FLORIDA PUBLIC ARCHAEOLOGY NETWORK

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Students discover how an inaccurate interpretation of historical documents can have far-reaching consequences.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

Visual Arts

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

RESOURCES:

Chilvers, Ian. "Woodcut." The Oxford Dictionary of Art. 2004. Encyclopedia.com. 20 February 2012 <http://www.encyclopedia.com>.

Lorant, Stefan. The New World – The First Pictures of America. Duell, Sloan, & Pearce. New York: 1946.

Milanich, Jerald T. Personal Correspondence. November 13, 2011 – February 28, 2012.

Milanich, Jerald T. "Tattooing Among the Sixteenth Century Timucua Indians." A paper presented at SEAC, the Southeastern Archaeological Conference in 2009.

Milanich, Jerald T. "The Devil in the Details." Archaeology. Volume 58 Number 3, May/June 2005.

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"John White Drawings / Theodor de Bry Engravings." 12 February, 2012. Virtual Jamestown. <*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/lemoyne/lemoyne0/photos/lemoy003.jpg
De Bry's Engraving of John White's Fishing Methods, "Virtual Jamestown," courtesy of the British Museum http://upload.wikimedia.org/wikipedia/commons/thumb/2/21/Indians_fishing_de_bry.jpg/494px-Indians_fishing_de_bry.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/lemoyne/lemoyne0/photos/lemoy007.jpg
De Bry's Timucua War Club http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy013.jpg
De Bry's Timucua Village http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy029.jpg
De Bry's Engraving of the Timucua Deer Hunt http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy024.jpg
De Bry's Engraving of Cannibalism witnessed during Staden's Captivity http://26.media.tumblr.com/tumblr_lp9px4RrTd1qb20e4o1_500.jpg
European Red Deer http://upload.wikimedia.org/wikipedia/commons/thumb/5/50/Red_deer_stag_2009_denmark.jpg/250px-Red_deer_stag_2009_denmark.jpg
John White Drawing of Fishing Methods, "Virtual Jamestown," courtesy of the British Museum http://www.virtualjamestown.org/images/white_debry/white_42_big.GIF
Le Moyne's Apple Painting http://upload.wikimedia.org/wikipedia/commons/thumb/f/fd/Jacquelemoyne.jpg/220px-Jacquelemoyne.jpg
Modern Deer Hunt Painting, courtesy Brett Pigon, http://www.brettpigon.com/DeerHunting_s.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

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

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

Woodcut of Cannibalism witnessed during Staden's Captivity http://t1.gstatic.com/images?q=tbn:ANd9GcSE1kBp5Y04dYob6nS_VHNxfGtHNveA7xiWfo8Dux-ATIsRs_OqPoNcD3LI0g

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, http://www.KelleyWeitzel.com

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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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.

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.
- 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.3.4) 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:

"A Comparison of Leavening Agents." 17 January 2012. http://www.orbitals.com/self/leaven/index.html
"About Wood Firing." 12 January 2012. <http://garyhootman.com/about-wood-firing.php>
Bennet, Charles E. editor: Laudonnière, Rene. Three Voyages, The University of Alabama Press, Tuscaloosa: 2001.
"Ceramics." 12 January 2012. <http://www.chemistryexplained.com/Bo-Ce/Ceramics.html#b>
"Chert." 12 January 2012 <http://web.mac.com/linnog/Fire_Arch/Chert.html>

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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.

Compton, Robert. "Firing Methods and Results – Pit Firing." 12 January 2012. <http://robertcomptonpottery.com/Method%20of-Pit-Firing-Pottery.htm>
"Exploring Florida - Le Moyne Engravings." 12 January 2012. <http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne.htm>
"Fire Felling a Tulip Tree for a Dugout Canoe." Video hosted on YouTube. 12 January 2012. <http://www.burntmud.com/Burntmud/Home.html>
"Fire II: Color and Temperature." 12 January 2012. <http://maggiemaggio.com/color/2011/08/fire-ii-color-and-temperature/>
"Fire Water Balloon – Cool Science Experiment." 12 January 2012. <http://www.stevespanglerscience.com/experiments/>
"Heat Treatment of Microcrystalline Quartz." 12 January 2012. <http://donsmaps.com/heatflint.html>
Manthey, David. "A Braintan Short course." 21 January 2012. <http://yallerdog.com/amohkali/fileshare/tancourse.pdf >
Milanich, Jerald T. *The Timucua*. Blackwell Publications, Inc. Massachusetts. 1996.
Milanich, Jerald T. Personal Correspondence. November 13, 2011 – February 28, 2012.
Purdy, Barbara, *How to Do Archaeology the Right Way*. University Press of Florida. Gainesville: 1996.
"The Impact of Wildland and Prescribed Fire on Archaeological Resources." 12 January 2012 <http://www.blm.gov/pgdata/etc/medialib/blm/wo/Planning_and_Renewable_Resources/coop_agencies/cr_publications.Par.30817.File.dat/DissertationBuenger_for_merge.pdf>
"The Science of Candles." 12 January 2012. < http://www.candles.org/candlescience.html>
"Smoker Fuels for Beekepers." 11 January 2012 <http://www.beekeepingandbeehives.com/smoker-fuels-for-beekeepers/>
"Solid State Structure." 12 January 2012. < http://www.ndt-ed.org/EducationResources/CommunityCollege/Materials/Structure/solidstate.htm>
"Steam Bending Wood." 11 January 2012 <http://www.primitiveways.com/bending.html>
"Steam Bending." 11 January 2012 <http://danenbergboatworks.com/steam_bending.htm>
Volmar, Mike. "The Dugout Canoe Project." 12 January 2012. <http://www.fruitlands.org/media/Dugout_Canoe_Article.pdf>
"What Ancient Technology Assisted in Food Preparation?" 12 January 2012. <http://mhs.mt.gov/shpo/archaeology/Ancient%20Teachings/Ancient%20Teachings%203/Ancient%20Teachings%203D.pdf>

PICTURE RESOURCES (Image URLs and Permissions):

De Bry Engraving of Saturiwa Leading his Men to Battle http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne3/photos/lemoy307.jpg
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

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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.

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
Raw Chert http://upload.wikimedia.org/wikipedia/commons/thumb/5/56/ChertUSGOVjpg.jpg/220px-ChertUSGOVjpg.jpg

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?":

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

MATERIALS LIST for Balancing Equations Activity: no additional materials

ANSWER KEY for Balancing Equations Activity:
$C_6H_{12}0_6 + 6\ 0_2$ ----------→ $6\ C0_2 + \mathbf{6}\ H_20$

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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Pyrotechnology - Fire

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ANSWER KEY for "Cooking Before Pottery" Experiment:

The black mark is not the balloon burning. It is the result of incomplete combustion of the candle wax.

***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.

Time Before Balloon Burst	Number of Balloons
< 20 seconds	9
20-60 seconds	6
1-2 minutes	3
2-3 minutes	2
3-4 minutes	4
> 5 minutes	1

The hole is not all the way through the rubber. But the moment heat stresses it, this flawed balloon will break.

The drops of condensation indicate that the water inside is boiling. (3 minutes)

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 back 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:

Important Timucua Temperatures	Degrees Fahrenheit	Degrees Celsius
Water Freezes	32° F	***0° C***
Healthy Body Temperature	98° F	***37° C***
Water Boils	***212° F***	100° C
Fire-Treating Chert	***662° F***	350° C
Firing Pottery	1400° F	***760° C***

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: Kelley Weitzel MacCabe, http://www.KelleyWeitzel.com
Author of *The Timucua Indians – A Native American Detective Story* and *Journeys with Florida's Indians*

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Pyrotechnology - Fire

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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 Al_20_3), 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 Fe_20_3), impurities, iron (Fe), land management, leaf litter, loin cloth, lye, matchcoat, niacin, nutrients, obsolete, oxide, oxygen (0_2), palm fronds, pelt, pheromones, physical change, pliable, prescribed fire, preserve, projectile point, pyrotechnology, quartz, rawhide, silica (silicon dioxide $Si0_2$), spindle, tinder, turbines, venison, water molecules, water vapor gas, whelk

ASSESMENT 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.

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Student Learning Enhancement

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

Classroom Technology Strategies

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
- "Benefits of Prescribed Burning" http://edis.ifas.ufl.edu/fr061
- "Effects of Fire on Florida's Wildlife and Wildlife Habitat" http://edis.ifas.ufl.edu/uw132
- "Fuel, Weather, and Considerations" http://www.bugwood.org/pfire/weather.html

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- "Environmental Effects" http://www.bugwood.org/pfire/environmental.html

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/ 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

FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Tool-Making Technology

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

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

SUNSHINE STATE STANDARDS ASSESSED:

Science

- SC.7.N.1.5 Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
- SC.7.N.2.1 Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.
- SC.7.N.3.2 Identify the benefits and limitations of the use of scientific models.
- SC.8.N.1.5 Analyze the methods used to develop a scientific explanation as seen in different fields of science.

