

Stratigraphy – Layers of Time in the Earth by Carol Schlenk

Subject: Science, Social Studies

Grade level: 11-12

Rationale: This lesson introduces students to the concept of stratification as a historical and geological process.

Materials:

- *Stratigraphy-Layers of Time in the Earth* student handout, pages 1 & 2
- Colored pencils or markers

Lesson Duration: 45 minutes

Objectives:

Students will read about the Richard Beene archeological site, which lies near San Antonio, Texas on the Medina River, and watch a short video about stratification. They will then color code the different strata present at the site and answer questions from the reading.

Texas Essential Knowledge and Skills (TEKS):

Science

- Geology 112.49 (2C), organize, analyze, evaluate, make inferences, and predict trends from data
- Geology 112.49 (8B), identify geologic formations that result from differing weathering processes
- Geology 112.49 (8C), illustrate the role of weathering in soil formation
- Geology 112.49 (10B), analyze the impact of floods on a watershed

Social Studies

- Social Studies Research Methods 113.39 (8A), construct visuals to convey appropriate data
- Special Topics in Social Studies 113.38 (1B), analyze information by identifying cause-and-effect relationships
- Special Topics in Social Studies 113.38 (2D), create visual presentations of social studies information.
- World Geography Studies 113.34 (2A), describe the human and physical characteristics of the same place at different periods of history
- World Geography Studies 113.34 (3B), describe physical environment of regions and the physical processes that affect these regions such as weather and soil-building processes

Activity:

Step 1 – Ask Students how we gain information about peoples and cultures from thousands of years ago. Explain that archeologists dig in the earth for artifacts, (objects made or used by man) that help us understand how people of long ago lived.

Step 2 – Distribute pages 1 & 2 of the activity, *Stratigraphy – Layers of Time in the Earth*. Read the text of page 1 aloud with students. Ask students for examples of artifacts they sometimes see on the ground and that future archeologists may find (for example, gum wrappers, marbles, buttons, etc.)

Step 3 - Explain that students will view an action video illustrating the stratification process. Before viewing the video, display the following questions (omitting answers) on the board or overhead and read them aloud with students:

- What Texas river is depicted in the video? (answer: Medina River)
- What stratification time span was depicted in the video? (answer: 15,000 years)
- Describe the cause and effect process depicted in the video which created the strata. (answer: Cause – continual flooding of the Medina River: Effect – layers of silt and gravel left by the flooding built up strata)
- List at least 3 examples of human interaction at the site. (possible answers: prehistoric peoples hunting and camping on the Medina River; Spanish explorers and missionaries moving through the area; Spanish ranchers settling in the area; cotton farmers and their slaves cultivating the area)

Have students go to the Texas Beyond History *Digging Through Layers of Time* website at <http://www.texasbeyondhistory.net/beene/digging/index.php> and click on the *See Stratification in Action* activity. As they view the video, have them write down the answers to the above questions. After viewing the activity, call for volunteers to read their answers to the questions and discuss.

Step 4 – Distribute the stratigraphy diagram handout and colored pencils. Have students complete the worksheet.

Step 5 – Have students write their answers to the four questions on the diagram handout.

Modification: Have students color only the sky, trees, and color code only the wide bands on the diagram. The four questions on the handout may be answered aloud.

Student Products:

- Completed color-coded stratigraphy diagram
- Answers to the four handout questions

- Answers to the video questions

Closure: Ask students what one artifact from their lives they would NOT want found by future archeologists and have them explain their answers.

Assessment: Ask students why the deepest layer of stratification in an archeological site is usually the oldest.

Extension:

Have students read aloud and explain their answers to question #4 (Why do you think people camped at this site over and over again during different time periods?) on the diagram handout.

Stratigraphy - Layers of Time in the Earth

Richard Beene Archeological Site

Have you ever found a penny on the ground and wondered who dropped it, and when? And if you wondered that, have you also wondered what might lie hidden in the ground below the penny? If you have, then you were curious about **stratigraphy**, which is the study of the layers of earth found in a specific geographic area, or in this case, an archeological site. Archeologists can learn a great deal about how a site was formed by studying these layers. Generally, younger layers are deposited on top of older layers.

