

BEGINNING BOTANY WITH CAMAS

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CAMAS

The Camas plant (*Camassia quamash*) has a bright blue or white stalk of flowers and a bulb covered with black bark. It is a member of the lily family. In 1832, the botanist John Lindley named the plant *Camassia esculenta*. Frederick Pursh (1814) was the first to describe the plant in Latin, naming the genus *phalangium*. In 1894, Edward L. Greene (1894) changed the genus name back to *camassia*, but kept the species *quamash* from Pursh. Since Pursh was the first to describe the plant in Latin according to code, his name, rather than Greene's, is usually depicted in parentheses in scientific references. There are two Western species, *C. esculenta* and *C. leichlini*, growing in moist meadows from California to British Columbia and Montana (Coues, 1965).



Credit: Smithsonian Institution Photo



Credit: Smithsonian Institution Photo

Camas has been harvested by several tribes and used for a variety of purposes (Moerman, 1998, p. 134):

Native American Group

Uses

Blackfoot

Medicinal:

Gynecological aid during birth

Blackfoot
Chehalis
Cowichan

Food:

Bread and cake

Soup

Bulbs served at potlatches

Flathead
Hesquiat
Karak
Klamath
Nez Perce

Beverage, soup
Steamed vegetable
Vegetable cooked in pit
Dried
Cash crop traded to Gros
Ventre and Crow

When Camas blooms in the springtime, the flowers are thick and can give the appearance of a blue lake from a distance. After the seed ripens, the bulbs may be dug, an activity traditionally done by Native American women and children. They usually do the digging with a crooked-nosed stick, which has been hardened in fire. Both hands are placed on the handle, and body weight is applied until a depth of about six inches is reached (Spinden, 1908, p. 200). A parfleche, bag made from animal skin, was typically used to hold the bulbs (Murphey, 1993).

After the women and children spend days bringing in sacks of bulbs, the tribal communities sometimes celebrate the harvest by having a festival. When there is an adequate harvest, the cooking begins. Nearly a half century ago, Murphey (1993) described the activities:

The men's part is to bring in hard wood and green branches to roast the camas. After a day's burning of wood down to coals, the bulbs have been washed, and the coals are raked out, leaving a bed of warm ashes. This is usually about 20 feet in diameter. Green branches of alder or birch are laid down, and along the branches are placed the camas bulbs. Next a layer of ashes, then some slow coals, more ashes, more branches[,] more camas, and so on until all the bulbs have been placed. Branches and layers of dry grass cover the top.

The camas pit is divided among four women who see to it that a supply of coals and ashes is on hand to keep the cooking going. From 24 to 36 hours is needed to complete the job. During this time, neighbors visit, sometimes deer or antelope are barbecued, and bubbling pots send forth appetizing odors.

When the camas is ready to eat, large, flat openwork willow baskets are brought to the side of the pit, and with forked sticks used as tongs, the bulbs are laid on the baskets to cool, as they are too hot to handle. When they are merely warm, the black bark is stripped from them, and the bulbs are pressed between women's hands, until they look like macaroons or ginger snaps. The fragrance is delightful like vanilla cake.

More recently, Caroline James interviewed women of the Nez Perce Tribe as a way to preserve their cultural traditions. In her book, Nez Perce Women in Transition, 1877-1990 (1996, p. 12), James documents the way Nez Perce women prepared camas roots before the use of machines. The bulbs were gathered in the wet upland meadows – The Weippe Meadows and Camas Prairie north of Grangeville, Idaho; the Palouse Prairie near Moscow, Idaho; the Elk City, Idaho, area; and the Grande Ronde Valley of

eastern Oregon. According to one young interviewee who grew up in a longhouse on Nespelem Reservation:

When I was fourteen years old, my mother brought me to Mrs. Cleveland's house in Nespelem. ...we went out root digging. ...That was the first time I had dug roots with these people, that certain people from the long house. Previously, I had dug roots with my grandmother, Carrie Innes, ... Women cleaned the roots in their hands...Most of the roots have covering on them. There was an old lady who lived in this area, and she used a little rock like a knife to peel off the skin or the covering.



Credit: Smithsonian Institution Photo

The Nez Perce describe how camas was prepared for immediate use and baked for use in later months. Camas roots were baked and steamed in a large pit for a few days and never eaten raw. For immediate consumption, the cooked roots could then be made into a porridge or boiled in water (James, p. 13). When the cooked roots turned from white to brown, the taste became sweeter. In the words of one Nez Perce woman (James, 1996, p. 17): *“My grandmother would dig to check how far along they were cooking and then dig them out...When they are fresh it was just like candy to us...”*

Because baked camas did not keep well, the cooked roots were pounded and dried as a meal called *kom'es'es*. They were then formed into loaves, rolled in bunch grass (*Agropyron sp.*), and again steamed. After cooking, the loaves were made into smaller cakes, known as *ep'ine*, and dried in the sun or over a campfire. These were stored for winter use. Since Clark was offered camas bread with salmon when he encountered the Nez Perce on September 20, 1805, it is possible that he ate camas that had been prepared in this manner.

