



FLORIDA PUBLIC
ARCHAEOLOGY
NETWORK

Building Technology

Students learn how Florida’s early people built structures, like huts and fishing weirs, as well as earthworks, like middens and burial mounds.



STUDENT LEARNING GOALS:

Students will be able to identify Timucua building processes involved in the construction of native earthworks (middens and burial mounds) and be able to construct models of native structures (huts and fishing weirs).

SUNSHINE STATE STANDARDS ASSESSED:

Science

- SC.7.E.6.6 Identify the impact that humans have had on Earth, such as deforestation, urbanization, desertification, erosion, air and water quality, changing the flow of water.
- SC.7.N.1.5 Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
- SC.7.N.3.2 Identify the benefits and limitations of the use of scientific models.
- SC.8.N.1.5 Analyze the methods used to develop a scientific explanation as seen in different fields of science.
- SC.8.N.1.6 Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.
- SC.8.N.4.2 Explain how political, social, and economic concerns can affect science, and vice versa.

Social Studies

- SS.7.G.1.3 Interpret maps to identify geopolitical divisions and boundaries of places in North America.
- SS.7.G.2.3 Explain how major physical characteristics, natural resources, climate, and absolute and relative location have influenced settlement, economies, and inter-governmental relations in North America.
- SS.7.G.3.1 Use maps to describe the location, abundance, and variety of natural resources in North America.
- SS.8.A.1.2 Analyze charts, graphs, maps, photographs and timelines; analyze political cartoons; determine cause and effect.
- SS.8.A.1.7 View historic events through the eyes of those who were there as shown in their art, writings, music, and artifacts.
- SS.8.G.1.1 Use maps to explain physical and cultural attributes of major regions throughout American history.
- SS.8.G.2.1 Identify the physical elements and the human elements that define and differentiate regions as relevant to American history.

Language Arts

- LA.7.1.6.2 The student will listen to, read, and discuss familiar and conceptually challenging text.



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- LA.7.4.2.2 The student will record information (e.g., observations, notes, lists, charts, legends) related to a topic, including visual aids to organize and record information, as appropriate, and attribute sources of information.
- LA.8.1.6.2 The student will listen to, read, and discuss familiar and conceptually challenging text.
- LA.8.4.2.2 The student will record information (e.g., observations, notes, lists, charts, legends) related to a topic, including visual aids to organize and record information, as appropriate, and attribute sources of information.
- LA.8.6.4.1 The student will use appropriate available technologies to enhance communication and achieve a purpose (e.g., video, digital technology).

Mathematics

- MA.7.A.3.2 Add, subtract, multiply, and divide integers, fractions, and terminating decimals, and perform exponential operations with rational bases and whole number exponents including solving problems in everyday contexts.
- MA.7.G.4.4 Compare, contrast, and convert units of measure between different measurement systems (US customary or metric (SI)), dimensions, and derived units to solve problems.
- MA.8.G.5.1 Compare, contrast, and convert units of measure between different measurement systems (US customary or metric (SI)) and dimensions including temperature, area, volume, and derived units to solve problems.

RESOURCES:

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Benfield-Barker, Simon. “The Timucua – A Civilization the Flourished at River’s Edge.” 10 February 2012. <<http://jacksonville.com/special/river/timucua.html>>

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- “The Council House.” 9 February 2012.
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- “Native American Charnel House.” 10 February 2012.
<<http://www.learnnc.org/lp/multimedia/6275>>
- “Partial Scaffold Burial and Ossuaries.” 11 February 2012.
<<http://www.nanations.com/burialcustoms/ossuaries.htm>>
- “Projects – Mount Royal Indian Mound,” Florida Department of State, Division of Historical Resources. 29 March 2012.
<<http://www.flheritage.com/archaeology/projects/mountroyal/index.cfm>>
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PICTURE SOURCES (Image URLs and Permissions):

