

# CHAPTER FIVE

## WILD PLANT TECHNOLOGY

**STUDENTS LEARN HOW THE TIMUCUA UTILIZED WILD PLANT AS FOODS, CLOTHING, TOOLS, AND MEDICINES.**



### WHAT IS WILD PLANT TECHNOLOGY?

The Timucua utilized every part of their environment, living and non-living. The living parts of their environment included plants, animals, and fungi. The non-living parts included water and minerals. The Timucua observed each part of their environment, noticing what parts could be helpful and what parts might be dangerous.

This kind of natural observation is called Aristotelian science. Whoa...what kind of science? Aristotelian (uh-ris-toe-teel-ee-un). Aristotle was a philosopher born in 384 BCE in Macedonia (north of Greece). At that time - over 2,000 years ago - the Timucua's ancestors were already using the principles of observational science. But they did more than just observe the natural world. They also put that knowledge to good use. Aristotelian science means organizing your observations in logical, practical ways. We're not exactly sure how native peoples applied observational science. Perhaps it went something like this:

- Modern science tells us that willow tree bark contains a natural pain remedy, but it's hard to imagine someone with a bad headache deciding to chew a willow branch.
- So how did they make this discovery? Native hunters may have observed male deer chewing willow branches while shedding their antlers.
- Perhaps they reasoned that shedding antlers gave the deer headaches.
- Someone decided to test willow bark on people to see if it actually cured headaches.
- They observed the effects of willow bark on the person's headache.
- It worked! The active chemical in willow bark is salicylic acid. It's also the chemical name for aspirin, a pain medication still in use today.

The Timucua did not try to analyze the chemical composition of willow bark. They did not do a series of scientific tests with controlled variables. Instead, they observed what worked and applied it to solve problems.

“Technology” is the use of scientific knowledge to design tools or techniques that solve problems. Through careful observation of plants and animals, the Timucua were able to solve a variety of daily problems.

- What can we use to make clothing?
- What materials can we use to build strong huts?
- How do we find, cook, and preserve plant foods?
- What can we use to make hunting tools?
- How can we heal injuries and illnesses?
- What will stop the bugs from biting us?

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Wild plant technology is more than just picking and eating raw berries. By observing the natural world, the Timucua developed tools and processes that are still useful to Floridians today.

### FOOD PLANTS

Many of the food plants eaten today were not available to the Timucua. Bananas, apples, and oranges did not grow in prehistoric Florida. Neither did wheat, which is used to make most modern breads and cereals. Even without these foods, each season brought the Timucua a wealth of plant materials that could be collected and processed into soups, sauces, and breads. Look at the list below to see a few plants they used for food.

**What did the Timucua do with fresh fruits?** Many fruits were collected and eaten fresh from the tree (like persimmons), from the vine (like blackberries), from the shrub (like blueberries), from palms (like saw palmetto), and even from cacti (like prickly pear). In addition to being eaten fresh, many were dried and preserved for winter (like grapes, plums, and black cherries). Many fruits were used to flavor stews and breads as well. Some fruits were really challenging to process. The fruits of prickly pear cactus are covered in tiny hair-like spines that embed deep in the skin. Ouch! Once the spines are removed from these fruits, they taste a lot like kiwi.

**Interesting Fact:** *Most fruits are only available in the summer, while the plants are producing seeds.*

**What did the Timucua do with fresh vegetables?** Many wild vegetables are tough and bitter. Very few would have been eaten raw. Some examples are greenbriar stem tip and young pokeweed leaves. Most would be boiled into stews and soups. They used many different plant parts in their soups, including leaves (like wood sorrel), inner leaves (sabal palm hearts), and stems (onions - yes, they're stems).

**Interesting Fact:** *Wood sorrel has three times as much iron as a serving of spinach!*

**How did the Timucua make teas and seasonings?** They collected leaves (and sometimes berries) from aromatic plants. Bunches of leaves were tied together and hung to dry. To make tea, these dried leaves were soaked in boiling water. The smell and flavor of the dried leaves transferred to the water, creating tea. A lemony tea was made from the berries of winged sumac. Sassafras roots made root beer tea. And horsemint leaves taste like, well...mint. To make seasonings for stews and meats, dried leaves were added to the stew pot as it cooked over a fire. Bay leaves add a savory flavor. Peppergrass seeds add spice. And saltwort tastes...salty.

