



Help a Sister Out: Garden Companions

Grade 2

Standards

GPS.SS2HS; NGSS 2.LS2

Time

(2) 45 minute periods +
Approx. 60 – 70 days to grow crops

Supplies

(per class)

- Book: Roots, Shoots, Buckets and Boots by Sharon Lovejoy
- Seeds for planting a Three Sisters garden using corn, squash and beans or a combination of companion plants appropriate for the season
- Trowels and gloves for planting

(per student)

- Copy of companion plant chart (included)

Garden Connections

Students will demonstrate companion planting in the school garden or in a container garden. This lesson may be started in any season by changing the types of vegetables, as noted in the Exploration section.

Overview

Students experience Native American culture by using Creek and Cherokee methods to plant a Three Sisters garden while investigating the value of companion planting.

Guiding Questions

Why do some plants in the garden grow well together?
What is the Three Sisters method of gardening?
Can I apply the Three Sisters method to other groups of plants?

Engaging Students

Students will listen to the Three Sisters story and guess which vegetables the sisters represent. They will act out the sisters in a skit and then discuss ways some people – like some plants – grow well together, while others need more space.

Exploration

Students will design and carry out an experiment as a “fair test” of whether corn, beans and squash grown together become larger, healthier or produce bigger harvests than the same plants grown separately. They will observe whether companion planting makes a visible difference, track the growth and harvest of companion plants, and compare it to those planted separately.

Explanation

Students will explain that Indian planting techniques were based on companion planting, or grouping together plants that benefit each other.

Extension

Students will write a new Three Sisters story or skit with a different set of companion plants (other than corn, beans and squash).

Environmental Stewardship

Students will use the included companion plant chart to research vegetables that can be grown together in the school garden, choose a set of companion plants appropriate for the season, and plant them. They will observe whether certain combinations of plants reduce insect damage, when planted together.

Evaluation

Students will be able to explain that Three Sisters gardens were a part of Creek and Cherokee cultures and demonstrate an agricultural method called companion planting.

Standards

GPS Social Studies

SS2H2. The student will describe the Georgia Creek and Cherokee cultures of the past in terms of tools, clothing, homes, ways of making a living, and accomplishments.

- a. Describe the regions in Georgia where the Creeks and Cherokees lived and how the people used their local resources.
- b. Compare and contrast the Georgia Creek and Cherokee cultures of the past to Georgians today.

Next Generation Science Standards

Core Idea LS2: Ecosystems, Interactions, Energy and Dynamics

2.LS2.A Interdependent Relationships in Ecosystems

Plants depend on water and light to grow. (2-LS2-1)

Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)

Background Information

Legend of Three Sisters (to read aloud to class):

<http://www.ncdcr.gov/Portals/7/Collateral/Database/F05.legend.three.sisters.pdf>

Facts about Creek Native Americans: http://www.bigorin.org/creek_kids.htm

Facts about Cherokee Native Americans: http://www.bigorin.org/cherokee_kids.htm

Additional Resources on growing Three Sisters Gardens:

- <http://www.reneesgarden.com/articles/3sisters.html>
- http://www.darrolshillingburg.com/GardenSite/NewsletterPDF/TrainingClass/ThreeSistersGuide_all.pdf
- <http://faq.gardenweb.com/faq/lists/teach/2003045238014436.html>
- <http://web3.cas.usf.edu/tbsg/gardeningactivities.aspx.html>

Teacher Preparation

Students can research 'Companion Planting' using the included chart from AfriStar Foundation. Then students may choose groups of plants to plant together, appropriate for the season. For example:

May: Corn, beans, squash

Aug/Sept: Lettuce, beets, onions

March: Cabbage, dill, potatoes

Recommended Reading with students

Roots, Shoots, Buckets and Boots (pages 120 – 127) by Sharon Lovejoy

In the Three Sisters Garden: Native American Stories and Seasonal Activities for the Curious Child by JoAnne Dennee