Social Studies

- SS.7.G.2.3 Explain how major physical characteristics, natural resources, climate, and absolute and relative location have influenced settlement, economies, and inter-governmental relations in North America.
- SS.7.G.3.1 Use maps to describe the location, abundance, and variety of natural resources in North America.
- SS.8.G.1.1 Use maps to explain physical and cultural attributes of major regions throughout American history.
- SS.8.G.2.1 Identify the physical elements and the human elements that define and differentiate regions as relevant to American history.
- SS.8.G.5.1 Describe human dependence on the physical environment and natural resources to satisfy basic needs in local environments in the United States.

Language Arts

- LA.7.1.6.2 The student will listen to, read, and discuss familiar and conceptually challenging text.
- LA.7.4.2.2 The student will record information (e.g., observations, notes, lists, charts, legends) related to a topic, including visual aids to organize and record information, as appropriate, and attribute sources of information.
- LA.8.1.6.2 The student will listen to, read, and discuss familiar and conceptually challenging text.
- LA.8.4.2.2 The student will record information (e.g., observations, notes, lists, charts, legends) related to a topic, including visual aids to organize and record information, as appropriate, and attribute sources of information.

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

Visual Arts

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

RESOURCES:

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

"Bone Tools – Series in Ancient Technologies." 2 February 2012. <http://www.uiowa.edu/~osa/learn/ancient/bone.htm>

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

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

"Caveman Chemistry - Pottery." 2 February 2012. <http://cavemanchemistry.com/oldcave/projects/pottery/>

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

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

"Firing Methods and Results – Pit Firing." 2 February 2012. <http://robertcomptonpottery.com/Method%20of-Pit-Firing-Pottery.htm>

"Flintknapping." 1 February 2012. <http://www.uiowa.edu/~osa/learn/ancient/flint.htm>

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

"Going Local – How to Dig, Screen, and Process Your Own Clay." 4 February 2012. <http://ceramicartsdaily.org/ceramic-supplies/pottery-clay/going-local-how-to-dig-and-process-your-own-clay/>

"How to Make a Grapevine Basket." 4 February 2012.<http://fossillady.hubpages.com/hub/How-to-Make-a-Grapevine-Basket>

"How to Rework Clay and Fire Without a Kiln." 2 February 2012. <http://www.goshen.edu/art/DeptPgs/rework.html>

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

"Making Cordmarked Pottery," 28 February 2012. <http://www.texasbeyondhistory.net/theme/cordmarked/>

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

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

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

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

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

PICTURE SOURCES (Permissions and Wikipedia image URLs):

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

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Owl Totem http://upload.wikimedia.org/wikipedia/en/thumb/e/e6/Timucua_owl_totem.jpg/218px-Timucua_owl_totem.jpg
Palm Hut, from *The Timucua Indians – A Native American Detective Story*, reprinted with permission from the University Press of Florida
Percussion
Flaking http://upload.wikimedia.org/wikipedia/commons/thumb/b/b2/Soft_Hammer.jpg/220px-Soft_Hammer.jpg
Shell tool illustrations were created by Merald Clark and provided by the Florida Museum of Natural History
Stingray Spine http://upload.wikimedia.org/wikipedia/commons/4/47/Stringray%27s_sting.jpg
Tiger Shark
Teeth http://upload.wikimedia.org/wikipedia/commons/thumb/3/3f/Tiger_shark_teeth.jpg/180px-Tiger_shark_teeth.jpg
Turkey vulture effigy pot http://www.flmnh.ufl.edu/flarch/images/CO17V4.jpg permission pending

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

MATERIALS LIST FOR "Grouping Modern Tools" ACTIVITY:
No additional materials needed. If you wish to bring in hands-on examples of modern tools, these can be used later to compare to native versions that do the same job.

ANSWER KEY FOR "Grouping Modern Tools" ACTIVITY:
Every answer will be individual. Tools that cause a chemical change will be a tough one. You may wish to require only one response for that one. Here is a sample answer with a few extras.
Part I:
Tools that Cut or Crush: jackhammer, pocket knife
Tools that Move Things: bicycle, wheelbarrow, pen (moves ink across a page), water bottle, ladder
Tools that Cause Chemical Change: lighter, catalytic converter on a car, blowtorch
Tools that Guide and Measure: ruler, measuring cup, calipers, thermometer
Tools that Shape Things: scissors, rolling pin, cookie cutters

Part II:
Tools Made from Metal: jackhammer, pocket knife, bicycle, wheelbarrow, scissors, catalytic converter, blowtorch, ladder legs, cookie cutters calipers
Tools Made from Plastic: lighter, ruler, pen, water bottle, ladder rungs, cookie cutter, thermometer
Tools Made from Glass: measuring cup, thermometer
Tools Made from Wood: hammer handle, wheelbarrow handles, ruler, rolling pin

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

MATERIALS LIST FOR "Soap Carving" ACTIVITY:

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

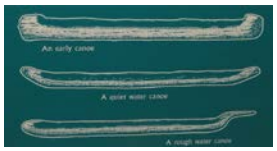
***Teacher Tips**: The tiny boat in the photograph took about 15-20 minutes to carve with an unmodified Popsicle stick. It is probably the simplest shape available, so plan to allow more time for complex soap carving. This activity can be assigned as an at home project, freeing up class time to discuss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

ANSWER KEY FOR "Soap Carving" ACTIVITY

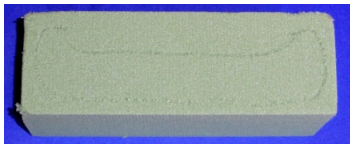
Answers will vary by individual. *See photo of Carved Soap Toy Boat.*

Teacher Tips – Carving Extension for use in the unit "Archaeology: Beyond Excavation":
Choose 3-6 students (or everyone if you have enough time and resources) to take on an additional carving project - making different types of canoes. In the "Beyond Excavation" unit, you'll use these carved canoes in a lab to test the efficiency of each canoe style in rough water, tidal water, and still water. Materials include 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.*

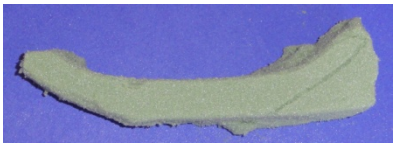


Three Florida Canoe Shapes



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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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: Kelley Weitzel MacCabe, http://www.KelleyWeitzel.com
Author of *The Timucua Indians – A Native American Detective Story* and *Journeys with Florida's Indians*

STUDENT ARTICLES, EXPERIMENTS, & ACTIVITIES:

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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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.

Student Learning Enhancement

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.

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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Student Learning Enhancement

Questions to Demonstrate Evidence of Application

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

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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:

Ashley, Keith. "Beyond Potsherds – A Technofunctional Analysis of San Pedro Pottery from the North Beach Site (8SJ48)" The Florida Anthropologist, Vol. 54, No. 3 & 4. Florida Anthropological Society. September - December 2001.

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

Chaudhari, Sarit and Chaudhari, Sucheta. Primitive Tribes in Contemporary India, 2 Volumes. Mittal Publications. New Dehli. 1995.

