

VEGETAL DYES

Inspired by plants from
the Navajo Nation
and Southeast Ohio

ACTIVITY GUIDE



KENNEDY
Museum of Art



OHIO
UNIVERSITY

Have you ever experimented with using plants to dye fabric or yarn?

The [Kennedy Museum of Art](#) is home to a collection of Navajo textiles that demonstrates how some Navajo weavers continue to use their local plants on the Navajo Nation in the Southwestern United States to dye wool and create vibrant colors in their intricate weavings.

The [Ohio Museum Complex](#) features the exhibition *Through the Appalachian Forest* highlighting local plants from the [Floyd Bartley Herbarium at Ohio University](#), and making connections between these specimen collections and the nature around us in Southeast Ohio, including plants in our backyards that can be used for dyeing fabrics.



The plants on display in *Through the Appalachian Forest* are from the Floyd Bartley Herbarium. Bartley was a farmer from Southeast Ohio who developed an extensive collection of local plants in the early 1900s, which was donated to Ohio University in 1957.

A map included in *Through the Appalachian Forest* demonstrates where the Floyd Bartley Herbarium plants on display were collected in Southeast Ohio.



NAVAJO WEAVING AND DYEING

The process of dyeing yarn has been practiced by Navajo weavers for hundreds of years. Dyes can be made with many natural materials like leaves, stems, flowers, roots, mushrooms, clay, ashes, cacti and even bugs. Dyeing with natural materials can be a complicated and time-consuming process that many weavers still engage in today.

Many weavers start the dyeing process by picking their own plants and combining different plant parts and other materials to create the colors they want for their weavings. It is a tradition that has been passed down through generations. Weavers still use their family's unique recipes to obtain the vibrant colors that distinguish their weavings.



Window Rock, Arizona (top) and Canyon de Chelly, Arizona (bottom).
[Photo credit: S. Delgado]



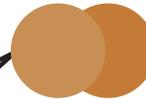
Southeast Ohio.
[Photo credit: M. Love]

On the following three pages are some Navajo weavings from our collection that are dyed using plant material. As you can see as you go through these weavings, a variety of plants and plant parts are used to create these vibrant colors. These are all examples of arid climate plants, but we can also create some of these colors using plants here in Southeast Ohio!

Crystal Rug, Irene Clark (2005)



GOLDS



***Navajo Tea,**
made from
Greenthread
(*Thelesperma
filifolium*)



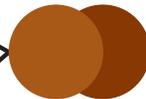
GREENS



Sagebrush
(*Artemisia
tridentata*)



RUSTS



***Navajo Tea/
Greenthread**
(*Thelesperma
filifolium*)



****Lichen**
(*Cup lichen:
Cladonia*)



*Navajo tea is known by many different names, but it is made from one basic herb. Called "Greenthread," the plant has thin leaves that literally look like a green piece of thread. It grows over the Western and Midwestern United States, with some versions of the herb only growing at higher altitudes.

**Lichen, which includes both fungus and algae living together, grows on rocks or trees. It is scraped off and used to make the color yellow or brown. Irene Clark remembers when her grandmother dyed her yarn:

"Yes, grandma used to do that. She used lichen – it creates a reddish brown if the dye bath is very concentrated...and Navajo tea, or sometimes she mixed both plants to produce a reddish or a rust color. That's what she used in her weaving."

***In the Path of the Four Seasons*, Lillie Taylor (2003)**



*Cochineal is NOT a plant, but rather a bug that lives on cacti.

***"You can only get dock roots in Page, Arizona, and I used to have a lot of dock roots but my supply is very low...I dried the roots, and then I ground them, and then I used them for dyeing. If I want a deeper color of orange or a deeper yellow, I go to the wash where there is red sand or red clay and I get the red dirt and the water from there and I soak it in there to make it a deeper color. And I boil the dock roots with the dye bath to make it deeper. I mix things. I mix different things." - Lillie Taylor

Untitled, Amber and Twyla Gene (2004)

Walnut (*Juglans*) & Herbal plant root. The black color is wool from black sheep plus a pinch of aniline dye.

