CHAPTER
7

Evolution

NCERT FOCUS

ANSWERS

Topic 1

1. The process of evolution of different species in a given geographical area starting from a point and literally radiating to other areas of geography (habitats) is called adaptive radiation. Adaptive radiation gave rise to Australian marsupials. A number of marsupials, each different from the other evolved from an ancestral stock, but all within the Australian island continent.

Topic 2

1. When a bacterial population encounters a particular antibiotic, those sensitive to it, die. Sometimes a bacterial population happens to contain a few bacteria having mutations which make them resistant to the antibiotic. Such resistant bacteria survive and multiply quickly. Soon the resistance providing genes become widespread and entire bacterial population becomes resistant. This type of sorting out of the organisms with useful variations has been called as 'natural selection' by Darwin.

2. Species (used both as singular and plural) is a natural population of individuals or group of populations which resemble one another in all essential morphological and reproductive characters so that they are able to interbreed freely and produce fertile offspring.

Topic 3

1. New fossil discoveries are as follows :

(i) An international research team has recently discovered some amber fly specimens in El Sopalo cave (Cantabria, Spain). According to an article published in the scientific journal 'Current Biology', these specimens fed on nectar and pollinated gymnosperm plants 105 million years ago.

(ii) Research conducted in Japan has revealed a very unusual new species of octocoral from a shallow coral reef in Okinawa, Japan. This new species can be considered as "living fossil," and is related in many ways to the unusual blue coral.

(iii) The 48 million year old fossil, recovered from the Bridger Formation in Wyoming, is the first description of a new species, named Babibasiliscus alxi by the author, and may represent the earliest clear member of the lizard group, Corytophanidae.

(iv) Neanderthals became extinct about 40,000 years ago but contributed on average one to three percent to the genomes of present day Eurasians. Researchers have now analysed DNA from a 37,000 to 42,000 year old human mandible in Romania and have found that six to nine percent of this person's genome came from Neanderthals, more than any other human sequenced till date. Because large segments of this individual's chromosomes are of Neanderthal origin, a Neanderthal was among his ancestors as recently as four to six generations back in his family tree. This shows that some of the first modern humans that came to Europe mixed with the local Neanderthals.

2. Human evolution shows the following trends :

A. Brain size : It increased gradually along with evolution. The brain capacity of *Australopithecus africanus* - 500 *cc*, *Homo habilis* - 700 *cc*, *Homo erectus* - 800 - 1300 *cc*, *Homo sapiens sapiens* - 1450 *cc*.

B. Skeletal structure :

(i) *Dryopithecus* was ape-like, without brow ridges, had semierect posture, and prognathous face (having a projecting jaw).

(ii) *Ramapithecus* had jaws and teeth like humans (small canines and large molars), prognathous face and walked on legs.

(iii) *Australopithecus africanus* had erect posture, human like teeth, was without chin, with brow ridges, and had prognathous face.

(iv) *Homo habilis* walked nearly erect, had human like teeth, with brow ridges, face was slightly prognathous.

(v) *Homo erectus* had erect posture, prognathous face, with projecting brow ridges, small canines and large molar teeth and had small chin.

(vi) *Homo sapiens sapiens* had four curves in the vertebral column, orthognathous face (without projecting jaw), forehead broad, chin well developed, walked on sole.

C. Dietary preference : *Dryopithecus* and *Ramapithecus* were herbivores, *Australopithecus africanus* and *Homo habilis* were carnivores, *Homo erectus* and *Homo sapiens sapiens* were omnivores.

3. Yes, chimpanzees are most near to the man than any other living animal and have self-consciousness.

4. List of few modern day animals and their corresponding ancient fossils is as follows :

	Modern day	Ancient fossil
(i)	Modern horse *(Equus)*	*Eohippus*, Dawn horse - The first fossil found in the evolution of horse.
(ii)	Camel *(Camelus)*	*Protylopus* - The first ancestor of modern camel.

