



Peanut Butter & Jelly Archaeology

Adapted from *Peanut Butter and Jelly Archaeology* by the South Carolina Archaeology Public Outreach Division, Inc. (2010).

Grade Levels

3rd – 8th and High School Earth Science

Estimated Time

45 – 60 minutes for activity only.

Goal

Students will examine the principle of stratigraphy by building an edible archaeological site.

Objectives

After completion of the activity and viewing of the *Fort Frederick Archaeology* documentary, students will be able to:

1. *Observe* the archaeological process and *reproduce* the process through activity.
2. *Listen* to the history of Fort Frederick and *remember* key events.
3. *Identify* the location of Fort Frederick in South Carolina.
4. *Construct a model* archaeological site and *simulate* archaeological excavation techniques.
5. *Link* the construction of the model layers to stratigraphy in the archaeological record.
6. *Investigate* techniques of *establishing* a grid for an excavation *survey*.
7. *Analyze* the *cause and effect* of natural erosion and human activity to the Fort Frederick Heritage Preserve property (i.e., erosion due to changes in the river, looting).
8. *Discuss* the importance of cultural resources preservation and *propose* ideas for preserving archaeological sites.
9. *Interpret* the model archaeological site following *testing* and *justify* the excavation technique used (i.e., Why were model shovel tests placed where they were? Would the student recommend further testing to *evaluate* the model archaeological site?).

Academic Standards

Math

- 3-1 Students will demonstrate an understanding of the academic standards and accompanying indicators through problem solving, reasoning and proof, communication, connections and representations.

- 3-4 Through the process standards students will demonstrate an understanding of geometric attributes and the relationship to shape, congruency, symmetry, and movement within two-dimensional space.
- 3-5 Through the process standards students will demonstrate an understanding of measurable attributes of objects, apply tools to determine measurements, and demonstrate an ability to make change.
- 3-6 Through the process standards students will demonstrate an understanding of organizing, interpreting, analyzing and making predictions about data, the benefits of multiple representations of a data set, and the basic concepts of probability.
- 4-3 Through the process standards students will demonstrate an understanding of numeric and nonnumeric patterns, representing simple mathematical relationships, and applying procedures to find the value of an unknown.
- 4-4 Through the process standards students will demonstrate an understanding of the characteristics and properties of two-dimensional and three-dimensional geometric shapes and a developing understanding of the applications of transformations and the coordinate system.
- 4-6 Through the process standards students will demonstrate an understanding of the impact of data collection methods, interpreting and organizing data, the appropriate graph for categorical and numerical data, and analyze possible outcomes of a simple event.
- 5-1 Students will demonstrate an understanding of the academic standards and accompanying indicators through problem solving, reasoning and proof, communication, connections and representations.
- 5-6 Through the process standards students will demonstrate an understanding of designing an investigation, the affect of data collection methods on a data set, interpretation and application of measures of center, and application of basic concepts of probability.
- 6-1 Students will demonstrate an understanding of the academic standards and accompanying indicators through problem solving, reasoning and proof, communication, connections and representations.
- 6-4 Through the process standards students will demonstrate an understanding of the properties and attributes of two-dimensional shapes through coordinate geometry and transformational geometry.
- 7-1 Students will demonstrate an understanding of the academic standards and accompanying indicators through problem solving, reasoning and proof, communication, connections and representations.
- 8-1 Students will demonstrate an understanding of the academic standards and accompanying indicators through problem solving, reasoning and proof, communication, connections and representations.

Science

- 3.S.1 The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content.
- 3.E.4 The student will demonstrate an understanding of the composition of Earth and the processes that shape features of Earth's surface.
- 4.S.1 The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content.
- 5.S.1 The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content.
- 5.E.3 The student will demonstrate an understanding of how natural processes and human activities affect the features of Earth's landforms and oceans.
- 6.S.1 The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content.
- 7.S.1 The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content.
- 8.S.1 The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content.
- 8.E.6 The student will demonstrate an understanding of Earth's geologic history and its diversity of life over time.
- H.E.1 The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content.
- H.E.4 The student will demonstrate an understanding of the dynamic relationship between Earth's conditions over geologic time and the diversity of organisms.

Social Studies

- 3-2.2 Summarize the motives, activities, and accomplishments of the exploration of South Carolina by the Spanish, French, and English.
- 3-2.4 Summarize the development of the Carolina colony under the Lords Proprietors and the royal colonial government, including settlement by and trade with the people of Barbados and the influence of other immigrant groups.
- 4-1.3 Explain the political, economic, and technological factors that led to the exploration of the new world by Spain, Portugal, France, the Netherlands, and England, including the competition between nations, the expansion of international trade, and the technological advances in shipbuilding and navigation.
- 6-6.4 Compare the economic, political, and religious incentives of the various European countries to explore and settle new lands.
- 7-1.1 Compare the colonial claims and the expansion of European powers through 1770.