Rabbitbrush (*Chrysothamnus*) & a plant called "Gray Eyes" in Navajo.



Sumac berries (*Rhus coriaria*).



Juniper (*Juniperus*) & freshly cut alfalfa hay (*Medicago sativa*).



Walnut (*Juglans*).



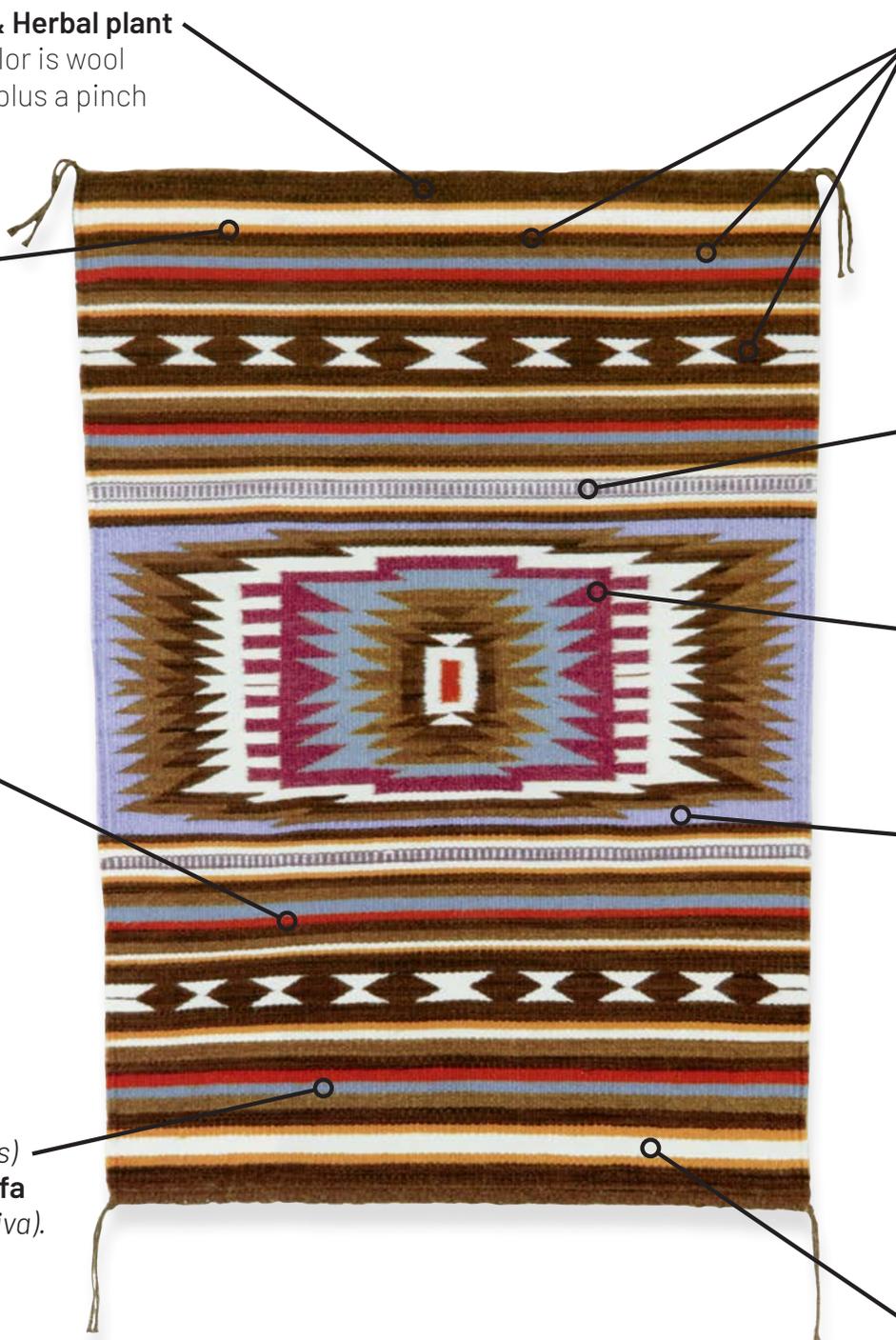
Natural white wool, walnut, herbal root.

