“Timucua Technology” - A Middle Grade Florida Curriculum

Theodore de Bry’s Timucua Engravings – Fact or Fiction?

Students discover how an inaccurate interpretation of historical documents can have far-reaching consequences.

STUDENT LEARNING GOAL:
Students will review and understand evidence that indicates that de Bry’s engravings of native peoples in the New World were intended as exciting travel tales and religious propaganda, not as reflections of reality.

SUNSHINE STATE STANDARDS ASSESSED:

Social Studies
- 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.A.2.1 Compare the relationships among the British, French, Spanish, and Dutch in their struggle for colonization of North America.

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.
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- LA.8.6.4.1 The student will use appropriate available technologies to enhance communication and achieve a purpose (e.g., video, digital technology).

Visual Arts
- VA.68.H.1.1 Describe social, ecological, economic, religious, and political conditions reflected in works of art.

RESOURCES:

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Theodore de Bry’s Timucua Engravings – Fact or Fiction?

Students discover how an inaccurate interpretation of historical documents can have far-reaching consequences.

<http://www.virtualjamestown.org/images/white_debry_html/introduction.html>

PICTURE SOURCES (Image URLs and Permissions):

De Bry Engraving of Timucua
Weirs http://fcit.usf.edu/florida/photos/native/le moyne/le moyne0/photos/lemoy003.jpg


De Bry’s Engraving of John White’s Algonquin Village, copyright by British Museum http://www.virtualjamestown.org/images/white_debry/debry_31_big.jpg

De Bry’s Engraving of John White’s Cooking Fish, copyright by British Museum http://www.virtualjamestown.org/images/white_debry/debry_44_big.jpg

De Bry’s Engraving of Rivers and Vegetation http://fcit.usf.edu/florida/photos/native/le moyne/le moyne0/photos/lemoy007.jpg

De Bry’s Timucua War
Club http://fcit.usf.edu/florida/photos/native/le moyne/le moyne0/photos/lemoy013.jpg

De Bry’s Timucua Village http://fcit.usf.edu/florida/photos/native/le moyne/le moyne0/photos/lemoy029.jpg

De Bry’s Engraving of the Timucua Deer
Hunt http://fcit.usf.edu/florida/photos/native/le moyne/le moyne0/photos/lemoy024.jpg

De Bry’s Engraving of Cannibalism witnessed during Staden’s Captivity http://26.media.tumblr.com/tumblr_lq9px4RrTd1qb20e4o1_500.jpg


Modern Weir at Cape Cod, courtesy of Shareen Davis at shareendavisphotography.com http://www.capecodcsf.com/images/gallery/w500/1303798182216.86.248.155.jpg

Staden’s Tupinamba Brazilian War
Club http://www.english.ucsb.edu/faculty/rraley/courses/engl165CL/cannibalism6.jpg

White-tailed Deer http://upload.wikimedia.org/wikipedia/commons/thumb/b/b7/White-tailed_deer.jpg/220px-White-tailed_deer.jpg

The “Timucua Technology Curriculum” was sponsored by a FL Division of Historical Resources Grant.
Woodcut of Cannibalism witnessed during Staden’s Captivity [Image]

Teacher Tips: One of the Le Moyne paintings from Florida has been located. It shows the Timucua paying homage to the French monument built by Jean Ribault. However, recent analysis suggests that painting was actually made after Le Moyne’s death, by someone copying the de Bry engraving. You can see this engraving in the History unit.

Materials List for “What’s Wrong with This Picture?” Activity:
No additional materials.

Answer Key for “What’s Wrong with This Picture?” Activity
1) The deer have the wrong shaped antlers and chests because they’re a different species.
2) The deer’s reflection shouldn’t show up in the dark water.
3) Europeans might think Florida is full of wide open spaces instead of being choked with saw palmetto and other shrubs, vines, and trees.

Author: Kelley Weitzel MacCabe, [Website]

Student Articles, Experiments, & Activities:
1) What’s the Controversy?
2) Who was Jacques Le Moyne?
3) The Man Behind the Mischief – Theodore de Bry
4) Who was John White?
5) Comparing John White’s Originals with de Bry’s Engravings
6) Who was Hans Staden?
7) War Clubs from Brazil
8) Analyzing the Deer Hunt
9) Activity: What’s Wrong with this Picture?

New Terminology:
Algonquin, anthropology, archaeological record, bioarchaeology, botany, cartographer, Contact Period, engraving, memoirs, palisade, watermark, woodcut

Assessment Options:
Writing Prompt 1: Visual and print media often portray themselves as truth, when they are actually fiction. Think about clues that would suggest that a show, photo, or article was not factual. Write to explain at least three ways you could test visual and print media for authenticity.

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“Timucua Technology” - A Middle Grade Florida Curriculum

Pyrotechnology - Fire

Students learn the properties of fire as they study how the Timucua used fire to solve the problems of daily life.

STUDENT LEARNING GOAL:
Students will understand the properties of fire and identify how the Timucua used fire to solve the problems of daily life.

SUNSHINE STATE STANDARDS ASSESSED:

Science
- SC.7.N.3.2 Identify the benefits and limitations of the use of scientific models.
- SC.7.P.11.1 Recognize that adding heat to or removing heat from a system may result in a temperature change and possibly a change of state.
- SC.7.P.11.2 Investigate and describe the transformation of energy from one form to another.
- SC.8.P.9.2 Differentiate between physical changes and chemical changes.

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.
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- 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.3.4) Use the properties of equality to represent an equation in a different way and to show that two equations are equivalent in a given context.
- (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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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Pyrotechnology - Fire

Students learn the properties of fire as they study how the Timucua used fire to solve the problems of daily life.


PICTURE RESOURCES (Image URLs and Permissions):


De Bry Engraving of Timucua Men Canoeing to Storehouse <http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy021.jpg>

De Bry Engraving of Timucua Fashion <http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy037.jpg>

De Bry Engraving of Timucua Warfare <http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy030.jpg>

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

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Pyrotechnology - Fire

Students learn the properties of fire as they study how the Timucua used fire to solve the problems of daily life.

Fire Drill [http://upload.wikimedia.org/wikipedia/commons/thumb/6/6f/Bow_Drill.png/220px-Bow_Drill.png]

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


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

MATERIALS LIST for “What Fire Products did the Timucua Use?”: no additional materials

ANSWER KEY for “What Fire Products did the Timucua Use?”:

<table>
<thead>
<tr>
<th>Timucua Need or Task</th>
<th>Light</th>
<th>Heat</th>
<th>Smoke</th>
<th>Ashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeing at Night</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staying Warm</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooking</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Repelling Insect Pests</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Making Clothing</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Antiseptic and Healing</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shaping Wooden Tools</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firing Pottery</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Making Stone Tools</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building Houses</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Making Canoes</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managing Forests and Hunting</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Warfare</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

MATERIALS LIST for Balancing Equations Activity: no additional materials

ANSWER KEY for Balancing Equations Activity:

\[ \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2 \rightarrow 6 \text{CO}_2 + 6 \text{H}_2\text{O} \]

MATERIALS LIST for “Cooking Before Pottery” Experiment: Per student: Safety glasses. Per 2-student Team: One candle (plus a back-up): white, unscented tapers work best. Votives are workable. Tea-lights do not work. 4-6 balloons. Clear balloons are best if you can find them, because you can easily see condensation inside. All balloons should be the same size. 1 paper cup that holds at least ¼ cup of water. Access to more water. Paper towels for water clean-up.

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Page 3
Pyrotechnology - Fire

Students learn the properties of fire as they study how the Timucua used fire to solve the problems of daily life.

**ANSWER KEY for “Cooking Before Pottery” Experiment:**

**Teacher Tips:** Balloons without water in them will pop the moment they touch the flame. Balloons with water can last longer than five minutes. Adding more than ¼ cup of water will increase the cleanup proportionally. The best place to do this activity is outside on a basketball court. Be sure that all of the exploded balloon bits make it into a trash can afterwards. Students should hold the balloon so that it just touches the tip of the flame. The balloon surface will blacken where the flame touches it. Why? The balloon blocks some of the flame’s access to oxygen. The result is incomplete combustion, which produces soot. This is what causes the “fire shadows” on pottery (discussed more fully in the unit on Tool Technology). The photo of a replica pot shown later in this unit has a “fire shadow.”

In 25 test runs, nine balloons burst in less than 20 seconds. (See the photo showing a flaw in a balloon that will result in this kind of speedy burst.) For this experiment, any balloon that lasts longer than 20 seconds is a success.

<table>
<thead>
<tr>
<th>Time Before Balloon Burst</th>
<th>Number of Balloons</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20 seconds</td>
<td>9</td>
</tr>
<tr>
<td>20-60 seconds</td>
<td>6</td>
</tr>
<tr>
<td>1-2 minutes</td>
<td>3</td>
</tr>
<tr>
<td>2-3 minutes</td>
<td>2</td>
</tr>
<tr>
<td>3-4 minutes</td>
<td>4</td>
</tr>
<tr>
<td>&gt; 5 minutes</td>
<td>1</td>
</tr>
</tbody>
</table>

If you have similar results, you should expect a 36% failure rate. That’s why each group is allotted four balloons: one to burst dry, and three to try wet. Take an average if you’d like to include math. Be aware that when wet, a candle wick sputters and produces a wavering flame. During the trials, this inconsistent flame seemed to cause more early bursts. That’s why you need reserve candles, to replace drenched ones if a team has repeated balloon breakages.

After 2-3 minutes, the water inside the balloon does boil into steam. You can’t hear it happening, but you can, if you look closely, see the condensed steam dripping down the inside of the balloon. If all of the water turned to steam, the balloon would pop immediately; however, none of the trials lasted long enough to boil off all of the water. So why did the balloons break? Latex melts around 260°F, but it probably weakens at a lower temperature. Balloons that reach the 2-3 minute level may have reached 260°F, causing the balloons to break.
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Answer: Balloons differ from hide pots because they are made of different materials. The balloon is sealed, and the pot is open. The pot will eventually hold water and food materials; the balloon just holds water. Water soaks into the hide, but it does not soak into the rubber of the balloon. The balloon is a closed system, so the water that boils into steam stays inside the balloon. Steam rises out of the open pot.

MATERIALS for “Converting Temperatures” Activity: no additional materials

ANSWER KEY FOR ACTIVITY 1:

<table>
<thead>
<tr>
<th>Important Timucua Temperatures</th>
<th>Degrees Fahrenheit</th>
<th>Degrees Celsius</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Freezes</td>
<td>32° F</td>
<td>0° C</td>
</tr>
<tr>
<td>Healthy Body Temperature</td>
<td>98° F</td>
<td>37° C</td>
</tr>
<tr>
<td>Water Boils</td>
<td>212° F</td>
<td>100° C</td>
</tr>
<tr>
<td>Fire-Treating Chert</td>
<td>662° F</td>
<td>350° C</td>
</tr>
<tr>
<td>Firing Pottery</td>
<td>1400° F</td>
<td>760° C</td>
</tr>
</tbody>
</table>

MATERIALS for “Getting to Know Fire” Activity: Safety glasses for each student. One candle per lab team (2 students). White, unscented tapers work best.

