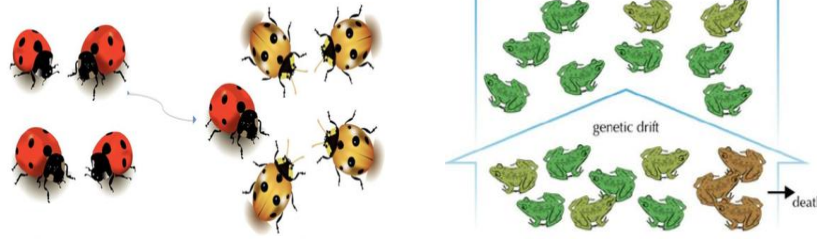


EOC Review: Evolution

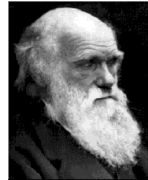
Evolution is the gradual and continual process of descent with modification (change over time).

Methods of Evolution

- Gene flow - is the transfer of genes into and out of a population due to interbreeding between different populations



- Genetic drift - is the change in the frequency of an allele in a population due to random sampling
- Mutation: Any change in the sequence of DNA-can be beneficial, neutral or harmful
- Recombination: The process by which genetic material from different individuals becomes combined-during meiosis or sexual reproduction.
- Natural Selection: Mechanism by which individuals that have inherited beneficial adaptations produce more offspring.



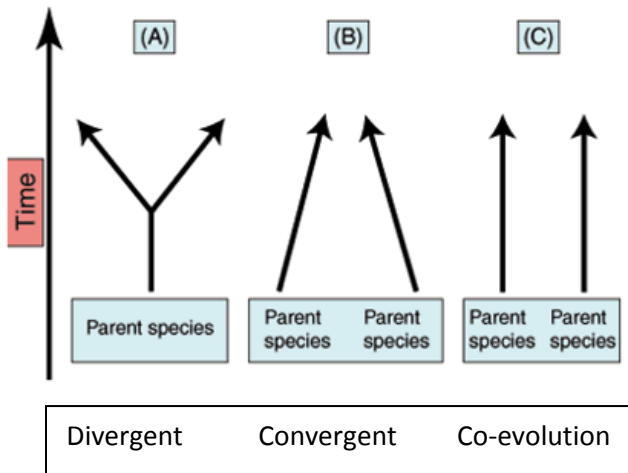
Natural Selection

*Idea proposed by Charles Darwin

and Alfred Wallace

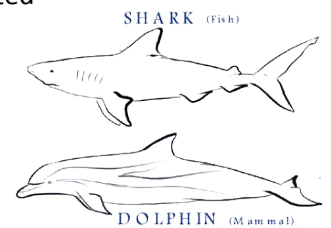
- More offspring are produced than the environment can support (competition for food, shelter, water & mates)
- Variations exist in a population-some variations give some individuals a slight survival advantage.
- Competition for reproduction and survival of individuals

Types of evolution



A-Divergent Evolution - process by which an interbreeding population or species diverges into two or more descendant species, resulting in once similar or related species to become more and more dissimilar.

B-Convergent Evolution - two unrelated species independently evolve similar traits to cope with specific evolutionary challenges, like living in ice-cold water or eating ants.



C-Co-evolution - evolution of two or more interdependent species, each adapting to changes in the other, example -between predators and prey or between insects and the flowers that they pollinate.

Evidence of Evolution

1) Cell Theory

- Cell is basic unit of life
- Every life form is made of this basic structure

2) Organic Molecules

- 99% of all life is made of carbon, hydrogen, oxygen, nitrogen, phosphorous, & sulfur

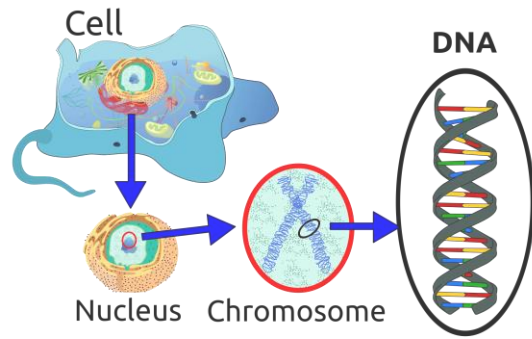
3) DNA

- Genetic informational molecule in every organism, including viruses
- DNA language (genetic code) is universal: A-T and C-G
- Common genetic language allows for insertion of human genes in bacteria to produce human proteins

4) ATP – primary energy molecule for every organism

5) Biogeography – geographic distribution of species can show how organisms are related

Example: Flightless birds found in Africa, South American, and Australia. It is thought that all 3 had a common ancestor before the tectonic plates moved (continental drift).



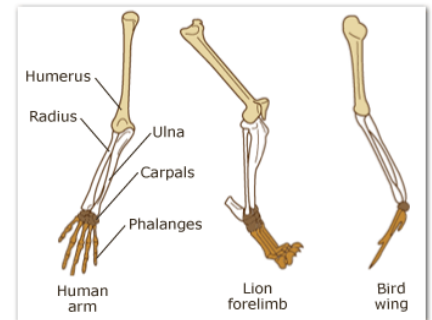
6) Fossils – preserved remains of dead organisms

Fossil records provide valuable information about evolutionary changes or modifications in organisms



7) Homologous Structures

Anatomical similarities of related life forms
Example: forelimbs of vertebrates made of same basic bones but have different functions based on environment



8) Vestigial structures – are the remains of non-functional structures

Example – pelvic bones in modern whales or tailbone in humans



9) Analogous structures - Some biological characteristics are analogous (also called

"convergent"), which means that they serve the same function in different species but they evolved independently rather than from the same embryological material or from the same structures in a common ancestor.

Example of an analogous structure would be the wings on butterflies, bats, and birds.

10) Comparative embryology – early

developmental stages of humans share remarkably similar vertebrate characteristics with other vertebrates that either disappear or become vestigial in human adults.

