

Evidence for Evolution – Revision Notes

Evolution and Species Change:

· Evolution – the change in a population's genetics from generation to generation through any of the following processes:

- Mutation
 - Change of genetic sequence in organism
 - Error in DNA replication or extreme environmental conditions (eg. Radiation)
 - Can be an addition or a deletion from a genetic sequence

- Natural Selection
 - Organisms adapt to their environment
 - The ones that adapt live longer as they have conditioned themselves better to their environment
 - These characteristics/mannerisms are then passed on through the generations which allow their offspring to exist in their environment

- Genetic Drift
 - Random process
 - Some individuals have more descendants than others

Variations: cause diverse and complex life on Earth

- providing species with special food, skills, competition
- all from one microorganism around 3.8 billion years ago

Fossil records

- Method for mapping out the evolutionary progress across eras through fossils
- Shows an increase in organism complexity
- Supports evolution but does not support theory of minute and gradual changes
- May be due to lack of and gaps in evidence or may be a falsification of aspect of the theory
- Examples of specific changes seen in fossils can pinpoint significant adaptation that allowed for divergence in new environments (eg. transition to land or return to sea to form whales)

Selective Breeding

- Also known as artificial selection
- Can cause evolution
- eg. wild wolves are tamed, they produce offspring that have tamer qualities and characteristics, this is passed on through the generations constantly adapting based on the desirable features. This produces the domestic dogs we are familiar with today.

Homologous structures and Adaptive radiation

- share structures but they each have different purposes depending on species and needs

Think about: why is the magic number 5?

- Darwin's Finches - same species, different beaks depending on where they lived = beaks for different kinds of food = adapted to environment

Diverging into separate species

- According to the theory of evolution, we all derive from the same 'origin of life'
- We have diverged through the process of evolution into a variety of species
- Some have become extinct, including many ancestor species
- The animals that exist today exist as a result of millions of years of evolution and adaptation
- We share varying degrees of similar genes with all animals (often a surprisingly high amount)
- This can be seen in the multi-level classification system based on similar characteristics
- Similar characteristics can also be seen amongst species from different classes
- This is because they develop these in order to survive in their environment through adaptation
- The whale or dolphin, for example, are physically similar to the shark but are mammals rather than fish.