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## Lesson 2.2

# STRATIGRAPHY AND CROSS-DATING



Clay pipe from Montgomery County,  
North Carolina, AD 1000–1600.

**Subject:** science.

**Skills:** knowledge, comprehension, application, analysis, evaluation.

**Strategies:** observation, discussion, sequence.

**Duration:** 15 to 30 minutes.

**Class Size:** any.

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## Objectives

In their study of stratigraphy, students will use an activity sheet to:

- interpret archaeological strata using the law of superposition;
- apply cross-dating to determine the age of other artifacts.

## Materials

Five books of any size; “Site Near Roanoke Rapids” and “Cross-Dating” activity sheets for each student.

## Vocabulary

*Cross-dating:* the principle that a diagnostic artifact dated at one archaeological site will be of the same approximate age when found elsewhere.

*Diagnostic artifact:* an item that is indicative of a particular time and/or cultural group; a computer would be a diagnostic artifact of our time and culture.

*Spatial:* concerned with space.

*Strata:* layers (the plural of stratum); in archaeology, this term usually refers to layers of earth.

*Stratigraphy:* the layering of deposits in an archaeological site. Cultural evidence and natural sediments become buried over time. The layer on the bottom is the oldest; the layer on top is the youngest.

*Stratum:* layer (the singular of strata); in archaeology, this term usually refers to a layer of earth or human-generated debris.

*Temporal:* concerned with time.

## Background

Natural materials such as rocks, soil, and traces of plants and animals settle on the earth’s surface and over time can accumulate in layers. Each layer, or *stratum*, may be distinguished by its physical characteristics: color, texture, and structure. Similarly, materials of human origin are also deposited onto the earth’s surface. In archaeological sites, natural and human-generated materials occur together in layers. These layers, called *strata*, form a record of past events that archaeologists analyze and interpret.

The materials deposited first are the oldest and are always found at the bottom of a given *stratigraphic* section. The most recently deposited materials are the youngest and are always at the top. This concept is known as the *Law of Superposition*. It always applies except when some type of disturbance has occurred.

Strata in archaeological sites provide archaeologists with *temporal* and *spatial* information. All of the artifacts in a given stratum will be of approximately the same age, while those in strata above or below will be younger or older respectively.

*Cross-dating* can indirectly establish a date for artifacts and sites. Artifacts such as stone points and pottery were made in distinctive styles through time. A modern analogy is automobiles: one would not mistake the style of a car made in the 1920s with one made in 1990. If an arrow point was found in association with a hearth that was radiocarbon dated to be 500 years old, it is assumed that the arrow point is the same age. When that style of arrow point is found at another site, the archaeologist would assign the site and the arrow point an age of approximately 500 years. Often cross-dating is the only method archaeologists have to determine the age of sites.

Archaeological sites in North Carolina often contain evidence of repeated occupations. Usually these occupations occurred on exactly the same surface, which results in a mixing of artifacts from different periods. Yet archaeologists also find stratified sites, in which each occupation is associated with a distinct stratum. Stratified sites contain artifacts and other evidence that can show culture change over time and have the potential to give clues about the relationship one group of people had to those who came before or after them. In North Carolina, information from just four stratified sites—three in the Uwharrie Mountains and one near Roanoke Rapids—allowed archaeologist Joffre Coe to construct a chronology of different Native American cultures spanning the time from 10,000 years ago until Colonial times. Because of their great information potential, and their rarity, archaeologists regard stratified sites as particularly important.

When an archaeological site is vandalized or artifacts are removed, knowledge about past cultures is lost forever. Damage to stratigraphy by unauthorized digging destroys the information that could be obtained under controlled scientific excavation. The removal of *diagnostic artifacts* from a site by vandals often removes all possibility of determining the site's age.

## Setting the Stage

Stack five books on a table. Tell the students that the books were placed in their positions one at a time. Ask them which book was placed in position first. Which one was placed last? This illustrates the Law of Superposition.

Now have the students imagine how thick the dust would be on a table if no one dusted it for 100 years. Each book represents a layer of sediment built up in a similar fashion for hundreds or even thousands of years.