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

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

FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Animal Technology

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Compton, Matthew J. Faunal Analysis from the Sapelo Shell Ring Complex (9MC23), McIntosh County, Georgia. University of Georgia. September 2004. 29 January 2012. <*http://compton.myweb.uga.edu/Sapelo%20shell%20ring.pdf*>

Connaughton, Sean P. "Onset of Pottery in the Subsistence Economy of Prehistoric Hunter Gatherers of the St. Johns River." Thesis by University of Florida. 2004. 29 January 2012. <*http://sfu.academia.edu/SeanConnaughton/Papers/528980/Onset_of_Pottery_in_the_Subsistence_Economy_of_Prehistoric_Hunter-gatherers_of_the_St._Johns_River_Valley*>

"Coquina – Tasty Tiny Clam." 28 January 2012. <*http://www.eattheweeds.com/coquina-tasty-tiny-clam/*>

"Discover Florida Aquaculture." 29 March 2012. <*http://www.fl-seafood.com/pubs/pubform/pdf/English_Brochure_Discover_Florida_Aquaculture.pdf*>

D.S. Jones, I.R. Quitmyer and C. Fred T. Andrus. **"**Seasonal shell growth and longevity in *Donax variabilis* from Northeastern Florida: Evidence from oxygen isotopes." 2004: Journal of Shellfish Research 23(3): 707-714. 28 January 2012. <http://www.thefreelibrary.com/Seasonal+shell+growth+and+longevity+in+Donax+variabilis+from...-a0130777655>

"Figure 4 Deadfall." 30 January 2012. <*http://www.wildwoodsurvival.com/survival/traps/figure4/figure4.html*>

"Florida Alligator Hunting. 30 January 2012. <http://www.ronsguideservice.com/alligator>

"Harvesting Freshwater Mussels." 28 January 2012. < *http://www.willghormley-maker.com/FreashWaterMussels.html* >

"Hazel Primitive Bows." 30 January 2012. <*https://sites.google.com/site/delsbows/home/hazel-primitive-bows*>

"History of the Cow." 30 January 2012. <*http://www.strausfamilycreamery.com/?id=72*>

"History of the Domestication of Turkeys." 30 January 2012. <*http://archaeology.about.com/od/tterms/qt/turkey.htm*>

Horvath, Elizabeth. "The Lake Monroe Outlet Midden (8Vo53) – An Overview of a Middle – Late Archaic Period Site in the Upper St. Johns River Valley." 29 January 2012. <*http://www.flmnh.ufl.edu/monroe/*>

"Le Moyne Engravings." 28 January 2012. <*http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne.htm*>

Lee, Harry G. "Archaeology Team Really Digs Shells." 28 January 2012. <http://www.jaxshells.org/arko.htm>

Lorant, Stefan . The New World: First Pictures of America. Duell, Sloan & Pearce; 1st edition. 1946.

Lutz, Peter L., Musick, John A., Wyneken, Jeanette. The Biology of Sea Turtles, Vol. 2. CRC Press. 2003. Boca Raton, FL.

Milanich, Jerald T. Archaeology of Precolumbian Florida. University Press of FL. Gainesville.1994.

"Mussels and Us – Prehistory." 28 January 2012. <*http://molluskconservation.org/MUSSELS/Prehistory.html*>

"Natural Bait." 29 January 2012. <*http://www.takemefishing.org/fishing/fishopedia/bait-and-equipment/natural-bait*>

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Nielsen, Allysum. "Weirs." 29 January 2012. <*http://www.clayoquotalliance.uvic.ca/es481a/_pdf/ES%20481A%20Student%20practicals/ES481A_ANielson_Weirs.pdf* >

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

"Oysters and Clams." 28 January 2012. <*http://www.dnr.sc.gov/marine/pub/seascience/oyster.html*>

Parsons, Alexandra. The Grand Shell Ring: A Study of Site Seasonality, Hard Clam, Exploitation, and Resource Scheduling. 25 January 2012. <http://etd.lib.fsu.edu/theses/available/etd-04142008-122142/unrestricted/ap_thesis.pdf>

Quitmyer, Irvy R. "Zooarchaoelogy at the Lake Monroe Outlet Midden (8VO53)" 28 January 2012. <*http://www.flmnh.ufl.edu/monroe/animals.htm*>

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

Reitz, Elizabeth E. and Scarry, C.Margaret. Reconstructing Historic Subsistence with an Example for Sixteenth-Century Spanish Florida. Elizabeth J.. Society for Historical Archaeology. 1985.

Ste. Claire, Dana. True Natives – The Prehistory of Volusia County. Museum of Arts and Sciences Daytona Beach, FL. 1992. Hall Publishing Company.

Schwartz, Marion. A History of Dogs in the Early Americas.. Yale University Press. London. 1997.

"Snails,Slugs, and Freshwater Mollusks." 29 January 2012. <http://www.eattheweeds.com/are-slugs-edible-what-about-snails-2/>

"Take Me Fishing – Natural Baits." 28 January 2012. <*http://www.takemefishing.org/fishing/fishopedia/bait-and-equipment/natural-bait*>

"The Apple Snail Website." 28 January 2012. <*http://www.applesnail.net/content/ecology.php*>

"The History of the Domestication of Goats." 30 January 2012. <*http://archaeology.about.com/od/domestications/qt/goats.htm*>

"The Timucuan Paddle Page." 28 January 2012. <http://www.paddlethetimucuan.net/journal_mar_08.htm>

"Uses of Domesticated Animals by Early Virginia Indians." 30 January 2012. <*http://www.encyclopediavirginia.org/Domesticated_Animals_During_the_Pre-Colonial_Era*>

Waselkov, Gregory A. "Evolution of Deer Hunting in the Eastern Woodlands." 28 January 2012. Midcontinental Journal of Archaeology . 1978. Volume: 3, Issue: 1, Pages: 15-34. <*http://www.southalabama.edu/archaeology/writings/pdfs/evolution-of-deer-hunting-in-the-eastern-woodlands.pdf* >

Weber, George. "The Shompen People." 30 March 2012. *http://www.andaman.org/NICOBAR/book/Shompen/Shompen.htm*

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

White, Nancy Marie. "Testing Partially Submerged Shell Middens in the Apalachicola Estuarine Wetland, Franklin County Florida." The Florida Anthropologist, Vol. 56, No. 1. Florida Anthropological Society. March 2003.

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PICTURE SOURCES (Image URLs and Permissions):

Alligator Hunt http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy025.jpg
Apple Snail http://upload.wikimedia.org/wikipedia/commons/thumb/3/38/Pomacea_paludosa_drawing.jpg/220px-Pomacea_paludosa_drawing.jpg
Blue Crab http://upload.wikimedia.org/wikipedia/commons/thumb/9/99/The_Childrens_Museum_of_Indianapolis_-_Atlantic_blue_crab.jpg/220px-The_Childrens_Museum_of_Indianapolis_-_Atlantic_blue_crab.jpg
Coquina, courtesy of Kimber Herrera
Deer Hunting, courtesy of artist Brett Pigon, http://www.brettpigon.com/DeerHunting_s.jpg
Deer Hunt http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne0/photos/lemoy024.jpg
Dog Burial, courtesy of Jerald T. Milanich
European Red Deer http://upload.wikimedia.org/wikipedia/commons/thumb/5/50/Red_deer_stag_2009_denmark.jpg/250px-Red_deer_stag_2009_denmark.jpg
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
Freshwater Snail http://upload.wikimedia.org/wikipedia/commons/thumb/3/38/Pomacea_paludosa_drawing.jpg/220px-Pomacea_paludosa_drawing.jpg
Knobbed Whelk *http://upload.wikimedia.org/wikipedia/commons/thumb/f/fb/Knobbed_whelk_shells.jpg/220px-Knobbed_whelk_shells.jpg*
Modern Deer Hunt Painting http://www.brettpigon.com/DeerHunting_s.jpg
Oyster Midden http://upload.wikimedia.org/wikipedia/commons/thumb/e/e5/OysterBed.jpg/220px-OysterBed.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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Small Modern Seine Net http://upload.wikimedia.org/wikipedia/commons/thumb/6/6a/Seine_%28PSF%29.png/220px-Seine_%28PSF%29.png
Snapping Turtle http://upload.wikimedia.org/wikipedia/commons/thumb/6/61/Snapping_Turtle.jpg/800px-Snapping_Turtle.jpg
Whelk on mud flat 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
White-tailed Deer http://upload.wikimedia.org/wikipedia/commons/thumb/b/b7/White-tailed_deer.jpg/220px-White-tailed_deer.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

Item the Timucua Made	Animal Part It Was Made From
Clothing	Hide
Fish Hook	Bone
Net Floats	Fish Air Bladder

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Animal Technology

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

Cup, Chisel, Axe	Shell
Tool Handle	Antler
Lotions & Conditioners	Animal Fat
Meat	Muscle
Glue	Hooves, Hide
Drill Bits	Sharks Teeth
Fletching on Arrows	Feathers

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.

