

Lesson Title: Montana Cherries—Native and Non-Native Species

Brief: Students will identify fruit crops in Montana and learn the different between native and non-native cherry varieties in Montana. They will learn about the nutritional values of cherries and how Native Americans used them.

Grade: 4-6

Materials:

4 bags fresh or dried sweet cherries
Chokecherry jam or syrup

Duration of Lesson: 45 minutes

Key Terms citrus, non-citrus, native, non-native, USDA zones

Standards / Objectives

Math Common Core: Math Practices

1. Make sense of problems and persevere in solving them.
5. Use appropriate tools strategically.
8. Look for and express regularity in repeated reasoning.

NGSS 5. Matter and Energy in Organisms and Ecosystems

Disciplinary Core Ideas, PS3.D: Energy in Chemical Processes and Everyday Life

The energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1)

NGSS MS. Matter and Energy in Organisms and Ecosystems

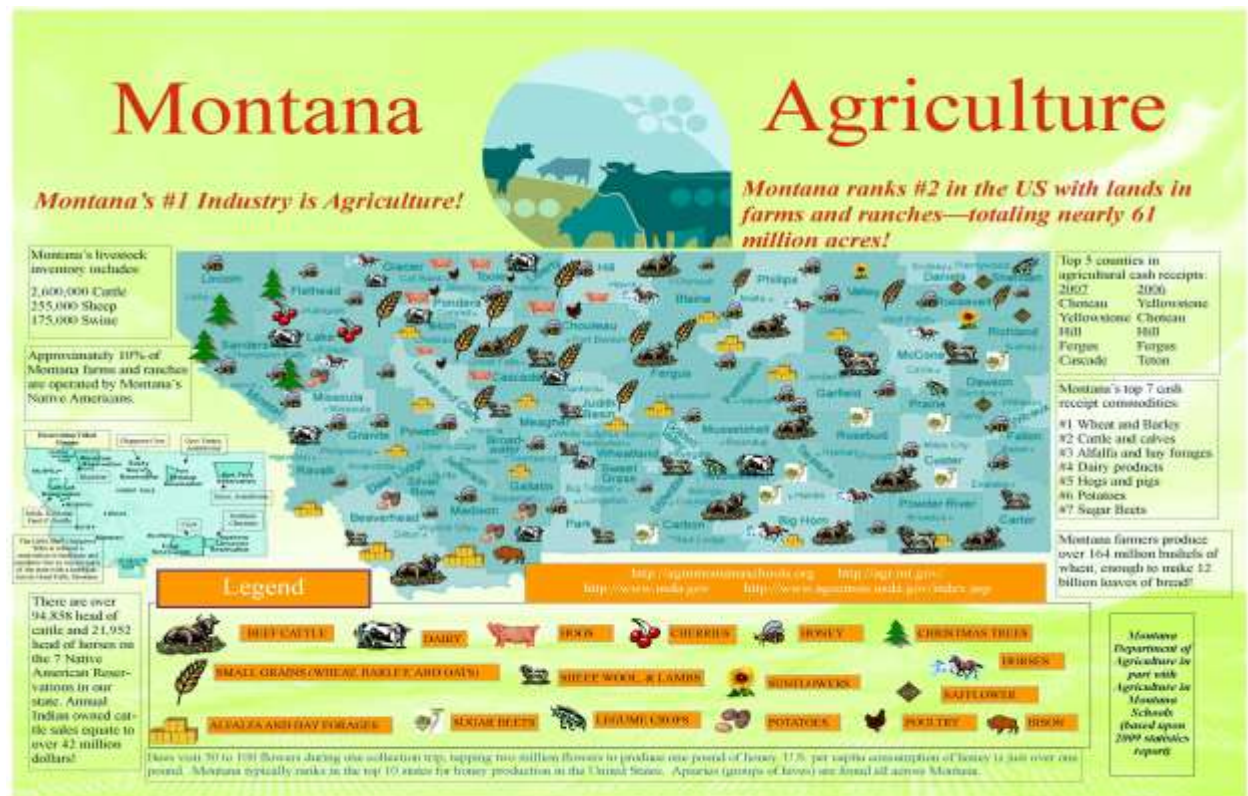
Disciplinary Core Ideas, LS2.C: Ecosystems Dynamics, Functioning, and Resilience

Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4)

IEFA Essential Understanding 3: The ideologies of Native traditional beliefs and spirituality persist into modern day life as tribal cultures, traditions, and languages are still practiced by many American Indian people and are incorporated into how tribes govern and manage their affairs.