(iii)	Modern elephant *(Elephas)*	*Moeritherium* - The ancestor of modern elephant.
(iv)	Man *(Homo sapiens)*	*Sahelanthropous* - Oldest of man's ancestors.
(v)	Vertebrates	Jawless primitive fish like animals collectively known as ostracoderms (*e.g.*, *Jamoytius*).
(vi)	Reptiles	*Seymouria*-Missing link between amphibians and reptiles.
(vii)	Birds	*Archaeopteryx* - Missing link between reptiles and birds.
(viii)	Mammals	*Cynognathus*-Missing link between reptiles and mammals
(ix)	Frogs, toads and salamanders	Some stem amphibians called *Labyrinthodontia* (*e.g.*, *Eryops*) gave rise to modern amphibians such as frog, toads and salamanders.

5. No, we cannot call human evolution as adaptive radiation.

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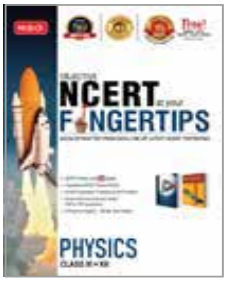

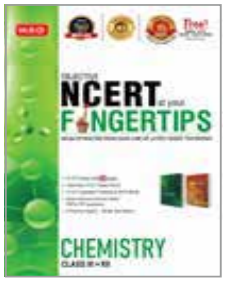

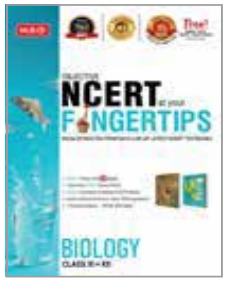

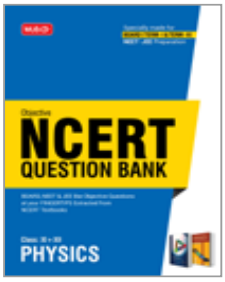

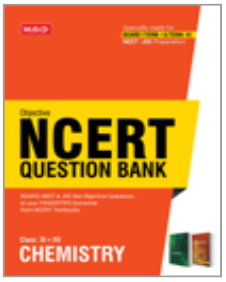

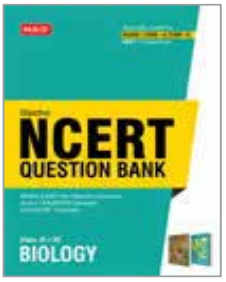

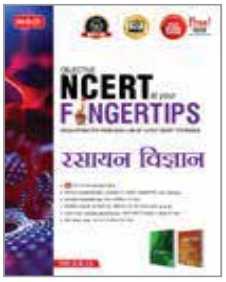

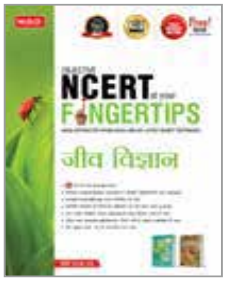

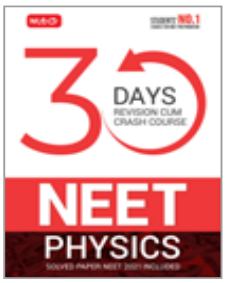

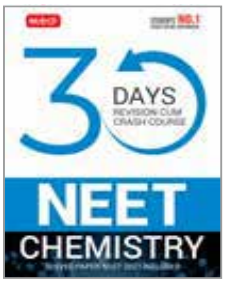

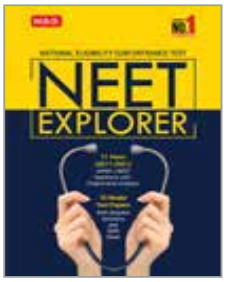

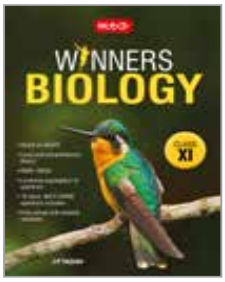

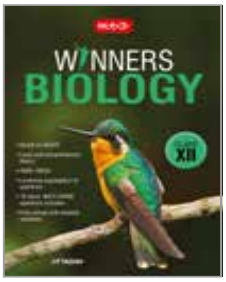

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