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Animal Technology

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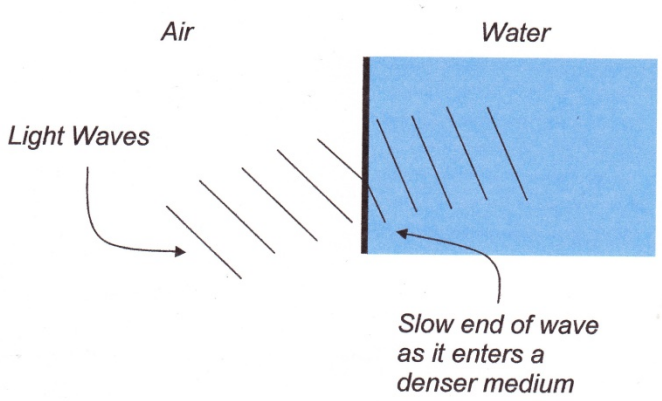
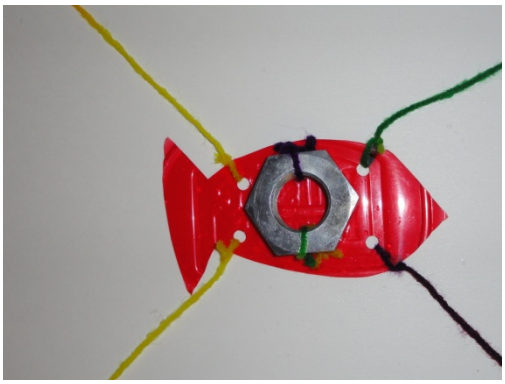
Teacher Tips 1: *Splashing is a given. Do this activity outside or cover the floor with a tarp. For visibility, try to use a brightly colored lid to make your plastic fish. Try this activity yourself before running the lesson. Don't be surprised if you have 90-100% accuracy gigging in air, and 0% accuracy 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, 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.

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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

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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.

Student Learning Enhancement

Questions to Generate Evidence of Learning

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

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Animal Technology

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

Student Learning Enhancement

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: Kelley Weitzel MacCabe, http://www.KelleyWeitzel.com
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?

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Wild Plant Technology

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:

Barceloux, Donald G. Medical Toxicology of Natural Substances: Foods, Fungi, Medicinal Herbs, Plants, and Venomous Animals. John Wiley and Sons. 2008.

Beste, Robert C. "A Location Guide for Rockhounds in the United States," 16 January 2012. http://www.micromountersofnewengland.org/pdfs/Min-Loc1.pdf

Boning, Charles R. Florida's Best Herbs and Spices. 2010. Pineapple Press, FL.

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

"Coontie Courage," 17 January 2012. < http://www.eattheweeds.com/zamia-floridana-making-toxins-edible-2/>

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Wild Plant Technology

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

"Edible Plants of Wild Florida." 14 January 2012. <http://www.wildfloridian.com/EdiblePlants.html>
"Elderberry - Medicinal Uses, Interactions, Side Effects, Dosage." 17 January 2012. <http://www.herbalremediesinfo.com/elderberry-medicinal-uses.html>
Harper, Nancy. "Natural Pigments," <http://www.womenofthefurtrade.com/wst_page18.html> 16 January 2012.
"Passionflower." 16 January 2012. <http://www.umm.edu/altmed/articles/passionflower-000267.htm>
Pleasant, Barbara. "Beautyberry Banishes Bad Biting Bugs," 16 January 2012. http://www.motherearthnews.com/Natural-Health/Beautyberry-Natural-Insect-Repellent.aspx
Purdy, Barbara A. The Art and Archaeology of Florida's Wetlands. CRC Press. Boca Raton, FL. 1991.
Renner, Clara. "Pickerelweed Is Edible From Leaves To Seeds" The Orlando Sentinel. June 20, 1985.
"Sassafras." 15 January 2012. <http://belfirebotanicals.wordpress.com/2011/03/06/sassafras/>
"Saw Palmetto Saga." 14 January 2012. <http://www.eattheweeds.com/saw-palmetto-saga-3/>
Taotao Ling, Jing Xu, Ryan Smith, Abbas Ali, Charles L. Cantrell, Emmanuel A. Theodorakis. "Synthesis of (-)-callicarpenal, a potent arthropod repellent ," <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ada544464.&Location=U2&doc=GetTRDoc.pdf> 16 January 2012.

PICTURE SOURCES (Image URLs and Permissions):

Acorns http://upload.wikimedia.org/wikipedia/commons/thumb/6/61/Acorns.jpg/220px-Acorns.jpg
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/f/f0/Amerikaanse_vogelkers_bessen_Prunus_serotina.jpg/220px-Amerikaanse_vogelkers_bessen_Prunus_serotina.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
De Bry Engraving of Timucua Women Carrying Food http://fcit.usf.edu/florida/photos/native/lemoyne/lemoyne5/photos/lemoy521.jpg
Elderberry: http://upload.wikimedia.org/wikipedia/commons/thumb/0/0a/Wild-grapes-indiana.jpg/220px-Wild-grapes-indiana.jpg
Fishing Net, from *The Timucua Indians – A Native American Detective Story*, reprinted with permission from the University Press of Florida

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Wild Plant Technology

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

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

Hickory Nuts http://upload.wikimedia.org/wikipedia/commons/thumb/9/90/Hickory_nuts_6060.JPG/222px-Hickory_nuts_6060.JPG

Passionflower http://upload.wikimedia.org/wikipedia/commons/thumb/3/35/Bildtankstelle_1_090.jpg/220px-Bildtankstelle_1_090.jpg

Sassafras: http://upload.wikimedia.org/wikipedia/commons/thumb/a/a8/Sassafras7.jpg/220px-Sassafras7.jpg

Saw Palmetto http://upload.wikimedia.org/wikipedia/commons/thumb/5/56/Serenoa_repens_USDA1.jpg/220px-Serenoa_repens_USDA1.jpg

Waxmyrtle http://upload.wikimedia.org/wikipedia/commons/thumb/c/c2/Starr_031108-0155_Morella_cerifera.jpg/220px-Starr_031108-0155_Morella_cerifera.jpg

Wild Garlic http://upload.wikimedia.org/wikipedia/commons/thumb/2/21/Allium_canadense.jpg/220px-Allium_canadense.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

Woodpecker Painting http://upload.wikimedia.org/wikipedia/commons/thumb/4/43/WoodPanelBird.jpg/123px-WoodPanelBird.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"x 2" holds115 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:

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Wild Plant Technology

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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.

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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,

FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Wild Plant Technology

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

outfit, or a game when the Timucua Indians lived in Florida in 1564. Write to explain how they might have acquired these items in the days before stores.

Assessment #1: Based on your reading of the article titled, "Food Plants," explain how a single plant can be both poisonous and edible.

Assessment #2: Based on the article titled, "Food Plants," explain how some plants use chemical toxins to protect themselves.

Assessment #3: Based on your reading of the articles titled, "Textiles – Woven Materials" and "Activity - Rope Weaving," list four different plant parts used in the weaving process.

This engraving by Theodore de Bry depicts healing practices of the Timucua. The woman in the background may be carrying medicinal herbs. The man lying on the right is inhaling medicinal steam from boiling herbs.

Student Learning Enhancement

Questions to Generate Evidence of Application

- How will you *connect this to…*
- How does _____ affect _____?
- Describe the actions we could take to stop _____ from happening.

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Wild Plant Technology

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Student Learning Enhancement

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

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Wild Plant Technology

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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.

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Agricultural Technology

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

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

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

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

"A Quiet Revolution: Origins of Agriculture in Eastern North America." 21 January 2012. <http://www.mesacc.edu/dept/d10/asb/lifeways/hg_ag/quiet_revolution.html>

Ashley, Keith & Rolland, Vicki. "Where's the Corn in Peninsular Precolumbian Florida"? Presented at the 74th annual Society for American Archaeology Conference. Atlanta, Georgia, April 22-26, 2009.

"Biologists Confirm Sunflower Domesticated in Eastern North America." 21 January 2012. <http://www.sciencedaily.com/releases/2011/08/110815162344.htm>

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

Cowan, C. Wesley. Smith, Bruce D. "New Perspectives on a Wild Gourd in Eastern North America." *Journal of Ethnobiology*." 13(1):17-54. Summer 1993. 20 January 2012. <http://ethnobiology.org/sites/default/files/pdfs/JoE/13-1/CowanSmith.pdf>

"Drying and Harvesting Sunflowers," 22 January 2012. < http://www.sunflowerguide.com/drying-sunflowers.html >

"Environmental Effects of Genetically Modified Food Crops -- Recent Experiences" <*http://www.ucsusa.org/food_and_agriculture/science_and_impacts/impacts_genetic_engineering/environmental-effects-of.html#monarch*> 24 January 2012.

"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>

Mangelsdorf, Paul C., "Ancestor of Corn: a genetic reconstruction yield clues to the nature of the extinct wild ancestor." S.l.: American Association for the advancement of Science, 1958. pp. 1313-1320. *Science,* v. 128, Nov., 1958. <http://historia.ucr.ac.cr/cmelendez/bitstream/123456789/416/1/ancestorofcorn.pdf>

Milanich, Jerald T. *Florida Indians and the Invasion from Europe*. University Press of Florida. 1995.