PROCEDURES FOR LESSON ACTIVITIES

Day 1: Engagement

- Read a Three Sisters story in the classroom, such as this version:
<http://www.ncdcr.gov/Portals/7/Collateral/Database/F05.legend.three.sisters.pdf>
- Assign 1/3 of the class the role of corn, 1/3 the bean plant, and 1/3 the squash plant. Each planting mound will include 3-4 corn plants, 3-4 bean plants, and 3 squash plants. Have students act out the companion planting method this way: corn plants help bean plants by providing tall stalks for bean vines to climb; beans grow up the corn stalks, making corn stalks stronger against the wind; bean plants also use their special roots to fix nitrogen in the soil so it can make plants healthy; squash plants take nitrogen from the soil and grows close to the ground, spreading its big leaves to shade out weeds and using its prickliness of its stems and leaves to discourage hungry bugs from eating the garden.
- Ask students to identify similarities and differences in Three Sisters agriculture methods (companion plants together in round mounds) and current ways they have seen corn, squash and beans growing in big farms (plants grown separately in rows). Ask students to keep their assigned plant roles and act out a modern farm. Note that companion planting can still be practiced in gardens, and that many people plant this way.
- Another skit: assign students the roles of the three Indian sisters and have them act out the parts, based on the legend. Ask which sister symbolizes which plant.
- Allow students to research Creek and Cherokee culture in Georgia, using Internet-connected computers and the resources listed in the Background Information section OR read information from web sites about Creek and Cherokee tools, clothing, homes, ways of making a living, and accomplishments, while allowing students to act out the text.
- Read pages 120-127 from Roots, Shoots, Buckets and Boots to the class.

Day 2: Exploration

- Discuss with students how to design an experiment that will be a fair test of whether the Creek and Cherokee companion planting method has any different results than current farming methods. (Note: Elements of a fair test should include planting in similar locations with similar conditions such as soils, water and sun).
- Make mounds of dirt in the school garden and plant a Three Sisters garden on each mound to include 3-4 corn plants, 3-4 bean plants and 3 squash plants on each mound. Or, choose an alternative set of plants from AfriStar Foundation companion plant chart (included in this lesson) depending on the season when the lesson is taught:
<http://afriSTARfoundation.org/wp-content/uploads/2012/09/Companion-Planting.jpg>. These may include:
 - May: Corn, beans, squash
 - Aug/Sept: Lettuce, beets, onions
 - March: Cabbage, dill, potatoes
- Plant additional squash, corn and beans separately, in rows. (Note: corn will pollinate best when planted in rows that make a square. Longs rows of corn do not get fully pollinated and result in ears with fewer kernels). If alternative companion plants were planted together, be sure to plant the same species separately, also.

Days 3 – 60+: Exploration part 2

- Tend both the companion-planted mounds and the separately-planted rows the same, providing equal amounts of water and attention (or arrange for families to care for the garden over the summer).
- Regularly measure the plant height, number and size of leaves, and weight of harvested vegetables. Keep these records in a garden journal or on a chart in the classroom.
- Compare the data from companion-planted to the separately planted plants and determine whether there appears to be a difference in the health and productivity of the plants. What other unintended factors may cause differences.
- Harvest vegetables and eat.

Day 4: Explanation

- Students should be able to explain to garden visitors that the Three Sisters garden was a Creek and Cherokee method of companion planting, that companion planting can be done in school gardens using several different types of plants. Students should also be able to argue from their evidence about the benefits of companion planting and to tell how they set up a fair test in their planting experiment.

