



FLORIDA PUBLIC
ARCHAEOLOGY
NETWORK

Tool-Making Technology

Students learn how the Timucua used natural materials to make tools - and how these tools helped them to survive.



STUDENT LEARNING GOALS:

Students will be able to identify the processes involved in Timucua tool manufacture and replicate the process of pottery coiling.

SUNSHINE STATE STANDARDS ASSESSED:

Science

- 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.2.1 Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.
- 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.

Social Studies

- 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.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.
- SS.8.G.5.1 Describe human dependence on the physical environment and natural resources to satisfy basic needs in local environments in the United States.

Language Arts

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



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Visual Arts

- VA.68.C.3.4 Compare the uses for artwork and utilitarian objects to determine their significance in society.

RESOURCES:

Ashley, Keith. “Colorinda and its Place in Northeast Florida History,” The Florida Anthropologist, Vol. 59, No. 2. Florida Anthropological Society. June 2006.

“Bone Tools – Series in Ancient Technologies.” 2 February 2012.

<<http://www.uiowa.edu/~osa/learn/ancient/bone.htm>>

Brown, Robin C. Florida’s First People. Pineapple Press, Sarasota, FL 1994.

Bullen, Ripley P. A Guide to the Identification of Florida Projectile Points, Kendall Books, 1975.

“Caveman Chemistry - Pottery.” 2 February 2012.

<<http://cavemanchemistry.com/oldcave/projects/pottery/>>

Deagan, Kathleen & Thomas, David Hurst. “From Santa Elena to St. Augustine: Indigenous Ceramic Variability.” American Museum of Natural History 2009.

Elpel, John J. Participating in Nature: John J. Elpel’s Field Guide to Primitive Living Skills. Hops Press. 5th Edition. 2002.

“Firing Methods and Results – Pit Firing.” 2 February 2012.

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Furey, John F. “An Analysis of Shark Tooth Tools for the Boca Weir Site in South Florida.” The Florida Anthropologist, Vol. 30, No. 3. September 1977.

“Going Local – How to Dig, Screen, and Process Your Own Clay.” 4 February 2012.

<<http://ceramicartsdaily.org/ceramic-supplies/pottery-clay/going-local-how-to-dig-and-process-your-own-clay/>>

“How to Make a Grapevine Basket.” 4 February 2012. <<http://fossilady.hubpages.com/hub/How-to-Make-a-Grapevine-Basket>>

“How to Rework Clay and Fire Without a Kiln.” 2 February 2012.

<<http://www.goshen.edu/art/DeptPgs/rework.html>>

Horvath, Elizabeth A. “Archaeological Excavations at the Colorado Site (8HE241) – A Lithic Workshop in Hernando County Florida.” The Florida Anthropologist, Vol. 53, No. 2-3. Florida Anthropological Society. June-September 2000.

“Making Cordmarked Pottery,” 28 February 2012.

<<http://www.texasbeyondhistory.net/theme/cordmarked/>>

Marquardt, William H. Culture and Environment in the Domain of the Calusa. Institute of Archaeology and Paleoenvironmental Studies. Gainesville, 1992.

Peters, Eric David. “Determining Form and Function: An Analysis of Use-Related Wear on *Strombus gigas* Shell Tools,” Lambda Alpha Journal, Vol. 31. 2001.

Purdy, Barbara. How to Do Archaeology the Right Way. University Press of Florida: Gainesville: 1996.



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- Purdy, Barbara. The Art and Archaeology of Florida's Wetlands, CRC Press. Boca Raton, FL: 1991.
- Purdy, Barbara. "The Owl Totem" The Florida Anthropologist. Vol. 60, No. 2-3. June – September 2007
- Richardson, Joseph L., "The Windover Archaeological Research Project," 4 February 2012. <<http://www.nbbd.com/godo/history/windover/>>
- Roland, Vicki and Bond, Paulette. "The Search for Spiculate Clays Near Aboriginal Site in the Lower St. Johns River Region, FL." The Florida Anthropologist. Vol. 56, No. 2. June 2003.
- "Shell Ornaments." 4 February 2012. <<http://www.ou.edu/cas/archsur/OKArtifacts/shellorna.htm>>
- "Uses of Fiber and Wood by Native Americans (and Others)" 5 February 2012. <<http://w3.uwyo.edu/~funqi/FibrWood.pdf>>
- "What is an Atlatl?" 5 February 2012. <<http://www.tasigh.org/ingenium/atlatl.html>>
- "Withlacoochee Agatized Coral," 2 February 2012. <<http://www.memphisgeology.org/images/rocknews1207.pdf>>