The following account of camas preparation provided by an eighty-two-year-old woman suggests that it is rare to observe the traditional way of harvesting camas roots: *“Baking camas, it's a lot of hard work. Only one woman bake the camas. She has most of her grandchildren do for her. She is lucky to have a lot of help. They don't do digging by hands anymore, but they now do it by machine”*(James, 1996, p. 17).



Credit: Smithsonian Institution Photo

BEGINNING BOTANY WITH CAMAS

Lesson Plan for Primary Students

Grade Levels Primary (1-3)

Time Two Hours

Purpose The purpose of this lesson is for students to learn fundamental principles of botany by studying the history and characteristics of the camas plant.

Previous Knowledge Assume that this lesson will be an interdisciplinary extension to lessons describing the Lewis and Clark Expedition. This lesson should follow a viewing of the Smithsonian website which depicts a scientific specimen of the camas plant, a picture of the camas flower, a picture of flowers in the lily family, a picture of a field of blue camas from Idaho, a child's drawing of camas, Nez Perce artifacts, and a photograph of Camas Prairie.

Objectives

1. Given Smithsonian website depicting pictures of scientific specimen and field of camas, students will observe characteristics.
2. Given teacher demonstration, students will listen to lesson about the lily family and point out characteristics of plants in the lily family.
3. Given regional flowers, students will draw and label parts, indicating name and family of flower as well as parts specified by the teacher.

Procedure

Motivation: Provide students with background information about camas such as the context in which it was introduced to Lewis and Clark on the Lolo Trail. Describe and show pictures of the Nez Perce children and artifacts made by Nez Perce. Discuss their function in relation to gathering and storing food such as camas roots.

Content Focus: Show a picture of the camas flower. Explain that scientists, called botanists, study the plants in addition to admiring their beauty. Explain that botanists study plants in terms of characteristics such as appearance, and economic uses. Economic uses would include whether or not the plant could be eaten, used for other purposes like making medicine or dyes for paint, or traded as a crop. Point out that this lesson will focus on the way botanists study the parts of the camas plant and classify it into categories. See Background Information for details. Show family tree excerpt from Eyewitness Visual Dictionary. Take students through the classification process for the lily and point out that the camas plant that the Nez Perce harvested and ate was a part of the lily family. Make analogy to their own families, pointing out that they may have certain characteristics in common such as blue, hazel, or brown eyes, but that each person in the family has unique characteristics because no two people are exactly alike, even identical twins. Discuss the characteristics that make the camas plant part of the lily family.

Show selected flowers from the lily family and ask students to count the number of stamens, describe the bulbs, and examine the parallel veins. Show the picture of the camas plant drawn by a child, mostly likely from Idaho since the picture is from the University of Idaho website. Discuss how the student captured some of the characteristics of the plants from the lily family, e.g., bulb and long stem. Explain that they, too, will draw pictures of flowers. Distribute a regional flower to students in groups of 3 or 4. List of state flowers are provided in Background Information. Ask them to draw their state or regional flower, label three parts as specified by teacher, and write the species and family name. Simplify the labeling process based on individual abilities. Find pictures of other flowers that are in the same family as the flower distributed. Ask students to identify similar characteristics and make inferences about why they think scientists placed the flowers in the same family.

Closure: Ask students to hold up their drawings from their seats. Students should be able to identify essential features of the plant and the flower (e.g., petals, stamen, stem, leaves, root). Ask students to share their inferences about why scientists put the flowers they studied in the same family. Answers will vary depending on the flowers selected by teacher (Example: Family: Lily; Genus: Camassia; Species: Quamash).

Evaluation

- Students' labeled drawings of flower including species, family and those parts designated by the teacher.
- Students' inferences about why two flowers may be in the same family.

Background Information

For Teacher:

The system of classification used by botanists results in repeated subdivisions that are sometimes referred to as a “family tree.” See illustration of tree from Eyewitness Visual Dictionary.

Kingdom: Plantae
Phylum: Angiospermophyta (flowering plants)
Class: Monocotyledoneae (monocotyledons)
Family: Liliaceae (lily)
Genus: Camassia
Species: quamash

Monocotyledons typically have seeds with one seed leaf (cotyledon). Their foliage leaves are narrow with parallel veins and the flower components typically occur in multiples of three (Lindsay, 1992). Sepals and petals are indistinguishable and are known as tepals. Most monocotyledons are herbaceous (typically having green non-woody stems and are relatively short-lived—one to two years).

The Lily Family (*Liliaceae*) is one of the largest families of flowering plants, including approximately 250 genera and 3,500 species. The economic uses include popular ornamentals (e.g., lilies, tulips, hyacinths), vegetables (e.g., onions, leeks, garlic and asparagus) and some medicinal uses (e.g., bitter aloes) (Heywood, 1985).