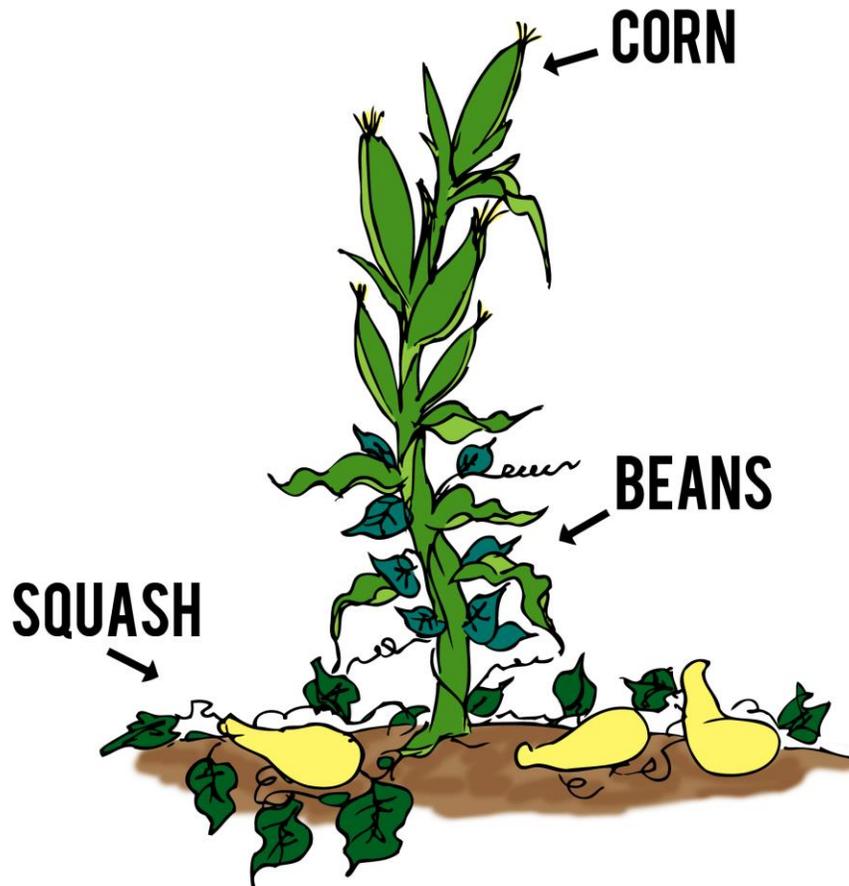
Environmental Stewardship

Companion planting can also offer benefits in terms of reducing the need for chemical pest control in the garden by limiting damage from insects. This occurs because some plants taste bad to insects, and planting other plants near them offers some protection to all the plants. Growing an organic garden using companion planting instead of chemical pest control, using mulch to prevent weeds instead of herbicides as well as to hold water and reduce the amount of wasted water, and using compost to increase soil fertility without artificial fertilizers makes students environmental stewards.

Companion Planting

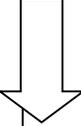
Plant	Friend	Foe
Basil	Tomato	Rosemary
Beans	Carrot, Strawberry	Onion
Broccoli (Cabbage & Cauliflower)	Potato, Bean, Rosemary	Strawberry
Carrot	Tomato, Bean	Dill
Corn	Peas, Squash	Tomato
Lettuce	Everybody!	None!
Peanut	Corn, Carrot	None!
Peas	Carrot, Pepper	Onion, Potato
Peppers	Tomato, Basil, Carrot, Onion	Bean, Kale, Cabbage Family
Potato	Bean, Corn	Tomato, Squash
Onion	Carrot, Pepper	Bean
Squash Family (Zucchini & Pumpkin)	Corn, Onion, Bean, Radish, Dill	Potato
Sunflower	Corn, Cucumbers	Potato
Tomato	Basil, Carrot	Corn, Potato, Dill

Three Sisters



Assessment for Help a Sister Out

Student Name(s): _____ Date: _____

Level of Mastery  Benchmark or Performance Measure 	 EMERGING 1 points	 COMPETENT Partially proficient 4 points	 PROFICIENT 80%+ proficiency 5 points	TOTAL POINTS
Describe Creek and Cherokee agricultural methods	Student cannot describe Creek or Cherokee agricultural methods	Student can describe Creek or Cherokee Agricultural methods, but not both	Student can describe Creek and Cherokee agricultural methods and identify similarities in the methods	
Explain the benefits of companion planting	Students cannot explain benefits of companion plants	Student can explain role of companion plants or create a list of suitable companions, but not both	Students can explain the role of companion plants and list plants that are suitable companions	
Create a plan using plants as natural pest control	Student is unable to identify or list possible companion plantings for pest control.	Student will identify possible plants that provide pest control benefits.	Student will draw or create a list of possible garden plantings that pair to maximize pest control benefits in the garden.	