PICTURE SOURCES (Permissions and Wikipedia image URLs):

- Agatized Coral, courtesy of the Museum of Florida History. <http://www.flheritage.com/images/facts/symbols/mid/coral.jpg>
- Casting an Atlatl Dart
http://upload.wikimedia.org/wikipedia/commons/thumb/5/5a/Poised_to_launch_a_dart_from_an_atlatl.jpg/220px-Poised_to_launch_a_dart_from_an_atlatl.jpg
- Cherokee Pottery Paddles
<http://upload.wikimedia.org/wikipedia/commons/thumb/2/21/Cherokeestampingpaddles.png/179px-Cherokeestampingpaddles.png>
- Fish Hook, from *The Timucua Indians – A Native American Detective Story*, reprinted with permission from the University Press of Florida
- Fishing Net, from *The Timucua Indians – A Native American Detective Story*, reprinted with permission from the University Press of Florida
- Freshwater Sponge, courtesy of R. Korth, <http://designspics.net/wp-content/uploads/2011/09/Freshwater-Sponges.jpg>
- Grapevine Basket, from *The Timucua Indians – A Native American Detective Story*, reprinted with permission from the University Press of Florida
- Gourd Bucket, from *The Timucua Indians – A Native American Detective Story*, reprinted with permission from the University Press of Florida
- Key Marco Mask
<http://upload.wikimedia.org/wikipedia/commons/thumb/f/fc/KMOvalMouth.jpg/170px-KMOvalMouth.jpg>
- Key Marco Panther <http://upload.wikimedia.org/wikipedia/commons/8/88/KeyMarcoCat.jpg>
- Megalodon Tooth
http://upload.wikimedia.org/wikipedia/commons/thumb/7/71/Megalodon_tooth_ruler.jpg/220px-Megalodon_tooth_ruler.jpg



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Owl Totem http://upload.wikimedia.org/wikipedia/en/thumb/e/e6/Timucua_owl_totem.jpg/218px-Timucua_owl_totem.jpg

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

Percussion Flaking

http://upload.wikimedia.org/wikipedia/commons/thumb/b/b2/Soft_Hammer.jpg/220px-Soft_Hammer.jpg

Shell tool illustrations were created by Merald Clark and provided by the Florida Museum of Natural History

Stingray Spine http://upload.wikimedia.org/wikipedia/commons/4/47/Stringray%27s_sting.jpg

Tiger Shark Teeth

http://upload.wikimedia.org/wikipedia/commons/thumb/3/3f/Tiger_shark_teeth.jpg/180px-Tiger_shark_teeth.jpg

Turkey vulture effigy pot <http://www.flmnh.ufl.edu/flarch/images/CO17V4.jpg>

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

MATERIALS LIST FOR “Grouping Modern Tools” ACTIVITY:

No additional materials needed. If you wish to bring in hands-on examples of modern tools, these can be used later to compare to native versions that do the same job.

ANSWER KEY FOR “Grouping Modern Tools” ACTIVITY:

Every answer will be individual. Tools that cause a chemical change will be a tough one. You may wish to require only one response for that one. Here is a sample answer with a few extras.

