

| O9 TN State Science Curriculum Standards for Unit 1: Fossils | | | | |
|--|---|--|------------|---|
| Level | Exercise 1 | Exercise 2 | Exercise 3 | Exercise 4 |
| K-3 | K-3.1.1*, K-3.1.2*, K-3.2.1, K-3.2.2*, K-3.2.3*, 1-3.3.2*, K-3.5.2*, 2-3.6.1, K-3.10.1*, K-3.12.1* | 2-3.6.1 | | |
| 4-5 | 4-5.2.1*, 4-5.3.1*, 4-5.3.2*, 4-5.4.3*, 4-5.5.1*, 4-5.5.2*, 4-5.6.1, 4-5.6.2, 4-5.9.1*, 4-5.9.2*, 4-5.10.1*, 4-5.10.3* | 4-5.5.2, 4-5.6.1, 4-5.6.2, 4-5.9.1 | | |
| 6-8 | 6.2.2*, 6.3.1*, 6.5.1, 6.6.1, 6.6.2, 6.6.3*, 7.8.3*, 8.2.3*, 8.5.2, 8.9.1*, 8.9.2*, 8.10.1*, 8.10.2* | 6.5.1, 6.6.1, 6.6.2, 6.6.3, 7.8.3*, 8.9.1*, 8.9.2* | 6.14.4* | 6.6.1, 6.6.2, 6.6.3*, 8.5.2 |
| Life Science | 2.1, 2.2*, 2.4*, 2.5*, 6.1, 6.2 | | 6.3, 6.4 | 5.1, 5.2, 6.1, 6.2, 6.3, 6.4, 6.5 |
| Biology I | 2.2, 2.5* 5.1*, 5.2*, 5.3*, 6.1 | 6.1 | | 5.1, 5.3, 6.1, 6.2*, 6.4 (in part: comparative anatomy) |
| Biology II | 1.1* 1.2*, 1.3*, 5.1* (very briefly, as cyanobacteria and the Kingdom Monera are briefly introduced), 6.1* (very briefly) | | | |
| Chemistry I | | | 1.4* | |
| Earth Science | 3.1*, 3.2*, 3.6*, 3.7*, 4.3, 4.4* | 3.6, 4.1, 4.2 | | 4.1, 4.2, 4.3, 4.4 |
| Geology | 1.2*, 4.4, 4.5, 5.2, 3.1* (in part, sedimentary rocks), 3.2 (in part), 3.3 (in part), 3.4* | 1.2*, 4.1, 4.2, 4.3, 5.1*, 5.2*, 5.4* | | 4.1, 4.2, 4.3, 4.4, 4.5 |
| Ecology | 1.1*, 1.2*, 1.4*, 1.6* | 1.4* | | 1.6 |
| Sci. Research | 1.3 | 2.3 | 2.3 | 1.3, 3.2, 3.5 |

* Denotes learning expectations that may not be addressed directly by a particular exercise, but could easily be related to the material covered through the use of additional assignments or activities, or brought into lecture using suggested information below. Teachers may want to also examine suggestions for grade levels outside their own for further inspiration.

For Teachers K-3

Focus on fossil (and non-fossil) parts of once-living organisms, such as the teeth, vertebrae, and even leaves (1-3.3.2). K-3.1.1, K-3.1.2, K-3.5.2 – Get students to think about what functions these structures served in the living organisms. How would such structures help an organism survive? K-3.2.2, K-3.2.3 – How could the structures discussed above be used to interact with living and non-living components of the environment? Have students come up with lists of traits that helped them determine whether an object is a fossil. After determining which items are fossils, and which are not, have students compare the two groups, and think about differences between living and non-living things. K-3.10.1 – Have students closely examine the fossils, and think about the differences in the types of sedimentary rock containing the fossils in the box. K-3.12.1 – Talk to students a little about how fossils are actually formed in sedimentary rock, and the process of how sedimentary rock is formed in general.

For Teachers 4-5

4-5.2.1, 4-5.3.1 & 4-5.3.2 – Have students pick an extinct organism for which they examined a fossil representative, and have them do some library and/or internet research to present to the class. Have them focus on ecological interactions such as natural predators, what the organism ate, as well as adaptations that helped them obtain food or avoid predators. You could even have the students construct food webs/chains of organisms from the time period during which their chosen organism lived! To incorporate 4-5.4.3, have the students think about how the organism reproduced. Did it lay eggs, have live birth, make seeds? To incorporate 4-5.5.1, have them research similar, closely related organisms that may have been present at the time their organism existed, or modern relatives of their chosen organism. 4-5.5.2 – Focus on fossil (and non-fossil) parts of once-living organisms, such as the teeth, vertebrae, and even leaves. Get students to think about what functions these structures might have served in the living organism. How would such structures help an organism survive? How could such structures be used to interact with living and non-living components of the environment? 4-5.6.1 & 4-5.6.2 – You may wish to talk about extinction, as it happened to many of the fossil species the students examined, as well as the threat of extinction to many species today. Instead of having them research an ancient extinct species, you may wish to get them to research a recently-extinct species, or a species currently threatened with extinction. 4-5.9.1 & 4-5.9.2 – Talk about how fossils are formed within sedimentary rock and how sedimentary rock itself is formed. Focus a bit on the idea of deposition of sediment in layers. You may also wish to talk about continental drift, and how the Earth's continents have moved over time. 4-5.10.1 & 4-5.10.3 – Have the students examine the lump of coal closely. Talk a bit about fossil fuels, as well as renewable versus non-renewable resources. You could have students do some research and a brief paper on a particular resource, or a “compare and contrast” paper on one (or several) renewable versus non-renewable resource(s).

For Teachers 6-8

6.6.3 – You may wish to address one or several major extinction events in Earth's history, or have your students research one of them! To incorporate 7.8.3, you may also wish to talk about shifts in oceanic and atmospheric conditions throughout Earth's history, as well as the accompanying changes in climate. 8.2.3 – Have students do some research comparing biomes of a particular period in Earth's history to modern biomes, in terms of geography, associated flora and fauna, etc. 8.9.1 & 8.9.2 – You may wish to incorporate discussions of plate tectonics and continental drift, as well as accompanying changes in biota during periods of large plate movements! 8.10.1 & 8.10.2 – This is a great lab to talk in-depth about sedimentary rock formation and the rock cycle!

For High School Teachers

For expansion on biology, many of the previous suggestions for younger grades could easily be turned into more detailed projects that can be assigned. For Exercise 4 in particular, this is a good time to do a really in-depth discussion of natural selection and speciation. For expansion on earth science, you could bring in more detailed discussions of movement of tectonic plates, the rock cycle, etc, as well as a connection between geology & geography throughout Earth's history. Exercise 3 provides a good place for further discussion of radioactive decay, and what actually goes on at the atomic level during the process.