## Procedure

1. Using the “Site Near Roanoke Rapids” activity sheet as a guide, draw a layer near the bottom of the blackboard. Show how artifacts and other traces of past life are deposited as people live on top of the layer. Then a new layer of sediments is deposited on top of that, by natural processes or by another group of people leaving different types of evidence. This happens several times until the stratigraphy is built up to present-day levels.

2. Distribute the “Site Near Roanoke Rapids” activity sheets to the students. Have students

answer the questions using the information on the stratigraphy drawing.

3. The artifacts on the “Site Near Roanoke Rapids” activity sheet have been dated based on the age of the stratum in which they are found. If you found similar artifacts elsewhere, would you know approximately how old they are? Yes. This concept is known as *cross-dating*. An artifact type that has been dated in one place can be assumed to have the same date when found elsewhere.

4. Give the “Cross-Dating” activity sheet to the students. Ask the students to imagine that the site near Roanoke Rapids is ten miles away from their town. Tell them that the artifacts shown on the “Cross-Dating” activity sheet were found in a plowed field close to their town. Have the students determine the approximate age of the artifacts based on the information from the “Site Near Roanoke Rapids” activity sheet.

5. Ask the students if they would be able to study the stratigraphy of a site if the strata had already been mixed up by illegal digging. If someone took an arrow point, what kind of information would he or she have removed from the site?

## Closure

Summarize how archaeologists use stratigraphy and cross-dating to study archaeological sites.

## Evaluation

The students turn in their activity sheets for evaluation.

## Extensions

Go on a field trip. Examine the stratigraphy of road cuts. Measure and draw the layers on graph paper. Describe the strata by comparing differences in color and texture and other observable characteristics.

## Links

Lesson 1.5: “Chronology: The Time of My Life.”

## Sources

Smith, Shelley J., Jeanne M. Moe, Kelly A. Letts, and Danielle M. Paterson. 1993. *Intrigue of the Past: A Teacher’s Activity Guide for Fourth through Seventh Grades*. Washington, D.C.: Bureau of Land Management, U.S. Department of the Interior. [This lesson is adapted from “Stratigraphy and Cross-Dating” on pp. 49–52, courtesy of the Bureau of Land Management.]  
Ward, H. Trawick, and R. P. Stephen Davis, Jr. 1999. *Time Before History: The Archaeology of North Carolina*. Chapel Hill: University of North Carolina Press. [The image in this lesson’s main heading is taken from Figure 4.22.]

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### “Site Near Roanoke Rapids” Activity Sheet Answers:

1. People from the middle Archaic Period; 6000–3000 BC.
2. Modern Americans.
3. Younger.
4. Clay pottery, pipe, fish hook, corn cob, etc.; early farmers who hunted, fished and gathered wild plant foods to supplement their diet.
5. Artifacts include a wagon wheel, horseshoe, and metal two-person saw, as well as a clay pot and stone arrow

