7.5.2 e2 Evolutionary Trees Narrative

Time: 60-90 minutes	**Anchor Phenomena:** How do modern horses compare to ancient horses?
Big Idea: Fossil record gives evidence that life has changed over time.	
CCCs Patterns	**Practices** **Analyze and Interpret Data**

EPISODE SNAPSHOT: Students will place imaginary fossils in sequences that show patterns of evolution or evolutionary trees. They will investigate the two major hypotheses on how evolution take place: Gradualism (slowly) and Punctuated Equilibrium (quickly).

Teacher notes: When making copies of the fossils and the Geological Rock Sequence Charts you may want to print them on different colors of paper so that the fossils will stand out on their chart. It would be good to copy the Geological Rock Sequence Chart on cardstock if available.

GATHERING

Show the PowerPoint. Discuss with the students briefly what they are looking at and what questions they have. Show the rest of the PowerPoint which will discuss the two main hypotheses of fossils. The last two slides show the evolutionary tree for horses. If you have not discussed species or where fossils are formed and found this may be a necessary step. Discuss the reasons the horse may have evolved the way it did. Discuss with the students how the horse has changed size as well as how the toes have changed to be hooves. Talk about how the horse "tree" branched off from the donkey tree in the past.

REASONING

Place students into groups of 2-4. Read over the student page with the students and describe where materials are and how important it is to read the directions, step by step. Students will proceed to read the directions, cut out the fossils and place them where they belong on the Geological Rock Sequence Chart. Students should look for patterns that they see within the various fossils. As they work they can discuss the similarities and differences that they see. Students should **analyze and interpret** their data as they document as much as possible about their specimens. The fossil record cannot accurately determine when one species becomes another species (speciation). One hypothesis suggests that abrupt mutations in a few genes occur after a species has existed for a long period of time. This mutation results in the entire species shifting to a new species**.** The other hypothesis suggests that a slow, steady accumulation of small genetic changes add up to many changes and new species develop. Most evolutionary biologists accept that a combination of the two models has affected the evolution of species over time.

COMMUNICATING

Once the students have been allowed time to create their chart of fossils, they will be allowed time to communicate their findings with the rest of the class. Groups should post their Fossil Charts on the wall and discuss them as a class. Each group should select a member of their group to show the patterns they saw and explain their reasoning.

Extension: A Logical follow up to this activity would be to have students research the fossil record of an organism that they are interested in. They could draw or cut and paste off the internet an evolutionary tree for the organism.

Assessment: The conclusion at the end of the student assignment is the assessment. To show that the proper learning has taken place, the student should be able to explain how evidence from the fossil record supports the existence, diversity, extinction, and change of life forms throughout the history of life on Earth.	**Materials, resources, handouts, etc:** Computer and Overhead Projector Materials needed per group of 3-4 students (marker, scissors, tape/glue, meter stick) 7.5.2 e2 EvolutionaryTreesPPT 7.5.2 e2 EvolutionaryTreesTEACHER 7.5.2 e2 EvolutionaryTrees Student Sheet 7.5.2 e2 EvolutionaryTreesTABLE 7.5.2 e2 EvolutionaryTreesFOSSILS Fossil Key