8-1.2 Compare the motives, activities, and accomplishments of the exploration of South Carolina and North America by the Spanish, French, and English.

Activity Type: In-Class

To be done as an in-class activity. The teacher will purchase the materials and distribute them to the students for the construction of their peanut butter and jelly archaeology sites. Construction of peanut butter and jelly archaeology sites can be done individually or as a team.

Materials

Please note that this is a suggested list of ingredients, which can be reduced for time and cost efficiency. If a student has a peanut allergy alternative ingredients should be substituted.

Per student

- 3 slices of bread (alternative: angel food cake)
- 3 tablespoons of jelly or jam
- 2 tablespoons peanut butter (alternative: cake frosting)
- Raisins
- Chocolate chips
- Chocolate sprinkles
- Broken candy pieces (M&Ms are suggested)
- Oreos
- Frosted Flakes
- Rice Krispies Bars
- Gummy worms
- Pretzel sticks
- 2 paper plates
- Plastic knife
- Plastic spoon
- Large clear straw
- Napkins

Historical Background

- Fort Frederick was built by the British colonial government to protect approaches to Beaufort Towne from the Atlantic Ocean by way of Port Royal Sound and the Beaufort River.
- Estimates for the construction costs of the fort were presented on 20 January 1726 to the South Carolina Commons House of Assembly by Colonel William Rhett. Rhett had overseen construction of the defenses surrounding Charles Towne in 1707.

- Funding for the construction of Fort Frederick was authorized in 1730.
- Barracks were probably completed before January 1733 because James Oglethorpe lodged a large group of Georgia's first settlers in the building while he looked for lands to settle around Savannah.
- Construction of the fort was complete, except for platforms, in 1734.
- The architect/engineer of the fort is not known, and the original plans for the fort have been lost.
- The best historical information we now have about the original construction of the fort is in the verbal description given by Robert Brewton who examined the nearly completed fort on behalf of the South Carolina Commons House of Assembly in 1734. Brewton stated that he saw four lines and two bastions, observing that the tabby walls were five feet high and five feet thick at the top. The fort contained a magazine, and this was described as leaky in 1739/1740. Brewton also mentioned barracks but does not give any location or dimensions leaving open the question as to whether or not such accommodations were constructed within the fort's enclosing walls. That is one of the research questions archaeologists working at the fort in 2014/2015 determined with their excavations.
- Fort Frederick was built by "Messrs. Bond and Delabere." A partial payment for construction was made on 24 January 1734 in the amount of £1,600.
- The fort was garrisoned from 1734/1735 until it was abandoned in 1757 following the construction of Fort Lyttelton.
- Within six years of the fort's completion, the tabby walls had partially disassociated along the western wall, the barracks had deteriorated, and the magazine was unfit for service. Other than a few minor patches to the fort, no major repairs or alterations were authorized.
- Openings along the fort walls may have been original or alterations during the Civil War to provide access for a landing stage.
- In the late 1750s, permission was sought to remove material from Fort Frederick in order to construct Fort Lyttelton. It cannot be determined if this actually took place.
- The fort varied in its number of occupants anywhere from two provincials to 100 British regulars.
- In 1785, the fort and its surrounding land were sold to Captain John Joyner on whose death in 1796 the property passed to his grandson John Joyner Smith (1790-1872). This tract of land was comprised of 700 acres by 1861 and was known during the late antebellum period as *Old Fort*, the *Smith Place*, or *Smith's Plantation*. By 1860, the history of the fort is assumed to have been forgotten as people called the fort *Old Spanish Fort* or *Smith's Fort*.
- The fort was occupied by Union forces following the Battle of Port Royal in November 1861. It became the headquarters for the 1st South Carolina Regiment of Volunteers, a regiment of African-American soldiers. The site was renamed Camp Saxton after General Rufus Saxton (self-styled Governor of the Sea Islands and leading advocate of the Port Royal Experiment).

- In 1863, the fort and its surrounding plantation land, as well as many other plantations on Port Royal Island were sold by the American government (Union authorities) for the non-payment of taxes. The amount owed on *Old Fort* plantation was \$93.40. The U.S. government purchased the property for \$1,000.
- In 1949, part of the site was developed as a U.S. Naval Hospital and associated housing.
- In 1974, Fort Frederick was nominated to the National Register of Historic Places.
- The preserve was acquired in 1997 by the South Carolina Department of Natural Resources with funds from the Heritage Land Trust Fund and by a donation from the National Park Service's Federal Land to Parks program.

