



National Agriculture in the Classroom

Relevancy and Engagement: agclassroom.org

Three Sisters Garden

Grade Level(s)

3 - 5

Estimated Time

60 minutes and on-going observation depending on planting situation.

Purpose

Students will investigate the "three sisters" crops (corn, beans, and squash) and explore the benefit to planting these crops together. Students will also learn about Native American Legends and plant growth.

Materials

- *Three Sisters Investigation* worksheet
- *Three Sisters Legends* handout

School Garden Option:

- Hoe, shovel, and/or trowel
- Corn seeds
- Bean seeds
- Squash seeds

Container Garden Option:

- Large pot or container with holes in the bottom
- Corn seeds
- Bean seeds
- Squash or pumpkin seeds – miniature or space-saver variety

Garden in a Glove Option:

- Clear plastic gloves
- Permanent markers
- Cotton balls
- Small paper plates
- Five different types of seeds: Three Sisters crops: corn (sweet corn, popcorn and/or field corn), squash (butternut and acorn), beans

Essential Files (maps, charts, pictures, or documents)

- *Three Sisters Investigation* worksheet

[https://naitc-api.usu.edu/media/uploads/2015/09/01/Three_Sisters_Invesitgation_Worksheet.pdf]

- Three Sisters Legends handout

[https://naitc-api.usu.edu/media/uploads/2015/09/01/Three_Sisters_Legends.pdf]

Vocabulary

legend: a nonhistorical or unverifiable story handed down by tradition from earlier times and popularly accepted as historical

legume: A legume is a plant in the family Fabaceae or Leguminosae. Legumes are grown agriculturally, primarily for their food grain seed (example beans and lentils, or generally pulse), for livestock forage and silage, and as soil-enhancing green manure. Most legumes have symbiotic nitrogen-fixing bacteria in structures called root nodules. Well-known legumes include alfalfa, clover, peas, beans, lentils, soybeans, and peanuts.

Interest Approach – Engagement

1. Ask your students if they know what a *legend* is. After students have offered their own ideas and prior knowledge, explain to your students that a legend is a way of passing stories from generation to generation. Legends are very important in many Native American cultures.
2. Explain to your class that they will be investigating the legend of the Three Sisters which focuses on the agriculture and food production techniques used by Native Americans. The three sisters refer to three crops that were commonly planted together – corn, beans and squash

Background - Agricultural Connections

Native people from different parts of North America have used a wide range of agricultural techniques. Perhaps the best known is the inter-planting of corn, beans and squash – a trio often referred to as the “three sisters”. Cultivating these companions in your school garden, a small planting near your school, a large container or even indoors, can inspire studies of Native American customs, nutrition, and folklore. As students dig in, investigations of plant growth and relationships will also flourish.

In a “three sisters” planting, the three plants benefit one another. Corn provides support for beans. Beans, like other **legumes**, have bacteria living on their roots that help them absorb nitrogen from the air and convert it to a form that plants can use. Corn, which requires a lot of nitrogen to grow, benefits most. The large squash leaves shade the soil, prevent weed growth, and deter pests. The three sisters also complement each other nutritionally. Corn supplies carbohydrates and a variety of amino acids. Beans have protein, including two amino acids that corn lacks. Squash contributes vitamin A.

It’s hardly surprising that these crops were considered by many Native Americans to be “special gifts from the creator.” They played an important role in the agriculture and nutrition of many Native people of the Americas. Because of the sisters’ central role as sustainers of life, a host of stories, customs, celebrations and ceremonies are associated with them.

Growing your own three sisters garden or planting the crops in a small area can provide a springboard for tying in studies of Native American customs, nutrition, **legends**, and folklore as well as investigating plant growth and relationships. Information for planting in a garden, in a container and also a seed germination activity are included. Select the option that fits with the resources, time and expertise available in your educational setting.

In this lesson students will begin to understand a portion of the agricultural history of our nation by learning how Native Americans preserved natural resources and soil nutrients to harvest crops.

