

Chapter 6: Evolution

NCERT · Class 12 · Biology

Textbook exercises

Question 1

Explain Antibiotic Resistance Observed in Bacteria in Light of Darwinian Selection Theory.

Solution

Ans:

Adaptations to a specific environment allow organisms to survive, according to Darwin. Bacteria that are sensitive to a particular antibiotic die when they come into contact with it. Some bacteria, however, develop resistance to the antibiotic when they have favourable mutations. Bacteria resistant to these types of bacteria can persist and multiply quickly after their competition is eliminated. As a result, the number of them grows. A member of the population may also inherit genes that confer resistance to others. Thus, bacterial people everywhere become resistant to antibiotics.

Question 2

Find Out from Newspapers and Popular Science Articles Any Few Fossil Discoveries or Controversies About Evolution.

Solution

Ans:

As per the Times of India- Chimps are more intelligent than humans:

In an experiment, researchers found that chimpanzees had greater evolutionary flexibility than humans. The human species is unquestionably more advanced than other species. Comparing 14,000 genes between humans and chimpanzees demonstrates that we humans have been more influenced by natural selection than our ape cousins.

Natural selection cannot explain why we have large brains and high intelligence. Chimpanzees and humans share a common ancestor, an ape, dating approximately 5 million years ago. As generations passed, their genes evolved to ensure future generations had the best chance of survival. In contrast, the findings of a US study indicate that humans possess a much lower number of positively selected genes than chimps.

Question 3

Attempt Giving a Clear Definition of the Term Species.

Solution

Ans:

Species are populations or groups of individuals capable of interbreeding and producing viable and fertile offspring.

Question 4

Try to Trace the Various Components of Human Evolution (hint: Brain Size and Function, Skeletal Structure, Dietary Preference, Etc.)

Solution

Ans:

Human evolution can be broken down into the following components:

1. Volume of the human brain
2. Structure of the skeleton
3. Posture
4. Preferences in terms of diet
5. Behavioral traits

Significant changes in morphology occurred in the ancestors of modern humans:

- (1) Elevation and narrowing of the nose.
- (2) Chin formation.
- (3) Diminishing the brow ridges.
- (4) The face becomes flattened.
- (5) Less hair on the body.
- (6) Curvature of the vertebral column to promote upright posture.
- (7) Presence of a bowl that constitutes the pelvic girdle in support of the viscera.
- (8) Height increases.
- (9) Possessing an upright posture and moving bipedally.
- (10) The rounding of the head and the enlargement of the head.
- (11) Increase in brain size and intelligence.
- (12) Broadening of the forehead and with vertical elevation

Question 5

Find Out Through the Internet and Popular Science Articles Whether Animals Other Than Man Have Self-Consciousness.

Solution

Ans:

The ability to introspectively determine one's relationships to the environment and other people remains an essential self-awareness component. All animals cannot have it, but human creatures do. Only humans have shown such a capacity from the many animals tested. Animals such as orangutans, chimpanzees, gorillas, bottlenose dolphins, elephants, orcas, bonobos, Rhesus macaques, and European magpies are examples. The Canidae family of animals, including dogs, show subtle displays of self-consciousness.

Question 6

List 10 Modern-Day Animals and Using the Internet Resources Link it to a Corresponding Ancient Fossil. Name Both

Solution

Ans:

Serial Number	Animal	Fossil
1	Man	Ramapithecus
2	Horse	Eohippus
3	Dog	Leptocyon
4	Camel	Protylopus
5	Elephant	Moerithers
6	Whale	Protocetus
7	Fish	Arandaspis
8	Tetrapods	Ichthyostega
9	Bat	Archaeonycteris
10	Giraffe	Palaeotragus

Question 7

Practice Drawing Various Animals and Plants.

Solution

Ans:

Make these diagrams perfect by practising with a few plants and animals that seem relatively easy to draw. Teachers and parents can offer suggestions, or you might even try looking up simple animal or plant figures online.

Question 8

Describe One Example of Adaptive Radiation.

Solution

Ans:

A lineage or group of individuals evolves into various forms as a result of adaptive radiation. In addition to natural selection, resources and habitats also contribute to the evolution of these forms. The Galapagos Darwin finches may have a common ancestor but now have different beaks based on their food preferences. The different feeding habits and types of beaks these finches possess are due to their different eating habits. It has evolved from a seed-eating finch ancestor to become insectivorous, blood-sucking, and many other types of finches with varied diets.

Question 9

Can We Call Human Evolution Adaptive Radiation?

Solution

Ans:

There is no such thing as adaptive radiation in human evolution. One way to define adaptive radiation is that it occurs when new species evolve from one common ancestor. Even though we share an ancestor, human evolution has seen gradual but progressive changes in our bodies, eating habits, etc. Diversification into new species, a characteristic of adaptive radiation, is not part of human evolution.

Question 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.

Solution

Ans:

During the Eocene period, horses evolved from Eohippus. It involved the following evolutionary stages.

A trio of Eohippus, Mesohippus, Merychippus, and Pliohippus led to the emergence of Equus.

Trends in evolutionary development:

- (i) Increase in body weight.
 - (ii) Lengthening of the neck.
 - (iii) An increase in leg length.
 - (iv) Enlarging the third digit.
 - (v) Progressive reduction of lateral digits
 - (vi) More complex teeth to feed on grass
 - (vii) Strengthening of the back
 - (viii) Brain and sensory organ development
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