Ecology Chapter 17-1& 17-4 BIO Cheat Sheet

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Fossils and Ancient Life

- paleontologists are scientists who study fossils
- they collect information about fossils and put it into a fossil record -> shows how species lived and have changes over time
- 99% species on earth are extinct

How Fossils Form

1) water carries small rock particles to lakes and seas
2) as layers of sediments build up over time, dead organisms sink to the bottom and become buried
3) the layers of sediment compress and turn into rock -> fossils
4) the fossils are later discovered and studied

Interpreting Fossil Evidence

paleontologists determine a fossil's age using two techniques: relative and radioactive dating

Radioactive & Relative Dating

- in relative dating, the age of one fossil is determined by comparing its placement with other fossils in other layers of rock
- scientists use index fossils to compare the relative ages of fossils
- index fossils are species that are easily recognized and have existed for a short period of time but have had a wide range of geographic range

- in radioactive dating, half-lives are used to determine the age of a fossil
- a half-life is the radioactive atoms in a fossil to decay
- age is calculated based on amount of remaining radioactive isotopes contained

Geologic Time Scale

- geologic time scale is divided into eras and periods
- eras are Cenozoic, Mesozoic, Paleozoic, and Precambrian Time
- periods range from tens of milions of years to less than two million years

Macroevolution

- macroevolution are large scale evolutionary pattens and processes that occur over large periods of time
- this includes:
1) extinction
2) adaptive radiation
3) convergent evolution
4) coevolution
5) puncuated equilibrium
6) changes in developmental genes

Extinction

- extinction happen b/c of competition for resources & environmental changes
- some species extinctions are caused by natural selection
- mass extenctions have wiped out ecosystems b/c environment was collapsing
- mass extinctions are caused by volcano eruptions, shifting continents, and sea level changes
- mass extinctions provide opportunities for new species and surviving species

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
- large scale changes; ex: dinosaurs -> reptiles today

Convergent Evolution

- when adaptive radiation occurs -> natural selection molds different body structures
- the process where unrelated organisms come to resemble one another is convergent evolution
- ex: dolphin and sharks body structure; penguin and dolphin nose and mouth

Coevolution

- the process where two species evolve in response to changes in each other over time is called coevolution
- ex: snakes and rats; snakes evolve -> more poison, rats evolve -> more resistance

Punctuated Equilibrium

- punctuated equilibrium is the pattern of long, stable periods interupted by brief periods of rapid change

Developmental Genes and Body Plans

- changes in the expression of developmental genes can explain differences in evolution
- 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

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