Herbal plant root (Protection Way plant).

Juniper leaves, juniper berries, juniper ash leaves (*Juniperus*).



Natural white sheep wool.



PLANT PART ACTIVITIES

Many Navajo weavers use a variety of plant parts in order to create the colors they want. For instance, Lillie Taylor uses Arizona dock roots. Irene Clark says that from sagebrush (*Artemisia tridentata*), she only uses the leaves of the plant for dyeing. The Taylor family used mountain mahogany root (*Cercocarpus*). From the juniper plant (*Juniperus*) the leaves, berries, and ash are all used to create different colors.

ACTIVITY #1

What is the purpose of each of these structures for the plant - why does the plant need them? Read the statements below and see if you can fill in the blanks with the plant part responsible for each.

Plant parts: **FLOWERS, LEAVES, STEM, ROOTS**

1. The plant's _____ absorb the energy of sunlight and carbon dioxide to make food for the plant. This helps it grow.
2. The _____ of a plant holds the leaves up to the light and helps water and food travel around the plant.
3. The plant's _____ develop into fruits and seeds that can spread around and become new plants.
4. The _____ of a plant absorb water and nutrients from the Earth to help the plant grow.

ACTIVITY #2

Can you identify each of these plant parts on a dandelion (*Taraxacum officinale*) plant?

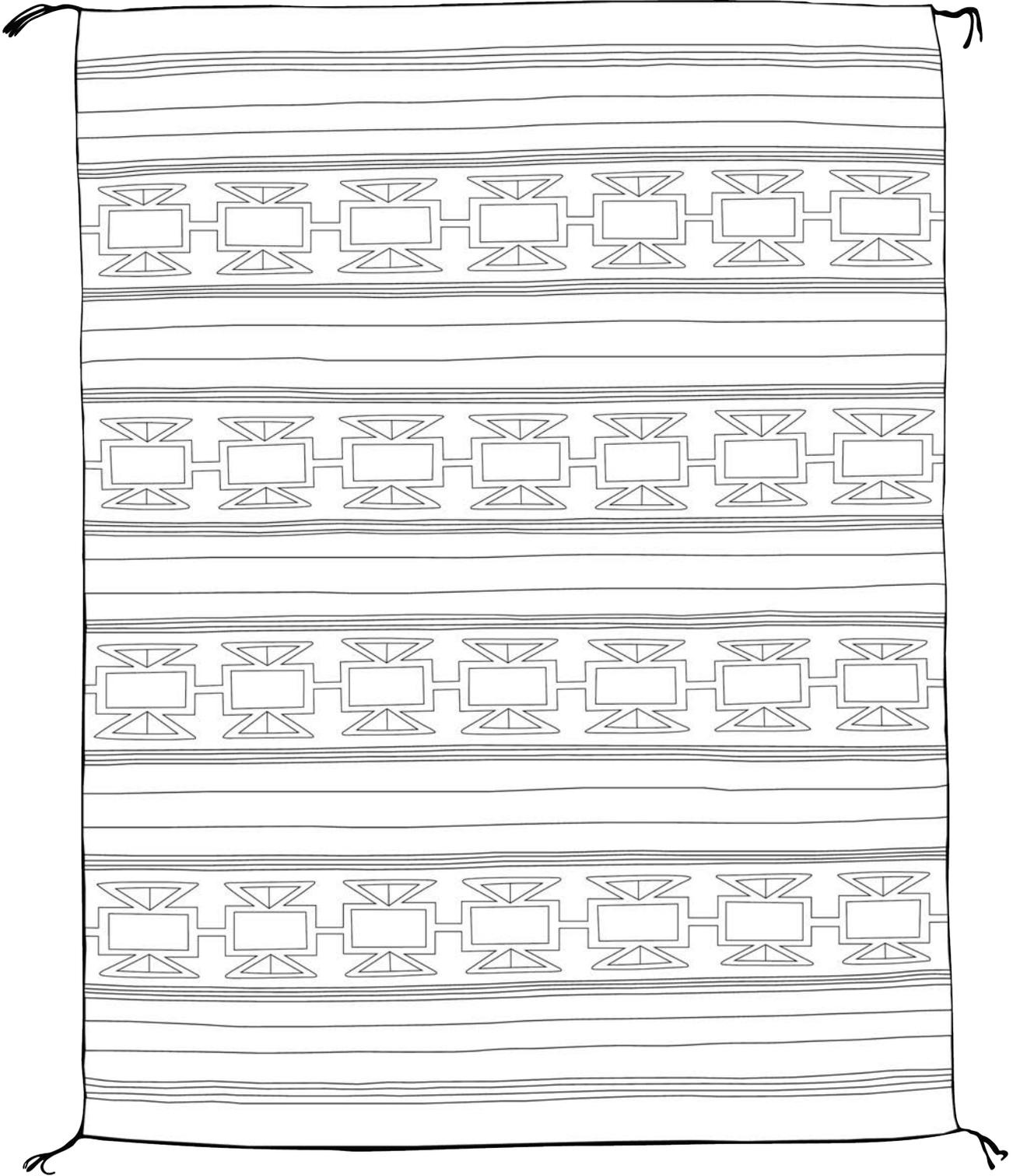
Plant parts:
FLOWERS, LEAVES, STEM, ROOTS