Procedures

Activity 1: Legend of Three Sisters

1. Hand out the *Three Sisters Investigation* worksheet and facilitate a class discussion that allows students to share what they know about corn, beans, and squash. (Examples could include: Corn – tall plant, kernels grow on ears, yellow in color, etc.) Instruct students to list the items in the chart. Feel free to share the information found in the *Background Agricultural Connections* section of the lesson or have students research the three crops using the internet or other resources to add to their chart.

2. Divide your class into groups of 3 or 4. Give each group one of the attached *Three Sisters Legends* handout. Instruct the students to read through their legend as a group and record characteristics of each sister in their chart on the *Three Sisters Investigation* worksheet. After the groups have read and discussed in a group, have each group share the characteristics of each sister (plant) with the whole class. They should also decide which crop each sister in their legend represents.
3. As a class, discuss how the legends relate to how the three sisters can help each other when planted together. For example: Several of the legends describe the sisters “becoming stronger together” or “three sisters helping and loving each other”. Examples of how the actual crops benefit each other include the corn providing a trellis or pole for the bean to climb. The bean providing nitrogen to the soil to help the corn grow. The squash prevents weeds from growing and deters pests.

Activity 2: Planting a *Three Sisters* Garden

Choose the gardening option below that best fits the gardening supplies and facilities that you have available to plant a *Three Sisters* garden.

School Garden:

1. Once the ground has thawed in the spring and the danger of frost has passed, select a site that has direct sunlight for at least 8 hours a day.
2. Build a small mound of soil about 12 inches high and three feet in diameter. If you have space for multiple mounds, each mound should be 3 to 4 feet apart in all directions.
3. Soak four to seven corn seeds overnight and then plant them about 6 inches apart in the center of each mound. (You’ll eventually thin to three or four seedlings). Many Native people honor the tradition of giving thanks to the “Four directions” by orientating corn seeds to the north, south, east and west.
4. After about two weeks, when the corn is at least 4 inches high, soak and then plant six pole bean seeds in a circle about 6 inches away from the corn. (You’ll eventually thin to three or four bean plants.) At the same time plant four squash or pumpkin seeds next to the mound, about a foot away from the beans, eventually thinning to one.
5. Maintain your three sisters garden. As plants grow, gently weed around them. Make sure the soil is moist. If beans aren’t winding their way around the corn, move tendrils to the corn stalk. Be sure to thin the plants once they are several inches tall – see steps 3 and 4 for the ideal number of plants.
6. Harvest any fruits that have been produced in the fall and enjoy a three sisters snack!



Container garden:

If outdoor growing space is limited or non-existent, you can create a mini-three sisters garden in a large pot or container. Students will most likely not be able to see the crops grow to maturity, however, they should be able to observe the pole beans twine around the corn and the large leaves from the squash create a “mat”.

1. Use a large container (about 18 inches in diameter) that has holes in the bottom and fill it with soil.
2. Follow the instructions from the previous planting description but plant 3 corn seeds (thin to one), 2 bean seeds and 1 mini-pumpkin seed. Place the container where it will receive 6-8 hours of sunlight each day.
3. To know when to water this container, insert your finger up to your first knuckle in the soil. If the soil is dry, apply water to the soil until water starts to drip out the holes in the bottom on the container. If the soil feels moist do not water.

Garden in a Glove:

If you have limited space indoors or want to germinate the seeds for an outdoor three sisters garden, a garden in a glove is a good alternative to allow students to actually see the seeds sprout!