**How did the Timucua make gum and candy?** Tree sap contains sugars made by the tree during photosynthesis. These sugars made excellent gums and candies for the Timucua. To make gum, native peoples began by scraping a bit of bark from a sweetgum tree. The tree responds to this injury by

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leaking sap to cover the wound. After several days, the sap hardens and can be scraped off and chewed as gum.

Making syrup and candy from maple trees took a little more effort. Sap was collected in a bowl as it dripped from a hole drilled into the tree. The collection process took place over several days in late winter. The sap was boiled for about 20 hours. That's right, two whole days. It took 86 gallons of red maple sap to produce just one gallon of maple syrup. That's four trees' worth! Don't worry; it doesn't kill the tree. Boiling the sap even longer evaporated more water from the mix. Finally, you get maple sugar. It sounds like the Timucua would have used more energy making the sugar than they got in return from eating it. Maple syrup and sugar would have been a very special treat.

After the Spanish introduced the European honey bee to Florida, the Timucua may have been able to use honey as a sweetener too. Bees convert sweet flower nectar into concentrated, evaporated honey.

### **How did the Timucua process nuts, grains, and starchy roots into bread?**

The Timucua collected nuts (*acorns and hickory nuts*), grains (*pigweed and wild rice*), and starchy roots (*cattail, greenbriar, and coontie*) because these foods are high in carbohydrates – food energy. Unfortunately, processing these raw materials into food also takes a huge amount of human energy. **Acorn and hickory nut** shells had to be cracked and removed. Both could be eaten as nuts, pounded to make flour, or boiled to make nut oils. (Today, many people use sunflower oil to cook with.) Hickory nuts have a mild taste, similar to pecans. Acorns, however, are extremely bitter. They contain high levels of tannins (tannic acid), which can be toxic if too much is ingested. The Timucua had to process the acorns to leach out this bitter chemical.



*Hickory Nuts,*  
*photo by Wikipedia*

How? Cool, running water is the easiest way to wash out the tannins. Since the Timucua lived before the invention of the kitchen faucet, they had to find a more natural alternative. Many native cultures submerged bags of shelled acorns in fast-flowing streams or buried crushed acorn meal in the sand of the river banks or swamps. In the first case, the flowing water washed away the tannins as it flowed by. In the second, the river or swamp water seeped through the sand and slowly washed the tannins away. Two different European accounts describe the Timucua burying ground-up acorn meal. They don't mention that it was buried near a stream or swamp, but it's a good guess that these acorns were buried near water. One account notes that acorn meal was left underground for eight days while the tannins leached away.

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Was that the whole process? Not quite. The acorn dough still needed to be baked. One European account describes balls of dough being pressed onto sticks and held over the fire to cook. Another explains that the dough was cooked by sprinkling very hot water over small loaves. The fire's heat changed the squishy dough into a dense, solid bread. (This process, like all baking, is a chemical change.) Because acorns have no "gluten," the natural leavening material in wheat, native breads were usually very dense and flat.



*Acorns, photo by Wikipedia*

What other grains and roots did the Timucua gather and cook? **Pigweed** grains are the size of a pencil point, so it took a lot of work to collect enough seeds to cook with. **Wild rice** grows in water, so the Timucua would have collected it from a canoe. Next, they probably heated the rice to crack its hulls, pounded it to loosen the hulls more, and finally sifted it to collect the edible bits.

If you think that's a lot of work, the starchy roots will blow your mind. Digging up a 75-pound **greenbriar** root took a fair amount of time and energy. The roots were probably sliced and dried for several days in the sun. Next, they were crumbled into a bowl of water, where the starch sank to the bottom, and the stringy fibers floated to the top. After pouring off the water and strings, the starch could be dried, ground up, and then used as flour for bread or thickening stews.