Cahokia Monk's Mound

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Calusa Canals by Merald Clark, courtesy Florida Museum of Natural History.

http://www.flmnh.ufl.edu/sflarch/images/canal_large.jpg

Charnel House http://www.learnnc.org/lp/media/uploads/2008/02/charnel_house.jpg

Copper-covered Wooden Ear Spool, courtesy of Brian Floyd

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Crystal River Temple Mound

http://upload.wikimedia.org/wikipedia/commons/thumb/0/05/Crystal_River_Arch_Park_TM01.jpg/250px-Crystal_River_Arch_Park_TM01.jpg

Lake Jackson Mound 2 http://upload.wikimedia.org/wikipedia/commons/thumb/1/17/07-09-11_LkJksnMoundsStPkMnd2.jpg/300px-07-09-11_LkJksnMoundsStPkMnd2.jpg

Mount Royal Copper Breastplate, courtesy of the Museum of Florida History,

<http://www.flheritage.com/images/archaeology/projects/plate.jpg>

Palm Hut, from *The Timucua Indians – A Native American Detective Story*, reprinted with permission from the University Press of Florida

Palmetto Fronds, courtesy of Ashley Herrera

Posthole Excavation (Flat) <http://www.missionsanluis.org/images/friaryComplex1.jpg>

Posthole Excavation (Deep) http://www.missionsanluis.org/images/pm4_ch.jpg

Photographs and illustrations without attribution were provided by Kelley Weitzel MacCabe.

MATERIALS LIST FOR “Building a Thatched Wall” ACTIVITY:

For each team of two to three students: Four 6' bamboo garden stakes. You can use the thin 1/4" stakes up to almost 1" in diameter. (Bamboo flexes while dowels do not. The flex is required for this activity.) 5' of hemp twine. Scissors for cutting twine. Roughly 50 palmetto leaves with long



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stems. [Palm leaf alternative: If a local landscaper can provide you with sabal palm leaves, you can use those instead with these amendments: eight 6’ bamboo garden stakes of 1” diameter. The thinner ones will not work. 16-23 palm fronds per wall. This will make a 6x6’ wall. Pros: needing fewer fronds and especially the lack of saw-edges on the stems. If you choose to use sabal palm fronds instead of palmetto fronds, be sure to harvest the long curly strings to use for rope weaving. Cons: it’s nearly impossible to get enough palm fronds without professional donation. Also, you use twice as many (and larger) bamboo stakes.] For each student: leather or cotton work gloves to protect skin from the saw-edges on palmetto stems. For class: Several pairs of garden clippers for trimming palmetto stems. The blades on these tools are potentially dangerous. Students should exercise caution. Water source and an outdoor space to test how waterproof the thatched walls are. **Teacher Tips:** *Bamboo stakes are not as strong as pines and grapevines. Too much stress placed on them while bending the weavers and palmetto stems over and under will crack them. Advise caution. As stems are poked through the lattice, it is very easy to poke neighboring students. Safely glasses are recommended, as is working outside with plenty of space between students. While a hut built with large pines and thatched with palm fronds can last many years, these model walls will only maintain their integrity until the fronds dry and shrink. At this point, the fronds will slip free, and the frame may fall apart. Please find a way to return these leaves to the forest, rather than putting them in a landfill.*



Constructing the frame using 8 three-foot-long ¼” diameter sections of bamboo



Thatching up to the first weaver



Thatching up to the second weaver



Completed palmetto wall



Testing for Water Resistance

ANSWER KEY FOR “Building a Thatched Wall” ACTIVITY:

1) It was a little challenging when we first started putting the thin weavers over and under the thicker uprights because it kept falling apart. But once we got all of the weavers in, it actually held together really well. We had to wrap twine around all four corners; otherwise the weavers got pushed out of position when we were trying to get the palmetto stems to go over and under. It was tough to get the palmetto leaves at the top to stay in place after we trimmed the stems. We ended up having to tie them on. Having the leaves bundled helped them lie close together. We had to tie them to the fronds underneath to keep them in place.