1. Instruct students to write their name on the palm section of a clear plastic glove with a permanent marker. Also label each finger with a different type of seed. (*See materials list for Three Sisters seed ideas*).
2. Dip five cotton balls in water. Give each cotton ball 3 flat squeezes to wring out excess water.
3. Place 2 seeds on a small paper plate or paper towel and pick up with a moistened cotton ball.
4. Put the cotton ball with the seeds attached into the matching labeled finger in your glove.
 - **Teacher Tip:** You may need to use a pencil to get the cotton ball all the way to the tips of the glove fingers. Also, for large seeds like squash, use only two seeds.
5. Repeat steps three and four with the additional cotton balls and seeds.
6. Tape the glove to a window, chalkboard, or wall. A clothesline can also be used with clothespins holding the gloves on the line.
7. Depending on what seeds are used, germination will take place in 3-5 days. The cotton balls should stay moist through germination. If one or more appear dry you can add a little water with an eyedropper or spray bottle. Germinated seeds can be transplanted in 1-2 weeks. Cut the tip off each finger and pull out the germinated seeds (cotton ball and all), and transplant into a container with soil.

Conclusion:

After conducting these activities, review and summarize the following key concepts:

- Agriculture is part of our history. It provides our food supply, clothing, and other necessities.
- Some Native Americans farmed and grew crops for their food. They also understood and practiced farming techniques to preserve their soil and other natural resources.
- Growing food requires nutrients in the soil. Growing a variety of crops helps maintain soil nutrients. Various plants benefit one another.



We welcome your [feedback!](#) Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

Enriching Activities

- Explore plant lifecycles – invite students to make observations and document in a journal the emerging plant parts and life cycle changes that occur in your three sisters garden.
- Nutrition – have students research the nutritional value of each of the three sisters and the benefits of eating them in combination. You could also challenge students to find “three sisters themed” recipes that they can make at home or as a class
- Explore the role and importance of the three sisters in Native cultures through stories, celebrations and art. Search for resources to discover these connections in your school library and on-line sources
- Read Issue 6 of [Ag Today](#) titled Plants & Animals...Providing Food, Fiber, and Energy! This reader can be printed or accessed digitally. Explore the facts about the renewable and non-renewable resources that make the products and byproducts we need for survival. Learn how agriculture provides energy through biofuels and hydropower, fiber through cotton and wool, and various food products from plants and animals that have been improved through biotechnology and crossbreeding.



Suggested Companion Resources

- The Great Pumpkin (Activity)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=441>]
- Kids' Container Gardening (Book)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=424>]

- **Corn in the Story of Agriculture (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=711>]
- **The Life Cycle of a Pumpkin (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=623>]
- **Step into the Inca World (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=467>]
- **Four Seasons of Corn: A Winnebago Tradition (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=466>]
- **Oliver's Vegetables (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=457>]
- **Pumpkin Jack (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=458>]
- **Pumpkin Pumpkin (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=459>]
- **Corn (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=446>]
- **A True Book: Corn (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=445>]
- **Life Cycles: Pumpkins (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=443>]
- **From Seed to Pumpkin (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=442>]
- **Lily's Garden (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=425>]
- **Unearthing Garden Mysteries: Experiments for Kids (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=68>]
- **Corn is Maize: The Gift of the Indians (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=189>]
- **A Gardener's Alphabet (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=137>]
- **Three Sisters Seed Packet (Kit)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=468>]
- **Crop Cards (Poster, Map, Infographic)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=797>]
- **Preserving Heirloom Crops with Wozupi Farms (Multimedia)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=887>]
- **All About the Pumpkin Video (Multimedia)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=444>]
- **How It's Made: Corn Tortillas (Multimedia)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=484>]
- **Into the Outdoors: A-maize-ing Corn (Multimedia)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=448>]

- **Ag Today (Booklets & Readers)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=829>]
- **Edible Gardening: Growing Your Own Vegetables, Fruits, and More (Teacher Reference)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=361>]
- **Native American Gardening (Teacher Reference)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=656>]
- **In The Three Sisters Garden (Teacher Reference)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=683>]
- **School Gardens: A Guide for Gardening and Plant Science (Teacher Reference)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=283>]
- **Greening School Grounds: Creating Habitats for Learning (Teacher Reference)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=417>]
- **Successful Container Gardens (Website)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=504>]
- **Kid's Gardening Website (Website)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=191>]

Sources/Credits

- Background information and aspects of the lesson were adapted from The National Gardening Association's kidsgardening.org
- Three Sisters Garden photo credited to Abri Le Roux.

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