ANSWER KEY for “Getting to Know Fire” Activity:

Teacher Tips: If you have access to Bunsen Burners, students should observe the flame while adjusting the amount of oxygen, then record their observations. Low oxygen produces a wavering reddish flame. Increased oxygen makes a yellow, cohesive flame. High oxygen produces a compact blue flame.

Candle Diagram: 1) Yellow, 2) Shadowy Orange, 3) Blue

Part One: The hottest part of the flame is located closest to the wick / at the bottom of the flame / on the thin outer edge (where the flame meets oxygen).

The coolest part of the flame is located in the middle (away from the oxygen).

The smoke is located above the top of the flame / it moves around in a breeze / none.

Part Two: The flame becomes longer and wavers. The flame has less blue and more oranges and yellows, so it’s cooler. There’s a thin line of wavering black smoke without much odor.

Part Three: The amount of smoke increases. It moves up and spreads out. It is lighter in color and smells stronger. The wick is still glowing at first, then the fire goes out completely.

Author of The Timucua Indians – A Native American Detective Story and Journeys with Florida’s Indians
“Timucua Technology” - A Middle Grade Florida Curriculum

Pyrotechnology - Fire

Students learn the properties of fire as they study how the Timucua used fire to solve the problems of daily life.

STUDENT ARTICLES, EXPERIMENTS, & ACTIVITIES:
1) What is Pyrotechnology?
2) ACTIVITY: Fire Products
3) Light at Night
4) Staying Warm
5) ACTIVITY: Balancing Equations
6) Creative Cooking
7) EXPERIMENT: Cooking Before Pottery
8) The Prehistoric War on Bugs
9) Fashion in the 1560s
10) Wooden Tools
11) Firing Pottery
12) ACTIVITY: Converting Temperatures
13) Stone Tools
14) Home Sweet Home
15) Canoe Building
16) Land Management
17) Warfare
18) ACTIVITY: Getting to Know Fire

NEW TERMINOLOGY:
alumina (aluminum dioxide Al₂O₃), artisan, baking soda, bow drill, carbon dioxide, caustic, cell walls, ceramic, char, chemical bond, chemical change, chert, clay, coals, collagen fiber, combustion, compound, compressed, conductor, corrosive, crystalline, denature, diameter, fibroblasts, fire drive, flint-knapper, formaldehyde, friction, generator, hematite (red iron oxide Fe₂O₃), impurities, iron (Fe), land management, leaf litter, loin cloth, lye, matchcoat, niacin, nutrients, obsolete, oxide, oxygen (O₂), palm fronds, pelt, pheromones, physical change, pliable, prescribed fire, preserve, projectile point, pyrotechnology, quartz, rawhide, silica (silicon dioxide SiO₂), spindle, tinder, turbines, venison, water molecules, water vapor gas, whelk

ASSESSMENT OPTIONS:

Writing Prompt #1: Fire was as important to the Timucua as electricity and fossil fuels are to modern Floridians. Think about the ways your life would be different if electricity and fossil fuels suddenly disappeared. Write to explain how your day would be different, starting when you wake in the morning.

Writing Prompt #2: Wood was the primary source of fuel for the Timucua people. Think about the many different kinds of fuel Floridians use today. Write to explain three different fuel sources used by modern Floridians.

Assessment #1: Chemical changes occur when chemical bonds are broken and formed. Review the articles titled “Firing Pottery,” and “Fashion in the Fifteen-Sixties.” Explain how fire causes a chemical change in both the clay pots and the animal hides.

Assessment #2: Review the articles titled “Creative Cooking,” “The Prehistoric War on Bugs,” and “Fashion in the Fifteen-Sixties.” Based on your reading of the articles, describe three ways the Timucua utilized smoke to solve every day problems.

Assessment #3: Consider the articles you’ve read in the Pyrotechnology lesson. Brainstorm a list of ways that modern Floridians depend on fire. Choose two from your list that are NOT discussed in the Pyrotechnology lesson and describe them here.
The Timucua used fire in nearly every aspect of their daily lives. The **New Terminology** reflects this diversity. The bullets below group **New Terminology** according to the type of tool they describe.

Ask student groups to look through the unit and pinpoint which fire technology is linked to each vocabulary group. 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 and definitions with the class, noting which technology they are linked with.

- **STARTING FIRES / CHEMISTRY OF FIRE**: bow drill, carbon dioxide, combustion, friction, oxide, oxygen, spindle, tinder, pyrotechnology, water vapor gas
- **HEAT-TREATING STONE**: alumina, chert, crystalline, flint-knapper, hematite, impurities, iron, oxide, projectile point, quartz, water molecules, whelk
- **PRESERVING ANIMAL HIDES**: chemical bond, chemical change, collagen fiber, formaldehyde, loin cloth, lye, matchcoat, pelt, rawhide
- **HUNTING**: fire drive, land management, leaf litter, pheromones, prescribed fire
- **COOKING**: baking soda, carbon dioxide, caustic, compound, conductor, corrosive, denature, lye, niacin, nutrients, preserve, venison
- **BENDING WOOD**: artisan, cell walls, compressed
- **FIRING CLAY POTTERY**: ceramic, clay, physical change, pliable, silica, water molecules
- **BUILDING HUTS AND CANOES**: char, coals, diameter, palm fronds
- **IMPROVING HEALTH**: fibroblasts
- **MODERN TERMS**: generator, turbine

**Webquest** – The Timucua used prescribed fire to maintain healthy agricultural and hunting lands. What variables did they need to consider to use prescribed fire safely?

First, research what modern foresters need to understand about using prescribed fire. Then, use your knowledge of the Timucua to explain what you think they would have considered important in planning a safe, successful burn.

- “Prescribed Burning Regulations in Florida” [http://edis.ifas.ufl.edu/fr055](http://edis.ifas.ufl.edu/fr055)
- “Benefits of Prescribed Burning” [http://edis.ifas.ufl.edu/fr061](http://edis.ifas.ufl.edu/fr061)
- “Effects of Fire on Florida’s Wildlife and Wildlife Habitat” [http://edis.ifas.ufl.edu/uw132](http://edis.ifas.ufl.edu/uw132)
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For the Teacher: Please preview these sites for readability. Like most public documents, they’re written somewhere near a 7th grade level, but the terminology may need explaining. These sites are sponsored by the USDA and the University of Florida Extension Service.

Teachers can visit [http://fireinflorida.org/educators-zone/curriculum/](http://fireinflorida.org/educators-zone/curriculum/) to download the Fire in Florida curriculum for free.

You can use the following links to create a web quest or treasure hunt for your students. AT&T Filamentality Free Web quest building site: [http://www.kn.pacbell.com/wired/fil/index.html](http://www.kn.pacbell.com/wired/fil/index.html)
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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.
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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:

<http://www.uiowa.edu/~osa/learn/ancient/bone.htm>
“Caveman Chemistry - Pottery.” 2 February 2012.
<http://cavemanchemistry.com/oldcave/projects/pottery/>
“Firing Methods and Results – Pit Firing.” 2 February 2012.
<http://robertcomptonpottery.com/Method%20of-Pit-Firing-Pottery.htm>
“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 Rework Clay and Fire Without a Kiln.” 2 February 2012.
<http://www.goshen.edu/art/DeptPgs/rework.html>
“Making Cordmarked Pottery,” 28 February 2012.
<http://www.texasbeyondhistory.net/theme/cordmarked/>

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

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“Uses of Fiber and Wood by Native Americans (and Others)” 5 February 2012.


“Withlacoochee Agatized Coral,” 2 February 2012.

PICTURE SOURCES (Permissions and Wikipedia image URLs):


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](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](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


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/ff/c/KMOvalMouth.jpg/170px-KMOvalMouth.jpg](http://upload.wikimedia.org/wikipedia/commons/thumb/ff/c/KMOvalMouth.jpg/170px-KMOvalMouth.jpg)

Key Marco Panther [http://upload.wikimedia.org/wikipedia/commons/thumb/8/88/KeyMarcoCat.jpg](http://upload.wikimedia.org/wikipedia/commons/thumb/8/88/KeyMarcoCat.jpg)

Megalodon Tooth [http://upload.wikimedia.org/wikipedia/commons/thumb/7/71/Megalodon_tooth_ruler.jpg/220px-Megalodon_tooth_ruler.jpg](http://upload.wikimedia.org/wikipedia/commons/thumb/7/71/Megalodon_tooth_ruler.jpg/220px-Megalodon_tooth_ruler.jpg)

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Tool-Making Technology

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

Owl Totem  

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

Percussion

Flaking  

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 permission pending

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**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