*Cattails, photo by Wikipedia*

**Cattails** are even more time consumptive. First, the Timucua had to tug them out of a muddy swamp. Next, they probably peeled them, crushed them, and let the starch settle out in a bowl of water. After several rinses in water, the cattail starch was finally ready to use as flour. In summer, cattail pollen could also be collected from the spikes on top of the plants and used as a flour substitute.

**Coontie palm** is the most outrageous root the Timucua used. Coontie requires the same digging, peeling, chopping, boiling, and washing. But after all that...coontie roots are still deadly poisonous. Coonties are in the cycad family. These primitive plants are built to defend themselves against dinosaur-sized predators. When cycad plants are crushed, they release cycasin, a chemical that breaks down to form the poison cyanide. Producing a deadly toxin when your leaves are damaged is a good way to stop animals from munching your leaves. Peeling, washing, and boiling remove some of the toxin, but the root is still deadly. How did the Timucua overcome this powerful defense system? They probably left a paste of coontie starch and water sitting



*Coontie palm, photo by Wikipedia*

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for several days. Bacteria from the air settled into the paste and began to ferment the material. During the fermentation process, these bacteria broke down the toxin, allowing the cyanide to escape as a gas. Now is the coontie edible? Not yet. The fermented starch still needed to be sun-dried for several days. At this point, most of the toxins were gone. You read that right...“MOST.” And all of this work just got them flour. They still had to bake it into bread before they could eat it.

**Interesting Fact:** *Have you ever eaten Tapioca pudding? It's made from the cassava plant. This deadly plant requires the same level of processing as coontie to prevent cyanide pudding poisoning.*

People living in subsistence cultures worked incredibly hard to process food into useful forms. Wild plant technologies like drying, peeling, chopping, boiling, and fermenting were often the difference between life and death.

### MEDICINES

For the Timucua, some plants were used as both a food and as a medicine. In some cases, these plants were also deadly poisonous. How can that be? Look at the modern garden-variety potato. Its tubers are delicious. We bake ‘em. We mash ‘em. We fry ‘em. But its berries are toxic. For the Timucua, the difference between toxic and tasty depended on 1) the part of the plant used, 2) the age of the plant, 3) the season it was harvested, 4) how it was processed, and 5) how much was eaten.

## NEVER, EVER EAT A WILD PLANT.

Plants protect themselves from predators by producing chemicals in their leaves, stems, and fruits. These chemicals work in two main ways. ONE: They inflict pain on the predators immediately - while the plant is being chewed. TWO: They make, OR they make the animals sick later, when digestion occurs. Either way, the animal learns not to eat that plant.

The same chemicals that make a plant dangerous as a food source also make it potentially useful as a medicine. Today, many companies manufacture herbal medicines. These medicines claim to improve or cure health problems. These claims have not been formally proven in a laboratory environment, and the safety of these herbs is not tightly regulated.

In many cases, herbal remedies have been used for generations. The native peoples shared these cures with early pioneers who passed the information on to their children and grandchildren. Scientists have evaluated many of these herbal medicines. When their tests prove a correlation between taking the medicine and getting better, an herbal medicine is on its way to becoming an FDA-approved drug.



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When native peoples used herbal medicines, there was usually a spiritual component to the cure. Prayers, spoken charms, and prohibitions on behavior (don't do X while taking this medicine) were an important part of the cure. Virtually all knowledge of Timucua spirituality has been lost. Many modern native cultures have begun projects to record the medical and spiritual practices of the elders.

Most native cultures had thousands of herbal remedies. Some, everyone knew (like taking Ibuprofen for muscle aches today), while many others were only dispensed by a shaman or herbalist with extensive training. We've already discussed willow bark as a pain medication. Below, we'll look at five more, which (like willow) have been incorporated into modern medicines.

**Witch Hazel** is a delicate tree with wispy yellow flowers and wavy-edged leaves. Its bark contains high amounts of chemical tannins. Tannins act as an astringent, which means they shrink tissues. Traditionally, witch hazel been used to ease itching and heal scratches. Because it is gentle on the skin, witch hazel is getting a lot of interest today as an acne medicine.



