FOSSILS AND EVOLUTION FACTSHEET

Fossils are formed when organisms become buried in sediments, causing little decomposition of the organism. As time progresses various sedimentary layers get deposited, with the oldest on the bottom and the youngest on the top.

Fossils are also formed through freezing, being embedded in amber, preserved in tar, or even footprints and imprints.

By observing the appearance, abundance and types of fossils in each of these layers we can understand the progression of the species that lived in that location over time.

Early fossils are fairly simple organisms, while later fossils become increasingly complex. This supports our more recent understanding of genetics and evolution: new alleles and genes develop from existing genes by mutation, and it seems unlikely that more complex organisms (those with many different genes) would develop first and then become more simple (having fewer genes).

Fossil records are both support and are supported by other evidence.

COMPARATIVE ANATOMY

Comparative anatomy compares the structures of organisms of both living species and fossils. Comparisons of anatomical features in different organisms often provide evidence to support the theory of evolution. Organisms are often classed together according to similarities in their structures.

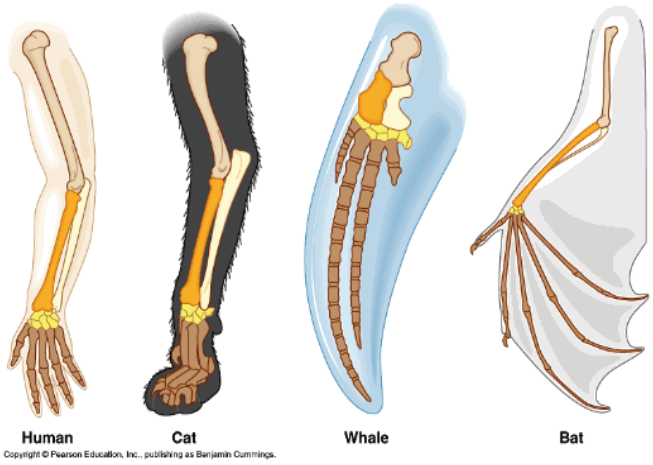
It was through comparing the anatomy of organisms that scientists discovered phylogeny, meaning the evolutionary history of a group of organisms.

Comparative anatomy includes homologous and analogous structures as well as vestigial features.

Homologous structures

Homologous structures evolved from a common ancestor. Examples of homologous structures include the forelimbs of a variety of mammals. For example, human, cat, whale and bat. These species show the same skeletal elements in the humerus, radius and ulna as share a common origin. However these skeletal elements have been modified over time to suit the different functions suitable for the type of mammal.

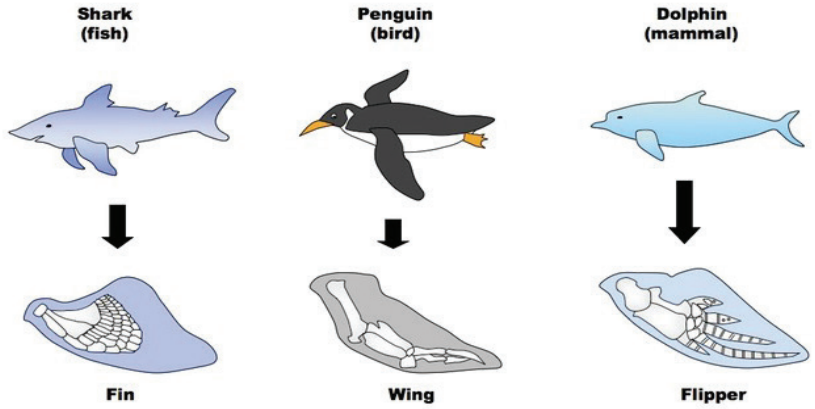
Homologous structures result from divergent evolution.



Homologous structures - the arm of a human, the foreleg of a cat, the fin of a whale and the wing of a bat. All show the same skeletal elements.

Analagous structures

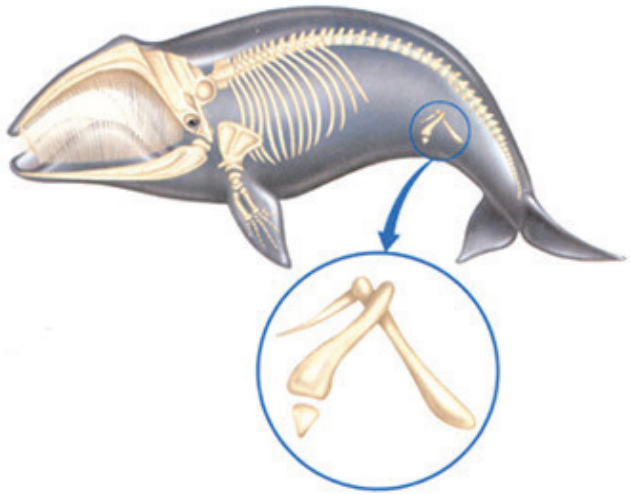
Analogous structures serve the same function between organisms but are different in internal anatomy. For example, the wings of birds and butterflies, and the eyes of lobsters and fish. These structures are of no use in classifying organisms or in working out their evolutionary relationships with each other.



Analogous structures - the fin of a shark, the wing of a penguin and the flipper of a dolphin serve the same function but have different internal anatomy.

Vestigial structures

Vestigial structures are usually dwarfed and useless to the organism. Sometimes vestigial structures may be adapted for new uses e.g. penguin wings can't be used for flight, yet they are adapted for swimming. Even though organisms have these structures there is no significant disadvantage to the organism. Examples of vestigial structures in humans include the appendix, the tail bone, wisdom teeth.



Vestigial structures - One commonly cited example of a vestigal structure is the pelvic bone in the baleen whale.

KEY POINTS

- The layers of fossils in sedimentary rock shows the progression of organisms through time.
- Homologous structures are structures that are similar in appearance but not In function.