<u>Understanding(s) /Big Ideas:</u> Although not well known, Montana does product fruit crops. There is a difference between native and non-native crop varieties. Native Americans had many uses for cherries.	<u>Essential Question(s):</u> What fruit crops grow in Montana? What are the differences between native and non-native cherries? How did Native Americans use cherries?
<u>Students will know:</u> How to identify non-citrus fruit crops. Difference between native and non-native cherry varieties in Montana. The uses that Native Americans had for cherries.	<u>Students will be able to:</u> Compare nutrition labels. Estimate volume of cherries. Explain the difference between native and non-native.
Performance / Observations	
<u>Performance Task(s):</u> Students will have a class discussion, as well as completing a nutritional worksheet.	<u>Other Evidence:</u> Students will taste test a few varieties of cherries.
Learning / Inquiry Activities	

Introduction: Sweet cherries are a non-native fruit crop of Montana. Sweet cherries are grown near Flathead Lake in northwestern Montana. Many of the orchards are located on the Flathead Indian Reservation, which is home to the Salish, Kootenai, Pend d' Oreille tribal groups. Follow the red arrow below to the Flathead Indian Reservation and Flathead Lake. The climate, soil, and water in this area make a perfect combination for growing sweet cherries.



For a copy of the commodity map above, complete with Montana Indian Tribal areas, please contact lbrenneman@mt.gov

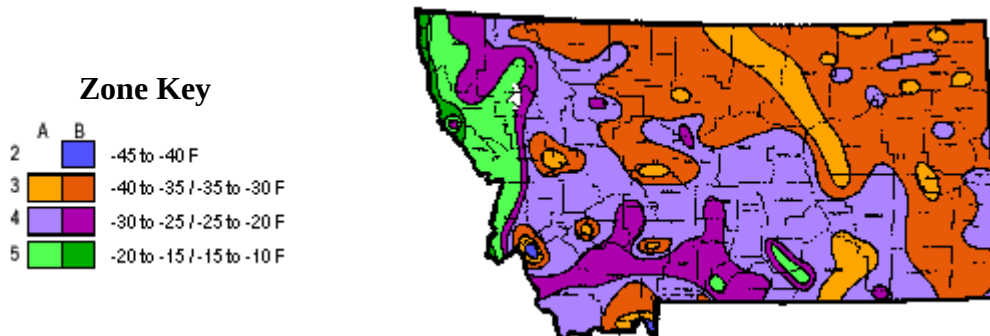
Learning / Inquiry Activities:

In the Zone!

We mentioned that the climate around Flathead Lake is a main factor in being able to grow sweet cherries. All plants, including cherry trees, have limitations for areas that they can survive. We can find this information based upon their hardiness zone. The zone designation for each plant is usually noted on the plant's label at the nursery. The hardiness zone is a designation based upon temperature. The Plant Hardiness Zones divide the United States and Canada into 11 areas based on a 10 degree Fahrenheit difference in the average annual minimum temperature. (The United States falls within Zones 2 through 10). For example, the lowest average temperature in Zone 2 is -50 to -40 degrees Fahrenheit, while the minimum average temperature in zone 10 is +30 to +40 degrees Fahrenheit. This map shows the United States Department of Agriculture's hardiness zones for Montana. Not sure exactly what your hardiness zone is? This link will let you know by zip code!

<http://www.arborday.org/treeinfo/zonelookup.cfm>

MONTANA USDA Hardiness Zone Map



MONTANA SWEET CHERRIES



Facts about sweet cherries:

Non-citrus fruit. Also known as “stone fruit” which refers to trees and shrubby plants in the genus that includes peaches, apricots, plums and cherries.

Hardy to Zone 5

Introduced into Montana in 1866

In 1893 the Flathead Valley was found to be the best climate for growing sweet cherries because of the long warm days with plenty of sunshine and night temperatures of 40-50 degrees.

Small tree that grows up to 8-12 feet tall.