**MATERIALS LIST FOR “Soap Carving” ACTIVITY:**

---

The “Timucua Technology Curriculum” was sponsored by a FL Division of Historical Resources Grant.
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 soap that floats in water. 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 CANOES:** You can share these images with any students working on canoe carving. Carving soap is much like carving wood. Safety glasses are recommended.

```
Three Florida Canoe Shapes
Trace your shape.
Roughly carve the entire shape.
Carefully start to do more detailed work.

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.

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“Timucua Technology” - A Middle Grade Florida Curriculum

**Tool-Making Technology**

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

**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.

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

**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

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“Timucua Technology” - A Middle Grade Florida Curriculum

Tool-Making Technology

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

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.

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 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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Page 7
Tool-Making Technology

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

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…..
“Timucua Technology” - A Middle Grade Florida Curriculum

Animal Technology

Students learn how the Timucua utilized wild animals for everyday survival.

STUDENT LEARNING GOAL:
Students understand Timucua hunting methods, including which animals were hunted, how each animal part was utilized, and why the Timucua did not domesticate food animals.

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.P.10.2 Observe and explain that light can be reflected, refracted, and/or absorbed.

Social Studies
- SS.7.G.3.1 Use maps to describe the location, abundance, and variety of natural resources 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.

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.

RESOURCES:


“Chickens – Animal Domestications. 30 January 2012.
<http://archaeology.about.com/od/domestications/ig/Animal-Domestication/Chickens--Chang-Mai--Thailand-.htm>

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“Timucua Technology” - A Middle Grade Florida Curriculum

Animal Technology

Students learn how the Timucua utilized wild animals for everyday survival.


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Animal Technology

Students learn how the Timucua utilized wild animals for everyday survival.


“Night Time Flat Fish – Flounder Gigging.” 29 January 2012.
<http://saltfishing.about.com/od/flounderhalibut/a/aa060530e.htm>

<http://www.dnr.sc.gov/marine/pub/seascience/oyster.html>


“Recreational Shrimping and Scalloping.” 28 January 2012. 
<http://www.afn.org/~gofc/shrscall.html>


<http://archaeology.about.com/od/domestications/qt/goats.htm>

<http://www.paddletimucuan.net/journal_mar_08.htm>

<http://www.encyclopediavirginia.org/Domesticated_Animals_During_the_Pre-Colonial_Era>


“What are the Alligators Doing this Spring?” 29 January 2012. 
<http://srel.uga.edu/ecoviews/ecoview080511.htm>

Animal Technology

Students learn how the Timucua utilized wild animals for everyday survival.

PICTURE SOURCES (Image URLs and Permissions):

Alligator Hunt: http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy025.jpg
Coquina, courtesy of Kimber Herrera

Deer Hunt: http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy024.jpg
Dog Burial, courtesy of Jerald T. Milanich
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
Flounder: http://upload.wikimedia.org/wikipedia/commons/thumb/2/2b/Pseudopleuronectes_americanus.jpg/250px-Pseudopleuronectes_americanus.jpg
Freshwater Mussels: http://upload.wikimedia.org/wikipedia/commons/thumb/1/11/Anodonta_cygnea1.jpg/148px-Anodonta_cygnea1.jpg
Modern Deer Hunt Painting: http://www.brettpigon.com/DeerHunting_s.jpg
Oysters in a Salt Marsh: http://upload.wikimedia.org/wikipedia/commons/thumb/e/e5/OysterBed.jpg/220px-OysterBed.jpg
Quahog Clams: http://upload.wikimedia.org/wikipedia/commons/thumb/3/3b/LittleNeck_clams_USDA96c1862.jpg/250px-LittleNeck_clams_USDA96c1862.jpg

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Animal Technology

Students learn how the Timucua utilized wild animals for everyday survival.

Small Modern Seine
Net [http://upload.wikimedia.org/wikipedia/commons/thumb/6/6a/Seine_%28PSF%29.png/220px-Seine_%28PSF%29.png](http://upload.wikimedia.org/wikipedia/commons/thumb/6/6a/Seine_%28PSF%29.png/220px-Seine_%28PSF%29.png)


Whelk on mud flat [http://www.paddlethetimucuan.net/images/ftgeorgeriver_031008_049a.jpg](http://www.paddlethetimucuan.net/images/ftgeorgeriver_031008_049a.jpg)

White Shrimp [http://upload.wikimedia.org/wikipedia/commons/thumb/2/20/Penaeus_line_drawing.jpg/220px-Penaeus_line_drawing.jpg](http://upload.wikimedia.org/wikipedia/commons/thumb/2/20/Penaeus_line_drawing.jpg/220px-Penaeus_line_drawing.jpg)


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**Biology Note Regarding Shellfish Size:** By studying modern shellfish, biologists have learned that oysters from one area can grow significantly larger than oysters from another area. When archaeologists tell us that oysters gathered 120 years ago were 9” long, that data is really only telling us that oysters at a particular spot in Florida were 9” long. If modern data on oyster size were collected in exactly the same location, the comparison data would be valid. However, in most cases, prehistoric data and modern data are from differing locations in Florida. The size differences noted in this lesson (for oysters and coquina) are useful for demonstrating a trend, but they are not considered scientifically valid comparisons.

**MATERIALS LIST FOR “How Did They Use the Animals They Hunted?” ACTIVITY:** No additional materials. Students should work in teams of two to try and guess which item was made from which animal part. In many cases, they’ll be able to use deductive reasoning. Some of the answers will be presented later in this unit. Some are scattered through the other units. The goal is for students to realize how little (or how much) they know about native processes.

**ANSWER KEY FOR “How Did They Use the Animals They Hunted?” ACTIVITY**

<table>
<thead>
<tr>
<th>Item the Timucua Made</th>
<th>Animal Part It Was Made From</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothing</td>
<td>Hide</td>
</tr>
<tr>
<td>Fish Hook</td>
<td>Bone</td>
</tr>
<tr>
<td>Net Floats</td>
<td>Fish Air Bladder</td>
</tr>
</tbody>
</table>

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“Timucua Technology” - A Middle Grade Florida Curriculum

Student learn how the Timucua utilized wild animals for everyday survival.

<table>
<thead>
<tr>
<th>Cup, Chisel, Axe</th>
<th>Shell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool Handle</td>
<td>Antler</td>
</tr>
<tr>
<td>Lotions &amp; Conditioners</td>
<td>Animal Fat</td>
</tr>
<tr>
<td>Meat</td>
<td>Muscle</td>
</tr>
<tr>
<td>Glue</td>
<td>Hooves, Hide</td>
</tr>
<tr>
<td>Drill Bits</td>
<td>Sharks Teeth</td>
</tr>
<tr>
<td>Fletching on Arrows</td>
<td>Feathers</td>
</tr>
</tbody>
</table>

MATERIALS LIST FOR “Refraction and Gigging for Flounder” ACTIVITY:

Per Class: 2 large tote containers (approximately 18 gallons). Several meters of twine or yarn. 2 plastic fish (approximately 5” x 3” cut out from disposable Tupperware lids). A single-hole punch. 2 weights to hold the fish in place (large metal nuts or any other small heavy objects, even rocks, will do). 2 dowels approximately 3 feet long and ¼ to ½” in diameter. You may wish to have a spare or two in case aggressive gigging cracks a dowel. **NOTE:** In lieu of creating a plastic fish target, you can use weighted pool targets (the kind that kids swim to the bottom to recover. Using a hoop makes it much easier to tell if you’ve actually speared the fish. And with these, you don’t need to add a weight.

Preparation: Cut out the plastic fish. Punch four holes, one in each “corner” of the fish. You will also punch either one or two holes in the center for the purpose of tying on the weight. Use a short piece of twine to attach your weight directly to the bottom of your fish, or dangling just below it. (Remember, your plastic fish will float to the top of the water. If you give the weight too much line, it will not hold the fish the required 6” under the surface.) Next, cut eight 2-foot pieces of twine. Tie one to each of the four corner holes on your fish. Fill one tote about 2/3 full. Position your fish in the center of your tote and use the corner twines to suspend the fish in the tote. Lower the fish until it is at least 6” below the surface of the water, but not resting on the bottom. Tie the four corner ties to the handles. Tie the other fish in the same position in the dry tote.
Students learn how the Timucua utilized wild animals for everyday survival.

**Teacher Tips 1**: Splashing is a given. Do this activity outside or cover the floor with a tarp. For visibility, try to use a brightly colored lid to make your plastic fish. Try this activity yourself before running the lesson. Don’t be surprised if you have 90-100% accuracy gigging in air, and 0% accuracy your first ten tries gigging in water. Once you do manage to hit the underwater fish a few times, you’ll start to get a feel for how low you need to jab. Then you’ll hit it more often than not. Fish-hunting birds like ospreys and eagles must also overcome the refraction problem when they are first learning to hunt.

**Teacher Tips 2**: Nearly every teaching resource tells us that light bends when moving into a denser material. Very few explain why. In a nutshell, one end of the light wave hits the water first. This end of the wave slows down. The other end of the wave is still travelling quickly. As a result, the wave appears to bend where it crosses into the water. Then the wave proceeds at the angle of the slower wave end. Visit [http://galileo.phys.virginia.edu/outreach/8thgradesol/RefractionFrm.htm](http://galileo.phys.virginia.edu/outreach/8thgradesol/RefractionFrm.htm), the source of this illustration, to learn more.

**ANSWER KEY FOR “Refraction and Gigging for Flounder” ACTIVITY**
1) and 2) are individualized
3) You need to aim closer / lower because the fish is actually lower than it appears.
4) The answer is A, because the fish is lower than it appears.
Animal Technology

Students learn how the Timucua utilized wild animals for everyday survival.

MATERIALS LIST FOR “Where Were Animals Domesticated?” ACTIVITY: You may wish to provide a reference for students to look up the locations of the countries listed in the table. **Teacher Tip:** Many animals were domesticated more than once. Only the location of the first known domestication is indicated. The dates of domestication vary from source to source. Expect this information to change as new studies provide further information.

ANSWER KEY FOR “Where Were Animals Domesticated?” ACTIVITY

Animal Domestications Worldwide
Animal Technology

Students learn how the Timucua utilized wild animals for everyday survival.

New Terminology

algae bloom, aquaculture, artifact, artificial selection, basking, bellow, domesticated, draw weight, dung, engraving, feral, filaments, filter feeders, gastropod, gigs, gill nets, hybrid, inaccuracies, intracoastal, midden, modern hunter-gatherer, musket ball, opportunistic, recurved bow, refraction, salinity, seine nets, terrestrial, weir.

ASSESSMENT OPTIONS:

Writing Prompt #1: Your teacher has decided not to teach students to construct deadfall traps as part of this native technology lesson. He is concerned that the knowledge may be used to kill neighborhood squirrels. Think about whether or not you agree with his decision to withhold this information. Write to a letter to your teacher to persuade him to agree with your opinion.

Writing Prompt #2: The Timucua used every part of the animals they hunted to make a wide variety of foods, tools, and other products. Think about the things you use and wear that might be made from parts of animals. Write to explain at least three things you use or wear that are made from animals.

Assessment #1: Based on your reading of the article titled “What is Animal Technology?” how would you define a “successful food choice” in a survival situation?

Assessment #2: Based on the articles titled “Let’s Talk Fish” and “Let’s Talk Land Animals,” explain how technologies like gill nets, fish traps, weirs, snares, and deadfall traps increased the hunting efficiency of native peoples.

Assessment #3: Based on your reading of the articles titled “That Brings Us to Alligators” and “Let’s Talk Land Animals,” you’ve learned about many of the inaccuracies of the de Bry engravings. Think about the best ways historians, archaeologists, and educators might use these images, since they are not historically accurate. Describe at least three ways these images can be useful, despite all of the misinformation they include.