Coloured plate of *Taraxacum officinale* from Köhler's Medizinal-Pflanzen, Vol. 2, 1887
Kew Science Plants of the World Online
Paul Little, ©RBGKew



COLOR-IN WEAVING

Color in the weaving below using whatever colors you'd like. Once you're finished, take a look at the lists of plants and dye colors on the following pages. Based on the colors you included, what plants could you use to dye the yarn for your weaving?



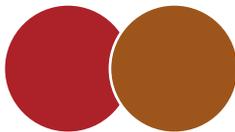
Crystal Rug (1980). This is a digital line drawing of a weaving in KMA collections by Irene Clark's mother Glenabah Hardy. We invite you to create your own color palette for this design.

COMMON PLANTS USED FOR DYEING

NAVAJO LANDS

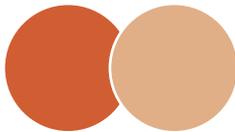
The Navajo Nation (*Diné Bikeyah*) extends into the states of Arizona, Utah and New Mexico. The region is arid, meaning there is little to no rain. The plants used by the Navajo to dye wool for weaving are plants capable of growing in arid climates, which are much different from the plants we have here in Southeast Ohio! Here, the climate is more humid, and a wider variety of plants can grow. Southeast Ohio is known as a 'biodiversity hotspot', where there is a large, diverse number of plant and animal species.

REDS,
BROWNS



Mountain Mahogany (*Cercocarpus*) root bark

ORANGES,
TANS



Ground lichen (*Cup lichen*)

YELLOWS



Rabbitbrush
(*Chrysothamnus*)

Chamizo (*Atriplex
canescens*)

GREENS,
YELLOWS,
TANS



Juniper
(*Juniperus*)



Sagebrush
(*Artemisia tridentata*)



Rocky Mountain Bee plant (*Cleome serrulata*)



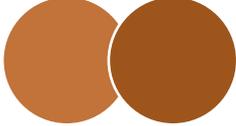
Indian Paintbrush
(*Castilleja*)

Cont. on next page



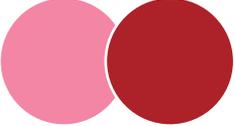
COMMON PLANTS USED FOR DYEING

NAVAJO LANDS (CONT.)

