



ETHNOBOTANY: PEOPLE AND PLANTS

Lesson 7: Food, Medicines, and Survival

Utah Core Curriculum Alignment 4th Grade Social Studies Standard 2:	Intended Learning Outcomes: Science
Students will understand how Utah's history has been shaped by many diverse people, events and ideas.	<p>In Extension</p> <ul style="list-style-type: none">• Make simple predictions and inferences based upon observations.• Record data accurately when given the appropriate form and format.• Use scientific language appropriate to grade level in oral and written communication.

Enduring Understandings

There is documented evidence of the presence of humans for over 10,000 years in the geographical area known as the State of Utah. Those inhabiting this area used native Utah plants as rich resources for survival for many years. Groups who immigrated also brought seeds and plants from other areas for use by man.

Essential Questions

Who are the people who have inhabited the geographical area that is now Utah? How did people interact with and use the native plants found here over time?

Background Information

Although all the inhabitants of this area have used native plants for survival or to enhance their lives, early native peoples relied more heavily on these plants than others because of their close ties to the natural environment, and because industrialization did not begin until the 18th Century. Once the agrarian lifestyle became the more dominant culture, cultivars began to take on a larger role as a means to survival. The projects in this lesson were most likely done by all who settled here, but have their origins in Native American culture.

Review Lessons Five and Six regarding the people who have inhabited the area and their uses of the native plants found here.



Lesson Plan

NOTE: This activity is dependent on seasonal availability of materials. You will receive materials from our Education Department to complete two of the three projects when you check out this Botany Bin.

Materials

BB = Materials included in Botany Bin

Natural Dyes

- BB Navajo Dye Chart
- BB samples of naturally dyed cotton yarn
- BB Recipe/Instruction Card for making dyes, laminated
- BB plant material for dyes: Oregon grape berries (*mahonia repens*), gambel oak bark (*Quercus gambelii*) to be sent to you
- Mortar and pestle or knife for chopping
- rubber gloves for dyeing
- hot plate to heat water for dyes
- saucepan to boil dyes
- containers to hold the cooled dyes
- white 100% wool or 100% cotton yarn pieces or small squares of white cotton fabric for dyeing
- butcher paper to cover table

Poultice

- BB laminated photos of native plants used in making poultices
- BB sample of a poultice (dried) from native plants
- BB Recipe/Instruction Card for making poultice, laminated
- BB (to be mailed to you) - soft plant parts: quaking aspen (*Populus tremuloides*), cattail (*Typha latifolia*), sage (*Artemisia tridentata*)
- 4"x4" clean white cloth
- Mortar and pestle or knife for chopping
- paper towels
- container for soaking plant parts
- butcher paper to cover table

Weaving

- BB Basket or spoon woven from Utah native grasses or shrubs
- BB (to be mailed) - plant parts for weaving; ponderosa pine needles (*Pinus ponderosa*), cattail leaves (*Typha latifolia*)
- BB Recipe/Instruction Card for weaving



Other Activities

- BB Book: *Songs from the Loom*, Monty Roessel (This book can be used for background knowledge about a variety of topics in Navajo life, especially dyeing and weaving, and present-day life on a reservation.)
- science or language arts journal
- pencils
- Optional: alstroemeria flowers (enough for you and students to each have one); lima or mung bean soaked in a wet cotton ball and sprouted in a plastic bag (this should be at the stage where it has roots and cotyledons emerging)
- Optional: BB blacklines Plant Diagram / Flower Diagram (and answer keys)

Procedure

Warm-up

(The activities you will be able to do will depend on the availability of materials we have to send you. You will receive materials for two of the three projects.)

We often think a plant's purpose is to provide us with food. However, today we will be looking at some other uses for plants.

- Show the spoon from the Botany Bin. Discuss the plants from which it was made. Show the laminated weaving instructions photos.
- Show Navajo Dye Chart and naturally dyed cotton sample. Discuss the plants from which they were made.
- Show the poultice sample. Discuss the plants that were used to make it and show the laminated photo.

The enclosed book, *Songs from the Loom*, is helpful for giving students excellent background knowledge for this lesson. You can pick out selected passages and pictures as you like. Be sure to point out that some of these native plants are still being used today, such as Sumac branches to make baskets, and various plants as dyes for yarn and weaving.

Activity

Explain that they are going to make one item that was actually made in the past from a native plant. They will choose one of two projects. In addition, they will be writing in a journal about the landscape 100 years ago, and about their experiences in completing the project.