Questions to Generate Evidence of Learning

- If you changed ____, what might happen?
- If you had to choose between….
- If you were going to organize....
Animal Technology

Students learn how the Timucua utilized wild animals for everyday survival.

Pairs of students should construct their own Mini-Word Wall to share, illustrating it with the activities and images from this unit.

What’s a Word Wall? For middle school, it can be a collection of new vocabulary, words student have difficulties with, or words recently mastered, displayed prominently in the classroom. This display allows students to refer to the words while doing in-class writing, allowing greater writing independence and reading skill. A mini-word wall can do the same job (in this case for New Terminology), but it is created on a simple bi-fold, like a file folder. Words can be grouped according to definitions, phonetics, or other relationship. You can visit “Instructional Strategies Online,” at http://olc.spsd.sk.ca/de/pd/instr/strats/wordwall/, for a variety of articles on the use of Word Walls in the classroom.

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

STUDENT ARTICLES, EXPERIMENTS, & ACTIVITIES:
1) What is Animal Technology?
2) Let’s Talk Shellfish
3) ACTIVITY: How Did They Use the Animals They Hunted?
4) Let’s Talk Fish
5) ACTIVITY: Refraction and Gigging for Flounder
6) What Other Water Animals Did They Hunt?
7) That Brings Us to Alligators
8) Let’s Talk Land Animals
9) Why Didn’t the Timucua Use Domestic Animals?
10) ACTIVITY: Domestication of Animals around the Globe
11) Where Were Animals Domesticated?
Students learn how the Timucua utilized wild plant as foods, clothing, tools, and medicines.

**STUDENT LEARNING GOALS:**
Students will understand how the Timucua utilized wild plants as food, clothing, tools, and medicines.

**SUNSHINE STATE STANDARDS ASSESSED:**

**Science**
- SC.7.L.17.2 Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.
- SC.8.N.2.2 Discuss what characterizes science and its methods.
- SS.8.A.2.7 Describe the contributions of key groups (Africans, Native Americans, women, and children) to the society and culture of colonial America.

**Social Studies**
- 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.
- SC.8.P.9.2 Differentiate between physical changes and chemical changes.

**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.

**Mathematics**
- MA.7.A.1.1 Distinguish between situations that are proportional or not proportional, and use proportions to solve problems.

**RESOURCES:**

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*Page 1*
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Wild Plant Technology

Students learn how the Timucua utilized wild plant as foods, clothing, tools, and medicines.


PICTURE SOURCES (Image URLs and Permissions):


American Beauty Berry http://upload.wikimedia.org/wikipedia/commons/thumb/4/4c/Purple_Beautyberry_Callicarpa_dichotoma_%27Early_Amethyst%27_Berries_Closeup_2875px.jpg/220px-Purple_Beautyberry_Callicarpa_dichotoma_%27Early_Amethyst%27_Berries_Closeup_2875px.jpg

Black Cherry http://upload.wikimedia.org/wikipedia/commons/thumb/0/0a/Wild-grapes-indiana.jpg/220px-Wild-grapes-indiana.jpg

Cattails http://upload.wikimedia.org/wikipedia/commons/thumb/1/16/Typha_latifolia_02_bgiu.jpg/220px-Typha_latifolia_02_bgiu.jpg

Coontie Palm http://upload.wikimedia.org/wikipedia/commons/thumb/2/2b/Zamia_integrifolia02.jpg/250px-Zamia_integrifolia02.jpg

De Bry Engraving of Caring for the Sick http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy019.jpg


Elderberry http://upload.wikimedia.org/wikipedia/commons/thumb/0/0a/Wild-grapes-indiana.jpg/220px-Wild-grapes-indiana.jpg

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


Passionflower [http://upload.wikimedia.org/wikipedia/commons/thumb/3/35/Bildtankstelle_1_090.jpg/222px-Bildtankstelle_1_090.jpg](http://upload.wikimedia.org/wikipedia/commons/thumb/3/35/Bildtankstelle_1_090.jpg/222px-Bildtankstelle_1_090.jpg)


Witch Hazel [http://upload.wikimedia.org/wikipedia/commons/thumb/a/aa/Hamamelis_virginiana_-_K%C3%B6hler%E2%80%93s_Medizinal-Pflanzen-070.jpg/220px-Hamamelis_virginiana_-_K%C3%B6hler%E2%80%93s_Medizinal-Pflanzen-070.jpg](http://upload.wikimedia.org/wikipedia/commons/thumb/a/aa/Hamamelis_virginiana_-_K%C3%B6hler%E2%80%93s_Medizinal-Pflanzen-070.jpg/220px-Hamamelis_virginiana_-_K%C3%B6hler%E2%80%93s_Medizinal-Pflanzen-070.jpg)


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**MATERIALS LIST FOR “Rope Weaving” ACTIVITY:** For class: A bag of raffia found in art stores or in the arts and craft section of superstores. A bag of approximately 10”x5”x2” holds 115 cubic inches of raffia. This contains more than enough material for this activity. Be sure to save your ropes so that you can use them in the natural dyes activity.

**MATERIALS LIST FOR “Natural Dyes” ACTIVITY:** *This activity is completed at home by the students.* The teacher may complete his or her own dye project in the classroom using a crock pot to eliminate the need for a stove. Here’s a list of other potential dye sources, not included in the student materials. They did not perform well in testing, but are mentioned repeatedly online if you wish to expand your options. Green: spinach, grass clippings. Purple: red grapes, crushed, or ½ head of cabbage, chopped. Yellow: saffron, turmeric. Orange: Carrots. Per Student: 1 raffia rope, 1 pot, water to boil, one item from the list of pigmented plant materials, one strainer, one bowl with a watertight lid, plastic bag to bring rope to class.

**ANSWER KEY FOR “NATURAL DYES” ACTIVITY:**

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

Students learn how the Timucua utilized wild plant as foods, clothing, tools, and medicines.

Teacher Tips: If you do your own project in the classroom, bring your raffia rope, plant material, and water to a boil (or as warm as it will get in the crock pot). Allow it to boil for 15 minutes. Follow student directions from here on.

1) Even when two of us used the same dye material (walnut shells), one turned out lighter than the other. Reasons: Maybe one was left in the water longer and got darker. Maybe one dye bath used more shells than the other and got darker.
2) Beets and red cabbage both dyed the water they were boiled in a really dark red. But beets dyed the rope, and red cabbage did not. Maybe some dyes, like the liquid from red cabbage, do not bond well without a mordant. Also, onion skins make a lighter brown, while walnut shells make a darker brown. Maybe these colors are made by different chemicals in these plants.
3) Like all humans, the Timucua expressed their creativity through art. The French explorers wrote that the Timucua paintings on animal hides rivaled anything they’d seen in France.

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

STUDENT ARTICLES, EXPERIMENTS, & ACTIVITIES:
1) What is Wild Plant Technology?
2) Food Plants
3) Medicines
4) Insect Repellent
5) Textiles (Woven Materials)
6) ACTIVITY: Rope Weaving
7) ACTIVITY: Using Natural Dyes

NEW TERMINOLOGY:
Aristotelian science, chemical change, cordage, correlation, cyanide, diameter, dye, essential oils, fermented, fibers, ingest, leach, mordant, ochre, oxidized, physical change, pigment, ply, raffia, sifted, textiles

ASSESSMENT OPTIONS:

Writing Prompt #1: Floridians use items made from plant materials every day. Think about the different ways you use things made from plants. Write to explain how you use three different items made from plants.

Writing Prompt #2: Today, if someone wants a new backpack, outfit, or game, they simply buy these items at the store. Think about how much more difficult it was to get a backpack,
Wild Plant Technology

Students learn how the Timucua utilized wild plant as foods, clothing, tools, and medicines.

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

Page 5
After gaining familiarity with the **New Terminology**, review with students the differences between a physical and a chemical change. Then, students will assign each word in the **New Terminology** to one of the following three categories. They should explain their reasoning with a follow-up statement.

1- This word is related to a Chemical Change.
2- This word is related to a Physical Change.
3- This word is not related to a Chemical or Physical Change.
4- This word is related to both Chemical and Physical Changes.

For example:

- When coontie palm is **fermented**, this is a chemical change because bacteria cause the cyanide in the plant to be released as a gas. The cyanide molecules are no longer bonded to the plant.
- The making of **cordage** is a physical change. Thin strands are woven into extremely strong rope. No chemical bonds are changed.
- **Aristotelian Science** is not related to a chemical or a physical change. It’s just a type of observational science. OR it is related to both because you can observe and learn from observing both kinds of change in nature.

**REVIEW:**

A **physical change** is one in which a substance is basically the same before and after the change. It may change state (water boiling and turning to steam), be transformed into smaller pieces (a branch being carved into wood chips), or dehydrate (wet, squishy clay being dried into clay powder).

A **chemical change** is one in which a new substance is formed and chemical bonds are broken or created. Energy is often added or created in the process. Boiling an egg is a chemical change. When heat is added, it breaks covalent bonds, then allows them to reconnect in a different pattern. Burning wood chips into ash is a chemical change because combustion breaks the bonds in cellulose, releasing...
Wild Plant Technology

Students learn how the Timucua utilized wild plant as foods, clothing, tools, and medicines.

carbon and water (along with other chemicals). When pottery is fired, chemical bonds in the raw clay break. Water molecules are released. Alumina and silica molecules bond tightly to one another. The clay becomes a completely new, permanently hard substance called a ceramic.
**STUDENT LEARNING GOAL:**
Students will be able to identify how the Timucua and their ancestors utilized domesticated plants.

**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.L.16.4 Recognize and explore the impact of biotechnology (cloning, genetic engineering, artificial selection) on the individual, society and the environment.
- SC.7.L.17.2 Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.
- SC.7.L.17.3 Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.
- 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.P.9.2 Differentiate between physical changes and chemical changes.

**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.A.2.7 Describe the contributions of key groups (Africans, Native Americans, women, and children) to the society and culture of colonial America.
- 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.
- 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**
Agricultural Technology

Students learn how the Timucua and their ancestors utilized domesticated plants.

- MA.7.A.1.1 Distinguish between situations that are proportional or not proportional, and use proportions to solve problems.
- MA.8.A.6.1 Use exponents and scientific notation to write large and small numbers and vice versa and to solve problems.

RESOURCES
<http://www.mesacc.edu/dept/d10/asb/lifeways/hg_ag/quiet_revolution.html>
“Environmental Effects of Genetically Modified Food Crops -- Recent Experiences”  
“Genetic Analysis of Sunflower Domestication.” 22 January 2012.  
<http://www.genetics.org/content/161/3/1257.full.pdf>
“Genetically Modified Foods – Harmful or Helpful?” 23 January 2012.  
<http://www.csa.com/discoveryguides/gmfood/overview.php>
“Le Moyne Gallery Full Plates.” 22 January 2012.  
<http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/lemoy0.htm>
Newsom, Lee A. “Archaeobotanical Data from Groves’ Orange Midden (8VO2601), Volusia County, Florida.” The Florida Anthropologist. Vol. 47, No. 4. 1994
<http://www.uaex.edu/Other_Areas/publications/PDF/FSA-2152.pdf>
“Sunflowers (Helianthus annus L.)” 21 January 2012.


“This Big Era and the Three Essential Questions.” 21 January 2012.


“What is the History of Popcorn?” 22 January 2012.


PICTURE SOURCES (Image URLs and Permissions):

Amaranth http://upload.wikimedia.org/wikipedia/commons/thumb/6/6b/Amaranthus_retroflexus_flower1.jpg/220px-Amaranthus_retroflexus_flower1.jpg


Bottle http://upload.wikimedia.org/wikipedia/commons/thumb/a/a2/Courge_encore_verte.jpg/220px-Courge_encore_verte.jpg

Chenopodium http://upload.wikimedia.org/wikipedia/commons/thumb/1/11/Chenopodiumberlandieri.jpg/180px-Chenopodiumberlandieri.jpg

De Bry Engraving of Timucua Agriculture http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy020.jpg

De Bry Engraving of Timucua Planting Ritual http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy033.jpg

De Bry Engraving of Timucua Taking Food to the Storehouses http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy021.jpg


Pumpkin http://upload.wikimedia.org/wikipedia/commons/thumb/9/99/Pumpkins.jpg/220px-Pumpkins.jpg

Purple Martin http://upload.wikimedia.org/wikipedia/commons/thumb/b/b9/PurpleMartin_cajay.jpg/220px-PurpleMartin_cajay.jpg