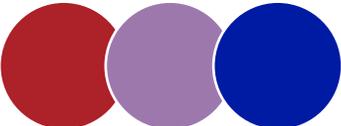
BROWNS   Wild walnut (*Juglans*) shells

BLACK   Sumac (*Rhus*)

SOUTHEAST OHIO

**PINKS,
REDS**   Pokeberries
(*Phytolacca*) ***TOXIC***

 Wild Bergamot/
Bee Balm (*Monarda fistulosa*)

**REDS,
PURPLES,
BLUES**   Wild Black Cherry
(*Prunus serotina*) fruit

**PINKS,
REDS**   Black Locust (*Robinia
pseudoacacia*)

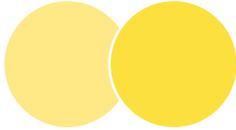
Cont. on next page



COMMON PLANTS USED FOR DYEING

SOUTHEAST OHIO (CONT.)

YELLOWS



Ohio Goldenrod
(*Solidago ohioensis*)



Dandelion
(*Taraxacum officinale*)



Yarrow
(*Achillea millefolium*)

GREENS



Stinging Nettle
(*Urtica dioica*) ***CAUTION: painful stinging***



Butterfly Milkweed
(*Asclepias tuberosa*)



Black Eyed Susan
(*Rudbeckia hirta*)

BROWNS,
BLACK



Sumac (*Rhus*)
berries



Elderberry
(*Sambucus*)



Black Walnut
(*Juglans nigra*) shells

DYEING WITH SOUTHEAST OHIO PLANTS

We can experiment with dyeing using a variety of plants that grow in Southeast Ohio. In the spring and summer, you will notice colorful berries and flowers popping up that can be used to dye. You can also use the leaves, stems, and roots of many plants to dye!

TIPS ON GATHERING PLANTS

When gathering for dyeing, remember that plants are alive, just like you! Once removed from the ground, the plant is no longer able to grow, so be sure to gather with care. Try to find various sources of each plant so you are not taking too much from one source (this could kill the entire plant). Some of the plants included can irritate skin, so we recommend wearing gardening gloves or another type of heavy-duty glove when gathering. If exploring in the woods or their edges, be sure to AVOID poison ivy, poison hemlock, and wild parsnip coming in contact with the skin. Be sure to always gather/explore with an adult.



Poison ivy
(*Toxicodendron radicans*)



Poison hemlock
(*Conium maculatum*)



Wild parsnip
(*Pastinaca sativa*)

GENERAL INSTRUCTIONS FOR DYEING WITH PLANTS

The general process of dyeing yarn, wool, or fabric with plants involves collecting a pot full of the plant (or plant part), covering with water, and simmering anywhere from 30 minutes to over an hour. **Generally, the more plant matter you have, and the longer you soak your materials, the more vibrant the color will be.** Once this process is done, take the plant matter out of the pot, leaving only the dye. You then add the yarn, wool, or fabric to the pot and simmer it in the dye for another half hour to hour. Finally, you let it cool in the dye, and then rinse it in cold water and hang it to dry. **Be aware that if you are using this method to dye clothes, the washing machine may wash away the color.**

INDIVIDUAL PLANT DYEING INSTRUCTIONS



Dandelions create a yellow dye.

Instructions:

Gather a pot of dandelions and pull off the flowers from the stems. Cover with water in the pot and boil for about an hour. While you are boiling the flowers, soak your yarn in warm water. Remove the dandelions from the pot and place your pre-soaked yarn in the dye. Let this simmer for another hour. Rinse your yarn with cold water and let dry.



Black walnut shells create a brown dye.

NOTE: walnut shells with the black pigment are usually found September-November.

Instructions:

Wear old clothes and gloves, this dye may get messy and will stain clothes and hands. Collect about 6-8 black walnuts and carefully use a hammer or rock to break them open. Put the shells and nuts in a pot of boiling water for an hour. You can either put them in a container inside the pot, and then remove them after the hour, or put them in with the water and then strain all of the pieces of walnut out. While the walnuts are boiling, soak your yarn in hot water. Then, strain out all the walnut pieces and soak your yarn in the dye. Simmer for 30 minutes to an hour, rinse your yarn, then hang it to dry.





Stinging nettle creates a green dye.