Minnis, Paul E. (Editor). *People and Plants in Ancient Eastern North America*. Smithsonian Institute Scholarly Press. USA: 2003.

Newsom, Lee A. "Archaeobotanical Data from Groves' Orange Midden (8VO2601), Volusia County, Florida." *The Florida Anthropologist*. Vol. 47, No. 4. 1994

"Plant Profile – Quinoa." 23 January 2012. <http://www.porchsideecology.com/blog/2009/09/14/plant-profile-quinoa/>

"Prevention and Control of Glyphosate Resistant Pigweed in Soybean and Cotton." 23 January 2012. < http://www.uaex.edu/Other_Areas/publications/PDF/FSA-2152.pdf>

Randall, Asa R. & Sassman, Kenneth E. "Cultural Resource Assessment Survey of Infrastructure Repair and Trail Rebuilding Within Hontoon Island State Park." University of Florida, Gainesville, FL. April 2009. http://www.anthro.ufl.edu/LSA/publications/LSATechReport9.pdf

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

FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Agricultural Technology

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

"Sunflowers (Helianthus annus L.)" 21 January 2012. <http://www.sciencedaily.com/releases/2011/08/110815162344.htm>
Lorant, Stefan. *The New World: First Pictures of America*. Duell, Sloan & Pearce; 1st edition. 1946.
"The Origins of Agriculture in Eastern North America." 20 January 2012. <http://archaeology.about.com/od/neolithic/qt/Eastern-North-American-Neolithic.htm>
"This Big Era and the Three Essential Questions." <http://worldhistoryforusall.sdsu.edu/eras/era3.php> 21 January 2012.
"Three Sisters Agriculture," 22 January 2012. <http://en.wikipedia.org/wiki/Three_Sisters_(agriculture) >
"What is the History of Popcorn?" 22 January 2012. <http://www.essortment.com/history-popcorn-41743.html>
Winter, Joseph C. Tobacco Use by Native North Americans: Sacred Smoke and Silent Killer. University of Oklahoma Press, Oklahoma. 2000.

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
Beans http://upload.wikimedia.org/wikipedia/commons/thumb/c/ca/Snijboon_peulen_Phaseolus_vulgaris.jpg/220px-Snijboon_peulen_Phaseolus_vulgaris.jpg
Bottle Gourd 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
Modern Martin House http://upload.wikimedia.org/wikipedia/commons/thumb/c/c4/Progne_subis_-Tulsa%2C_Oklahoma%2C_USA_-nestboxes-8.ogv/mid-Progne_subis_-Tulsa%2C_Oklahoma%2C_USA_-nestboxes-8.ogv.jpg
Palmer's Amaranth http://upload.wikimedia.org/wikipedia/commons/thumb/4/4d/Amaranthus_palmeri.jpg/220px-Amaranthus_palmeri.jpg
Popcorn http://upload.wikimedia.org/wikipedia/commons/thumb/0/0c/PopcornCobs2007.jpg/220px-PopcornCobs2007.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

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Quinoa Grain Larger than Life http://upload.wikimedia.org/wikipedia/commons/thumb/f/f5/QuinoaGrains.jpg/120px-QuinoaGrains.jpg
Sunflower http://upload.wikimedia.org/wikipedia/commons/thumb/a/a9/A_sunflower.jpg/180px-A_sunflower.jpg
Sunflower Seed http://upload.wikimedia.org/wikipedia/commons/thumb/2/29/Sunflower_seed_whole_and_kernel.jpg/220px-Sunflower_seed_whole_and_kernel.jpg
Teosinte and Corn http://upload.wikimedia.org/wikipedia/commons/thumb/c/cb/Maize-teosinte.jpg/150px-Maize-teosinte.jpg
Tobacco http://upload.wikimedia.org/wikipedia/commons/thumb/a/ae/Nicotiana_Tobacco_Plants_1909px.jpg/220px-Nicotiana_Tobacco_Plants_1909px.jpg

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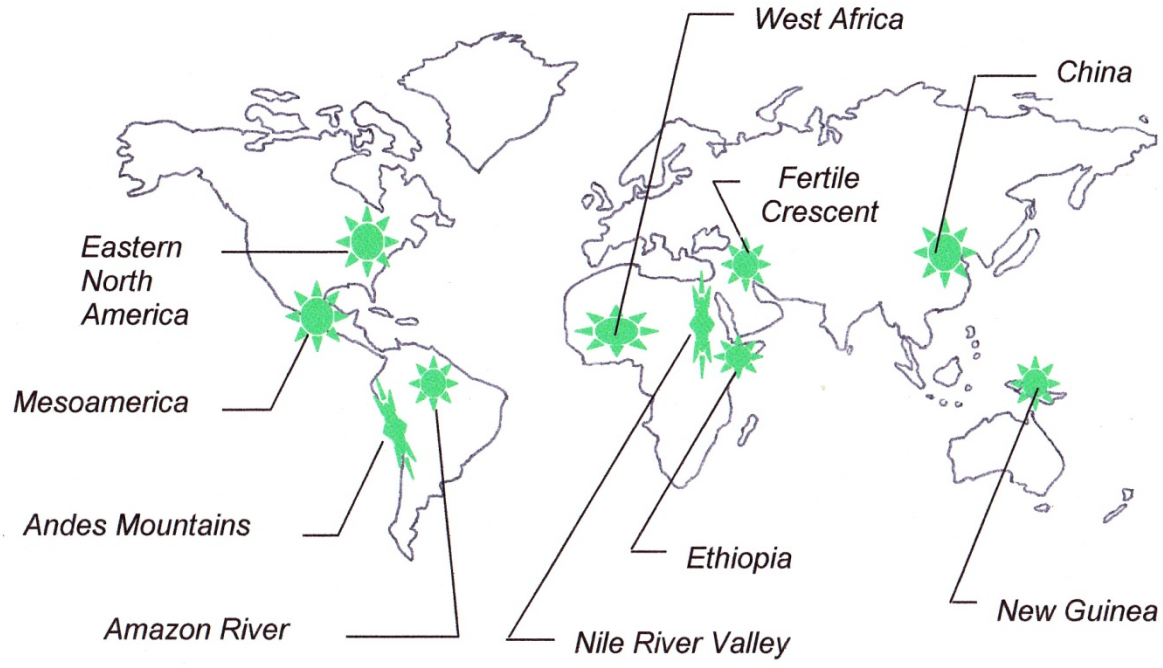
MATERIALS LIST FOR "Where Did Agriculture Begin?"ACTIVITY:
For each student: Access to an atlas or geography book if needed.

ANSWER KEY FOR "Where Did Agriculture Begin?" ACTIVITY



MATERIALS LIST FOR "Which Crop Would You Choose?" ACTIVITY:

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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

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

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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 PowerPoint presentations.

AUTHOR: Kelley Weitzel MacCabe, http://www.KelleyWeitzel.com
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?

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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, mortar 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.

Classroom Technology Strategies

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

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Building Technology

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

SUNSHINE STATE STANDARDS ASSESSED:

Science

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

Social Studies

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

Language Arts

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

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

Mathematics

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

RESOURCES:

"Archaeologists: Irish Medieval Fishing Site Will Be 'Lost to the Tide.'" Underwater Times.com, Feb. 11, 2011. 9 February 2012.

"*Arundinaria gigantean.*" 10 February 2012. <http://www.fs.fed.us/database/feis/plants/graminoid/arugig/all.html>

Ashley, Keith. "Introducing Shields Mound (8DI12) and the Mill Cove Complex." The Florida Anthropologist. Vol. 58, No. 3-4. September – December 2005.

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

"Boylston Street Fishweir." 9 February 2012. <*http://en.wikipedia.org/wiki/Boylston_Street_Fishweir*>

"Cahokia Mounds – State Historic Site." 9 February 2012. <*http://cahokiamounds.org/explore/*>

Erikson, Clark L. PhD. "Pre-Columbian Fish Farming in the Amazon." 9 February 2012. <*http://ccat.sas.upenn.edu/~cerickso/fishweir/articles/Expedition2.htm*> Expedition 43(3):7-8 (2001).

Hann, John H. A History of the Timucua Indians and Missions. University of Florida Press, Gainesville: 1996.

"John White Drawings and Theodore de Bry Engravings," Virtual Jamestown. 7 February 2012. http://www.virtualjamestown.org/images/white_debry_html/introduction.html

Klingle, David. "Burial in Florida: Culture, Ritual, Health, and Status: The Archaic to Seminole Periods. Spring 2006.