Students learn how the Timucua and their ancestors utilized domesticated plants.

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**MATERIALS LIST FOR “Where Did Agriculture Begin?” ACTIVITY:**
For each student: Access to an atlas or geography book if needed.

**ANSWER KEY FOR “Where Did Agriculture Begin?” ACTIVITY**

**MATERIALS LIST FOR “Which Crop Would You Choose?” ACTIVITY:**
“Timucua Technology” - A Middle Grade Florida Curriculum

Agricultural Technology

Students learn how the Timucua and their ancestors utilized domesticated plants.

For each student: Safety glasses. For each lab team of 4 students: 10-40 of each of the following: quinoa seeds, sunflower seeds, pumpkin seeds, kidney beans, corn kernel (all dried). For class: A scale capable of weighing in milligrams. Paper towels and a whisk broom for clean-up.

Teacher Tips 1: Kidney beans are readily available with other dried beans in the grocery store. Sunflower seeds and pumpkin seeds (without hulls) are usually available in the snack area. Dried corn is easy to find as an ornamental item in the fall. Other times of year, you can use deer corn from feed stores, squirrel corn from birding stores, or seed corn from garden stores. Because we can’t get the same corn species the Timucua were using, just be sure that all of the students are using the same variety for their study. Quinoa (keen-wa) is becoming more easily available in regular grocery stores, often with the rice or in a health/alternative section. Teacher Tips 2: Quinoa seeds are very tiny, and they roll, so when they spill (and they will), the seeds will go everywhere. If possible, have students work over a tray with a raised edge to minimize the mess.

Teacher Tips 3: If your scale doesn’t read down to milligrams, the students can still find seed weights by weighing many seeds together and dividing the weight by the number of seeds weighed. Teacher Tips 4: You’ll notice that research for the activity titled “Why did the Old Crops Fall Out of Favor?” indicates that quinoa produces 0.1 pound per plant, while the weight test in this activity suggested 0.25 pounds per plant. Discuss with students possible reasons for this discrepancy:

- Different types of quinoa may produce varying seed weights and numbers.
- Measuring apparatus may not be appropriate for the job (i.e. having to weigh several grains and divide, rather than having a scale sensitive enough to weigh individual seeds).
- Don’t forget user error. (This can be overcome by replicating the measurement – each lab group completes their own measurement using the same quinoa and the same process.)

ANSWER KEY FOR “Which Crop Would You Choose?” ACTIVITY:
Answer: Answers will be dependent on the weight data that students collect. The table below reflects the weights gathered by the author.

Yield for Modern Versions of Plants Available to the Timucua People

<table>
<thead>
<tr>
<th>Name of Seed</th>
<th>Average Seed Weight in Milligrams</th>
<th>Number of Seeds per Plant</th>
<th>Yield per Plant in Milligrams</th>
<th>Yield per Plant in Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quinoa Grain (Chenopodium quinoa)</td>
<td>4 mg</td>
<td>28,000 - 56,000</td>
<td>112,000 – 224,000 mg</td>
<td>0.25 – 0.5 pounds</td>
</tr>
<tr>
<td>Kidney Bean (50 pods per plant)</td>
<td>600 mg</td>
<td>100 - 200</td>
<td>60,000 – 120,000 mg</td>
<td>0.13 - 0.26 pounds</td>
</tr>
<tr>
<td>Corn Kernel (2 ears per plant)</td>
<td>300 mg</td>
<td>1000 - 2400</td>
<td>300,000 – 600,000 mg</td>
<td>0.66 – 1.3 pounds</td>
</tr>
<tr>
<td>Sunflower Seed (1 flower per plant)</td>
<td>75 mg</td>
<td>800 - 2000</td>
<td>60,000 – 150,000 mg</td>
<td>0.13 – 0.33 pounds</td>
</tr>
<tr>
<td>Pumpkin Seed (2 pumpkins per vine)</td>
<td>150 mg</td>
<td>200 - 1400</td>
<td>30,000 – 210,000 mg</td>
<td>0.07 – 0.46 pounds</td>
</tr>
</tbody>
</table>

The “Timucua Technology Curriculum” was sponsored by a FL Division of Historical Resources Grant.
Corn produced the most per plant. I thought it might be pumpkins, but they were actually the lowest seed producers. Maybe that’s because they spend so much energy making the orange fleshy part of the fruit.

MATERIALS LIST FOR “Why Did the Old Grains Fall out of Favor?” ACTIVITY:
For each student: a calculator.

ANSWER KEY FOR “Why Did the Old Grains Fall out of Favor?” ACTIVITY:
1) 2 ears of corn x 500 kernels/ear x .043 ounces/kernel = 43 ounces
2) Answer: 2.7 pounds. Method: 43 ounces / 16 ounces per pound = 2.7 pounds.
3) Answer: 26.8 or 27. Methods: 10 plants/16 ounces = 1.6 ounces/plant. 43 oz / 1.6 oz = 26.8
chenopodium plants to produce as much as 1 corn plant.
OR 2.7 pounds of corn/plant divided by .1 pounds of chenopodium/plant = 27 chenopodium plants
to produce as much as 1 corn plant.
4) I guess I’d have switched to corn. It depends on whether or not there were lots of other leafy greens to be gathered wild. I don’t think you can preserve the greens like you can dry corn, though. Maybe they needed to focus on preserving food for winter. That’s why I would have chosen corn.

MATERIALS LIST for “Growing Your Own Crops” ACTIVITY:
Teacher Tips: This activity is a 4-month project; however, you can just run the beginning part, in which seeds are germinated. That part only takes about 2 weeks. For each student: five cleaned yogurt cups, potting soil, 2 corn kernels, 2 beans, 2 pumpkin seeds, 2 sunflower seeds, a sprinkling of quinoa seeds. Access to water. Sunny area (for LOTS of pots) or growth lamps. Recording notebook. For class: Digital camera. If doing outdoor planting, you’ll need space to garden, hoes and work gloves, hoses for irrigation, compost and fertilizer, garden shears, bags, bowls, or baskets for harvesting the crop. A groundskeeper willing to shred the garden contents after the project. An area to build a compost pile (visit http://www.gardeninginfozone.com/how-to-make-a-compost-bin for composting info). Bowls and pots to soak, rinse, and cook seeds and pumpkin flesh. Access to Power Point. An audience students can teach with their Power Point presentations.

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

STUDENT ARTICLES, EXPERIMENTS, & ACTIVITIES:
1) What is Agricultural Technology?
2) The Dawn of Agriculture
3) ACTIVITY: Where Did Agriculture Begin?
4) How It Actually Began
5) What Crops Did They Plant?
6) ACTIVITY: Which Crop Would You Choose?
7) Florida’s Agricultural Latecomers
8) ACTIVITY: Why Did the Old Grains Fall out of Favor?
9) What Technologies Did the Timucua Use to Cultivate their Fields?
Agricultural Technology

Students learn how the Timucua and their ancestors utilized domesticated plants.

10) Were the Timucua Practicing Modern Science?
11) Agricultural Science in Modern Florida
12) ACTIVITY: Growing Your Own Crops

NEW TERMINOLOGY:
agriculture, amaranth, archaeologist, artificial selection, biological pest management, chenopodium, crop yield, cultivation, division of labor, domestication, engraving, germinate, GMO (genetically modified organism), gourd, herbicide resistance, insectivore, monocropping, mortal and pestle, nitrogen fixation, nutrient, reproductive rate, rind, silt, symbiotic relationship, teosinte

ASSESSMENT OPTIONS:

Writing Prompt #1: Your school just received a grant to fund an organic agricultural project. The principal has proposed that every student volunteer ten hours to each phase of the project: planting, maintenance, and harvest. Think about whether you consider this a good school policy or a bad one, and why. Now write to persuade your school board that they should accept your view on this subject.

Writing Prompt #2: The Timucua grew a variety of food plants. Think about your favorite plant foods and consider which ones you might like to grow in a garden. Write to explain at least three plants you would like to grow and why.

Assessment #1: Based on your reading of the article titled, “Were the Timucua Practicing Modern Science?” discuss three ways in which the Timucua were OR were not using the scientific method.

Assessment #2: Based on the article titled, “What Technologies Did the Timucua Use to Cultivate their Fields?” explain how four different kinds of technology were utilized during a planting season.

Assessment #3: Based on your reading of the entire Agriculture unit, explain why you think the author included a section on genetically engineered crops.

Using an online Flash Card maker, students will summarize New Terminology definitions. They should utilize one or more of these words in proper context when responding to the assessment questions. On-line flash card creator: [http://www.scholastic.com/kids/homework/flashcards.htm](http://www.scholastic.com/kids/homework/flashcards.htm)
“Timucua Technology” - A Middle Grade Florida Curriculum

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.

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

Page 1
“Timucua Technology” - A Middle Grade Florida Curriculum

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.

- 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:


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

“Lake Jackson Mounds Archaeological State Park.” 10 February 2012.  
<http://en.wikipedia.org/wiki/Lake_Jackson_Mounds_Archaeological_State_Park>


“Mount Royal gets a Makeover.” 29 March 2012.  

<http://www.missionsanluis.org/research/reconstruction3.cfm>

“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.  


“The Ides of the Tides, Part II – Interpreting and Using a Tide Table.” 10 February 2012.  

“The Virtual Hampson Museum – the 3-D Visualizations of the Upper Nodena Site.” 10 February 2012.  <http://hampson.cast.uark.edu/nodena_3D_FAQ.htm>
“Timucua Technology” - A Middle Grade Florida Curriculum

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.


PICTURE SOURCES (Image URLs and Permissions):

Cahokia Monk’s Mound http://upload.wikimedia.org/wikipedia/commons/thumb/2/2d/Monks_Mound_in_July.JPG


Copper-covered Wooden Ear Spool, courtesy of Brian Floyd http://trinitycreate.com/Copper%20ear%20spolls%202.JPG

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/1/17/1709-09-11_LkJksnMoundsStPkmnd2.jpg/300px-1709-09-11_LkJksnMoundsStPkmnd2.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

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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 ¼” 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...
Students learn how Florida’s early people built structures, like huts and fishing weirs, as well as earthworks, like middens and burial mounds.

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. Safety 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.

**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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“Timucua Technology” - A Middle Grade Florida Curriculum

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.

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 “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.

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

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

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

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 objects. 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 corralling a fish towards the trap
Two Loop Weirs, the leftmost being gated to corral the captured fish

ANSWER KEY FOR “Weir Building” ACTIVITY:

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

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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.

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.


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

**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, chamel house, chieftdom, 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://archaeology4kids.tripod.com/id38.html)
- [http://mdah.state.ms.us/hpres/arch_vocab.php](http://mdah.state.ms.us/hpres/arch_vocab.php)
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.

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.

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 that 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.
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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.

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.
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Archaeological Technology

Students learn how modern archaeologists utilize excavation, carbon-dating, curation, and publication to develop our understanding of Florida’s early people.


PICTURE SOURCES (Image URLs and Permissions):

Archaeologist screening artifacts, courtesy of the Florida Public Archaeology Network, West Central Region

Archaeologists screening with water, courtesy of the Florida Public Archaeology Network, Northeast Region

Excavation

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Excavation in Shell Midden with Archaeologists, courtesy of the Florida Public Archaeology Network, NE Region
Excavation in Shell Midden with Feature, courtesy of the Florida Public Archaeology Network, Northeast Region