*Witch Hazel, image by Wikipedia*



*Elderberry, photo by Wikipedia*

**Elderberry** is a tall shrub with bunches of dark berries. Native peoples used its flowers to make a medicinal tea for sinus congestion. Cooked elderberries were also used as food, but raw elderberries contain cyanide-forming chemicals, just like Coontie. Today, many herbal remedies for congestion and cold-prevention contain dried elderberry flowers.

**Passionflower** is a twining vine with large, showy purple flowers. Native peoples used its stems and leaves to make a relaxing tea. Today, passionflower extract is used in many European sedatives. It is also a popular herbal remedy for anxiety in the United States.



*Passionflower, photo by Wikipedia*

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*Saw Palmetto, photo by Wikipedia*

**Saw Palmetto** berries contain large amounts of sugar and oil, which made them a useful food for the Timucua. In 1696, the shipwrecked Quaker merchant, Jonathon Dickinson, described the taste of saw palmetto berries as “rotten cheese steeped in tobacco juice.” Mmmm. The Timucua also used these fine-tasting berries to make a medicine for prostate problems. Today, saw palmetto prostate remedies are a \$70 million industry in Florida.

**Black Cherry** trees provided the Timucua with tiny edible cherries. Unfortunately, the leaves, wood, and seeds contain cyanide-forming chemicals...so don't swallow cherry pits! The white inner bark (not the tough outer bark) has been used as a cough medicine throughout American history. People came to associate the cherry tree with effective cough medicines. When pharmaceutical companies needed to choose a flavoring for their cough medicines, they chose cherry flavor. These medicines actually contain no cherry bark, but it was a great marketing idea! (NOTE: You can still purchase herbal cough medicines that contain cherry bark, if you look hard enough.)

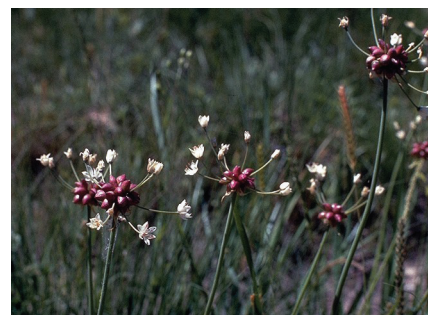


*Black Cherry, photo by Wikipedia*

### INSECT REPELLENT

Florida is known for its bugs. If it's not gnats, it's mosquitoes. If it's not mosquitoes, it's biting flies. During some seasons, it's all three. And don't forget the arachnids: ticks and itch-inducing red bug mites. The Timucua needed protection from these biting bugs even more than we do today. They couldn't retreat into bug-free, air-conditioned buildings. We learned in the pyrotechnology unit that bugs don't like smoke. This is true, but you can't carry your smoky fire with you while collecting oysters on the mud flats. The mud flats offered their own help, though. The Timucua could slather a thick layer of mud on their skin as a barrier against biting bugs. It gets a bit itchy though as it dries.

So what did they do? Well, they probably ate a lot of **Wild Garlic**. Biting bugs do not like the smell or the taste of garlic. When you eat a lot of garlic, the garlicky odors come out in your breath, your sweat, your blood, and your urine. The bugs won't be able to stand you. Of course, your friends might not be able to stand you either. Well, maybe if you all smelled that bad...



*Wild Garlic, photo by Wikipedia*

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Luckily, native peoples had one other method for protecting themselves from insect bites. They learned which plants naturally repel insects. The basic method is crushing a handful of the plant's leaves and rubbing the leaves on all of your exposed skin. Luckily, insect repellent plants are PLEASANTLY aromatic. Once you've rubbed these on your skin, you smell nice to your friends and you smell unappetizing for bugs. Just be sure which plant you're rubbing on your skin. If you accidentally use poison ivy, you'll have more to worry about than bug bites.



*Waxmyrtle, photo by Wikipedia*

**Waxmyrtle** is a Florida shrub that is sometimes used in landscaping because its leaves are green all year. It has waxy gray berries that early settlers used to make candles. And the leaves, when crushed, smell a bit like a spicy Christmas tree. The aromatic oils in these leaves repel mosquitoes and gnats – and even some biting flies.