Trees bear fruit about 5 years after planting, cherries grow on stems in 3's.
Sweet cherries are yellow or deep red, depending upon the variety.
The taste is sweet, and the cherries are juicy and they are about $\frac{3}{4}$ inch in diameter.
Flower in late spring (early to mid May) and the crop can be lost if the blossoms freeze hard.
Trees require cross pollination with another variety in order to produce fruit (varieties are specific!)
Trees mature after 15 years, but will start bearing fruit after 5 years.
A mature sweet cherry tree is capable of producing more than 100 pounds of fruit in a season.
Trees bear ripe fruit from late July through mid August.
Cherries split if they get too much rain when they are almost ready to pick, helicopters fly over to produce wind to dry the cherry trees and save the crop!

http://www.montanacherries.com/PhotoGallery_OrchardsHarvest.asp



There are other types of cherries that we grow in Montana as well, tart cherries, used for pies and jams, and chokecherries, which are used for syrup and jam. You may recall that chokecherries were used in making pemmican, a traditional food for American Indians. Chokecherries are native to Montana and were named by the American Indians. The Latin name for chokecherries is *Prunus virginiana* L. But commonly chokecherries are known by many names: chokecherry; wild cherry; wild black cherry, black chokecherry; rum chokecherry; whiskey chokecherry; chuckleyplum; sloetree; and cabinet cherry. The fruit of the chokecherry has long been favored for jellies, syrups, sauces, jams and wine in the prairie states and provinces of the U.S. and Canada. The fruit was widely used as food by Native Americans, who considered the vegetative parts of the plant medicinal.

CHOKECHERRIES



Facts about chokecherries:

Non-citrus fruit. Also known a “stone fruit” which refers to trees and shrubby plants in the genus that includes peaches, apricots, plums and cherries.

Hardy to Zone 2 – Native plant found all across Montana, grows well in a variety of zones and conditions.

Shrub or small tree that grows up to 20' tall and can form a

thicket by suckering or seed dispersal. Competitive plants that live about 40 years.

The small red fruit are true cherries about a quarter-inch in diameter.

The cherries are in clusters, about two dozen cherries to a cluster

Fruit changes from red to a deep purple or black when ripe.

The taste is acid and astringent when ripe.

The plant was introduced into cultivation in 1724, many varieties such as “Canada Red” which has green leaves at the tip of the stems, which soon turn to red and deep purple.

The chokecherry is noted for its toxic properties, one should not eat the leaves or stems.

Fruit loses its toxic properties in the late fall, which is when it should be harvested.

Flower buds are formed on the current year’s wood and bloom on one-year-old wood. Since the plants flower later in the spring they are not especially subject to spring frost damage.

The chokecherry is self-fruitful (that is, it will set fruit by its own pollen) and insect-pollinated.

Each shrub will yield about 30 pounds of fruit, with from 350 to as many as 1,100 berries per pound.

Looking at Nutrition Lesson: Worksheet (page 1 of 2)
 Use the tables below to complete the nutrition worksheet.

Does the sweet cherry or the chokecherry have more calories per 100 g serving?

_____.

Which type of cherry has more fiber?

_____.

Which type of cherry has more calcium?

_____.

Which type of cherry has more riboflavin (vitamin B2)?

_____.

Which type of cherry has a better carb/protein ratio?

_____.

List several reasons chokecherries added nutrition to the Indian diet. _____

_____.

Nutrition Facts				
Cherries Sweet Raw				
Serving Size 100g				
Calories 63				
% Daily Value*				
Total Fat 0.2g			0%	
Saturated Fat 0.038g			0%	
Cholesterol 0mg			0%	
Sodium 0mg			0%	
Total Carbohydrate 16g			5%	
Dietary Fiber 2.1g			8%	
Sugar 12.8g			~	
Protein 1.1g			~	
Vitamin A	1%	•	Vitamin C	12%
Calcium	1%	•	Iron	2%
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.				

Nutrition Facts				
Chokecherries Raw Pitted				
Serving Size 100g				
Calories 162				
% Daily Value*				
Total Fat 1.69g			3%	
Saturated Fat ~g			~%	
Cholesterol ~mg			~%	
Sodium 5mg			0%	
Total Carbohydrate 33.6g			11%	
Dietary Fiber 20g			80%	
Sugar 9.4g			~	
Protein 3g			~	
Vitamin A	3%	•	Vitamin C	9%
Calcium	6%	•	Iron	4%
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.				

