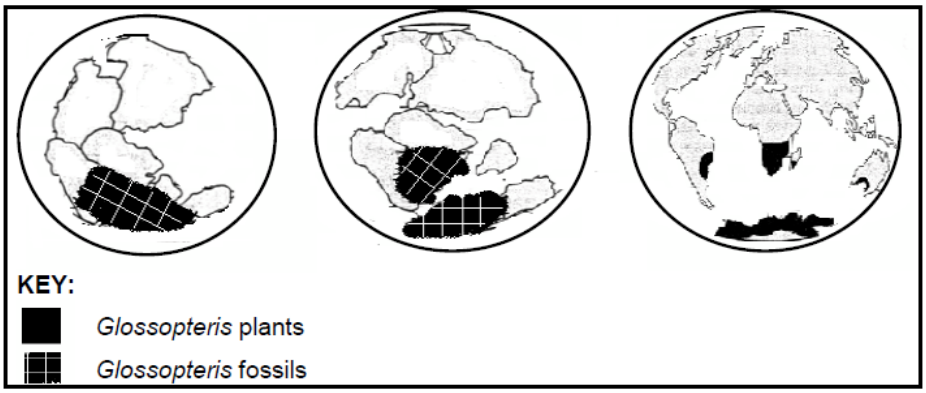
2.2 Name the evolutionary mechanism that is illustrated in these diagrams.

2.3 Use the THREE diagrams above to explain the mechanism named in QUESTION 2.2.

Question 3

(Adapted from March 2013, Paper 2, Version 2, Question 3.1)

Refer to the diagrams below that show the distribution of the fossils of *Glossopteris* and the present-day *Glossopteris* plants and answer the questions that follow.



3.1 Between 500 and 300 million years ago the Earth was one supercontinent as shown in the first diagram. What is the name of this supercontinent?

3.2 How do scientists explain the present-day distribution of Glossopteris plants?

Question 4

Describe how each of the following contributes to genotypic variation within a species:

4.1 Meiosis (6)

4.2 Mutation (2)

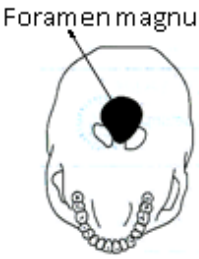
4.3 Sexual reproduction (4)

Human Evolution

Improve your Skills

Question 1

Study the diagrams below of the upper jaw, skull and the foot of two organisms **A** and **B**. The diagrams are NOT drawn to scale.

Organism	Upper jaw	Skull (bottom view)	Foot
A			
B			

1.1 Name the order to which both the organisms belong.

1.2 With regard to the drawings above:

(a) Tabulate TWO visible differences between the upper jaws of organisms A and B.

(b) Name ONE visible difference between the feet of organisms A and B.

1.3 Which organism (A or B) is more likely to be bipedal?

1.4 Give a reason for your answer to QUESTION 1.3 above.

1.5 Explain how bipedalism could benefit the organism you identified in 3 above.

1.6 Provide 5 characteristics that organisms belonging to groups that A and B belong to probably share.

Question 2

(Adapted from P2 Exemplar 2014)

Study the table below, which indicates some of the hominid fossils found in different parts of the world.

SPECIES	AREA WHERE IT WAS FOUND	PERIOD OF EXISTENCE
Australopithecus afarensis	Eastern Africa	3,4–2,8 mya
Australopithecus africanus	Southern Africa	2,1–2,8 mya
Australopithecus sediba	Southern Africa	2,0–1,9 mya
Homo habilis	Sub-Saharan (Africa)	2,3–1,4 mya
Homo erectus	Africa, Europe, Asia	1,5–0,2 mya
Homo heidelbergensis	Europe, China	0,6–0,35 mya
Homo neanderthalensis	Europe, Western Asia	0,35–0,03 mya
Homo sapiens	Worldwide	0,2 mya–present

[Adapted from *The Evolutionary Road*, Jamie Shreeve, *National Geographic*, July 2010]

2.1 Explain TWO ways in which the information in the table supports the 'Out of Africa' hypothesis.

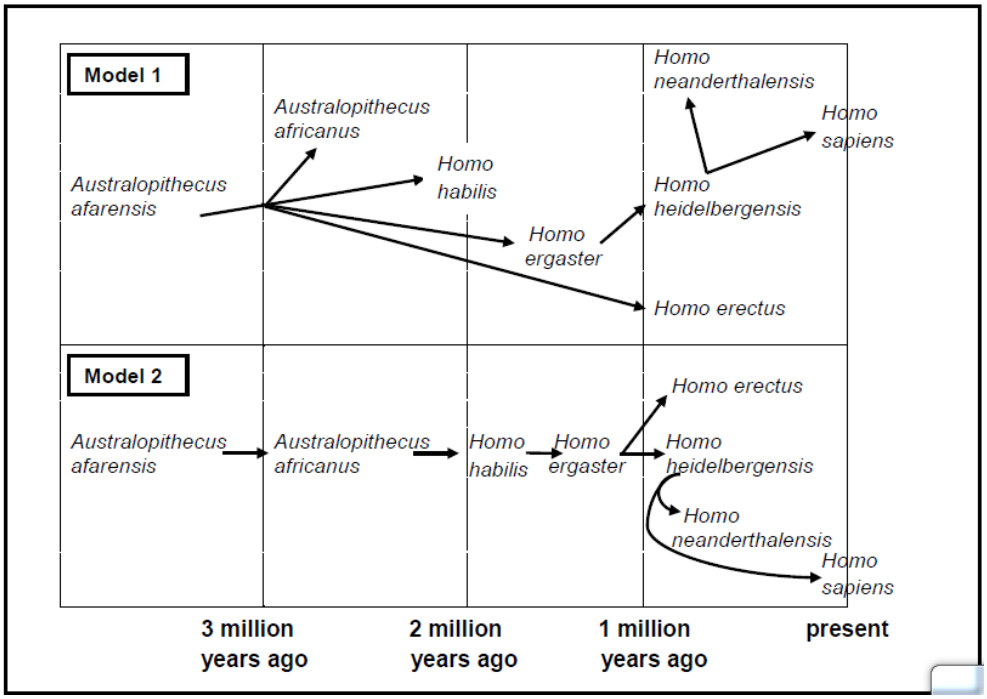
2.2 Describe how the analysis of mitochondrial DNA is used to support the 'Out of Africa' hypothesis.

2.3 How would Darwin have explained why only Homo sapiens and none of the other species mentioned in the table exist today?

Question 3

(Adapted from March 2014 P1)

3.1 Two palaeontologists suggested different models for the human evolutionary tree. The models they proposed are shown below.



3.1.1 State TWO similarities between the two models with regard to relationships among the different species.

3.1.2 Describe TWO ways in which the models are different with regard to relationships among the different species.

3.1.3 Fossilised skeletons of Australopithecus sediba were discovered in the Malapa Caves. When scientists analysed the fossils, they discovered that they shared some characteristics with the genus Homo. Between which TWO species would Australopithecus sediba be placed in Model 2?

3.1.4 Comment on the trends in human development from *Australopithecus* to *Homo sapiens*.

3.2 The incomplete table represents famous scientists, the fossil they discovered and the countries and the dates of discovery. Complete the table by writing down the number and the answer.

Scientist	**Fossil**	**Place of discovery**	**Year of discovery**
1	Ardipithecus	2	1999-2003
3	4	Awash river valley	1992-1993
5	6	Taung	1924
Robert Broom	7	8	1947
9	Lucy	10	1974
11	Karabo	12	2008