**Sassafras** is a tree that native peoples and early settlers used for many purposes: drinks, medicine, and insect repellent. Its large, soft leaves were sometimes crushed and rubbed on the skin. Other times, the large leaves were pinched to release their essential oils, then rolled into tiny tubes and tucked behind each ear. This kept the bugs from swarming around the face.



*Sassafras, photo by Wikipedia*



*American Beautyberry, photo by Wikipedia*

**American Beautyberry** is another plant with a long history of folk use. Its large, soft leaves were crushed and rubbed on the skin to repel bugs. In landscaping, it is also prized for its bunches of violet-colored berries.

Because insects are becoming resistant to chemicals like DEET, the US Department of Agriculture is researching possibilities for new repellents. In 2006, they discovered two insect-repellent chemicals in Beautyberry leaves: callicarpinal and intermedeol. Each worked as well as DEET for repelling mosquitoes. In 2007, these chemicals were also proven to repel 100% of black-legged ticks for three hours. And in 2008, fire-ants were added to the list of bugs these natural chemicals could repel. Safety trials are needed before this repellent can be marketed to the public. In 2011, scientists discovered how to synthesize callicarpinal in a laboratory, so wild populations of American beautyberry won't have to be demolished to manufacture this repellent.



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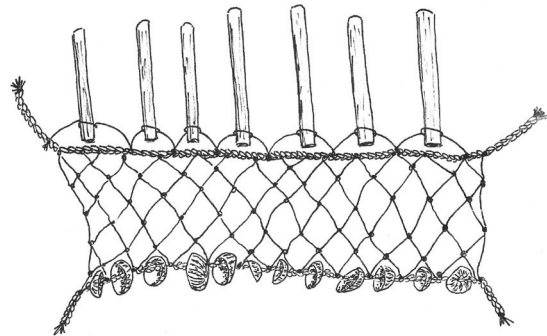
## TEXTILES (WOVEN MATERIALS)

Very few plant materials last in the archaeological record. Over thousands of years, the baskets, cloth, and ropes have simply rotted away. The only glimpses we get of early Florida textiles are bits of fabric and fishing nets that have been preserved at underwater archaeology sites. The water protected these artifacts from oxygen, so they didn't rot away.



*Prehistoric net recovered from the Key Marco site. (Key Marco is a non-Timucua wet archaeology site in southwest Florida.)*

*On display at the Florida Museum of Natural History.*

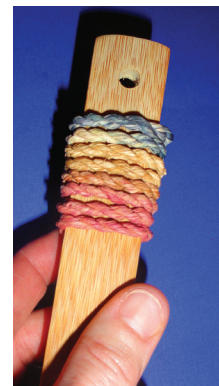


*Sketch of an early Florida fishing net, courtesy of the University Press of Florida*

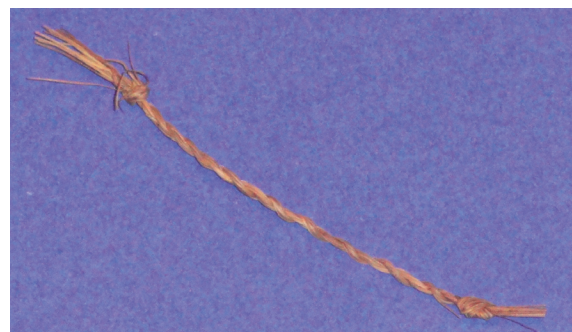
At dry archaeology sites, cord-marked pottery provides more evidence of textile use. Cords woven from palm, palmetto, and inner tree bark were wrapped around a wooden paddle, and then pressed into the wet clay during the pottery-making process. This left a perfect impression of the cord on the finished pot.