Spanish Glass Beads http://www.missionsanluis.org/_images/hispanicVillage_beads.jpg

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

MATERIALS LIST FOR “Constructing a Midden” LAB:
For each pair of students: 1 foil loaf pan (most are 8” x 4” x 2.3” deep) (20.3 x 10.2 x 5.8 cm).
For class: Midden materials you must include:
- 2-4 cups of yellow sand
- 8-10 cups of light gray soil
- 8-10 cups of dark brown soil
- 8-10 cups of crushed shell or small bits of shell
- small, broken pottery sherds
- ½ cup of dried kidney beans
- ½ cup of charred quinoa seed
- ½ cup of dried acorns
- ¼ - ½ cup of tiny glass beads

A selection (or all) of the following materials should be offered to students:
- tiny bits of stone debitage
- chips of bone
- larger pieces of shell (of more than one species if possible: whelk, oyster, clam, mussel, snail, coquina)
- ½ cup dried corn kernels, sunflower seeds in shell, pumpkin seeds in shell, or gourd seeds
- copper beads or wire
- tiny nails

Teacher Tips: For stone debitage: Try to find chipped aquarium gravel that is whitish-gray. This is inexpensive at pet stores and superstores. For bone: You can salvage poultry, pork, or beef bones from your meals. Remove all meat. Allow to dry completely. Shatter with a hammer. Please use safety glasses. For pottery: Purchase a small pot, preferably unglazed and either gray or black. (Terra cotta color will probably be the easiest to find, however.) Shatter it with a hammer. If you can find two pots that will appear obviously different, even after shattering, provide both pots to the students, one labeled prehistoric, the other Contact Period. For shells: Look at the beach, (coquina are a great size, but larger shells are fine too). If you need to, you can purchase bags of shells at craft stores. Smash many of them, but leave at least 1-3 whole ones for use by each student team. For beads: Purchase tiny glass beads at craft stores. For seeds: Use the leftover bean and quinoa seeds from the Agriculture activities. Quinoa toasts to dark
Archaeological Technology

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brown or black in 3-4 minutes. See the Flotation Teacher Tips for more information on charring the seeds. Quinoa seeds must be charred, or they will not float up in the follow-up Flotation activity.

**For nails:** Purchased nails (which are obviously very different from 1500s Spanish nails) should be tiny. You can file or snip the points if you have safety concerns. Provide no more than one per student group. **For copper:** Both copper beads and wire are available inexpensively at craft stores. Prehistoric cultures in Florida traded for copper as a status item. They beat the copper pieces flat and engraved designs on them, or rolled the beaten copper into beads. The Building Technology unit shows some of the designs engraved on copper breastplates from the Mount Royal site in Putnam County. **For soil:** During test excavations, it proved very difficult to tell the difference between gray and brown soil. There simply wasn’t enough light getting into the unit to differentiate the two colors. Consider using brightly colored sands instead of natural soils. Because sand particles do not stick together unless wet, you will need to moisten the midden (not soak it) after construction. Be sure to excavate it within a day or two so that the sand will remain moist. Covering the container with foil will help retain moisture.

**ANSWER KEY FOR “Constructing a Midden” LAB:**
Students will answer the planning questions and record their methodology for constructing the midden. They will submit the answers to the questions for Prehistoric Midden Record and Historic Mission Record. These records will be used by the students who actually excavate the midden, to see how close their units came to accurately representing the entire site.

**MATERIALS LIST FOR “Excavating a Midden” LAB:**
For each pair of students: 1 model midden, 8-10 sandwich bags, a sharpie marker for labeling bags, 1 putty knife, 1’ of string, 8 toothpicks, 1 metric ruler, paper and pencil for record-keeping, and a shoe box or similar stackable container for storing bagged artifacts. **For class:** Material to cover work surface (foil, wax paper, or newsprint). **Teacher Tips:** Plan where you will store (curate) the boxes of artifact and soil bags for the duration of the excavation, screening, and flotation labs.

**ANSWER KEY FOR “Excavating a Midden” LAB:**
Students will produce their Research Question for this excavation and an excavation plan (including sketch). They will submit bagged artifacts for each level of two different units along with the midden which should now have two excavated units with straight edges and bottoms. A sketch and/or digital photo of the strata should be included, along with a collection of observations made during excavation.

**MATERIALS LIST FOR “Screening for Artifacts” LAB:**
For each pair of students: Construction record for the midden they excavated, 3 screens (½”, ¼”, and 1/8”), 10-15 sandwich bags, a sharpie marker for labeling bags, paper and pencil for record-keeping. **For class:** Material to cover work surface (foil, wax paper, or newsprint).
Archaeological Technology

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**Teacher Tips:** Constructing screens for each student group will require a significant outlay of funds, perhaps $100. Please review the cost breakdown to decide if you wish to make fewer and have the students take turns with the equipment. ½" roll of hardware cloth: $10, ¼" roll of hardware cloth: $10, 1/8" roll of hardware cloth (available online, usually not at hardware stores) $25 including shipping, Ziploc 20 oz. disposable food containers, eight 5-packs $26, 1 roll of duct tape $5, 1 set of tin snips $15. The hardware cloth can’t be bought in smaller units than what’s listed above, so decreasing the number of screens you make will only save funds on the plastic containers, as well as construction time. Splitting the cost with other educators who wish to do this activity is a good option for cutting costs. Contact your regional FPAN office to see if they can offer any assistance.

**How to make a screen:** Use an Exacto knife to (carefully) cut a 3” square window in the bottom of the container. Use tin snips to cut the hardware cloth into 3.75” x 3.75” squares. Wire cutters will work, but because the blades are so short, it makes the job more difficult – and you will be cutting a lot of hardware cloth. Invert the container. Place the square of hardware cloth on top. Ensure that no sharp points stick out past the edge. Use duct tape to secure the hardware cloth on all four sides. Use a sharpie marker to label the screen size on the container. Repeat so that each student team has one screen of each size. After use, brush all dirt and debris off of the screens. Ensure that they are completely dry. Store until you need them next year.

**ANSWER KEY FOR “Screening for Artifacts” LAB.**

Answers to screen test: Students will submit lists of materials recorded for each size screen. They will compare the lists and decide which screen is appropriate for use at this excavation site. They will produce bagged, labeled artifacts from each as well as bags of soil for use in the flotation activity.

Answers to Excavation: Students will submit bagged artifacts. They will create lists of artifacts found in each cultural stratum. They will answer Analysis questions regarding what they found, including what they learned regarding their Research Question.

Answers to Follow-up: Students will compare their artifact lists with the records of all artifacts in the midden. What did they miss? How well did the 2 units represent the entire midden site?
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ANSWER KEY FOR “Flotation” LAB:
Students will produce labeled bags of light and heavy fractions for each level excavated. They will submit a list of artifacts (beads) and biofacts (seeds) found in each cultural strata and answer the analysis questions regarding their finds. If students find no artifacts or biofacts, they should simply note this, along with any other pertinent observations.

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

STUDENT ARTICLES, EXPERIMENTS, & ACTIVITIES:
1) What is Archaeology?
2) LAB: Creating a Model Midden
3) LAB: Excavating a Model Midden
4) Different Kinds of Archaeology
5) A Case Study: Wet Site Archaeology at Hontoon Island
6) LAB: Screening for Artifacts
7) Flotation – Collecting Tiny Artifacts and Biofacts
8) LAB: Field Flotation
9) How Old are these Artifacts?
10) Now You’ve Got the Artifacts. What Do You Do With Them?
11) What Have you Learned and How Will you Tell Others?

NEW TERMINOLOGY:
archiveology, bundle burial, carbon-14, carbon dating, charnel house, charred, Contact Period, culture, curation, datum, excavation, flotation, isotope, matrix, Mesoamericans, midden, nitrogen-15, polyethylene glycol (PEG), publication, screening, sieve, Spanish mission, Spanish olive jar, sponge spicules, stratigraphy, thermoluminescence dating, timelines

Several websites with good definitions for archaeological terms:
[http://archaeology4kids.tripod.com/id38.html](http://archaeology4kids.tripod.com/id38.html)
[http://mdah.state.ms.us/hpres/arch_vocab.php](http://mdah.state.ms.us/hpres/arch_vocab.php)

ASSESSMENT OPTIONS:

Writing Prompt #1: Your school was starting construction on a new swimming complex when native artifacts were discovered at the construction site. Digging was halted to allow
Archaeological Technology

Students learn how modern archaeologists utilize excavation, carbon-dating, curation, and publication to develop our understanding of Florida’s early people.

archaeologists to study the site. No burials were discovered, but the archaeologists believe that significant information will be lost if the site is not properly excavated. They have asked the school to delay construction for three months to allow a proper excavation. This delay means that the pool will not be available until next year—after you will have moved on to high school. Think about whether the excavation should be permitted, even though it will prevent an entire grade level from ever using the pool. Write a letter to your principal to convince her that your opinion is the correct one.

Writing Prompt #2: Archaeologists frequently study middens—ancient trash piles—to learn more about the peoples who once lived in the area. Think about the things that modern humans throw away, and what future archaeologists might learn about us from our trash. Write to explain three conclusions a future archaeologist might draw based on the information he collects from a modern midden (landfill).

Assessment #1: Based on your reading of the article titled, “What Is Archaeology?” explain how the fields of archaeology and history are fundamentally different. Give one example of how they have worked together to solve a mystery in the past.

Assessment #2: Based on the article titled, “How Old Are These Artifacts?” explain why carbon dating and thermoluminescence dating can work together to pinpoint the timeline for a site. Be sure to explain which materials each method can date. You do not need to explain the specifics of how each method works.

Assessment #3: Based on the article titled, “Now You’ve Got the Artifacts; What Do You Do With Them?” discuss the meaning of the word “curation,” and describe some of the challenges of ethical curation, including storage, preservation, and publication.

Assessment #4: Archaeologists have recently excavated what they believe to be the very first Spanish fort at St. Augustine. Look in the section titled “LAB: Creating a Modern Midden.” The excavation photo shows a portion of the first Spanish fort at St. Augustine. The feature in the lower left had been completely covered by shell midden. What can you interpret about the history of this site based on stratigraphy?

Connect Writing Prompt #2 (modern middens) and Technology: Question: How is NASA involved in Florida archaeology? Internet article: http://www.nasa.gov/centers/kennedy/about/aerospace_arch.html

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Archaeological Technology

Students learn how modern archaeologists utilize excavation, carbon-dating, curation, and publication to develop our understanding of Florida’s early people.

Making New Connections: The Archaeology unit covers a broad range of topics, and the list of New Terminology reflects this:

**Excavation**: archaeology, bundle burial, charnel house, charred, datum, excavation, material culture, flotation, matrix, midden, screening, sieve, stratigraphy

**Analysis of Artifacts and Data**: carbon dating, Contact Period, culture, isotope, Mesoamericans, nitrogen-15, publication, Spanish Mission, Spanish olive jar, sponge spicules, thermoluminescence dating, timelines

**Preservation and Storage**: curation, polyethylene glycol (PEG)

After reading the unit, show students this grouping of words. Ask them to decide which word list matches each heading. Pull two words at random from these lists and ask the class to discuss how the two words are related. For example, nitrogen-15 and PEG. Nitrogen-15 is the stable isotope remaining after C-14 breaks down. These isotopes are both part of the carbon-dating process that provides archaeological dates for once-living things, like canoes made from trees. PEG is a preservative that preserves waterlogged artifacts, like canoes made from trees. Extra note: PEG and other preservatives cannot be applied to wood that will be carbon-dated. It will contaminate the sample and disrupt the dating process.