NOTE: This plant is very common in Southeast Ohio and primarily grows along rivers. **However, it does sting, so it should be handled with heavy duty gloves.** Wear long sleeved shirts and pants.

Instructions:

Gather at least a 2:1 ratio of nettles to the fibers you want to dye (ex. 1 cup yarn to 2 cups of nettles). Cut the nettles into small pieces and put them into a stainless steel pot. Boil a separate pot of water and pour it over the nettles. Let sit 12-24 hours. Put the nettles back on the stove and simmer for 40 minutes. Strain out the nettles and let the liquid cool enough to submerge your pre-wetted fibers. Simmer the dye and fibers for 40-60 minutes. Remove your fibers from the heat and let sit overnight. Finally, rinse your fibers thoroughly and let them dry in a shady spot.



Wild black cherry fruit create a purple, blue or red dye.

Wild black cherry fruit can be found from June-October. The berries turn from bright red to black as they ripen, giving you a variety of colors depending on when you harvest them.

[How to harvest](#)

Below is a link to a map that shows where you can find various fruit trees (including wild black cherry) in Athens, Ohio.

[Fruit Trees in Athens, Ohio](#)

SIMPLER DYEING METHOD

Using an old white T-shirt or cloth, you can experiment dyeing with things you find in your own backyard! Spend a few minutes observing the various plants around you and you may be surprised to find more variation than you expected. Take some of your favorite plants and rub them into the cloth. You can also experiment with crushing them into the cloth with a rock or stick. Try making patterns and utilizing a variety of colors! Dandelions work great for this exercise.

OBSERVATION JOURNALING

Journal prompts for outdoor exploration:

Bring a pen and some paper outside with you and observe the plants you see around you using these prompts.

1. *How many different types of plants can you count?*
2. *Do you know the names of any of these plants?*
3. *How many different colors can you see? Which parts of the plants have the most vibrant colors?*
4. Thinking back to the dandelion activity, pull up a plant and consider its different parts. *Can you identify the roots, stem, leaves, and flower of each plant?* (NOTE: some plants may not have all of these parts)
 - a. *If you do not want to remove a plant from the ground, try to find a fallen/uprooted tree. Think about the size of their roots. How are they different from the roots of a dandelion or weed? Why do you think this is?*
5. *What plant do you think is most interesting? The prettiest? The weirdest?* In your journal, draw pictures of the plants you choose. Label the different parts if you'd like!
6. *If you were making a weaving out of these plants, which colors would you choose to go in your weaving?*

Sources

Black Walnut <https://search.creativecommons.org/photos/660c3477-633e-4be2-9470-cc057840c5d6>

Dyeing Cotton Yellow With Dandelions <http://www.sewhistorically.com/dyeing-cotton-yellow-with-dandelion-flowers-without-mordant/>

From Sheep to Loom: The Navajo Weaving Process Weaving is Life Education Gallery, Kennedy Museum of Art, Ohio University

Moerman, Daniel E. 1998. *Native American Ethnobotany*. Timber Press, Inc. Portland, OR. Native American Ethnobotany: <http://naeb.brit.org/>

Naturally Dye Yarn with Black Walnuts <https://www.fiberartsy.com/how-to-naturally-dye-yarn-with-black-walnuts-update/>

Navajo History and Culture <https://www.britannica.com/topic/Navajo-people>

Royal Botanic Gardens Kew Science Plants of the World Online <http://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:254151-1>

Stinging Nettle Dye <https://katiegrovestudios.com/2013/05/07/celebrate-stinging-nettles-a-recipe-for-nettle-dye/>

Science, Plants of the World Online <http://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:254151-1#source-LAA>

USDA Plants Database <https://plants.usda.gov/java/>



This activity guide was created by **Rachel Broughton** (Anthropology & Spanish '20) and **Sarah Melaragno** (Interactive Multimedia & Art History '20), KMA PACE Interns 2018-2020.

Special thanks to **Dr. Kim Thompson**, Department of Environmental and Plant Biology, and **Dr. Nancy Stevens**, Professor of Functional Morphology and Vertebrate Paleontology, HCOM.