*Cord Marked Pottery, courtesy of Keith Ashley. Can you see the marks made by cords?*



*Replica pottery paddle wrapped with cord*



*2-Ply Rope made from Sabal Palm threads, modern replica*

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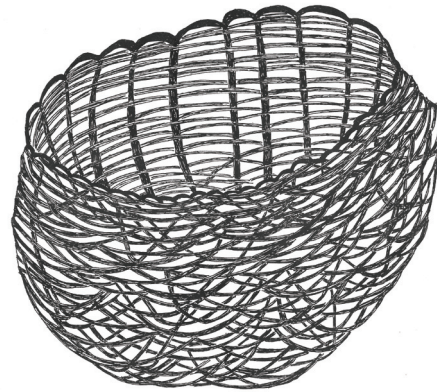
The French explorers described the Timucua women as wearing a sash or skirt made of woven Spanish moss. Spanish moss isn't actually a moss. It's an epiphyte – an air plant – related to the pineapple. It's that curly gray stuff that hangs from oak trees. When Spanish moss falls to earth, it becomes a habitat for redbugs, so don't kick it around (unless you really want to itch). The Timucua probably collected the moss from the trees (above the redbug zone). Then they boiled it to remove its outer layer, leaving only the curly, wiry inner core. Yarn could be spun from the moss fibers, then woven to create Spanish moss cloth.

**Interesting Fact:** *Spanish moss was also called “Old Man’s Beard” and “Spanish Beard”.*

Baskets and mats are also textiles. Palm leaves, palmetto stems, and grape vines made excellent weaving materials. Gathering these materials took a lot of time and effort. How did native peoples decide which plant to collect? It depended on the tool they needed to make. Sabal palm roots made excellent fish traps. Cattail leaves made durable mats. Peeled grapevine made sturdy baskets. Basic mat-weaving is a simple over-and-under process, but basket weaving is a much more challenging skill. Native peoples are often quite artistic when making these textiles, but for the Timucua, weaving wasn't just an art. It was a survival skill.



*De Bry engraving of Timucua women carrying food*



*Grapevine basket, courtesy of the University Press of Florida*

*Compare the European-style baskets in the de Bry engraving (left) with the drawing of a Timucua-style basket (right). How are they similar? How are they different?*

The Timucua used wood from trees to make everything from tool handles to canoes to hut supports. Check out the unit on Tool Making Technologies to learn more about the tools made from wild plants. Because wood was also used as fuel for fire, the Pyrotechnology unit can tell you even more about how the Timucua utilized wild plants.

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### **ACTIVITY – ROPE WEAVING:**

**BACKGROUND:** The Timucua used threads, cords, and rope for a variety of purposes: straps for carrying things, bindings to lash things together, materials used in sewing and weaving, and especially lines and nets for fishing. When making cordage, they needed to gather long thin strands of plant material. Collecting these fibers took a lot of effort. To collect the inner bark, they had to strip off a long section of outer bark, leaving the smooth, white inner bark. Then the inner bark had to be split into strips only 1/16th of an inch wide. Wow.

Different weaving materials were used in different ways. Barks had to be kept wet during the weaving process (to keep them flexible). Palm strips needed to be dried for weeks (so they wouldn't shrink within the woven product). The Timucua developed these methods (technologies) through observation, practice, and experimentation.

Now, it's your turn. Instead of collecting parts of living trees, we will be using raffia to practice our rope-weaving skills. Raffia is a palm tree native to Madagascar (an island to the southwest of Africa). Its leaflets can reach six feet in length. The material we'll be using is a thin membrane from the underside of these leaflets that is very easy to dye. In Africa, raffia's leaf fibers are used to make baskets, cloth, and rope, while its leaves and stems are used in construction as support poles and roofing materials. Much like Florida's sabal palm, raffia is an all-purpose plant.

**INSTRUCTIONS:** Work in teams of two. You will each be weaving a rope, so you should each gather approximately 8 strands of raffia. Line up the 8 strands as neatly as possible. Tie a knot in one end. You will be weaving a short section of rope, so use a pair of scissors to trim the free ends of the raffia to about 8 inches.

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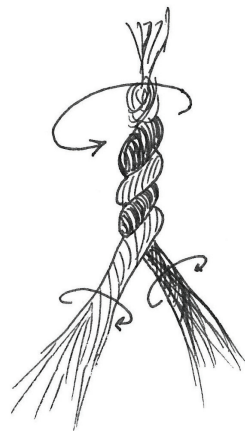
### ACTIVITY – ROPE WEAVING continued:

Have your partner hold the knotted end of your raffia. Next, divide the strands into two roughly equal sections. Your goal is to twist each bundle independently clockwise (to the right). If you need to twist one bundle at a time, that's okay. Twist one for about an inch, but don't let it go! It will unravel, wasting all of your work. Grip it tightly while you're twisting the other bundle clockwise.