For Primary Children (use selected information as appropriate):

Characteristics of plants/flowers in Lily Family:

1. Swollen storage organs such as bulbs, corms, rhizomes or thick, fleshy roots
Basic: Swollen storage parts such as bulbs and thick roots
2. Narrow leaves with parallel veins (illustrate).
3. Usually six stamens (rarely 3 or up to 12)

STATE FLOWERS:

1	Alabama	<i>Camellia</i>	26	Montana	bitterroot
2	Alaska	wild forget-me-not	27	Nebraska	goldenrod
3	Arizona	saguaro cactus blossom	28	Nevada	sagebrush
4	Arkansas	apple blossom	29	New Hampshire	purple lilac
5	California	golden poppy	30	New Jersey	violet

6	Colorado	Rocky Mtn. columbine	31	New Mexico	yucca
7	Connecticut	mountain laurel	32	New York	rose
8	Delaware	peach blossom	33	North Carolina	dogwood
9	Florida	orange blossom	34	North Dakota	wild prairie rose
10	Georgia	Cherokee rose	35	Ohio	scarlet carnation
11	Hawaii	Pua aloalo (hibiscus)	36	Oklahoma	mistletoe
12	Idaho	<i>Syringa</i>	37	Oregon	Oregon grape
13	Illinois	violet	38	Pennsylvania	mountain laurel
14	Indiana	peony	39	Rhode Island	violet
15	Iowa	wild rose	40	South Carolina	yellow jessamine
16	Kansas	wild native sunflower	41	South Dakota	pasqueflower
17	Kentucky	goldenrod	42	Tennessee	iris/passion flower
18	Louisiana	<i>Magnolia</i>	43	Texas	bluebonnet
19	Maine	white pine cone & tassel	44	Utah	sego Lily
20	Maryland	blackeyed Susan	45	Vermont	red clover
21	Massachusetts	mayflower	46	Virginia	dogwood
22	Michigan	apple blossom	47	Washington	western rhododendron
23	Minnesota	pink & white lady's-slipper	48	West Virginia	<i>Rhodendron maximum</i>
24	Mississippi	<i>Magnolia</i>	49	Wisconsin	Wood Violet
25	Missouri	hawthorn blossom	50	Wyoming	Indian paintbrush

Materials

Smithsonian Website - Lewis & Clark as Naturalists

(<http://www.mnh.si.edu/lewisandclark>), *Camassia quamash* (Pursh) Greene - Pictures of: camas scientific sample, field of camas, lilies,

Using resources listed in References (below) and in classroom: family tree of lily, flowers in lily family, real flowers, paper and markers or crayons. Students may enjoy reading Thunder rolling in the mountains or Soun Tetoken: Nez Perce boy.

Education Standards

National Science Education Standards: (<http://www.nap.edu/html/nses/html/>)

Life Science C: characteristics and life cycles

(<http://www.nap.edu/html/nses/html/6c.html#ls>)

National History Standards: (<http://w3.iac.net/~pfilio/hstst.htm>)

National Council for the Social Studies: (<http://www.ncss.org/>)

Virginia Standards of Learning:

(<http://www.pen.k12.va.us/VDOE/Superintendent/Sols/home.shtml>)

Science

- K.1** The student will conduct investigations in which
- Objects are described both pictorially and verbally
- 1.4** The student will investigate and understand that plants have life needs and functional parts and can be classified according to certain characteristics
- Parts (seeds, roots, stems, leaves, blossom, fruit)
- 2.4** The student will investigate and understand that plants and animals go through a series of orderly changes in their life cycles. Key concepts include:
- Flowering plants undergo many changes from the formation of the flower to the development of the fruit
- 3.5** The student will investigate and understand relationships among organisms in aquatic and terrestrial food chains. Key concepts include:
- Producer, consumer, decomposer;
 - Herbivore, carnivore, omnivore; and
 - Predator—prey
- 4.4** The student will investigate and understand basic plant anatomy and life processes. Key concepts include:
- The structures of typical plants(leaves, stems, roots, and flowers);
 - Processes and structures involved with reproduction (pollination, stamen, pistil, sepal, embryo, spore, and seed);

History and Social Science

History

- K.1** The student will understand that history relates to events and people of other times and places by
- Identifying examples of past events in legends and historical accounts, ...
 - Identifying examples of interesting Americans through exposure to biographies of important people of the past, ...
- 1.1** The student will compare everyday life indifferent places and times and recognized that people, places, and things change over time through such comparisons as
- Contemporary American life with American life in previous time periods
- 2.3** The student will compare the tribes of American Indians in Virginia with nomadic (e.g., Sioux) and settled, agricultural tribes (e.g., Pueblo) in other regions in America
- 3.2** The student will describe the discovery of the Americas by Columbus and other European explorers and also the first permanent Spanish, French, and English settlements in North America, with emphasis on the people (explorers and their sponsors), their motivations, and the obstacles they encountered, and the successes they achieved.

Economics

- K.5** The student will match simple descriptions of work that people do and the names of those jobs with examples from the local community and historical accounts
- 3.6** The student will describe the economic specialization and interdependence involved in the production of goods and services in various types of communities in the past

References

Web Sites:

<http://www.pullman-wa.com/rec/WALLPAPR/camus640.HTM>

<http://www.uidaho.edu/ed/EDTECH/abcwolves/camas.htm>

Nez Perce web site about Lewis and Clark expedition and impact:

<http://www.l3-lewisandclark.com/Sites/ShowOneSite.asp?SiteID=34>

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