Vitamins	%DV
Vitamin A 64IU	1%
Retinol equivalents 3µg	~
Retinol 0µg	~
Alpha-carotene 0µg	~
Beta-carotene 38µg	~
Beta-cryptoxanthin 0µg	~
Vitamin C 7mg	12%
Vitamin E 0.07mg	0%
Vitamin K 2.1µg	3%
Vitamin B12 0µg	0%
Thiamin 0.027mg	2%
Riboflavin 0.033mg	2%
Niacin 0.154mg	1%
Pantothenic acid 0.199mg	2%
Vitamin B6 0.049mg	2%
Folate 4µg	1%
Folic Acid 0µg	~
Food Folate 4µg	~
Dietary Folate Equivalents 4µg	~
Choline 6.1mg	~
Lycopene 0µg	~
Lutein+zeaxanthin 85µg	~

Minerals	%DV
Calcium 13mg	1%
Iron 0.36mg	2%
Magnesium 11mg	3%
Phosphorus 21mg	2%
Sodium 0mg	0%
Potassium 222mg	6%
Zinc 0.07mg	0%
Copper 0.06mg	3%
Manganese 0.07mg	4%
Selenium 0µg	0%
Water 82.25g	~
Ash 0.48g	~

Stats	
Percent of Daily Calorie Target (2000 calories)	3.15%
Percent Water Composition	82.3%
Protein to Carb Ratio (g/g)	0.07g

Vitamins	%DV
Vitamin A 168IU	3%
Retinol equivalents 8µg	~
Retinol ~µg	~
Alpha-carotene 2µg	~
Beta-carotene 90µg	~
Beta-cryptoxanthin 19µg	~
Vitamin C 5.5mg	9%
Vitamin E 0.35mg	1%
Vitamin K 21.1µg	26%
Vitamin B12 ~µg	~%
Thiamin 0.034mg	2%
Riboflavin 0.173mg	10%
Niacin 0.628mg	3%
Pantothenic acid 0.398mg	4%
Vitamin B6 0.198mg	10%
Folate 2µg	1%
Folic Acid ~µg	~
Food Folate 2µg	~
Dietary Folate Equivalents ~µg	~
Choline 10.7mg	~
Lycopene 0µg	~
Lutein+zeaxanthin 347µg	~

Minerals	%DV
Calcium 60mg	6%
Iron 0.69mg	4%
Magnesium 27mg	7%
Phosphorus 67mg	7%
Sodium 5mg	0%
Potassium 379mg	11%
Zinc 0.33mg	2%
Copper 0.186mg	9%
Manganese 0.417mg	21%
Selenium ~µg	~%
Water 60.72g	~
Ash 0.93g	~

Stats	
Percent of Daily Calorie Target (2000 calories)	8.1%
Percent Water Composition	60.7%
Protein to Carb Ratio (g/g)	0.09g

* Percent Daily Values are for adults or children aged 4 or older, and are based on a 2,000 calorie reference diet.
Source: USDA National Nutrient Database for Standard Reference, Release 20.

Each "-" denotes a missing value.

Math Lesson: Estimating volume of packaged cherries.

1. Divide your classroom into 4 groups. (Follow your school's policy for food distribution in the classroom).
2. Give each child a dried or fresh sweet cherry to taste.
3. Give each student a taste of the chokecherry jam or syrup. Let students discuss the differences.
4. Give each of the 4 groups a bag of dried or fresh cherries. Ask students to complete worksheet 2.

Name: _____

1. Estimate how many cherries are in the bag. _____
2. Count how many cherries are in the bag. _____
3. If divided equally among your group, what percent of cherries would each person get? _____
4. If the entire bag of cherries weighs 20 ounces, how much do 10 cherries weigh? _____
5. What is 25% of the total number of cherries? _____
6. Multiply the number of cherries by 10^2 . Write the answer in scientific notation. _____
7. Make a pie chart comparing the number of single-stem cherries, double-stem cherries and cherries with no stem. Label with percentage of each. (This can only be done with fresh cherries)
8. The fresh cherry season is very short – lasting only about 3 weeks.
Describe two ways that you could preserve cherries for consumption beyond the fresh fruit season.
List one advantage to each type of preservation method.
A. _____
B. _____
C. _____

Parts of this math lesson based upon Idaho's Ag in the Classroom materials.

<http://msuextension.org/publications/HomeHealthandFamily/MT200909HR.pdf>

We invite you to send photos or information on your experience teaching the lesson to the Montana Department of Agriculture's Ag in the Classroom lbrenneman@mt.gov

This lesson was adapted from Agriculture in Montana Schools, aginmontanaschools.com.