Once you've got an inch twisted TIGHTLY for each, then you can wrap them around each other COUNTERCLOCKWISE (to the left). For every wrap to the left, you need to give each bundle a twist to the right. It is the combination of twisting to the right and wrapping to the left that gives this rope its strength.



*Twist each bundle of raffia to the right (clockwise). Do not relax your hold, or the twists will unravel.*



*Wrap the twisted strands around each other to the left (counter-clockwise). For every wrap, give the bundles a quick twist to the right to tighten them.*



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### ACTIVITY – ROPE WEAVING continued:

Now, continue wrapping to the left (with a clockwise twist between each wrap) until you get close to the bottom of the twisted area. Congratulations! You’ve just made one inch of rope. Stop wrapping, and start working on your next inch of twist (to the right, to the right, to the right). You’ve got to keep tension on the twisted raffia so it doesn’t unravel. Your goal is to reach at least four inches. When you finish wrapping to the left and twisting to the right, tie the bottom of the rope in a tight knot. Now it’s your partner’s turn to weave while you anchor his or her rope.

After your partner is done, give the ropes a tug test. Each of you should hold tightly to opposite ends of a rope. Pull as hard as you can. If you’ve woven it properly, the rope will not tear. From those wispy straw-like strands, you’ve woven a very strong piece of 2-ply rope. It is called 2-ply because you wrapped 2 twisted bundles together. In the table below, check out the breaking strength of some natural material cords.

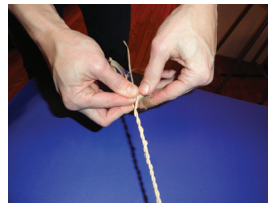
**Breaking Strengths of 2-Ply Ropes**

Plant Used	Part of Plant	Diameter of Cord	Breaking Strength
Sabal Palm	Leaf	1/16"	15 pounds
Cypress	Inner Bark (Stem)	1/8"	16 pounds
Cotton, machine-made	Seed Fiber	1/16"	17 pounds
Sabal Palm	Leaf	1/8"	20 pounds
Spanish Moss	Leaf	1/4"	50 pounds
Mulberry	Inner Bark (Stem)	1/8"	73 pounds

**Where do you think raffia rope fits into this table?** The 1/8" raffia rope pictured below was able to support 55 pounds. Compared to other 1/8" cords, it ranked second, but it is the highest ranked leaf material in this comparison.



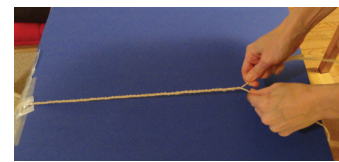
*Pull tight.*



*Wrap to the left, switching the fiber bundles from one hand to the other.*



*Twist each to the right to tighten.*



*Weave a long section of 2-ply rope.*

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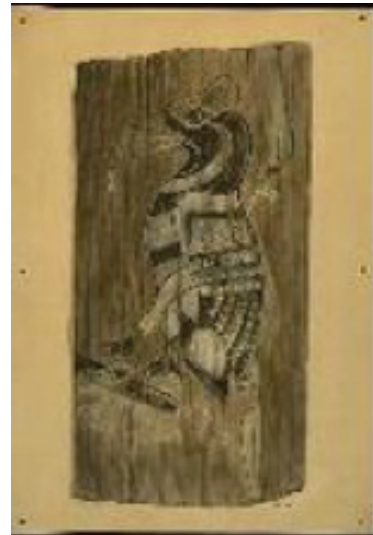
### ACTIVITY – USING NATURAL DYES:

**BACKGROUND:** Native peoples used a variety of natural materials to make paints and dyes. Paints were used on animal hides, on feathers, and on wooden objects (like the masks and animal carvings found at Key Marco).