Part I:

Tools that Cut or Crush: jackhammer, pocket knife

Tools that Move Things: bicycle, wheelbarrow, pen (moves ink across a page), water bottle, ladder

Tools that Cause Chemical Change: lighter, catalytic converter on a car, blowtorch

Tools that Guide and Measure: ruler, measuring cup, calipers, thermometer

Tools that Shape Things: scissors, rolling pin, cookie cutters

Part II:

Tools Made from Metal: jackhammer, pocket knife, bicycle, wheelbarrow, scissors, catalytic converter, blowtorch, ladder legs, cookie cutters, calipers

Tools Made from Plastic: lighter, ruler, pen, water bottle, ladder rungs, cookie cutter, thermometer

Tools Made from Glass: measuring cup, thermometer

Tools Made from Wood: hammer handle, wheelbarrow handles, ruler, rolling pin



Above: Carving tools created by abrading popsicle sticks on a sidewalk. **Below:** a sample soap carving and debitage.

MATERIALS LIST FOR “Soap Carving” ACTIVITY:



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For each student: One bar of hand soap. 1-3 Popsicle sticks, toothpicks, seashells. For class: Newspaper to spread on the floor or across the ground outdoors. Soap shavings should not be left on the ground, because many soaps contain fragrances and antibacterial elements that are dangerous to aquatic ecosystems.

Teacher Tips: *The tiny boat in the photograph took about 15-20 minutes to carve with an unmodified Popsicle stick. It is probably the simplest shape available, so plan to allow more time for complex soap carving. This activity can be assigned as an at home project, freeing up class time to discuss methods and debitage and compare results.*



ANSWER KEY FOR “Soap Carving” ACTIVITY

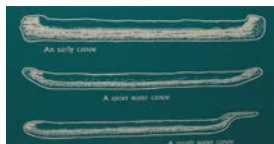
Answers will vary by individual. See photo of Carved Soap Toy Boat.

Teacher Tips – Carving Extension for use in the unit “Archaeology: Beyond Excavation”:

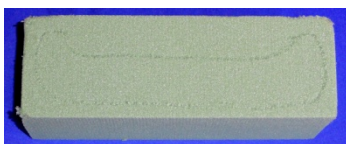
Choose 3-6 students (or everyone if you have enough time and resources) to take on an additional carving project - making different types of canoes. In the “Beyond Excavation” unit, you’ll use these carved canoes in a lab to test the efficiency of each canoe style in rough water, tidal water, and still water. Materials include blocks of Styrofoam, sized about 8”x3”x2.5.” These offer more carving space than bars of soap. Two canoes can be made from each block. Have students review all of the canoe images in the “Beyond Excavation” unit before carving. The front lip on the rough water canoe should be as wide as the canoe itself, but thin top-to-bottom. It must be carved last, or it will break off during the carving process.

TIPS FOR CARVING STYROFOAM: *You can share these images with any students working on canoe carving. Carving soap is much more like carving wood. Working with styrofoam involves more slicing and scraping. You can compare the debitage from foam and soap. Each material chips/slices a bit differently, leaving a different kind of debitage for archaeologists to study. Styrofoam debitage can be very powdery. Safety glasses are recommended.*

Note: *These models were created with dry floral foam. This medium is not recommended because airborne fragments cause eye irritation.*



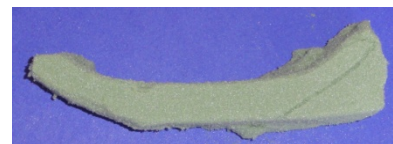
Three Florida
Canoe Shapes



Trace your shape.



Roughly carve the
entire shape.



Carefully start to do
more detailed work.



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*Still Water and
Archaic Canoes*



Both Canoes Floating



*Debitage from
two canoes.
Imagine how
many thousands
of wood chips
would be left
behind after
making a full-
size wooden
canoe.*

MATERIALS LIST FOR “POTTERY COILING” ACTIVITY:

For each student: One pound of air-drying clay. Use gray or tan colors when possible to mimic the natural color of Florida clays. 3 popsicle sticks and 3 toothpicks for scraping and compressing coils. A disposable paper bowl (with sloping sides) to provide a form for the base of the pot. For the Class: Scotch Tape, Scissors. For use as pottery paddles, one of the following: several wooden serving utensils with wide bases OR a few 2”x2” wooden garden stakes cut into 6” lengths. Woven raffia cord wrapped and glued to some of the paddles - to make cord-marked pottery.

