

# NCERT Solutions for Class-XII Biology

## Chapter -6

### NCERT Biology Class 12

1. Explain antibiotic resistance observed in bacteria in light of Darwinian selection theory.
  1.
    - Darwinian Selection Theory states that *“The organisms with the characteristics that enable them to survive better in natural conditions (the existing environmental conditions) would outbreed others that are less-endowed to survive under those conditions.”*
    - Bacteria have been subjected to antibiotics since the earliest discovery of the first antibiotic i.e. *Penicillin*. Due to these constant treatments, certain strains of bacteria, due to mutations, developed resistance, or the already present resistance gene, now got selected as they could still survive in the presence of the antibiotics.
    - Only the ones that survived the antibiotic treatment could further perpetuate and produce offsprings, resulting in the increase of antibiotic resistance in the bacterial population.
    - Hence, the antibiotic resistance was observed in bacteria.
  2. Find out from newspapers and popular science articles any new fossil discoveries or controversies about evolution.
  2. Fossils of dinosaurs have revealed the evolution of reptiles in Jurassic period. As a result of this, evolution of other animals such as birds and mammals has also been discovered. However, two unusual fossils recently unearthed in China have ignited a controversy over the evolution of birds. *Confuciusornis* is one such genus of primitive birds that were crow sized and lived during the Cretaceous period in China.
3. Attempt giving a clear definition of the term species
3. A Species includes all those organisms with the characteristics similar enough, so that they can interbreed and perpetuate.
4. Try to trace the various components of human evolution (hint: brain size and function, skeletal structure, dietary preference, etc.)
4. The various components of human evolution are as follows:

S.No.	Name	Time period	Brain capacity	Height and structure	Features
1.	Dryopithecus	15 m.y.a.	-	Walked similar to chimpanzees or gorillas	<ul style="list-style-type: none"><li>• More ape like</li><li>• Large canines, both arms and</li></ul>

					legs of same size
2.	Ramapithecus	14-8 m.y.a.	-	Comparatively erect posture (not complete)	<ul style="list-style-type: none"> <li>• More man like</li> <li>• Smaller canines, larger molars</li> </ul>
3.	Australopithecus	2 m.y.a.	450 cc	Fully erect 1.05 m in height	<ul style="list-style-type: none"> <li>• Probably lived in East African Grasslands.</li> <li>• Hunted with stone weapons.</li> <li>• Fed on fruits</li> </ul>
4.	Homo habilis	2-1.5 m.y.a.	650-800 cc	Erect posture 105 m in height.	<ul style="list-style-type: none"> <li>• First human like being-hominid</li> <li>• Did not eat meat.</li> <li>• Developed tools</li> </ul>
5.	Homo erectus	1.6 m-200,000 y. a.	900 cc	Fully erect posture 1.5-1.7 m in height.	<ul style="list-style-type: none"> <li>• Ate meat</li> <li>• Left African subcontinent and spread to other parts of the world.</li> <li>• Used hides to protect their body and buried their dead.</li> </ul>
6.	Homo sapiens	400,000-40,000 y.a.	Neanderthals had the brain capacity of 1400 cc.	Fully erect posture 1.5-1.8m in height	<ul style="list-style-type: none"> <li>• Developed into different races.</li> <li>• Cultivated crops and lived in settled civilisations.</li> <li>• Domesticated various animals for</li> </ul>

					food and protection.
7.	Homo sapiens sapiens	40,000y.a.- present	1200-1600 cc	Fully erect posture 1.5-1.8 m in height.	<ul style="list-style-type: none"> <li>The modern day man, living in civilisations.</li> <li>Omnivorous.</li> </ul>

- Find out through internet and popular science articles whether animals other than man have self-consciousness.
- 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, tailslapping, and other body movements. Not only dolphins, there are certain other animals such as crow, parrot, chimpanzee, gorilla, orangutan, etc., which exhibit self-consciousness.
- List 10 modern-day animals and using the internet resources link it to a corresponding ancient fossil. Name both.

6.

S.No.	Name of the animal	Corresponding ancient fossil
1.	Horse	<i>Meshippus, Eohippus</i>
2.	Dog	<i>Leptacyon</i>
3.	African Elephant	<i>Deinotherium giganteum</i>
4.	Goat	<i>Myotragus</i>
5.	Crocodiles	<i>Sarcosuchus</i>
6.	Snakes	<i>Parviraptor estesi</i>
7.	Arthropods	<i>Trilobite</i>
8.	<i>Coelacanth</i> s	Living fossil
9.	Bat	<i>Archaeonycteris</i>

10.	Girrafe	<i>Palaeotragus</i>
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7. Practise drawing various animals and plants.
7. Ask your teachers and parents to suggest the names of plants and animals and practice drawing them. You can also take help from your book to find the names of plants and animals.
8. Describe one example of adaptive radiation.
8.
  - i. Adaptive radiation is the evolution of organisms such that a single species diverges into many through changes in the habitat and other habits so as to survive in a particular geographical area without facing competition. The best example of adaptive radiation is Darwin's Fiches.
  - ii. During his journey, Darwin observed a variety of birds in the Galapagos Islands. He observed that all these birds had evolved from a common ancestor.
  - iii. The birds, originally fed on seeds. But due to increase in population and limited resources, started facing competition. As a result, various birds acquired different features depending on the kind of food they procured.
  - iv. So, earlier to be of a single kind, these birds diverged into having different variety of beaks depending on their food habits- Seeds, insects, nectar, etc. thus enabling them to survive in the same geographical area without facing any competition.
  - v. Another example of adaptive radiation is Australian marsupials.
9. Can we call human evolution as adaptive radiation?
9. 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. It represents an example of anagenesis.
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.
10. Evolutionary stages of a horse (*Equus*) occurred in the following way:

*Hyracotherium or Eohippus*



*Mesohippus*



*Merychippus*



*Pliohippus*



*Equus*

S.No.	Name	Time period	Height	Features
1.	<i>Eiohippus</i>	52million years ago	2ft	Premolars simpler than molars, The forelimbs had developed five toes, feet padded like a dog
2.	<i>Mesohippus</i>	40 million years ago	More than 2 feet	walked on three toes on each of its front and hind feet, Face, snout and neck slightly longer
3.	<i>Merychippus</i>	Mesocene period	-	an effective grazer and runner, wider molars, The hind legs, were relatively short, had side toes equipped with small hooves,
4.	<i>Pliohippus</i>	12 million years ago	Very similar to modern day horse	had two long extra toes on both sides of the hoof,
5.	<i>Equus</i>	5.6 million years ago	4.5-6ft	Modern day horse, Only 1 toe on each foot, 24 teeth for chewing and grinding.



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