Native peoples often made paints from minerals. One mineral that archaeologists have discovered on Timucua sites is “ocher.” What is ocher? It’s clay that contains oxidized minerals. When iron is exposed to oxygen, it oxidizes (rusts). This rusty red clay is called red ocher, and native peoples used it as a red dye. Unfortunately, red and yellow ochers don’t occur in Timucua territory. The closest naturally occurring ocher is in southeast Alabama. This provides good evidence for trade between the native peoples who lived in the Florida and Alabama regions. One method for making primitive paint was to grind up the ocher, then mix it with water and glue made from boiled animal hide. These paints were then added to the surface of a material. This caused a physical change in the painted object because the paint did not actually bond to the wood or hide.

Dyes work differently. They do bond to the hide or fabric, causing a permanent chemical change. Some dyes will naturally bond to fibers. These are the same natural materials that stain clothes today (grass, coffee, grapes). Other natural dyes will wash right out of fabric. In these cases, dyers must add a mordant (or fixative). The Timucua probably used tannins as a mordant. Tannins are the chemicals in leaves and acorns that turn Florida streams brown. Tannins can be produced by boiling galls (the tiny 1/4” balls that grow on the bottoms of oak leaves).

**Why do mordants (like tannins) help dyes bond to fibers?** Mordants bond easily to the fiber you want to color. Next, you add the dye, and the mordant bonds to that as well. In effect, the mordant forms a chemical bridge between the dye and the fiber. (The word “mordant” actually means “to bite” because it helps the dye bite into the fiber.)



*Woodpecker painting,  
Key Marco, FL,  
photo by Wikipedia*

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### ACTIVITY – USING NATURAL DYES continued:

**INSTRUCTIONS:** Review the table listing natural materials and the dye color they produce when boiled. Each student should choose one material to use in dyeing their raffia rope **AT HOME**.

Color Dye Produced	Plant Part Used	Plant Material Needed
Light Brown	Stem	Onion Skins (from 2 red or yellow onions)
Dark Brown	Leaves	2 Teaspoons of Tea Leaves
Dark Brown	Seeds	2 Teaspoons of Coffee Grounds
Near Black	Seeds	1/2 Cup of Walnuts in the Shell (In the fall, collect wild hickory nuts instead.)
Blue	Fruit	1/2 Cup of Blueberries, Crushed
Red	Root	1/2 Cup of Chopped Beets

**STEP ONE – MAKING THE DYE BATH:** Place your plant materials in a pot of water. Bring to a boil, then reduce the temperature to a simmer (lowest temperature that will continue a slight boil). Allow to simmer for one to two hours. This will draw the colors out of the plant material and into the water. Meanwhile, soak your raffia rope in clear water.

**STEP TWO – STARTING THE DYEING PROCESS:** Allow the colored water to cool enough so that you can handle it without risk of injury. Pour the dyed water into another container through a strainer. Discard the plant materials. Place your raffia rope into the dyed water.

**STEP THREE – DEEPENING THE COLOR:** Allow your raffia rope to soak overnight.

**IMPORTANT:** After you remove your raffia from the water, allow it to air dry completely before rinsing it. After it dries, the dye should stay in place even if you rinse it.

**STEP FOUR - SHARING YOUR RESULTS:** Place some of the pigmented water in a watertight container. Bring the container and your dyed raffia to class and compare your results with classmates. Brainstorm reasons for varying results.

# CHAPTER FIVE

## WILD PLANT TECHNOLOGY

### ACTIVITY – USING NATURAL DYES continued:

- 1) How did results vary between raffia ropes dyed with the SAME materials?

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List 2 possible reasons for this variation.

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- 2) How did results vary between raffia ropes dyed with DIFFERENT materials? For example, how did the different brown dyes compare to one another?

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List 2 possible reasons for this variation.

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- 3) Dyeing items takes time and effort, yet it does not improve their function at all. Consider why native peoples were willing to spend time and energy on a task that was not related to survival. Write your conclusions here.

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*Raffia Dyed in Onion  
Skins – Brown*



*Raffia Dyed in  
Blueberries – Blue*



*Raffia Rope –  
Natural Color*



*Raffia Dyed in Beets -  
Crimson*