Native Americans adapted to their environment and used a variety of agricultural techniques to grow food. Three principal crops of the Eastern Woodlands Native Americans were corn, beans, and squash. These “Three Sisters” were planted together because of the ways in which they benefit and work with each other, similar to sisters in a family. The corn stalk serves as a sturdy pole for the beans to climb. In turn, the beans, which are legumes, help add nitrogen back to the soil; as corn requires lots of nitrogen. Squash shades the beans and soil with its large leaves, preventing evaporation, soil erosion, keeping predators away that want to feast on the beans or corn, and controlling weeds. Corn, beans, and squash also offer a nutritional diet with corn for grain and carbohydrates, beans for protein and squash for vitamin A. Thus, the Native Americans, who recognized the relationship between the plants, used the natural harmony between them to feed their communities. It is not surprising that many legends and Native American folktales reference the Three Sisters.

Modern agriculture still utilizes these same principles to maintain proper soil and crop health. However, instead of planting the crops at the same time, in a modern crop rotation, annual crops are rotated in and out of production in combination with other crops and various grasses and legumes. A typical crop rotation in Virginia is corn, soybeans, and wheat or a cover crop. Crop rotation allows farmers to maintain and improve soil fertility. It can also help with pest/weed management. This allows the farmer to maintain the vitality of both the crops and soil while also using fewer fertilizers.
Growing the Three Sisters

**Objective:**
The student will be able to—
- identify the “Three Sisters” and describe their role in Native American life
- investigate seed germination

**Materials:**
- Three Sisters handout, attached
- crayons/coloring pencils
- scissors
- jewelry-sized plastic bags
- corn, bean, and squash seeds
- cotton balls
- tape
- water

**Procedure:**
1. Begin the lesson by asking students to imagine what life would be like with no grocery stores, malls, etc. Where would they get food and clothing? Remind them that this is what life was like long ago. The Native Americans had to rely on and adapt to their environment to supply them with food, clothing, and shelter. Tell them that the three staple crops of the Eastern Woodlands Indians were corn, beans, and squash and explain how they worked together. These were harvested in the summer. The Native Americans recognized that when grown together these crops helped and assisted each other.

2. Pass out the Three Sisters handout. Have students label the rectangles with the correct “sister”. Point out that the beans are using the corn as a trellis, while the squash is spread out over the ground giving it shade and preventing erosion.

3. Have students cut out the squares with the dashed lines, to make “windows.”

4. Give each student 3 jewelry bags, 3 cotton balls, and one of each type of seed.

5. Place small cups with water around the room so that students can share.

6. Review the conditions necessary for seed germination: water, oxygen, and warmth.

7. Instruct students to dip their cotton balls in the water then place one in each bag.

8. Next, place a seed in each bag and close them.

9. Match the seeds with the correct labels and tape them behind the “windows.”

10. Lastly, students may color the picture.

11. You may choose to hang the sheets in the window so that seeds receive the warmth of the sun. Have students observe the seed germination over the next few days.

**Extension**
Students observe and record data related to the seed germination. Which seed germinated first? How long did each seed take to germinate? Measure the growth of each plant after one week. Graph the results.
The Three Sisters
Measuring a Three Sisters Garden

**Objective:**
The student will be able to—
- Measure length in feet
- Measure in inches
- Determine the center of a circle
- Identify diameter and radius
- Add
- Skip count/Multiply
- Determine and contribute to a pattern

**Materials:**
- Green paper plates (corn and bean mounds)
- Yellow paper plates (squash mounds)
- Yellow pom-poms for the corn
- Red pom-poms for the squash
- Orange pom-poms for the beans
- Pieces of string, 10 feet long each
- Rulers

There are several different ways to design a Three Sisters Garden, however, the basic set-up for growing the Three Sisters recommends using a 10’ x 10’ area. Each row is 10 feet long. The distance between each row is 5’ in order for the corn to gain maximum pollination ability. There are typically 3 rows per 10’ x 10’ area; however, this lesson can be used to demonstrate only one row if desired.

When planting the Three Sisters, corn is planted first. Once the corn stalks are approximately 4 inches tall, the squash and beans are planted in their mounds. In this garden design, squash is planted alone, and the beans are planted with the corn. The mounds are two feet apart from the center of the next mound. The squash seeds are planted as a triangle and are 4” apart from each other. The corn seeds are planted 6” apart so that they look like a compass rose (with a seed at each direction). When the bean seeds are planted, they are placed in the four corners of the mound 6” apart.

See diagrams in steps 12-14.

**Procedure:**

1. Cut string into 10’ long pieces.
2. Group your students into groups. If you are doing 1 row, you will need 5 groups. If you are doing 2 rows, you will need 10 groups, etc.
3. Pass out green and yellow paper plates. Alternate what color the groups get (green, yellow, green, yellow, etc.)
4. Give the groups a ruler and ask them to find and mark the center of the circle. For younger students you can mark the center of the plates prior to the activity.
5. Lay one piece of 10’ long string on the ground. Ask a student to measure 5’ below that string. That is where the next piece of string will go. Measure 5’ apart from the string for however many rows you want to do.
6. Remind students the rows are 5’ apart in order to ensure proper pollination of the corn, which is pollinated by wind rather than by insects.
7. Next, ask a student to measure 2’ increments on the strings and mark them with a piece of tape, starting at one end of the top row. There should be 5 increments marked on each piece of string.
8. Ask a squash group to place the center of their yellow paper plate on the piece of tape at the end of the top row.
9. Then ask a corn/bean group to place the center of their green paper plate on the next piece of tape 2 feet away. The next plate will be yellow, then green, then yellow.

10. Move on to the next row and begin with a green plate. Place the plates on all of the increments on your rows. The beginning of each row should be different than the row above and below it.

11. Now, pass out the pom-poms used for corn to the students that had green plates. Tell the students that you must plant corn first and wait for the stalks to be 4” high before planting the beans and squash.

12. Ask the students to plant the “seeds” on the green plates. Each seed is 6” apart and they are spaced similar to the compass rose.

13. Give the students that had yellow plates the pom-poms that represent squash. Ask them to plant their “seeds” 4” apart in an equilateral triangle.

14. Give the students that had the green plates the pom-poms that represent beans. Ask them to plant their “seeds” in the 6” apart like a square.

15. Practice adding the number of seeds in each row, using addition facts, repeated addition, or multiplication (depending on the needs of your students).