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Archaeology –
Beyond Excavation

Students learn how the genographic project, bioarchaeology, and experimental archaeology teach us about early native peoples.

STUDENT LEARNING GOAL:
Students will identify how the genographic project, bioarchaeology, and experimental archaeology teach us about early native people. Students will be able to assess use-wear in tools, analyze debitage, and test the efficiency of dugout canoe shapes.

SUNSHINE STATE STANDARDS ASSESSED:

**Science**
- SC.7.L.15.2 Explore the scientific theory of evolution by recognizing and explaining ways in which genetic variation and environmental factors contribute to evolution by natural selection and diversity of organisms.
- SC.7.L.16.1 Understand and explain that every organism requires a set of instructions that specifies its traits, that this hereditary information (DNA) contains genes located in the chromosomes of each cell, and that heredity is the passage of these instructions from one generation to another.
- 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.E.5.10 Assess how technology is essential to science for such purposes as access to outer space and other remote locations, sample collection, measurement, data collection and storage, computation, and communication of information.
- 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.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.

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

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Archaeology – Beyond Excavation

Students learn how the genographic project, bioarchaeology, and experimental archaeology teach us about early native peoples.

- 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.

Health
- HE.7.C.1.3 Analyze how environmental factors affect personal health.
- HE.8.C.1.3 Predict how environmental factors affect personal health.

RESOURCES:

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PICTURE SOURCES (Image URLs and Permissions):

Crystal River Canoe Replicas  http://epicroadtrips.us/2006/winter/crystal_river_archaeological_state_park/photo04.jpg


Gilmer Bennet, Chief of the Apalachee  http://upload.wikimedia.org/wikipedia/commons/thumb/7/76/Chief-59.jpg/220px-Chief-59.jpg

Haplogroup Map  http://upload.wikimedia.org/wikipedia/commons/thumb/d/dd/Migration_map4.png/300px-Migration_map4.png

Phytate Chemical Structure  http://upload.wikimedia.org/wikipedia/commons/thumb/4/45/Phytic_acid.svg/200px-Phytic_acid.svg.png

SNP Double Helix  http://upload.wikimedia.org/wikipedia/commons/thumb/2/2e/Dna-SNP.svg/220px-Dna-SNP.svg.png

Weedon Island Canoe  http://www.flpublicarchaeology.org/blog/wcrc/files/2011/03/St.-Petersburg-20110301-00041-e1299524649536-225x300.jpg

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MATERIALS LIST for “Take a Look at a Haplogroup Map” ACTIVITY:
Perhaps an atlas if students need to look up the names of location on the map.

ANSWER KEY FOR “Take a Look at a Haplogroup Map” ACTIVITY:
2. U: Northern and Western Europe

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“Timucua Technology” - A Middle Grade Florida Curriculum

Archaeology – Beyond Excavation

Students learn how the genographic project, bioarchaeology, and experimental archaeology teach us about early native peoples.

3. C: Berengia, Eastern North America, Eastern South America
4. N: Middle East, Australia
5. L: Northwest Africa, northeast Africa, southern Africa
6. Most similar = Melissa (M). Most different is David (D).

MATERIALS LIST for “Identifying Florida Canoe Types” ACTIVITY:
No additional Materials Needed

ANSWER KEY FOR “Identifying Florida Canoe Types” ACTIVITY:
A. Type 3 because it was found in a coastal salt marsh near Tampa Bay. Also, it was dated later than 500 BCE, so even though I couldn’t see the ends, I knew it wasn’t a Type 1.
B. Type 2 because the ends are angled up and the prow is not long.
C. It could be Type 3 because of the long prow. But it was found at an inland site, so it’s more likely that it would be a Type 2.
D. Type 2 because it has angled ends, with no long prow, plus it was found in Putnam County which is inland.
E. Type 1 because the ends are not angled. It is also almost 2,500 years old, the division between archaic and more modern canoes.

MATERIALS LIST for “Testing Canoe Styles” ACTIVITY:
(Per Class) 3 four-foot sections of vinyl gutter with end caps ($33 – best choice) OR 3 large tote bins. 1 spool of fishing line. 2-6 tiny eye screws. 1 spring scale ($5). 2 fishing weights. An outdoor space with access to hose and running water. 2 stopwatches. If you did not assign students to carve the three canoe types during the soap carving activity, you will need to create the sample canoes. Use soap that will float in water. Refer to the Tool Technology teacher section for instructions on carving.

ANSWER KEY FOR “Testing Canoe Styles” ACTIVITIES:
Teacher Tips: If using the gutter: Do not put an end cap on the gutter during the tidal test. This will allow hose water to flow out of the opposite end. For the still water and rough water tests, you will need to put the end cap on the gutter to keep the water in the chute. Use chairs to support the gutter/chute above the ground. This will allow the spring scale and fishing weights, which are suspended on fishing line, to use gravity to pull towards the ground. (See sketch.)
If you are using the tub, you will need to cut a hole at the top of one end for use in the tidal experiment. This will allow the hose water to flow out of the back without floating the canoe right out of the tub. Student data will vary. Generally, the Type 1 canoe should perform the worst because it is the least hydrodynamic. Type 2 should do best on still water, Type 3 on rough water, and either Type 2 or 3 in the tidal situation.

MATERIALS LIST for “Use-Wear Studies on Wooden Tools” EXPERIMENT:
(Per student) Magnifying glass (Per Class) Digital camera. 3-4 sturdy whelk or clam shells. Dried corn. Sturdy tape or twine (not glue) to bind the shells onto handles. Dowels 1” in diameter and 2’ long, cut on a slant on one end. You will need at least 6 dowels, but 12 is preferable (so that many students can use the tools simultaneously). Discreetly label 1/3 of the dowels with a code that signifies digging, 1/3 as pounding, and 1/3 as handles. Photograph one dowel as a “before.” Bind shells onto 1/3 of the dowels to create hoes. It will take some trial and error to figure out exactly how to bind the shell so it won’t move. It’s okay to use duct tape.

ANSWER KEY FOR “Use-Wear Studies on Wooden Tools” EXPERIMENT:
Please remind the students that wooden artifacts normally do not survive in the archaeological record because they decompose. The wooden tools that do survive in wet sites can be assessed for wear, but many of the surface changes may have disappeared or been altered as the wood sat underwater for so many years. Wear studies are generally performed on sturdier materials, including shell, stone, coral, and pottery.

Answers will vary. Sample below.
1a. Digging tools have little splinters of wood chipping off, and the edge is blunted. The wear is all on the pointy end of the tool.
1b. Pounding tools have very blunted edges with bits of wood pressed outward at the edges. Some of the wear is on the angled end, but most is on the flat end.
1c. Handles show no wear on the ends, but there are some shallow gashes where the shell pressed into the handle.
2a. Digging tools under magnification showed more and tinier splinters plus there was lots of dirt ground into the gashes.
2b. Pounding tools under magnification showed lots of tiny dents on the flat end as well as plenty of corn powder ground into the nicks.
2c. Hafted tools will show more and tinier scratches and gashes. Adhesive residue from binding tape is still on the tool.
3a. This tool has lots of wear on the pointy end, along with ground in dirt. It looks like it was used as a digging tool.
3b. This tool was very smashed on the flat end, with corn powder mashed into the grooves. That makes it a pounding tool.
3c. This tool has creases and grooves from a shell tool pressing against it. This means the tool was a handle for another tool.
4. Wear patterns on wood discovered at wet archaeological sites fall into three main groupings, with some intermediary pieces. Tools that had splinters stripped from the pointed end were generally used for digging. Tools that were smashed mostly on the flat end were probably used for pounding. And wooden tools that had grooves somewhere in the middle were probably used as handles for shell tools.

MATERIALS LIST for “Examining Debitage” ACTIVITY:
(Per team of 2 students) 2 small samples (10 flakes) of soap debitage from two sources. Source 1: curated debitage previously created by students carving with wooden tools in the Tool Technology unit. Source 2: new debitage created by a teacher carving (whittling) soap using a metal knife. You may need to carve up more than one bar of soap – or at least – an entire bar in order to provide enough debitage for everyone.

ANSWER KEY FOR “Examining Debitage” ACTIVITY:
Data will vary. In general, the debitage created with wooden tools will be smaller and less well-formed, more powder-like. The debitage created with metal tools will be thicker at the middle, but very narrow at one end. It may also have more variety in flake size.


STUDENT ARTICLES, EXPERIMENTS, & ACTIVITIES:

1) Studying Ancient Populations through Modern Genetics
2) Genetics and the Story of Human Migration
3) A Look at STRs (Repeats)
4) A Look at SNPs (Single Changes)
5) How Can Mutations Track Human Migration?
6) What is a Haplogroup?
7) ACTIVITY: Take a Look at a Haplogroup Map
8) Studying Ancient Populations through Isotopes, Cavities, and Skeletal Stress
9) What is Bioarchaeology?
Archaeology – Beyond Excavation

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10) Studying Ancient Peoples through Trial and Error
11) What is Experimental Archaeology?
12) ACTIVITY: Identifying Florida Canoe Types
13) Experimental Archaeology – Canoes
14) ACTIVITY: Testing Canoe Styles
15) Canoe Manufacturing Centers
16) The Detailed Side of Experimental Archaeology
17) EXPERIMENT: Wear Studies on Wooden Tools
18) ACTIVITY: Examination of Debitage

KEY TERMS:
abrade, adenosine, allele, analysis, anemia, angle, autosomal chromosome, Bering Land Bridge, bioarchaeology, bone marrow, buoyancy, celt, chromosome, cross-section, curate, cytosine, debitage, deficiency, degradation, DNA, dowel, exodus, experimental archaeology, eye orbit, First Amendment, femur, genealogy, generation, genes, genetically modified crops, genetic variation, genetics, geology, girdle, guanine, haplogroup, haplotype, hydrodynamic, hydrology, impact damage, in situ, iron, junk DNA, labor draft, long bones, maritime, mitochondria, mitochondrial DNA (mtDNA), mutation, Newtons, nucleotide, nucleus, osteoarthritis, paper trail, parallel, peat, perpendicular, pestle, pillage, primitive technologist, protein, red blood cell, SNP (single nucleotide polymorphism), STR (standard tandem repeat), striation, tyrosine, unaffiliated, use-wear analysis, Y-chromosome

Good websites for archaeological terms
http://archaeology4kids.tripod.com/id38.html
http://mdah.state.ms.us/hpres/arch_vocab.php

Good website for genetics terminology
http://www.clanlindsay.com/genetic_dna_glossary.htm

ASSESSMENT OPTIONS:

Writing Prompt #1: Genetic genealogy looks at a person’s DNA to make educated guesses about his or her ancestry. Think about the ethics of this kind of “genetic profiling,” and how it might be used positively and negatively. Write to explain why you feel that genetic genealogy should or should not be encouraged.

Writing Prompt #2: When permitted, archaeologists do study human graves to learn about peoples of the past. Think about how future archaeologists might interpret a modern cemetery. Write to explain three assumptions that archaeologists might make about our culture based on what they observe at a modern cemetery.
Assessment #1: Based on your reading of the articles about experimental archaeology, describe two basic methods that experimental archaeologists use when studying the past. Include at least one example of how each method has been applied, and discuss what was learned through this example.

Assessment #2: Based on your reading of the article titled “What is a Haplogroup?” explain why there will never be a way to solidly identify a person’s racial ancestry through genetics.

Assessment #3: Based on your reading of the article titled “What is Bioarchaeology?” explain three ways that prehistoric life left marks on the skeletons of Florida’s early people.