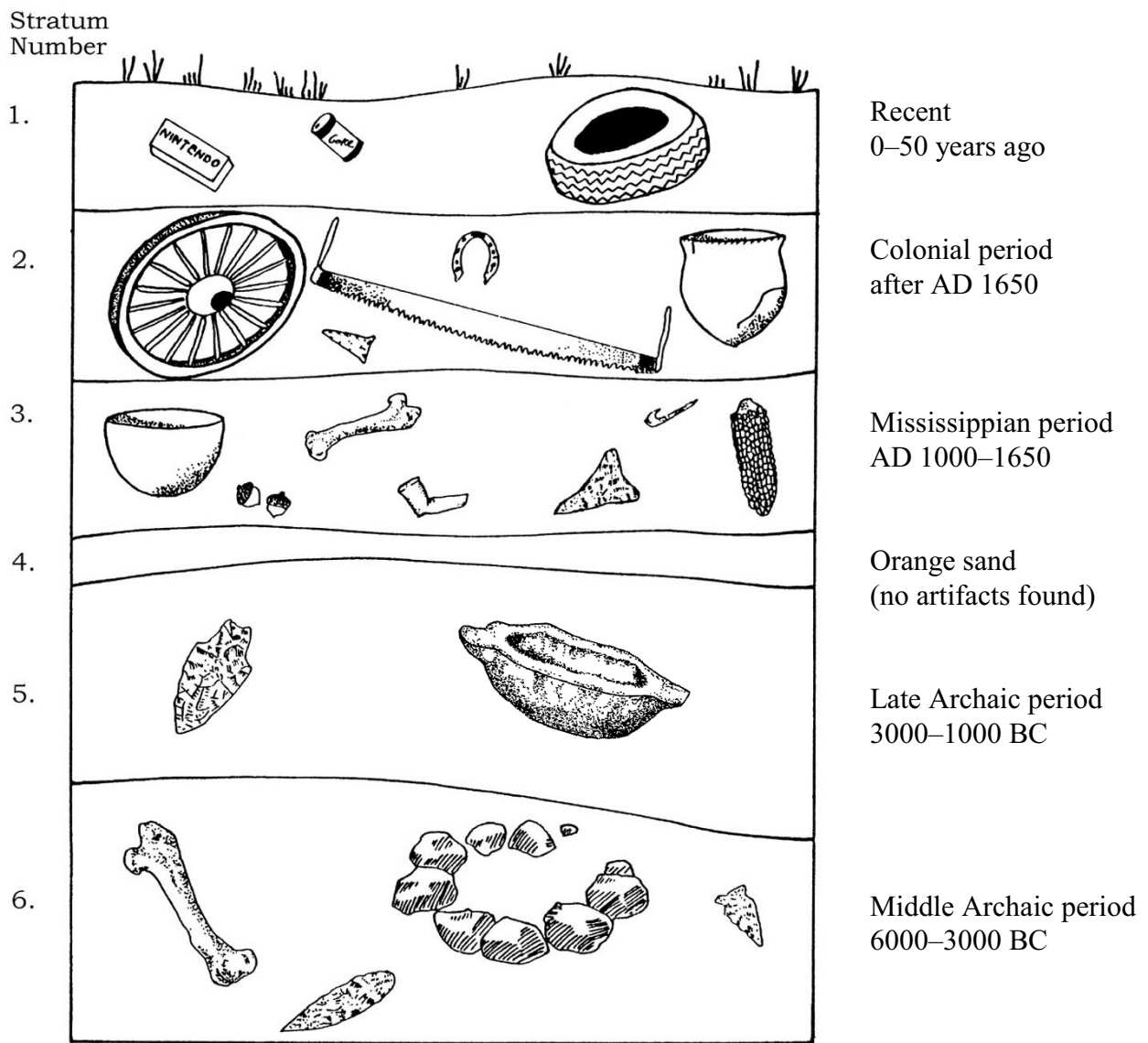
point; at least two cultures are represented: Colonial settlers and Native Americans.

**“Cross-Dating” Activity Sheet Answers:**

1, AD 1000–1650; 2, 3000–1000 BC; 3, after AD 1650; 4, after AD 1650; 5, AD 1000–1650.

# Site Near Roanoke Rapids

Name: \_\_\_\_\_

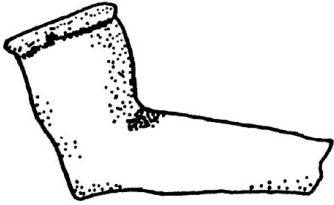


1. Which people lived at the site first?
2. Which people lived at the site last?
3. Are the artifacts above the layer of orange sand older or younger than the artifacts below it?
4. What kinds of artifacts and other remains are found in stratum 3? What inferences can you make about how the people who left them there lived?
5. What kinds of artifacts are found in stratum 2? Is more than one culture represented?

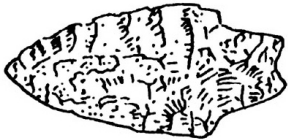
# Cross-Dating

Name:

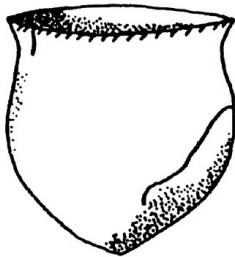
An archaeologist found these artifacts near your town. What is their approximate age?



1.



2.



3.



4.



5.