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

Lovewell, Mark Allen. “The Fisherman.” 2010. The Vineyard Gazette. 9 February 2012. <*http://www.mvgazette.com/article.php?26737*>

Lutins, Allen. “Prehistoric Fishweirs in Eastern North America.” 10 February 2012. <*http://www.lutins.org/thesis/index.html#4.24*>

Milanich, Jerald T. Personal Correspondence. November 13, 2011 – March 28, 2012.

Milanich, Jerald T. Archaeology of Precolumbian Florida. University Press of FL. Gainesville.1994.

Milanich, Jerald T. Famous Florida Sites – Crystal River and Mount Royal. University Press of Florida. Gainesville: 1999.

Milanich, Jerald T. Florida Indians and the Invasion from Europe. University Press of Florida. 1995.

Milanich, Jerald T. The Timucua. Blackwell Publishers. Cambridge, Massachusetts. 1996.

“Mount Royal gets a Makeover.” 29 March 2012. <*http://fpangoingpublic.blogspot.com/2011/11/mount-royal-gets-makeover.html*>

“The Council House.” 9 February 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. <*http://www.flheritage.com/archaeology/projects/mountroyal/index.cfm*>

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

Russo, Michael, PhD. “Archaic Shell Rings of the Southeast U.S. -National Historic Landmarks Historic Context.” 10 February 2012. <*http://www.nps.gov/nhl/themes/Archaic%20Shell%20Rings.pdf*> Southeast Archeological Center, National Park Service, Tallahassee. 2006.

Schafer, Daniel L. William Bartram and the Ghost Plantations of British East Florida. Gainesville: University Press of Florida, 2010.

Schneider, Paul. Brutal Journey: Cabeza de Vaca and the Epic First Crossing of North America. Holt Paperbacks: 2007.

Snyder, Christina. Slavery in Indian country: the changing face of captivity in early America. Harvard University Press: 2010.

“The First Floridians.” 10 February 2012. <*http://floridahistory.org/indians.htm*>

“The Ides of the Tides, Part II – Interpreting and Using a Tide Table.” 10 February 2012. <*http://www.redfishpro.org/interpreting-and-using-a-tide-table.html*>

“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*>

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

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Thunen, Robert & Ashley, Keith. "Mortuary Behavior along the Lower St. Johns – An Overview." The Florida Anthropologist. Vol. 48, No. 1. March 1995.
"Tide Tables for Florida (East Coast). 10 February 2012. <*http://www.tides4fishing.com/us/florida-east-coast*>
"Virtual Jamestown." 8 February 2012. <*http://www.virtualjamestown.org/images/white_debry_html/white.html*>
"Volusia County's Rich Prehistoric Past." St. Claire, Dana. 9 February 2012. <*http://volusiahistory.com/richpast.htm*>
Wallace, Antoinette B. McAullife, Nick, Tarleton, Michael B., Halbirt, Carl D. "Timucuan Architecture and Village Layout in St. Augustine at the Time of the Menendez Encampment." Paper presented at the 59th annual Florida Anthropology Society Conference: 2007.
"Weirs." 9 February 2012. <*http://bcheritage.ca/pacificfisheries/techno/weir.html*>

PICTURE SOURCES (Image URLs and Permissions):

Cahokia Monk's Mound http://upload.wikimedia.org/wikipedia/commons/thumb/2/2d/Monks_Mound_in_July.JPG/284px-Monks_Mound_in_July.JPG
Calusa Canals by Merald Clark, courtesy Florida Museum of Natural History. http://www.flmnh.ufl.edu/sflarch/images/canal_large.jpg
Charnel House http://www.learnnc.org/lp/media/uploads/2008/02/charnel_house.jpg
Copper-covered Wooden Ear Spool, courtesy of Brian Floyd 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/1/17/07-09-11_LkJksnMoundsStPkMnd2.jpg/300px-07-09-11_LkJksnMoundsStPkMnd2.jpg
Mount Royal Copper Breastplate, courtesy of the Museum of Florida History PENDING, http://www.flheritage.com/images/archaeology/projects/plate.jpg
Palm Hut, from *The Timucua Indians – A Native American Detective Story*, reprinted with permission from the University Press of Florida
Palmetto Fronds, courtesy of Ashley Herrera
Posthole Excavation (Flat) http://www.missionsanluis.org/_images/friaryComplex1.jpg
Posthole Excavation (Deep) http://www.missionsanluis.org/_images/pm4_ch.jpg

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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

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stems. [Palm leaf alternative: If a local landscaper can provide you with sabal palm leaves, you can use those instead with these amendments: eight 6' bamboo garden stakes of 1" diameter. The thinner ones will not work. 16-23 palm fronds per wall. This will make a 6x6' wall. Pros: needing fewer fronds and especially the lack of saw-edges on the stems. If you choose to use sabal palm fronds instead of palmetto fronds, be sure to harvest the long curly strings to use for rope weaving. Cons: it's nearly impossible to get enough palm fronds without professional donation. Also, you use twice as many (and larger) bamboo stakes.] For each student: leather or cotton work gloves to protect skin from the saw-edges on palmetto stems. For class: Several pairs of garden clippers for trimming palmetto stems. The blades on these tools are potentially dangerous. Students should exercise caution. Water source and an outdoor space to test how waterproof the thatched walls are. **Teacher Tips***: Bamboo stakes are not as strong as pines and grapevines. Too much stress placed on them while bending the weavers and palmetto stems over and under will crack them. Advise caution. As stems are poked through the lattice, it is very easy to poke neighboring students. 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.*

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

Thatching up to the first weaver

Thatching up to the second weaver

Completed palmetto wall

Testing for Water Resistance

ANSWER KEY FOR "Building a Thatched Wall" ACTIVITY:

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

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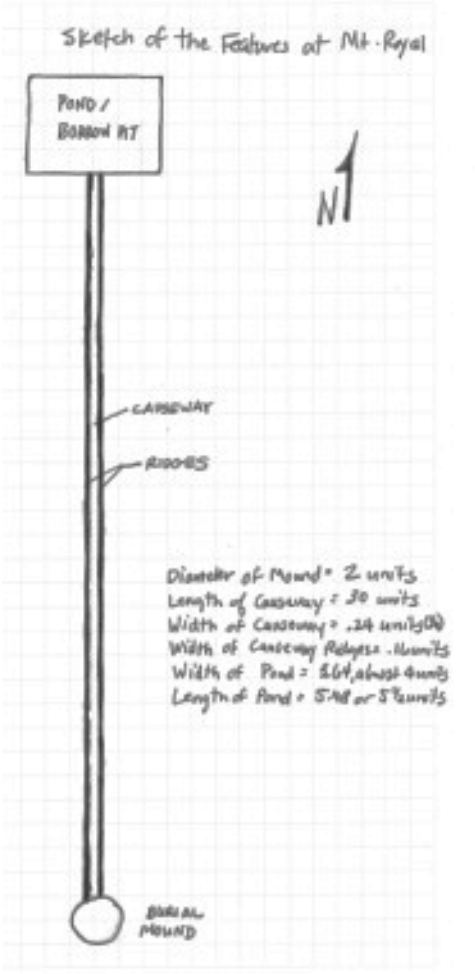
2) The water actually ran off the outside which was really cool. But I was wondering how they kept rain from coming in the open smoke hole at the top. Maybe they had a mat they tied across the opening in really nasty weather?
3) I would definitely use sabal palm fronds instead. Those saw palmettos are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

MATERIALS LIST FOR "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

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



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

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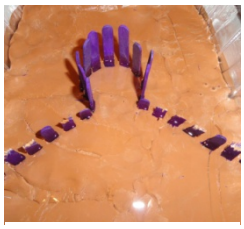
MATERIALS LIST FOR "Weir Building" ACTIVITY:
For each team of two students: 10-20 popsicle sticks, a foil pan at least 2" deep with a substrate in the bottom that popsicle sticks can be stuck into, like sand. Modeling clay was used in the images below. A handful of Cheerios or other tiny floating objects. 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:

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

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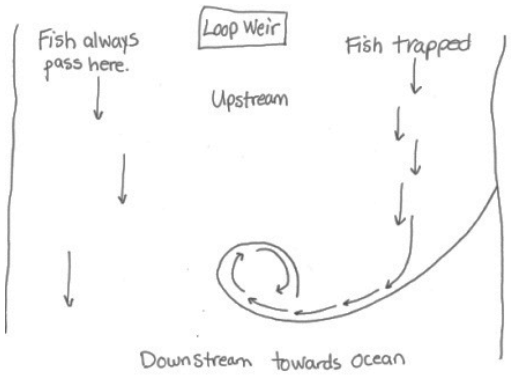
1) The further you get from the ocean, the smaller the tidal change you get. The incoming tidal water probably spreads out across the whole river, so not as much gets into the upstream areas to increase water levels.

