FOSSIL RECORD DOCUMENTS LIFE'S HISTORY

-Macroevolution

the broad pattern of evolution above the species level

-example: emergence of terrestrial vertebrates

DIVERSITY OF LIFE

major periods in earth's history END with **mass extinctions** and new ones BEGIN with **adaptive radiations**!

- mass extinctions can alter ecological communities

HETEROCHRONY

evolutionary change in the rate or timing of developmental events

CHANGES IN GENE REGULATION

changes in morphology can also occur when there is a change in the sequence of developmental genes

example: stickleback fish

the gene is the same, but is expressed differently in the 2 groups of fish

FOSSILS

provides glimpses of evolution over billions of years

FIRST LIFE ON EARTH

-**early**: earth's sols inhabitants were prokaryotic cells at least 3.5 billion years ago

-they transformed life on our planet!

ADAPTIVE RADIATION

-periods of evolutionary change in which groups of organisms form many new species whose adaptations allow them to fill different niches in their environment

diversity of life fueled by adaptive radiation

HOMEOTIC GENES

- one type **hox genes** provide positional information in an animal embryo

-small changes in regulatory sequences of particular genes can lead to major changes in body form

LAST WORDS...

evolution is the result of the interactions between organisms and their current environments

GEOLOGICAL CLOCKS

help to give us a perspective when discussing events in the contexts of geological record

EUKARYOTIC CELLS

did not evolve until another 2 billions years of evolution of prokaryotes

1.5 billion years ago

EFFECTS OF DEVELOPMENTAL GENES

evo-devo: research at the interface between evolutionary biology and developmental biology

-devlopmental genes guide the formation of the body from to adult. Even a small change in rate, timing, and spatial pattern can produce major morphological differences

EVOLUTION IS NOT GOAL ORIENTED

an evolutionary trend does not mean that evolution is goal-oriented

surviving species do not represent the peak of perfection. there is compromise and random chance involved as well

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