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- 2) The water actually ran off the outside which was really cool. But I was wondering how they kept rain from coming in the open smoke hole at the top. Maybe they had a mat they tied across the opening in really nasty weather?
- 3) I would definitely use sabal palm fronds instead. Those saw palmettos are sharp!

MATERIALS LIST FOR “Why Do Native Structures Have Short Doorways?” EXPERIMENT:

For each team of 3 students: 3 empty soda cans. 1-3 tea light candles. For class to share: several pairs of tin snips, wire cutters, or stout scissors to cut aluminum cans. A few long, narrow lighters to safely light candles. **Teacher Tip:** If you have safety concerns about the students cutting the cans, you can do most of the cutting in advance. If you have concerns about fire safety, this activity can be done outside on a basketball court. However, wind will compromise the results, so you’ll need to do the experiment on a still day or in a sheltered area.

ANSWER KEY FOR “Why Do Native Structures Have Short Doorways?” EXPERIMENT:

Measurement Sample Answers: width: 2cm-4cm, height: 2.5cm – 7.5cm

Observation Sample Answers: TM1: At first, nothing happened. Then the smoke went up out of the smoke hole, and it came out of the door. The inside of the can was filled with smoke. TM2: At first, the candle went out because our door was too low. We raised it 1 more cm, and then it worked okay, with the smoke exiting only from the smoke hole. TM3: We designed to play it on the safe side and only raise the height of the doorway 1 cm. It worked fine, with the smoke only going up through the smoke hole. Maybe we could have made it higher, but we wanted to be sure it could work. Maybe if we had more cans to practice on, we could make lots of cans, each with a slightly higher door to figure out the best actual doorway height.

In Your Own Words Sample Answer: Smoke from a fire is made of hot air, so it rises. It goes to the highest point, which is the smoke hole, and then floats out of the building. If a doorway is high, the rising smoke is pulled in two different directions and fills the house. If the door is low, it doesn’t interfere with the smoke going up out of the smoke hole.

MATERIALS LIST FOR “Mapping the Mount Royal Site” ACTIVITY:

For each student: 2 sheets of graph paper, one to sketch on, the other to create a final product. A calculator. *Note to Teachers:* The sample sketch was drawn to scale on graph paper.



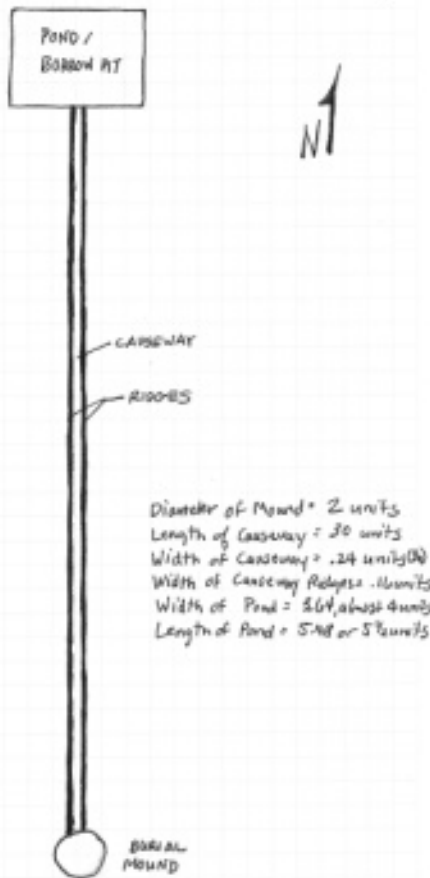
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ANSWER KEY FOR “Mapping the Mount Royal Site?” ACTIVITY

Mount Royal Features	Number of Squares per Feature (at 25m per square) Data used to sketch for part II.	Size in Meters
Mound	1.96 or 2	49 meters in diameter
Causeway	29.96 or 30	749 meters in length
Causeway	Total for causeway and both ridges	6 meters in width
Ridges	Is .6 or just over half a square	4 meters in width
Pond	3.64 or almost 4	91 meters in width
Pond	5.48 or 5 ½	137 meters in length

Sketch of the Features at Mt Royal



- 1) Sample Answer: In my sketch, each square equals 25 meters. This allows everything to fit onto a grid paper that is 40 units high.