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: Kelley Weitzel MacCabe, http://www.KelleyWeitzel.com
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, charnel house, chiefdom, confederation, cremation, diameter, effigy, egalitarian, frond, grave goods, hamlet, interment, lattice, midden, monument, noxious, periphery, primary burial, seasonally flooded, secondary burial, shaman, substrate, thatch, tidal, weir

Good websites for archaeological terms not available on Google: define
http://archaeology4kids.tripod.com/id38.html
http://mdah.state.ms.us/hpres/arch_vocab.php
http://www.archaeologywordsmith.com/lookup.php?category=&where=headword&terms=primary+burial

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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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STUDENT LEARNING GOALS:
Students will understand the archaeological process and will be able to construct and excavate a model archaeological site.

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.N1.1 Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
- 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.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.1.1 Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
- SC.8.N.1.3 Use phrases such as "results support" or "fail to support" in science, understanding that science does not offer conclusive 'proof' of a knowledge claim.
- 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.

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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.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.

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.

Visual Arts 6th-8th Grades

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

RESOURCES:

Ashley, Keith & Rolland, Vicki. "Where's the Corn in Peninsular Precolumbian Florida?" Presented at the 74th annual Society for American Archaeology Conference. Atlanta, Georgia, April 22-26, 2009.

"Augustine.com." 17 February 2012. <http://www.augustine.com/history/castillo/castillo5.php>

"Beyond Archaeology – Teaching Archaeology in the Classroom 2011" 29 March 2012. <http://www.flpublicarchaeology.org/resources/BeyondArtifacts2011.pdf>

Christensen, M. Hansen K. and Kutzke, H. "New materials used for the consolidation of archaeological wood –past attempts, present struggles, and future requirements" <http://www.woodculther.com/wp-content/uploads/2009/09/ChristensenMikkel.pdf>

"Difference Between Archaeology and Anthropology." 14 February 2012. <http://www.differencebetween.com/difference-between-anthropology-and-vs-archaeology/>

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Hamilton, Donny L. "Basic Methods of Conserving Underwater Archaeological Material Culture. <*http://www.history.navy.mil/branches/UA_%20Conserv.pdf*> *Nautical Archaeology Program, Department of Anthropology, Texas A&M University, Spring 1997.*

"Managing Archaeological Collections." 17 February 2012. <*http://www.nps.gov/archeology/collections/index.htm*>

McGee, Ray and Nodine, Bruce. "Sampling and Excavation Strategies at Hontoon Island (8-Vo-202) Florida. The Florida Anthropologist. Vol. 41, No. 1. March 1987.

Milanich, Jerald T. "Excavations at the Richardson Site, Alachua County, Florida: An Early 17th Century Potano Indian Village (with Notes on Potano Culture Change)." Bureau of Historic Sites and Properties, Bulletin No. 2. Florida Department of State, Tallahassee: 1972.

Nodine, Bruce. "APPENDIX: Wetland Excavation Strategies at Hontoon Island (8-Vo-202) Florida." The Florida Anthropologist. Vol. 41, No. 1. March 1987.

Purdy, Barbara & Ericson, Jonathon (editors). Prehistoric Quarries and Lithic Production. Cambridge University Press, New York: 2009.

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

Purdy, Barbara. "Investigations at Hontoon Island (8-Vo-202), An Archaeological Wetsite in Volusia County, Florida. An Overview and Chronology." The Florida Anthropologist. Vol. 41, No. 1. March 1987.

Randall, Asa and Sassaman, Kenneth. St. Johns Archaeological Field School 2003-2004: Hontoon Island State Park. Technical Report 6. Laboratory of Southeastern Archaeology. Department of Anthropology. University of Florida. 17 February 2012. <http://www.anthro.ufl.edu/LSA/publications/LSATechReport6.pdf>

Richter, D., Mercier N., Valladas H., Jaubert J., Texier J, Brugal P., Kervazo, B., Reyss, L. Joron, L., Wagner G. "Thermoluminescence dating of heated flint from the Mousterian site of Be´rigoule, Murs, Vaucluse, France." <http://www.eva.mpg.de/evolution/staff/richter/pdf/07-Richter-J-ArchaeologicalSciences.pdf> Journal of Archaeological Science 34 (2007) 532e539.

"Upper Catawba Valley Archaeology." 17 February 2012. <http://www.unc.edu/~crodning/ctwbarch.html>

PICTURE SOURCES (Image URLs and Permissions):

Archaeologist screening artifacts, http://flpublicarchaeology.org/gallery/cache/wcrc/driftwood/driftwood-011_595.jpg, courtesy of the Florida Public Archaeology Network, West Central Region

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

Excavation http://upload.wikimedia.org/wikipedia/commons/thumb/4/48/Iowa_archaeology_edgewater.JPG/220px-Iowa_archaeology_edgewater.JPG

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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*

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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).

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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.

Bottom of 1/8" screen

Top of 1/8" screen

Dirt and artifacts in 1/8" screen

Screened artifacts

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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MATERIALS LIST FOR "Flotation" LAB: Per pair of students: bagged matrix (soil) materials from midden excavation, container (plastic jar or bowl), 1 aquarium fish net, 8 bags, a sharpie, a large bowl or bucket, paper towels to dry samples and to clean up spills. ***Teacher Tips***: *Preparation for teacher demonstration of flotation: Toast quinoa seeds to carbonize the seeds. (It only takes about 3-4 minutes to char them in a dry skillet over high heat. Remember that quinoa will pop like corn, so expect some of the seeds to be jumping during the charring process.) Charring dries the seeds so that they will float up in this experiment. Native peoples used parching (light charring) as a method to preserve foods (without refrigeration). The carbonized seed coat doesn't react much with the environmental components (like heat and moisture), so it isolates the seed from environmental effects like rotting. Also, this form of carbon isn't readily metabolized by decomposers, so the carbonized seeds aren't broken down by living organisms either. That's why they last in the archaeological record.*

To make your test flotation sample for the class, add a tablespoon of cooled, charred quinoa seeds, along with a tablespoon of tiny glass beads to five tablespoons of dirt. Mix together and bag as a flotation sample. Reason for Teacher Demonstration: Because the student excavations cover just over 30% of their model midden, they may not have glass beads or charred seeds in their flotation sample. By doing a presentation up front, they see the process, so they know that they're doing it correctly even if no artifacts are recovered. Procedure: Because charred seeds easily slip through 1/8" screens, and because they're the same color as the soil, many sites were believed to have no plant remains at all - until flotation was invented in the 1970s. Plan to do 4-6 flotations. Have a bowl ready (to pour into), your net (to use as a sieve for the light fraction), and a source of water. See the student articles for descriptions of terminology like light fraction and flotation.
STEP 1: Pour your sample into your container with plenty of water, then stir to get the dirt into suspension. The seeds will begin to float up to the top.
STEP 2: Pour off the water through your net. Do not allow the muddy portion containing glass beads at the bottom to pour out. Archaeologists would remove the "light fraction" from the sieve, bag it, and proceed to the next flotation. To reduce the number of bags collected by each group in this activity, you may wait to bag the "light fraction" until all of the flotations are complete.
STEP 3: Start flotation #2 by adding more water to the sample in your bowl and stirring. Decant floating material on top through the sieve.
STEP 4: Repeat again 1-3 times, until it appears that you have removed all of the seeds from the mud and glass bead mixture.
STEP 5: For your last flotation, instead of stirring, just slosh the water around in the container a bit. Decant any remaining floating material through the sieve.
STEP 6: Spread the light fraction from the sieve on a paper towel to dry.
STEP 7: Add a bit of water to the original container and slosh around so that it's easier to pour the remaining material, "the heavy fraction" into the net (sieve).
STEP 8: Rinse with water, until you're basically left with tiny glass beads. (Spanish glass beads came in a variety of sizes, ranging from a tiny 7 mm to a very large 2.5 cm. Many had been part of rosary necklaces used in Catholic ceremonies.)

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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: Kelley Weitzel MacCabe, http://www.KelleyWeitzel.com
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:

archaeology, 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://mdah.state.ms.us/hpres/arch_vocab.php
http://www.archaeologywordsmith.com/lookup.php?category=&where=headword&terms=feature

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

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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?

