

Name: _____

Hour: _____

A Deep History of Life on Earth

Use the HHMI Click and Learn to complete the following information.

1. The Earth is _____ years old.
2. Life has been on Earth for _____ years.
3. A dramatic _____ in _____ allowed life to develop from microbial to more complex, multicellular organisms.
4. In order to construct a timeline of life on Earth, scientists have used two types of evidence: _____ and _____.
5. _____ is the most familiar type of geological evidence, but scientists can also use _____, _____, _____, and _____.
6. Scientists also analyze the _____ of extant organisms in order to find clues to the history of life on Earth.
7. Early Earth, known as the _____, was formed by a process of accretion where _____ and _____ was compressed by _____ and resulted in an increase in _____.
8. Despite bacteria being small, they are so numerous they can influence the _____ of seawater. By measuring the ratio of carbon isotopes in rocks and comparing it to the ratio in organic matter, scientists find strong evidence that there was an ancient biological _____ driven by _____ around _____ years ago.
9. _____ evidence for life appear about _____ million years ago in the form of stromatolites, which are layered mounds composed of _____ and _____.
10. The first branch in life's evolutionary phylogenetic tree was when the earliest forms of life branched into _____ and _____.

11. Early microorganisms evolved varying _____ pathways to make use naturally occurring electron donors and acceptors.
12. Ancient rocks hold _____ that provide evidence of early life. These include lipids, such as cholesterol.
13. Early Earth lacked oxygen in the atmosphere. That began to change after _____ evolved and started photosynthesizing approximately _____ years ago.
14. Eukaryotes are organisms whose cells contain a _____ and _____. The first eukaryotic cells evolved approximately _____ years ago.
15. The oldest known eukaryotic fossils are from _____ which has the appearance of _____ and is found in rocks dating back to _____.
16. The oldest example of an organism from an extant, which means _____, phylum is _____, which has been found in fossils dating to _____ years ago.
17. The precursors to multicellular animals were likely unicellular _____. These organisms are _____ trophs and evolved predatory feeding mechanisms.
18. Animals began to appear in the fossil record _____ years ago. However, _____ evidence suggests they actually evolved _____ years ago.
19. The large gap between the evolution of animals and the appearance of them in the fossil record is reconciled by considering that the first animals were very _____ because they were constrained by the availability of _____.
20. The first vertebrates to appear in the fossil record are tiny _____ that also has a primitive _____ protected in a cranium, or skull. They appear during the early _____ period about _____ years ago.
21. Going back _____ million years the seas are full of organisms such as the _____. These have _____ bodies and _____ legs which indicate they are members of the phylum of _____.
22. The earliest evidence of land plants are from _____ years ago.

23. Tetrapods, vertebrates with four limbs, transitioned to land during the _____ period approximately _____ years ago.
24. Complex ecosystems were brought about _____ years ago with the diversification of _____.
25. The oldest mammal-like animals are _____ which look like dinosaurs but are actually more closely related to mammals. They were prevalent during the _____ period _____ years ago.
26. The largest extinction even was the Great Dying when _____% of species went extinct. It happened _____ years ago and its cause is still being _____ by scientists. What is known is that it provided opportunity for the _____ to diversify, ushering in the Age of Dinosaurs.
27. Dinosaurs were the most prevalent large animal _____ years ago. Modern _____ are descended from these animals.
28. The most well-known mass extinction happened _____ years ago and resulted in the extinction of all _____.
29. Ancient skulls from _____ show familiar faces in the form of the earliest *Homo sapiens*. An important hallmark of this species is the size and shape of the _____.
30. _____ are currently the most dominant form of life on Earth despite the fact that they have only been present for about _____ years.