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MATERIALS LIST FOR “Weir Building” ACTIVITY:

For each team of two students: 10-20 popsicle sticks, a foil pan at least 2” deep with a substrate in the bottom that popsicle sticks can be stuck into, like sand. Modeling clay was used in the images below. A handful of Cheerios or other tiny floating object. For class: A water source, several watering cans. Towels to dry up spills. **Teacher Tip 1:** *Students will be tempted to tip the foil pan to try to force their fish to swim down the incline. However, floating objects don’t move with the tide, they just bob. The best way to simulate fish movement is to nudge your “fish” purposefully in the downstream direction.* **Teacher Tip 2:** *Tide charts are expressed in feet, not meters, so this activity will remain in standard measurements.* **Teacher Tip 3:** *Colored popsicle sticks look nice, but the color bleeds when they get wet. Here are photos of a sample V-weir and Loop-weir. (Note: These are not actual names for weir types, just shorthand for discussing weirs with students.)*



V-Weir,
fish swims
over
barrier at
high tide



V-weir
showing
difference in
post heights



V-weir with fish
trapped by gate



Loop-weir
corraling a fish
towards the trap



Two Loop Weirs,
the leftmost being
gated to corral the
captured fish



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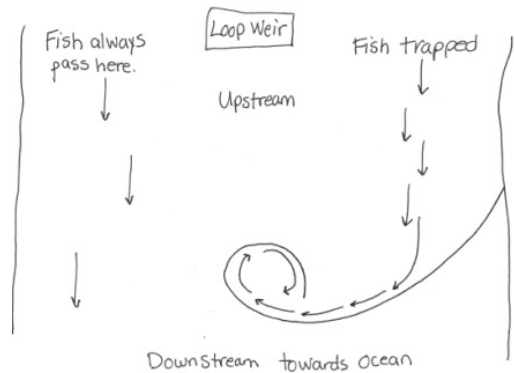
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ANSWER KEY FOR “Weir Building” ACTIVITY:

Location of Weir	Low Tide	High Tide	Change in Water Elevation	Half of this Change	Mean Low Depth	Depth pole is buried in the mud	Length of Poles Needed
Mayport	-1.1'	5.1'	6.2'	3.1'	+ 1'	+ 2'	6.1'
Clapboard Creek	-0.8'	3.7'	4.5'	2.25'	+ 1'	+ 2'	5.25'
Downtown Jacksonville	-0.1'	2.1'	2.2'	1.1'	+ 1'	+ 2'	4.1'
Palatka	-0.2'	1.1'	1.3'	0.65'	+ 1'	+ 2'	3.65'
Green Cove Springs	-0.3'	0.8'	1.1'	0.55'	+ 1'	+ 2'	3.55'
Welaka	0.0'	0.5'	0.5'	0.25'	+ 1'	+ 2'	3.25'

- 1) The further you get from the ocean, the smaller the tidal change you get. The incoming tidal water probably spreads out across the whole river, so not as much gets into the upstream areas to increase water levels.

Results: I built a loop-weir. At first, the “fish” wouldn’t fit through the opening in the weir, so I had to move the last post or two.



