

Fossils and Interpreting their Data

- _____ – scientists who study fossils
- **Fossil Record** – provides evidence about the _____
- _____ – species have died out
- How Fossils Form
 - Form in _____ rock that becomes _____ in the layers
- **Relative Dating** – age determined by comparing its placement with _____
- **Half-Life** – length of time required for _____
- **Radioactive Dating** – using the _____ to determine the _____

Geologic Time Scale

- **Geologic Time Scale** – divisions that represent _____.
- **Era** – the three major periods of time since _____
- **Period** – _____

Formation of Earth and Life

- Earth's early atmosphere probably contained:
 - _____
 - _____
 - _____
 - _____
 - _____
 - _____
 - _____
- Miller and Urey's experiments suggested how mixtures of the _____ necessary for life could have _____

Life's Origins

- **Proteinoid Microspheres** – _____
- _____ due to the fact that it could _____ *and* _____
- The first cells did not use _____, and it killed them off when it became _____
- Oxygen allowed more _____ organisms to develop

Eukaryotic Cells and Multicellularity

- Smaller prokaryotes began living _____
- Some of those prokaryotes would have been very much like _____
- **Endosymbiotic Theory** – eukaryotic cells arose from _____ formed by _____ organisms

- This accounts for the fact that those organelles have _____

The Geologic Time Scale

- **Precambrian Time** – _____ of the earth's history where life only lived in _____
 - Toward the end _____ evolved
 - Providing _____ to the atmosphere
- **Paleozoic Era** – Marine life became _____
 - Cambrian period – _____
 - Ordovician and Silurian periods – life began to develop _____
 - Devonian period – _____ took over land
 - Carboniferous and Permian periods – most _____ from this time period
- _____ at the end of this era killed as much as _____
- **Mesozoic Era** – Dinosaurs became more dominant and flowering plants started to appear
 - Triassic period – small _____, _____ plants, and reptiles
 - Jurassic period – _____ were dominant life
 - Cretaceous period – _____ plants; mass extinction killed _____
- **Cenozoic Era** – mammals evolved to _____
 - Tertiary period – _____ evolved, mammals _____
 - Quaternary period – _____ climate, _____ appear in Africa _____ years ago

Extinction

- **Macroevolution** – Large-scale evolutionary _____ that occur over long _____
- More than _____ of all species that have ever lived on Earth are _____
- Extinctions leave _____ and provide _____.
- Extinctions lead to the _____

Types of Evolution

- **Adaptive Radiation** – a single species or a small group of species has _____.
- **Convergent Evolution** – _____ come to resemble one another.
- **Coevolution** – two species evolve in _____ over time.

Punctuated Equilibrium

- **Punctuated Equilibrium** – pattern of long, stable periods interrupted by _____
- **Gradualism** - _____

Developmental Genes and Body Plans

- **Hox genes** – “ _____ ” that guide development of _____
- Changes in these genes can cause differences in _____ as well as other structures

Why Classify?

- Classification is a system used to _____.
- **Taxonomy** – classifying organisms and assigning each _____
- Example:
 - Teachers → _____ → _____ teacher

Assigning Scientific Names

- Early efforts to name organisms described them using _____
- “Oak with deeply divided leaves that have _____ and no teeth around their edges”
- **Binomial Nomenclature** – _____ developed this system in which each organism has a _____ scientific name
 - 1st part = _____
 - 2nd part = _____
 - _____ (bobcat)

Linnaeus’s System of Classification

- Linnaeus’s system includes 7 levels (from largest to smallest):
 - _____
 - _____
 - _____
 - _____
 - _____
 - _____
 - _____

Which Similarities are Most Important?

- **Evolutionary Classification** – grouping organisms into categories that represent _____, not just physical similarities
- **Phylogeny** – _____ relationships
- **Derived Character** – characteristics that appear in recent parts of a lineage but not _____
- **Cladograms** – a diagram that shows the _____ among a group of organisms.

- The genes of many organisms show _____ which can be used to help determine _____.
- Similar _____
- _____ evidence
- **Molecular Clocks** – uses _____ to estimate the length of time that two species have _____

The Five Kingdoms

- Five Kingdoms:
- Monera – _____
- Protista – _____
- Fungi – _____
- Plantae - _____
- Animalia - _____
- Now the kingdom monera has been _____:
- Eubacteria
- Archaeobacteria

The Three Domain System

- **Domain** – more _____ than kingdom
- Three domains:
- **Eukarya** – _____
- **Bacteria** – _____
 - Unicellular and prokaryotic
 - Live in basically _____
- **Archaea** – _____
 - Unicellular and prokaryotic
 - Live in _____