Archaeology Background

Archaeologists rely heavily on the principle of stratigraphy. Stratigraphy is defined as the layering of cultural remains (artifacts) and natural sediments over time. As layers are deposited, the oldest is on the bottom and the youngest is on the top. Archaeologists can estimate the relative age of artifacts by examining which layers the artifacts come from.

Habitation sites are places where people once lived. When archaeologists uncover these sites, they are known as archeological sites. Prehistoric habitation sites (occupied before A.D. 1500) may be identified by postholes (i.e., soil stains left where wooden posts once stood but have deteriorated away), middens (trash heaps), and stone tools. Historic habitation sites (occupied after A.D. 1500) may also contain postholes and middens, but will also contain more modern cultural material such as glass, metal, brick, and plastic.

When archaeologists find an area they think was once a habitation site they will excavate core samples or test pits in a systematic grid pattern across the property. Archaeologists also conduct sampling to find the extent of a known site. Testing sites allows archeologists to find concentrations of artifacts and features. Archaeologists can then excavate larger units in areas with dense artifact concentrations in order to extract more scientific data in order to interpret the archaeological site.

Lesson

1. Give a brief history of Fort Frederick Heritage Preserve.
2. Show the *Fort Frederick Archaeology* documentary film.
3. Review key archaeology terminology covered in the film (shovel test, cultural material, sterile soil, excavation, artifact, curation, feature, stratigraphy, integrity, analysis).
4. Discuss the process of archaeology with the students.
5. Talk with the students about the short-term and long-term effects of weather and human activity (i.e., looting) to archaeological sites.

6. Guide students in the peanut butter and jelly archaeology activity. Tell students they are going to create an archaeological site like those excavated at Fort Frederick Heritage Preserve. Students will bury their site, excavate it, and then eat it. You can use the following narrative to guide students through the activity. Remember to reinforce archaeological concepts throughout the activity.

Narrative:

- a. Here is Fort Frederick Heritage Preserve next to the Beaufort River in South Carolina. *Lay down a slice of bread.*
- b. A large flood leaves a layer of mud on the property. *Spread the peanut butter.*
- c. Shortly after the flood, a group of Woodland Period (1000 B.C. to A.D. 1200) Native Americans camp on the preserve. It can get pretty cold at night, so they build a fire. Their fire leaves behind charcoal and rocks that crack from the heat. *Arrange pieces of raisins in a circle and fill the circle with crushed Oreos.*
- d. These people depart and through time a layer of dirt forms over the campsite. *Lay down another slice of bread.*
- e. In the 1700s, the British start to build Fort Frederick using tabby on the edge of the Beaufort River. Inside the fort they built barracks and a powder magazine using brick. *Lay down thin layers of Rice Krispies Bars for the walls of Fort Frederick near the edge of the bread, and pieces of pretzel sticks for the outline of the barracks and powder magazine.*
- f. Within a short time the British abandon the fort as it starts to fall into disrepair and the river begins to move over the eastern wall. *Cover the eastern half of the fort with jelly.*
- g. In 1785, the property becomes part of a plantation. Many people live on the plantation, build houses, plant fields, and deposit trash. *Use pretzel sticks to make the outline of a small structure. Deposit a small pile to M&Ms (representing ceramics), Frosted Flakes (representing oyster shells) in a trash pile near the small structure.*
- h. Over the next 200 years the structures associated with the plantation are destroyed and buried. *Lay down a slice of bread (cut away at least $\frac{1}{4}$ of the bread to allow the fort to remain on the surface).*
- i. In 1949, the U.S. Naval Hospital builds housing near the property, and builds a road and boat ramp next to Fort Frederick. *Use the knife to spread a line of peanut butter across the bread to represent the road.*
- j. In 1997, the South Carolina Department of Natural Resources acquires the property, naming it Fort Frederick Heritage Preserve. In 2014, they begin archaeological investigations of the property. Students can start systematic shovel testing of their model sites by pushing the large straws through their sandwiches.
- k. What areas during testing produced the most artifacts or features? *Go back to your site and using your knife, cut in larger excavation units to reveal more of your site.*

1. *Students can eat their sites* (all together or layer by layer) following a discussion of the archaeological process they just modeled.
7. Following the activity, discuss with the students why the preservation of archaeological sites and historic structures like the ones found Fort Frederick Heritage Preserve is important, and what they can do to help with the preservation of cultural resources (i.e., historical structures, archaeological sites) in their own communities.