Teacher Tips: Most air-drying clay requires 24-48 hours to dry. Pots must be inverted while drying. Be sure you have space to store 30 inverted pots while they’re drying. You can use clays that require firing, but 30% or more of the pots will likely break in your oven, which is upsetting to student potters.

ANSWER KEY FOR “POTTERY COILING” ACTIVITY: Answers will vary by individual.

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Author of *The Timucua Indians – A Native American Detective Story* and *Journeys with Florida’s Indians*

STUDENT ARTICLES, EXPERIMENTS, & ACTIVITIES:

- 1) What is Tool-Making Technology?
- 2) **ACTIVITY:** Grouping Modern Tools
- 3) Let’s Talk About Stone Tools
- 4) What Did the Timucua Make with Shells?
- 5) Let’s Talk About Other Animal Materials – Teeth, Spines, Bone, Antler
- 6) Let’s Talk About Wooden Tools
- 7) Ancient Wooden Tools
- 8) Wooden Artwork
- 9) **ACTIVITY:** Soap Carving
- 10) Let’s Talk About Clay Pottery
- 11) **ACTIVITY:** Pottery Coiling

*The “Timucua Technology Curriculum” was sponsored by a
FL Division of Historical Resources Grant.*



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NEW TERMINOLOGY:

abrade, agatized coral, Appalachian Mountains, *Australopithecus*, awl, bannerstone, Bering Land Bridge, celt, ceremonial, chert, artifact, columella, compress, crystalline structure, culture, debitage, diatom, ember, freshwater sponge, gig, gorget, hammerstone, *Homo sapiens*, impurities, isosceles triangle, knapping, lever, marrow, middens, mortar and pestle, net gauge, outcropping, perforated, pre-Columbian, quartz, scoring, scraper, sherd, spall, specialization, tine, whorl

ASSESSMENT OPTIONS:

Writing Prompt #1: Your community is offering three scholarships to send middle school students to a wilderness survival school. Your teachers have nominated you for this program. Think about whether you would like to attend this program, and why. Now, write a letter to the review board, explaining why you should OR should not be chosen for this program.

Writing Prompt #2: The Timucua made all of their tools from natural materials. Think about the materials that modern tools are made from. Write to explain at least three modern tools that are (at least partly) still made from natural materials.

Assessment #1: The article titled, “Let’s Talk About Stone Tools,” describes flint-knapping as “physics in action.” Based on your reading of the article, explain how flint-knapping is “physics in action.”

Assessment #2: Based on the article titled, “Let’s Talk About Other Animal Materials,” explain at least two differences between antler and bone that affect how the Timucua processed them into tools.

Assessment #3: Based on your reading of the article titled, “What Did the Timucua Make with Clay?” describe the pottery making process, including each of the following: finding clay, removing impurities, tempering, coiling, and firing.

A diverse group of tools are discussed, and the **New Terminology** reflects this diversity. The bullets below group the **New Terminology** according to the type of tool they describe.

A scroll-shaped icon with the text "Student Learning Enhancement" written inside.

Student Learning Enhancement

Ask student groups to look through the unit and pinpoint which tool technology is linked to each list of **New Terminology**. Once matched, have them review that section to look for contextual definitions of each word. If no contextual definition is apparent, they should look for the definition in another source. Finally, groups should share their words



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and definitions with the class, noting which technology they are linked with.

- **STONE TOOLS:** agatized coral, chert, crystalline structure, debitage, hammerstone, impurities, isosceles triangle, knapping, outcropping, quartz, scraper, spall
- **ANIMAL PART TOOLS:** abrade, awl, gig, marrow, net gauge, scoring, tine
- **SHELL TOOLS:** celt, columella, debitage, gorget, middens, perforated, whorl
- **WOOD TOOLS:** compress, debitage, lever, mortar and pestle
- **CLAY POTTERY:** freshwater sponge, sherd



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Student Learning Enhancement

Questions to Demonstrate Evidence of Application

- What tools does your family use now that compare with....
- How could you improve.....
- What tool is the most....