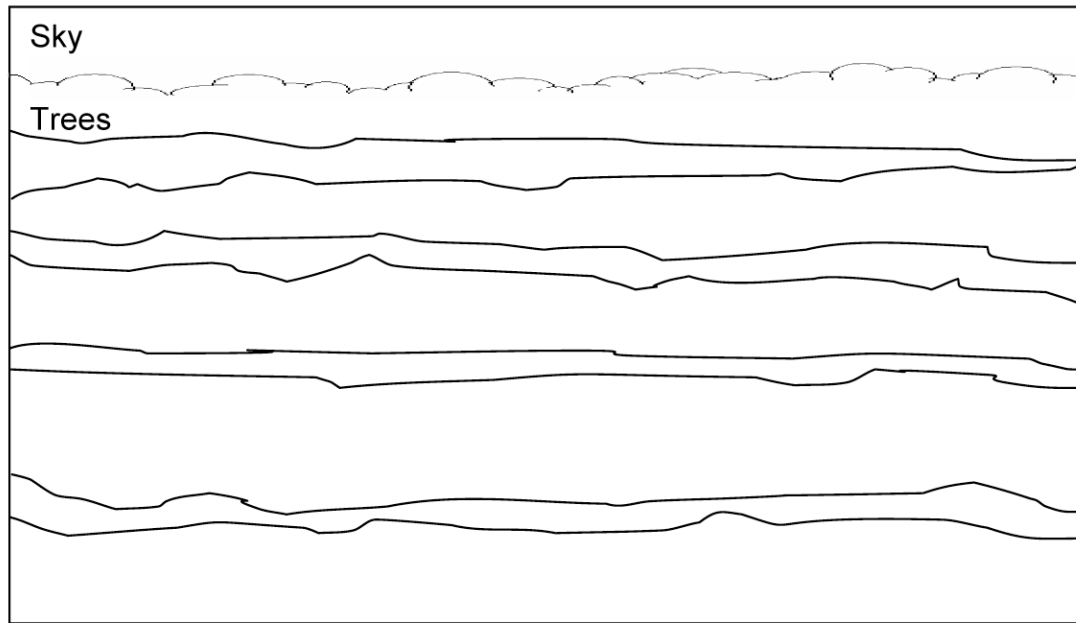
People who lived long ago dropped objects on the ground, too. Beginning almost 10,000 years ago, groups of hunter-gatherers camped during different time periods at a place south of San Antonio along the Medina River. There they left behind artifacts such as chipped-stone tools, mussel shells, animal bones, and fire-cracked rocks used for cooking. They would have discarded many torn or broken things made from wood, hide, and plant fiber, such as baskets, mats, and bows and arrows. These perishable items eventually rotted away, or decayed, and became part of the soil. Over time, the river would flood and spill over the top of the riverbanks, covering the campsite with mud, gravel, and sand. This process was repeated over and over again through time. People came, camped, and left their trash behind. The river flooded and covered the site over with mud, helping to seal, or preserve, some of the campsite remains. These deposits, created both by people and nature, became the layers of earth (strata) that archeologists study.

Archeologists named this place the Richard Beene site, and dug down 46 feet (14 meters) into the earth looking for traces of ancient peoples. That's almost 6 times the distance from your floor to your ceiling! They studied the artifacts and other traces, such as hearths, to understand how people used the site. The archeologists also took samples of organic materials, such as wood charcoal, for radiocarbon dates to help them learn the age of the different deposits. They identified the different layers of silt left by floods. All this evidence helped archeologists understand what happened at the site over thousands of years.

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Richard Beene Archeological Site near San Antonio, Texas

The diagram below represents some of the layers, or strata, that have built up over time at the Richard Beene site. Color the diagram to highlight the different strata. First, color the sky blue and the trees green. Next, color all the narrow layers in the diagram brown to represent silt, or mud, deposited during major floods on the Medina River. Then choose 4 different colors of map pencils or markers, and color each of the small boxes next to the time periods a different color. Then color the wide layers in the diagram, matching their colors to the correct colored boxes. Remember, younger layers of earth are deposited on top of older layers. After completing the diagram, answer the questions below.



- 500-1400 years ago
Late Prehistoric
- 2500-1400 years ago
Late Archaic
- 2500- 4500 years ago
Middle Archaic
- 4500-10,000 years ago
Early Archaic
- Silt deposited by major
floods on river

1. What is stratigraphy? _____
2. How did the Medina River affect the stratigraphy of the Richard Beene site? _____
3. What were archeologists looking for at the Richard Beene site? _____
4. Why do you think people camped at this site over and over again during different time periods? _____