**Standard 8Sb:** **The student will demonstrate an understanding of Earth’s biological diversity over time. (Life Science, Earth Science)**

**Indicators**:

1. Explain how biological adaptations of populations enhance their survival in a particular environment.

*Essential Question:* How do adaptations help organisms survive?

1. Summarize how scientists study Earth’s past environment and diverse life-forms by examining different types of fossils (including molds, casts, petrified fossils, preserved and carbonized remains of plants and animals, and trace fossils).

*Essential Question:* What do different kinds of fossils tell us about Earth’s history?

1. Explain how Earth’s history has been influenced by catastrophes (including the impact of an asteroid or comet, climatic changes, and volcanic activity) that have affected the conditions on Earth and the diversity of its life-forms.

*Essential Question:* How have catastrophes affected conditions on Earth?

1. Recognize the relationship among the units—era, epoch, and period—into which the geologic time scale is divided.

*Essential Question:* How is geologic time divided into units?

1. Illustrate the vast diversity of life that has been present on Earth over time by using the geologic time scale.

*Essential Question:* How are changes of Earth’s organisms related to the geologic time scale?

1. Infer the relative age of rocks and fossils from index fossils and the ordering of the rock layers.

*Essential Question:* How can you determine the relative age of rocks and fossils?

1. Summarize the factors, both natural and man-made, that can contribute to the extinction of a species.

*Essential Question:* What natural and man-made factors can cause extinction of a species?

**Vocabulary:** These words must be understood well enough for you to describe your results in the demonstration(s) suggested below by the date given in class.

1. adaptation
2. asteroid
3. biological adaptations
4. carbonized
5. casts
6. catastrophes
7. comet
8. diverse/diversity
9. embryology
10. environment
11. epoch
12. era
13. evolution
14. factors
15. fossils
16. genus
17. geologic time scale
18. gradualism
19. hominid
20. homo Sapiens
21. homologous
22. index fossils
23. meteor
24. molds
25. natural selection
26. organisms
27. period
28. petrified
29. populations
30. preserved remains
31. primate
32. punctuated equilibrium
33. radioactive element
34. sedimentary rock
35. species
36. survival
37. trace fossils
38. variation
39. vestigial structure
40. volcanism

**Suggested Resources:** You may use any online resource, any textbook, dictionary, or other books in the classroom or library.

Note: Get approval from Mr. Graham before you do any of the experiments given on these sites… several are very dangerous and must NOT be done.

**Suggested Demonstrations:** Demonstrate your mastery of the vocabulary using one or more of these suggestions. Written mastery may be demonstrated by keeping a science journal describing your activities. Be sure to give complete 5WH descriptions. (5WH = Who, What, Where, When, Why, and How) Oral mastery may be demonstrated by making a class presentation showing and telling about your science activity demonstrating your knowledge of the assigned words. In place of presenting in class, you may make a video recording, slideshow with pictures and voice over, or similar presentation and post it to Mr. Graham’s Webb Page.

1. Find any simple experiment involving fossils on the Internet for which you have the resources to do, ask Mr. Graham to approve it, and then do it. Be sure it has controlled all but one experimental variable. Be sure to keep careful 5WH journal notes of the questions you considered, researched, or investigated during your experiment.
2. Select one modern animal species. Research the recorded fossil record for its apparent progenitors and describe each of the major adaptations that advanced them toward what they are today. Tell the full 5WH for each adaptation found in the fossils of the animal’s progenitors. Include picture’s of the adaptations as much as possible.
3. Select a one-quarter acre site containing no man-made structures near your home. Conduct as complete a count of all the different plants and animals that you can observe on your acre at one moment of time. Take as many pictures as needed to cover your quarter acre. Be sure to keep careful 5WH journal notes of the questions you considered, researched, or investigated during your quest to count and identify every living thing on your quarter acre.
4. Sign for a fossil from Mr. Graham’s collection. Identify the fossil. Keep complete notes on each guess you make and what resources you used to determine whether you are correct or not. Your conclusion should be a description of how you determined what the fossil is, where it can be found, who wrote the journal or book that confirmed your conclusion on the fossil’s identity, when the fossil was living (in what era or epoch did it live), why this fossil became extinct or why animals like it are still alive today.