Podcasts (digital media) enable you to provide a quick bell-ringer activity that links the student with experts beyond the classroom. A fast internet search of podcasts + your topic opens up a new world of virtual guest speakers to enhance the student's experience. This may help students frame their own personal learning goals for the lesson.

Analogy #1: Geology is to Hydrology as Land is to Water.
Analogy #2: Distance is to Centimeters as Force is to Newtons.
Analogy #3: Niacin is to the disease Pellagra as Iron is to the disease Anemia.
Analogy #4: Kingdom Animalia is to Class Mammalia as Haplogroup is to Haplotype.
Analogy #5: Science is to History as Genetics is to Genealogy.
History and the Timucua

Students learn how historical resources teach us about the Timucua people and their technology.

STUDENT LEARNING GOAL:
Students will understand how historical resources teach us about the Timucua people and their technology.

SUNSHINE STATE STANDARDS ASSESSED:

Science
- SC.7.L.17.2 Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.
- SC.8.P.9.3 Investigate and describe how temperature influences chemical changes.

Social Studies
- SS.7.G.1.3 Interpret maps to identify geopolitical divisions and boundaries of places 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.1.5 Identify, within both primary and secondary sources, the author, audience, format, and purpose of significant historical documents.
- 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.A.2.5 Discuss the impact of colonial settlement on Native American populations.
- SS.8.G.1.1 Use maps to explain physical and cultural attributes of major regions throughout American history.

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.
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- 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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World Languages

- WL.K12.NM.2.1 Demonstrate understanding of written familiar words, phrases, and simple sentences supported by visuals.

RESOURCES:

“Does Caffeine Affect the Parasympathetic Nervous System?” 24 February 2012.

“Frey Francisco Pareja – Confessionario of Timucua Indians (1613)” 23 February 2012.
<http://dingo.sbs.arizona.edu/~rykash/collam/primarysources/pareja_confessionario.htm>


Halkuyt, Richard, Translator.  A Notable Historie Containing Foure voyages Made By Certaine French Captaines into Florida:  Wherein the Great Riches and Fruitefulnesse of the Countrey with the Maners of the People Hitherto Concealed are Brought to Light, Written All, Sauing the Last, By Monsieur Laudonniere, Who Remained there Himselfe as the French Kings Lieutenant a Yeere and a Quarter.  25 February 2012.

“How Much Caffeine Does a Cup of Coffee Contain?”  23 February 2012.

“How Much Caffeine is in Chocolate?”  23 February 2012.
<https://www.amanochocolate.com/articles/caffeineinchocolate.html>

“How to Read Primary Sources.”  25 February 2012.
<http://masterghistory.com/Documents/How%20to%20Read%20Primary%20Sources.pdf>


“Le Moyne Engravings.”  22 February 2012.
<http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne.htm>

“Men from Early Middle Ages were Nearly as Tall as Modern People.”  23 February 2012.
<http://researchnews.osu.edu/archive/medimen.htm>


The “Timucua Technology Curriculum” was sponsored by a FL Division of Historical Resources Grant.
Milanich, Jerald T.  Personal Correspondence. January – February 2012.
“Narrative of Le Moyne.” 23 February 2012.  
<http://ufdc.ufl.edu/UF00067341/00001/1?search=deer>
“Variation of Caffeine and Related Alkaloids in Ilex vomitoria.”23 February 2012.  
<http://www.econbot.org/_about_/06_awards/awards_morton/pdfs/a_edwards.pdf>

PICTURE SOURCES (Image URLs and Permissions):

De Bry engraving of the Black Drink Ceremony  http://upload.wikimedia.org/wikipedia/commons/6/6a/Black_Drink_map_HRoe_20082-300x207.jpg
De Bry engraving of the Ribault Monument  http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy008.jpg
FPAN Regional Map (modified)  http://flpublicarchaeology.org/images/florida_md.jpg
Yaupon holly  http://upload.wikimedia.org/wikipedia/commons/thumb/6/6c/Ilex_vomitoria_fws.jpg/150px-Ilex_vomitoria_fws.jpg

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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) Let’s Talk About Historical Documents
2) ACTIVITY: Which FPAN Regions Include Timucua Territory?
3) The Confessionario – A Guide to Timucua Technologies for Healthcare, Agriculture, and Hunting Success
4) ACTIVITY: Deciphering a Modern Confessionario
5) The Black Drink – Botanical Technology
6) ACTIVITY: Timucua Timeline
7) The Timucua Language
8) ACTIVITY: Try Your Hand at Translation

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NEW TERMINOLOGY:

bias, botanical, Catholic confession, causality, cede, contact-period, Crusades, cultural resources, diuretic, emetic, fabrication, fallow, Florida Public Archaeology Network, language barrier, literacy, memoirs, monument, Mississippian cultures, parasympathetic nervous system, primary source, secondary source, solubility, sponge-spicule pottery, suffix, sympathetic nervous system, teosinte, trend

MATERIALS LIST FOR “Which FPAN Regions Include Timucua Territory?” ACTIVITY:
No additional materials needed.  
Teacher Tips: Until now, there has been no map that shows the location of Timucua territory against a county backdrop.  This made the study of archaeological reports a bit challenging, because archaeological sites are categorized by county.  It is helpful to be able to look at a map and say, “Yes, the Timucua were in Bradford County.  The site I’m researching was in their territory.”  In an effort to make this process easier, here is a list of the 25 counties that include at least some Timucua territory:  Alachua, Baker, Bradford, Citrus (part), Clay, Columbia, Dixie (part), Duval, Flagler, Gilchrist, Hamilton, Lafayette, Lake (part), Levy (part), Madison (part), Marion, Nassau, Orange (part), Putnam, St. Johns, Sumter (part), Suwannee, Taylor (part), Union, Volusia (part).

ANSWER KEY FOR “Which FPAN Regions Include Timucua Territory?” ACTIVITY:
Northeast, North Central, Northwest, Central, a bit in East Central.

MATERIALS LIST FOR “Deciphering a Modern Confessionario” ACTIVITY:
No additional materials needed.
Teacher Tips: Visit the website https://www.msu.edu/~jdowell/miner.html?pagewanted=al to read a satirical article about trying to interpret other cultures.  It is called the Nacirema (American spelled backwards), and it looks at some of the odd things we do from an anthropological perspective.  Shaving, for example, is described as “scraping and lacerating the surface of the face with a sharp instrument.”  This is a humorous way to look at how distorted our understandings of other cultures can be.  Discuss with your students how this applies to the information recorded about the Timucua by explorers and priests.

ANSWER KEY FOR “Deciphering a Modern Confessionario” ACTIVITY:
Possible Answers:
1. Covering your face isn’t a magical ward against illness; it actually prevents the spread of the germs that cause illness.
2. Pesticides aren’t magic. They actually kill insect pests in the garden.
3. This incantation is a shopping list. It helps you remember everything you need. Without it, you probably will forget something and come home without the things you need.

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4. Taking an umbrella can’t stop the rain, but it makes the experience a lot more pleasant since you’ll be dry. So, umbrellas don’t ward off the rain, but they do stop you from getting soaked.

5. While good luck charms can’t actually affect the outcome of a game, they can improve player confidence. Players that are more confident and optimistic tend to perform better on the field.

6. Perfume can’t compel someone else to like you, but smelling nice is a much better way to make a good impression than smelling bad.

MATERIALS LIST FOR “Timucua Timeline” ACTIVITY:
No additional materials needed.

ANSWER KEY FOR “Timucua Timeline” ACTIVITY:
Possible Answers:
1. The brackets keep similar dates together, so we could compare Florida technologies with what’s going on in the rest of the world.

2. Early Florida peoples seem behind other cultures when it comes to big technologies.  
   (Please share the reasoning: The Timucua developed technologies appropriate to the specific challenges faced in Florida - with the resources available in Florida. For example, in Florida’s wet environment, Roman-style aqueducts (312 BCE) were never necessary. The same Paleoindians who became early Floridians also became the Incas in South America. The Incas’ development of terraced agriculture (1500s CE) was a response to life in the mountains (the terraced steps cut into mountainsides prevented erosion from runoff). Florida lands are very flat, so the Timucua never had a need to develop this specialized agricultural technology.

3. Regional cultures all seemed very powerful in this time period, able to pull together huge work forces to construct massive earthworks. If the cultures had still been this powerful when the Spanish arrived, I wonder if things might have gone differently.

4. a. First contact with the Europeans. b. Europeans get settled into Florida. c. Spanish missions and epidemics really take off. d. Epidemics, battles, and slave raids make things worse. e. The end of Florida’s Indians.

5. The epidemics were already in Europe before the contact period. They spread across the ocean onboard ship, then spread from the coastal missions inland. It’s interesting that the Crusades introduced smallpox to Germany and Christian missions accelerated the spread of smallpox in the New World.

6. slave raids; battles with the Spanish; evacuation that destroyed what remained of their cultural identity; Christianization, which replaced native beliefs with European ones.

MATERIALS LIST FOR “Try Your Hand at Translation” ACTIVITY:
No additional materials needed. Because this is an extinct language, pronunciation data is incomplete. For this activity, Timucua words are pronounced using the Spanish phonetic system, since Francisco Pareja spoke Spanish.
ANSWER KEY FOR “Try Your Hand at Translation” ACTIVITY:
1. itori-care alligators
2. acatala-ma the weir
3. efa-ye your dog
4. cuyu-na my fish
5. atulu-care arrows
6. colo acu atulu-care bow and arrows
7. honoso bali deer hunt
8. cuyu yabi fish bone
9. quello uqe-care rabbit traps
10. nia paha women’s house
11. bihi-tooma all of the grapes
13. Hontala amita-si. I am his sister.
16. Huque-no. It is a hurricane.
17. Huri-no. It is far away.
18. variable
19. variable
20. Angry Birds

ASSESSMENT OPTIONS:

Writing Prompt #1: When European explorers first met the Timucua, they could only communicate through signs. Think of the many questions that Europeans wanted to ask the Timucua – and ways you might be able to express these complex ideas through signs. Write to explain at least three questions the Europeans might have asked, and the signs they could have used to express them.

Writing Prompt #2: Your teacher has assigned a biography project, in which you will research the life of a grandparent or other senior citizen. Think about the various photos, records, interviews, diaries, etc. that you might use as resources. Write to explain how you would use these primary resources in creating a biography of a living or deceased person.

Assessment #1: Based on your reading of the article titled, “The Confessionario – A Guide to Timucua Technologies for Health Care, Agriculture, and Hunting Success,” give at least three examples of information the Confessionario provides about Timucua practices.

Assessment #2: Based on your reading of the article titled, “The Black Drink – Botanical Technology,” describe the physiological effects of caffeine on the human body.

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Assessment #3: Based on your reading of the activity titled, “Timucua Timeline,” describe three causes of the extinction of Florida’s Timucua speakers.

Making New Connections: The Timucua History unit covers a broad range of topics, and the list of New Terminology reflects this:

Physiology (the ways in which an organism’s body functions) botanical, diuretic, emetic, parasympathetic nervous system, solubility, sympathetic nervous system

Religion – Catholic confession, Crusades, language barrier

Agriculture – botanical, fallow, teosinte

How We Study the Past – Catholic confession, causality, cede, Contact Period, cultural resources, fabrication, Florida Public Archaeology Network, language barrier, literacy, memoirs, monument, Mississippian cultures, primary source, secondary source, sponge-spicule pottery, suffix, trend

After reading the unit, show students this grouping of words. Ask them to work in teams to demonstrate how each group of terms relates to religion in some way. For example, most terms in “How we study the past” could be classed under the heading “religion.” Why? It was a religious conflict that caused the French to colonize Florida, the Spanish to drive them out, and the Catholic priests to create the documents we use to study the Timucua. Likewise, students can characterize the “Physiology” terms which relate to the Black Drink as religious because of their role in ritual purification.