

Geologic Time - Essay Outline

Introduction – what do we know and how do we know it (evidence vs. theory vs. hypothesis)

- sedimentary rock, horizontal layers, superposition, U:Pb ratio
- fossil record, fossil structures, frozen/fossilized pollen, C-14 dating
- movement of tectonic plates, shapes of continents
- time divisions: eons, era, period, epochs

Major world events – things that change the biosphere in a major way

- Influence of slow actions: atmosphere development, CO₂ and O₂ in atmosphere, plate tectonics and continental drift, ocean current shifting (ice ball earth), greenhouse effect (global warming)
- Influence of fast actions (Extinction Events): asteroids, mantle plume, human pollution
- Era divisions due to major world events

Evolution – How do living things change over time?

- Small to large, simple to complex, biodiversity, food webs, niches, ecosystems
- Periods and Epochs divided by evolution and smaller world changes
- Gaia Hypothesis – life created its own habitat through control of the atmosphere

Precambrian – how it all began

- Volcanoes, single celled bacteria, cyanobacteria (blue-green algae) and photosynthesis, beginning of multi-celled organisms
- Transition: Rhodinia, ice ball earth

Paleozoic – first advances in life forms,

- Ice ball earth resolved by volcanoes and CO₂
- Cambrian: the explosion of life forms, biodiversity
- Ozone and UV light, evolution, soft bodies, hard parts, amphibians, reptiles,
- Transition: Mantle plume, volcanoes, CO₂

Mesozoic - what happened to the dinosaurs?

- Pangaea, tropical climate, higher CO₂, Age of Reptiles, evolution,
- Transition: asteroid hit, ash, volcanic eruptions

Cenozoic – modern ages, all humankind in a blink of an eye, increased pace of evolution

- Age of Mammals, ice ages, hominids, Age of Man, Homo sapiens

Conclusion

- Answer question: Why are time scales not linear?
- Current issue: global warming
- What will happen next? What are the possibilities?