

EXERCISE QUESTIONS

CHAPTER-7 EVOLUTION

1. Explain antibiotic resistance observed in bacteria in light of Darwinian selection theory.

Ans - Darwinian selection theory suggests that the environment selects organisms with useful variation over those which do not have useful variations. It is mainly because, in a dynamic environment, these organisms are better adapted to survive. A well-defined example for Darwin's theory is antibiotic resistance in bacteria. When bacteria were grown on penicillin containing agar medium, all the bacteria died, however, the ones having variations conferring penicillin resistance survived. Later, these bacteria multiplied and increased their number. As a result of this, penicillin-resistant bacteria evolved and survived because of the environment that selected these over the others.

2. Find out from newspapers and popular science articles any new fossil discoveries or controversies about evolution.

Ans - Chimps are more evolved than humans (The Times of India): Chimpanzees are more evolved than humans, a study suggests. There is no doubt that humans are the more advanced species. But a comparison of 14,000 human and chimpanzee genes shows the forces of natural selection have had the greatest impact on our ape cousins.

The researchers' discovery challenges the common assumption that our large brains and high intelligence were the gifts of natural selection. Humans and chimps followed different evolutionary paths from a common ape ancestor about 5 million years ago. Both underwent changes as the fittest survived to pass their genes on to future generations. But the US study shows that

humans possess a ‘substantially smaller’ number of positively-selected genes than chimps.

3. Attempt giving a clear definition of the term species.

Ans - The term species refers to a group of individuals that are similar in their characters and can interbreed among themselves and produce viable and fertile progenies.

4. Try to trace the various components of human evolution (hint: brain size and function, skeletal structure, dietary preference, etc.)

Ans -

The various components of human evolution are as follows.

(i) Brain capacity

(ii) Posture

iii. Food / dietary preference and other important features

	Name	Brain capacity	Posture	Food	Features
1.	<i>Dryopithecus africans</i>	---	Knuckle walker, walked similar to gorillas and chimpanzees (was more	Soft fruit and leaves	Canines large, arms and legs are of equal size

			ape-like)		
2.	<i>Ramapithecus</i>	---	Semi-erect (more man-like)	Seeds, nuts	Canines were small while molars were large.
3.	<i>Australopithecus africanus</i>	450 cm ³	Full erect posture, height (1.05 m)	Herbivorous (ate fruits)	Hunted with stone weapons, lived at trees, canines and incisors were small
4.	<i>Homo habilis</i>	735cm ³	Fully erect posture, height (1.5 m)	Carnivorous	Canines were small. They were first tool makers.
5.	<i>Homo erectus</i>	800-1100 cm ³	Fully erect posture, height(1.5-1.8 m)	Omnivorous	They used stone and bone tools for hunting games.
6.	<i>Homo neanderthalnsis</i>	1300-1600 cm ³	Fully erect posture, height (1.5-1.66 m)	Omnivorous	Cave dwellers, used hides to protect their bodies, and buried their dead
7.	<i>Homo sapiens</i>	1650	Fully erect	Omnivorous	They had strong

<i>fossilis</i>	cm ³	posture with height (1.8 m)		jaw with teeth close together. They were cave dwellers, made paintings and carvings in the caves. They developed a culture and were called first modern men.
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5. Find out through internet and popular science articles whether animals other than man has self-consciousness.

Ans - There are many animals other than humans, which have self-consciousness. An example of an animal being self-conscious is dolphins. They are highly intelligent. They have a sense of self and they also recognize others among themselves and others. They communicate with each other by whistles, tail-slapping, and other body movements. Not only dolphins, there are certain other animals such as crow, parrot, chimpanzee, gorilla, orangutan, etc., which exhibit self-consciousness.

6. List 10 modern-day animals and using the internet resources link it to a corresponding ancient fossil. Name both.

Ans - (i) Cockroach, Limulus (king crab), Neopilina, Latimaria (Fish) are fossil that has remain unchanged over years.

(ii)'Trilobites- fossil arthropods

(iii)Lung fishes – connecting link between fishes and amphibians

(iv)Peripatus – connecting link between annelids and arthropods .

(v) Woody mammoth – ice fossils

(vi)Dinosaur footprint – imprints

(vii)Gastropods – mould and cast fossil

(viii)Giant elk – amber fossil of asphalt

7. Practise drawing various animals and plants.

Ans - Ask your teachers and parents to suggest the names of plants and animals and practice drawing them



8. Describe one example of adaptive radiation.

Ans - Adaptive radiation is an evolutionary process that produces new species from a single, rapidly diversifying lineage. This process occurs due to natural selection. An example of adaptive radiation is Darwin finches, found in Galapagos Island. A large variety of finches is present in Galapagos Island that arose from a single species, which reached this land accidentally. As a result, many new species have evolved, diverged, and adapted to occupy new habitats. These finches have developed different eating habits and different types of beaks to suit their feeding habits. The insectivorous, blood sucking, and other species of finches with varied dietary habits have evolved from a single seed eating finch ancestor.

9. Can we call human evolution as adaptive radiation?

Ans - No, human evolution cannot be called adaptive radiation. This is because adaptive radiation is an evolutionary process that produces new species from a single, rapidly diversifying lineage, which is not the case with human evolution. Human evolution is a gradual process that took place slowly in time.

10. Using various resources such as your school Library or the internet and discussions with your teacher, trace the evolutionary stages of any one animal, say horse.

Ans - The evolutionary stages of a horse are as follows:

Period	Name of the evolutionary	Features of the animal
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	stage	
Eocene	Eohippus	It has 4 toes, all of them are functional. Head and neck are short
Oligocene	Mesohippus	A slight increase in height with 3 toes on each foot
Miocene	Merychippus	It was 100 cm tall with 3 toes on each foot. Molars were present
Pliocene	Pliohippus	It had a single functional toe with a splint in 2 and 4 of each limb. They are 108 cm tall.
Pleistocene	Equus	They have one toe in each foot. For grinding they have molars, and for cutting they have incisors