1. Instruct students to think about how they would collect the materials for the activities if they were living 100 or more years ago. Then have them write a short description of how they imagined the landscape and their interactions with the natural world as they collected. They might encounter other people (Native and immigrant groups), animals, difficult to gather materials, etc. They can write, sketch and color their responses.
2. They will complete the second part of the writing when they have finished their project. You can post the following prompts on the board: Were they successful at completing their project? What were the challenges or obstacles they would have faced if a



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particular plant or plants were something they relied on for survival? What would happen if there were many drought years in a row? Cold snaps? Imbalance of predator/prey populations?

Have everyone begin the first step of the writing project. As they are writing choose groups of four students at a time for each of the two projects. (They will only complete one of them.) While these students are completing their project, the other students will continue writing in journals until it is their turn at the stations.

There should be an adult to supervise each activity, especially the boiling for the dyes! Put all materials that the students will need on or near the stations. Place a Recipe/Instruction Card at each station for students to follow (two of these three projects):

- 1) Natural Fabric Dye
- 2) Achy Muscle Poultice
- 3) Weaving a Spoon

As students finish their activity, have them return to their writing. Continue to choose another group of four students to complete one of the projects until everyone has had a turn at one of the stations.

Assessment

Create a Project Assessment Rubric. Some elements of the rubric might include:

- Student followed instructions on card
- Student demonstrated full engagement in project and best effort
- Final product demonstrated ability to follow directions independently
- Writing demonstrated the use of student's background knowledge
- Writing demonstrated higher level thinking skills

Have students complete the Project Assessment Rubric. After each student scores him/herself on the rubric, complete the rubric in a different colored pen according to how you perceive their efforts. Compare the scores and discuss with students individually. Make adjustments as necessary.

Extensions

Anatomy of a Plant / Botany Review

Make a two-sided copy of the enclosed blank Plant Diagram/Flower Diagram for each student. (There are labeled answer keys enclosed as well.)

Each part of a plant is specialized to perform a function for the plant. Tell students they will be dissecting a flower and reviewing the plant's parts and the function of each.

Cut the flowers ahead of time, including about an inch of stem (below the rounded ovary) for students to dissect at the point of the review where you reach the flower and its function.

You can refer to the functions listed below. Use the sprouted bean to demonstrate the roots and cotyledons. For your demonstration of the stem, nodes and leaves, you will use the whole



Alstroemeria plant. Ask students about the name and function of each part, working up from the roots, cotyledon, true leaves, node, and stem.

Plant Parts and Functions:

- Roots: absorb water and nutrients, anchor and support plant, store nutrients and food
- Cotyledon: first/seed leaves contain or can access food stored in seed
- True leaf: contains chlorophyll to manufacture food (glucose)
- Node: the area of the stem from which leaves grow
- Stem: transports water and nutrients, stores nutrients, supports plant
- Flower: contains reproductive organs where pollination occurs
- Seed Pod: contains viable seeds

When you get to the flower, pass out one Alstroemeria flower to each student and continue the plant part/function as you dissect the flower. Students will dissect a flower along with you. As you are dissecting each part, be sure to give students an opportunity to offer the background knowledge they have about plants. Encourage them to offer ideas they have about each part's function. Begin at the sepals and remove those first. As you remove each part, refer to the information below to complete the dissection and discussion.

Flower Parts and Functions:

- Sepals: protect young flower
- Petals: attract pollinators
- Stamen: male part of flower, makes pollen grains
 - Anther: bears pollen grains (which contain male gametes)
 - Filament: stalk of stamen that holds the anther
- Pistil: female part of the flower
 - Stigma: receptive sticky surface of female part
 - Style: where pollen tube grows
 - Ovary: enlarged base of the pistil, contains ovules
 - Ovules: contained in ovaries, carry female gametes; ovules become seeds when fertilized (pollinated)

When you have finished dissecting the flower, pass out a copy of the Flower Diagram/Plant Diagram. Encourage your students to use the dissection activity to label as many parts as they can remember (using a pencil). When you feel they have had sufficient time, project the answer key on the whiteboard and ask them to correct and complete their diagram.

Discuss the importance of knowing a plant's anatomy related to a plant's use. Sometimes the seeds are edible, and in other plants, it might be the root that is eaten. Some flowers are used for dyes, and in other plants, it might be the stems or leaves. In addition, some parts of certain plants are edible, while other parts of the same plant can be toxic. For example, all of the tomato's plant parts are toxic, except for the fruit. Being knowledgeable about plant anatomy is a useful tool in the study of ethnobotany.

**This lesson is from the Red Butte Garden Grow Lab Teacher Workshop Botany Review.*