

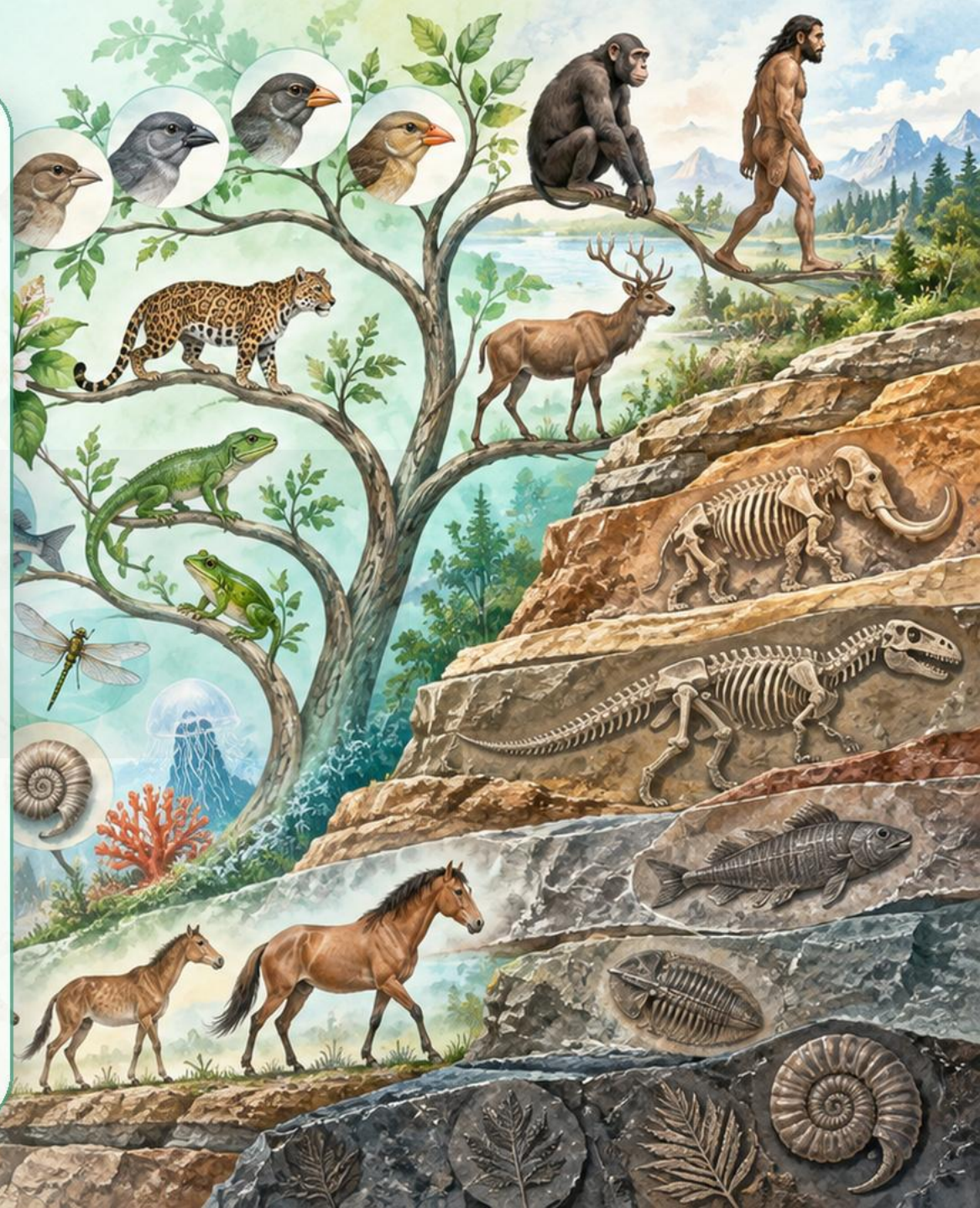
BIOLOGY • CLASS 12

6

CHAPTER

Evolution

NCERT SOLUTIONS

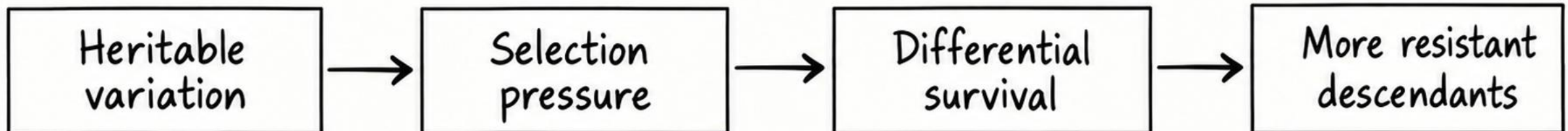


EXERCISE SOLUTION: QUESTION 1

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

Answer:

- A bacterial population contains heritable variation. Some bacteria may already be resistant to an antibiotic.
- The antibiotic acts as a selection pressure. Susceptible bacteria are killed or inhibited, while resistant bacteria are more likely to survive.
- Survivors leave more descendants and pass on resistance. Resistant forms become more common over generations.
- This is natural selection: the environment selects a useful inherited variation; bacteria do not become resistant because they need to.



EXERCISE SOLUTION: QUESTION 2

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

Answer:

A documented recent finding: the Harbin skull

Reported in 2025; fossil at least 146,000 years old.

- The nearly complete skull from Harbin, China, had previously been named Homo longi.
- New analyses of ancient proteins and mitochondrial DNA linked this individual to Denisovans, an ancient human group previously known mainly from fragmentary remains.
- The finding connects molecular evidence with skull anatomy and improves our understanding of human evolution in Asia.
- It shows that new evidence can change a fossil's classification. The relationship is supported by evidence, not by appearance alone.

Research: Fu and colleagues, Science and Cell, 2025.

EXERCISE SOLUTION: QUESTION 3

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

Answer: A species is a group of natural populations whose members can actually or potentially interbreed and produce viable, fertile offspring, and are reproductively isolated from other such groups.

Key points:

- Members share a common gene pool and fundamental similarities.
- Reproductive isolation limits gene exchange with other species.
- This biological species concept is most useful for sexually reproducing organisms. Asexual organisms and fossils must also be identified using other evidence, such as structure and DNA.

Interbreeding populations

+

reproductive isolation
from other groups

EXERCISE SOLUTION: QUESTION 4

4. Trace the various components of human evolution: brain size and function, skeletal structure, dietary preference, etc.

Answer:

Component	Changes in human evolution
Brain and behaviour	Brain size and complexity generally increased, supporting learning, planning, memory and communication. Brain size alone does not measure intelligence.
Upright walking	Habitual bipedalism developed before the major increase in brain size. A short, broad pelvis, curved spine and aligned feet support upright walking.
Hands and skeleton	Hands became free from locomotion; precise grips helped tool use. Later humans generally had flatter faces, smaller jaws and teeth, and lighter skeletons.
Diet	Diets varied among species and habitats. Plant foods remained important; animal foods, food processing and cooking became significant in later human groups.
Culture	Tool use became more varied. Social learning, language, symbolic art and, much later, agriculture and settled life expanded.

Human evolution was a branching process, not a straight ladder. These changes did not all appear together.



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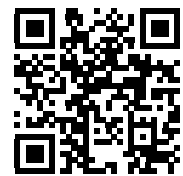


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