Classroom Technology Strategies

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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Student Learning Enhancement

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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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

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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- 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:

"2005 Pennsylvania Dugout Canoe Project," 21 February 2012. < http://www.paarchaeology.state.pa.us/documents/Dugout.pdf>

"A Remarkable Epilogue." History and Archaeology of Mission San Luis. 17 February 2012. <http://www.missionsanluis.org/research/archaeology5.cfm>

"A Science Primer – What is a Genome? 20 February 2012. <http://www.ncbi.nlm.nih.gov/About/primer/genetics_genome.html>

"About Genetic Genealogy." 20 February 2012. <http://www.thegeneticgenealogist.com/>

"Corn Flour May Improve Iron Absorption." 17 February 2012. <http://findarticles.com/p/articles/mi_go2638/is_1_11/ai_n28767500/>

Deitler, John E. Craft Specialization and the Emergence of Political Complexity in Southwest Florida. University of California. PhD Dissertation Anthropology. Michigan. Proquest LLC: 2008.

"Dugout Canoes – Discovering 101 Canoes at Newnans Lake, FL" 21 February 2012 <http://www.youtube.com/watch?v=9UNrck45OtE>

"Family Tree DNA." 21 February 2012. http://www.familytreedna.com/

"Human mtDNA Migrations." 21 February 2012 <http://www.mitomap.org/pub/MITOMAP/MitomapFigures/WorldMigrations.pdf>

"Native Americans Descended from a Single Ancestral Group, DNA Confirms." 20 February 2012. <http://www.sciencedaily.com/releases/2009/04/090428223836.htm>

"New Rice Line Could Benefit Malnourished Populations." 17 February 2012. <http://www.greenenvironmentnews.com/Environment/Agriculture/New+Rice+Line+Could+Benefit+Malnourished+Populations>

"Notre Dame Archives." 17 February 2012. < http://www.archives.nd.edu/cgi-bin/displa.pl?ANO011.HTM+95 >

"Overview of Stable Isotope Research." 16 February 2012. <http://sisbl.uga.edu/stable.html>

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

Primitive Technology II – Ancestral Skills. 2001. The Society of Primitive Technology. Gibbs Smith Publishing. Utah.

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Staller, J., Tykot, R., and Benz, B. Histories of Maize: Multidisciplinary Approaches to Prehistory, Linguistics, Biogeography, Domestication, and Evolution of Maize. Left Coast Press, Inc. Walnut Creek, CA. 2009

"The DNA Learning Center." 21 February 2012 <http://www.dnalc.org/websites/>

"The Genographic Project" 21 February 2012. <https://genographic.nationalgeographic.com/genographic/lan/en/index.html>

"The Talimali Band of Apalachee." 17 February 2012. <http://winhttp.nsula.edu/regionalfolklife/apalachee/Rapides.html>

Tykot, Robert. "Isotope Analyses and the Histories of Maize" Chapter 10. Department of Anthropology, University of South Florida, Tampa, Florida. <http://luna.cas.usf.edu/~rtykot/10%20Tykot.pdf >

PICTURE SOURCES (Image URLs and Permissions):

Crystal River Canoe Replicas *http://epicroadtrips.us/2006/winter/crystal_river_archaeological_state_park/photo004.jpg*

De Bry Engraving of Canoe Making, copyright British Museum http://www.virtualjamestown.org/images/white_debry/debry_128_big.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

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

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:
1. A: Alaska, Eastern South America, Berengia.
2. U: Northern and Western Europe

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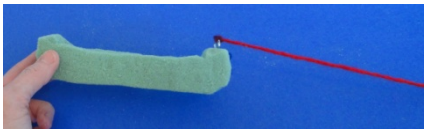
3. C: Berengia, Eastern North America, Eastern South America
4. N: Middle East, Australia
5. L: Northwest Africa, northeast Africa, southern Africa
6. Most similar = Melissa (M). Most different is David (D).

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.



Canoe with ring and string (you'll use fishing line). Still water and archaic canoes carved from dry foam.

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.)*

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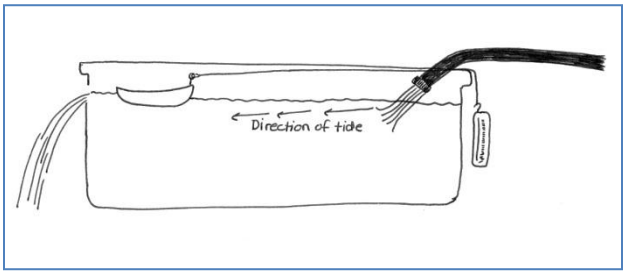

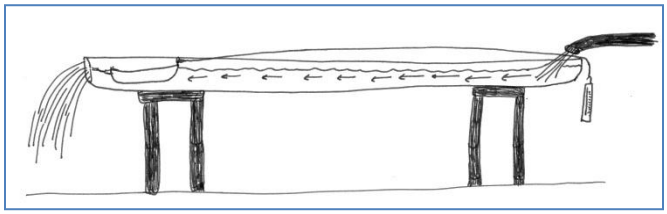

Tidal flow test with tub (left) and gutter (right). The arrows show the direction of the tidal flow.

***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.

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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.

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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?

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

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

Archaeology – Beyond Excavation

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

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.

Classroom Technology Strategies

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.

Student Learning Enhancement

Analogies express relationships among words. They are an excellent way to develop OR assess student understanding of **New Terminology**. Five sample analogies are provided below. After students complete these, you can create more. Alternatively, student teams can create their own analogies using at least two words from the list of **New Terminology** per analogy.

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

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

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.
- LA.8.1.6.2 The student will listen to, read, and discuss familiar and conceptually challenging text.
- LA.8.4.2.2 The student will record information (e.g., observations, notes, lists, charts, legends) related to a topic, including visual aids to organize and record information, as appropriate, and attribute sources of information.

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

History and the Timucua

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

World Languages

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

RESOURCES:

Bennett, Charles E. Three Voyages. The University of Alabama Press. Tuscaloosa:2001.

"Does Caffeine Affect the Parasympathetic Nervous System?" 24 February 2012. < http://www.livestrong.com/article/519499-does-caffeine-affect-the-parasympathetic-nervous-system/>

"Early Visions of Florida." 24 February 2012. < http://earlyfloridalit.net/?page_id=122>

"Florida State Map Collection." 23 February 2012. <http://geology.com/state-map/florida.shtml>

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

Granberry, Julian. A Grammar and Dictionary of the Timucua Language, 3rd Edition. The University of Alabama Press. Tuscaloosa: 1993.

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. <http://ebooks.adelaide.edu.au/h/hakluyt/voyages/v13/chapter35.html>

Hann, John H. A History of the Timucua Indians and Missions. University Press of Florida. Gainesville: 1996.

"How Much Caffeine Does a Cup of Coffee Contain?" 23 February 2012. <http://www.kantonslabor-bs.ch/files/infos/e_coffeinkaffee.pdf>

"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>

Hudson, Charles M. (editor) Black Drink – A Native American Tea. University of Georgia Press. Athens: 1979.

"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>

Milanich, Jerald T. Archaeology of Precolumbian Florida. University Press of Florida. Gainesville: 1994.

Milanich, Jerald T. Florida's Indians – From Ancient Times to the Present. University Press of Florida. Gainesville: 1998.

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FLORIDA PUBLIC ARCHAEOLOGY NETWORK

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Milanich, Jerald T. Florida Indians and the Invasion from Europe. University Press of Florida. Gainesville: 1995.
Milanich, Jerald T. Personal Correspondence. January – February 2012.
Milanich, Jerald T. The Timucua. Blackwell Publishers. Cambridge: 1996.
"Narrative of Le Moyne." 23 February 2012. <http://ufdc.ufl.edu/UF00067341/00001/1j?search=deer>
"The French of Fort Caroline and the Timucua of Florida." 24 February 2012. <http://nationalhumanitiescenter.org/pds/amerbegin/exploration/text4/lemoyne.pdf>
"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):

Black Drink Usage Map http://www.arrowheadology.com/wp-content/uploads/2009/11/1bBlack_Drink_map_HRoe_20082-300x207.jpg
De Bry engraving of the Black Drink Ceremony http://upload.wikimedia.org/wikipedia/commons/6/6a/Black_Drink_map_HRoe_2008.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

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

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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.

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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. *quelo uqe-care* **rabbit traps**
10. *nia paha* **women's house**
11. *bihi-tooma* **all of the grapes**
12. *Hontala hono.* **I am hungry.**
13. *Hontala amita-si.* **I am his sister.**
14. *Hontala nayuchami acu tera.* **I am fearless and handsome.**
15. *Hontala quachi-ye.* **I am your teacher.**
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.

Student Learning Enhancement

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.

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