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STUDENT ARTICLES, EXPERIMENTS, & ACTIVITIES:

- 1) What is Building Technology?
- 2) Let's Talk Buildings
- 3) ACTIVITY: Building a Thatched Wall
- 4) How Was a Typical Village Set Up?
- 5) What Was a Charnel House?
- 6) What About Mounds?
- 7) ACTIVITY: Mapping the Mount Royal Site
- 8) Mound Building
- 9) What about Middens and Shell Rings?
- 10) Let's Talk About Weirs
- 11) ACTIVITY: Weir Building

NEW TERMINOLOGY:

acidic, alkaline, archaeological feature, articulated, artifact, burial mound, charnel house, chiefdom, confederation, cremation, diameter, effigy, egalitarian, frond, grave goods, hamlet, interment, lattice, midden, monument, noxious, periphery, primary burial, seasonally-flooded, secondary burial, shaman, substrate, thatch, tidal, weir

Good websites for archaeological terms not available on Google: define

<http://archaeology4kids.tripod.com/id38.html>

http://mdah.state.ms.us/hpres/arch_vocab.php

<http://www.archaeologywordsmith.com/lookup.php?category=&where=headword&terms=primary+burial>

ASSESSMENT OPTIONS:

Writing Prompt #1: Weirs are tools that allow the Timucua to complete a task (fishing) without having to be there putting time and effort into the task. Think about ways that modern technology allows us to complete tasks while doing something else. Write to explain how three modern technologies can free you up to do other things while your tasks are being completed.

Assessment #1: The Timucua used weaving technologies to make tools (baskets and fishing nets) and houses (thatched walls and roofs). If needed, review the sections on weaving in the Wild Plants and Tool-Making units. Describe how those weaving processes are similar and different from the weaving used in hut-making.

Assessment #2: Based on your reading of the articles titled “What did a Timucua Council House Look Like?,” “Let’s Talk About Mounds,” and “What about Middens and Shell Rings?” describe ways that mounds, council houses, and shell rings served similar and different purposes.



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Assessment #3: Based on your reading of the article titled “What Was a Charnel House?” explain why the presence of bundle burials in a burial mound provides archaeologists with evidence that a charnel house was in use.

Assessment #4: The initial article in this unit describes how building technology satisfied both practical and spiritual needs for the Timucua. Based on your reading of the articles, describe how each of the following fulfills either a practical or a spiritual need for the Timucua: family hut, drying rack (for herbs, meats, deer hides, and fishing nets), sweat lodge, women’s seclusion hut, corn crib, council house, charnel house, burial mound, fishing weir.

Classroom Technology Strategies

Students often turn to sources like Wikipedia as a quick reference. Google offers a dictionary function which is simple, reliable, and a good alternative to Wikipedia when the goal is a basic definition. At the Google prompt, students should enter the word “define:” with a colon, and then list the word they need to look up. Definitions are provided by the Oxford American College Dictionary.

Before starting each unit, you can assign each student 2 words from the **New Terminology** list. They should seek the definition using Google define, and come prepared to share the definition with the class. Some of the more specialized archaeology terms will not be defined. Students can use the links provided with the **New Terminology** list to find definitions for these.

If you wish, you can have students use BOTH Google Define and Wikipedia to define **New Terminology**. Emphasize that Google Define is a dictionary. Wikipedia is an encyclopedia.

Ask students to count how many links down the page they go before a Wikipedia entry appears.

Discuss reasons that Wikipedia is not considered a reliable resource for scholarly research.

- 1- Anyone can write articles, so the information may be in error.
- 2- The articles are not peer-reviewed by experts in the field, so this information lacks authority. In other words, even if the information is true, saying it came from Wikipedia won’t convince anyone else it is true.
- 3- The content on Wikipedia changes frequently, so if you cite a source, it may not even contain that information a week later.
- 4- Encyclopedias, in general, are not good resources for research. They give overviews of topics without providing the details you need to genuinely understand the topic.



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Pros about Wikipedia:

- 1- It can be a good place to start research. Once students have a basic understanding of their topic, they can delve into more complex resources.
- 2- Wikipedia cites its sources, and those links can point students in other directions to continue their research.
- 3- Wikipedia images are available free for use in not-for-profit educational documents, so students can illustrate projects with these images.