EVOLUTION AND BIODIVERSITY

Evolution: A change in the allele frequency of a population's gene pool over successive generations.

- Evidence from Fossils
- Evidence from homologus structures
- Evidence from selective breeding
- Evidence from patterns of variation

FOSSILS

- It provides evidence by revealing the features of an ancestor for comparison against living descendants.
- Reliable methods of radioisotope dating revealed the ages of rock strata and of the fossils in them.

→ The sequence in which fossils appear matches the sequence in which they would be expected to evolve. → Law of fossil succession

Prokaryotes before Eukaryotes
Ferns before flowering plants
Invertebrates before vertebrate species

o only hard parts of the organism are preserved
↓
there are missing links because of this.

Ex:- Equus · related to rhinoceroses & tapirs
→ Hyracotherium similar to rhinoceros.

Transitional fossil: demonstrate the intermediary forms that occured over the evolutionary pathway taken by a single genus.

Example: Archaeopteryx

↓

links the evolution of dinosaurs (jaws & claws) to birds (feathers)

Example,
- comparison of australopithecus and homo sapiens.

SELECTIVE BREEDING

- it is form of artificial selection where humans intervene in the breeding of species to produce an offspring with desired traits.
- the desired trait's frequency increases and becomes more common in upcoming generations.

this allows variation in a short period of time.

Example: Plants of genus Brassica - modified to produce - broccoli (flower buds), cabbage (leaf buds), and Kale (leaf)

In animals - horse breeding, dog breeding, cow breeding

HOMOLOGUS STRUCTURES

Anatomical features that have the same structure but serve a different function are called homologus structures.

more similar homologus structures - closely related species.

Analogus structures

→ same function - different structure

Adaptive radiation: new species rapidly diversify from an ancestral source, with each new species adapted to utilise a specific unoccupied niche.

Convergent evolution:

independent evolution of similar features in different species due to similar environment.

Divergent evolution:

gradual evolution of different features in 2 different species who share a common ancestor due to a different environment.

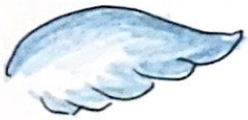
The Pentadactyl Limb

Humans - tool manipulation (power v/s precision grip)

Bird & Bat - wings adapted for flying.

Horse - hooves adapted for galloping

Whale & dolphin - adapted for swimming.



SPECIATION

The evolutionary process by which 2 related populations diverge into separate species is called speciation.

- 2 populations get separated - do not interbreed - natural selection acts differently on both - they evolve in different ways.

Transient Polymorphism - change in phenotype in the same species.

Industrial melanism:

Biston betularia exist in 2 polymorphic forms - light and dark.

Light - unpolluted environment - trees are covered by lichen.

Dark - polluted environment · SO_2 kills lichen while soot makes the bark dark.

Before industrial revolution, lighter moths had a greater chance of survival. ∴ lighter moth population↑

After industrial revolution, darker moths had a greater chance of survival ∴ dark moth population↑.