



FortWhyte Alive
HUMAN NATURE.

Naturescape for Educators

bringing biodiversity into the schoolyard

The Three Sisters Garden



The Three Sisters Vegetable Garden

Part of staying healthy is thinking about the food we put into our bodies. Most students are able to recognize an apple from an orange but understanding where our food comes from is not as simple. Building a vegetable garden is a vivid, hands-on and interactive way to get students thinking about the food they eat.

Introducing the Family: Corn, Squash and Beans

Three Sisters vegetable gardens are an example of companion planting that has been used for centuries in North America. Corn, beans and squash don't just tolerate each other; they have a symbiotic (mutually beneficial) relationship.

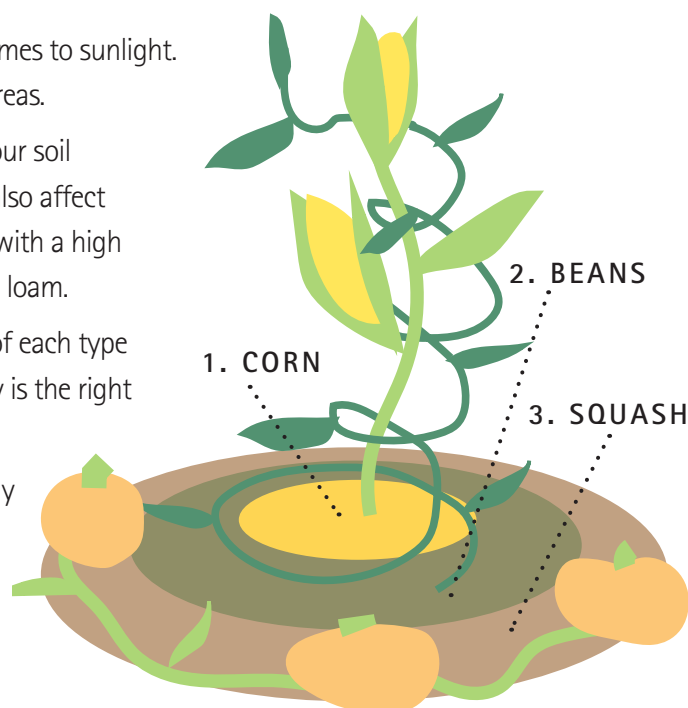
- **Corn:** Often in the centre of the garden, this sister provides a surface for the bean vines to hold onto and grow. A heavy user of nutrients, corn benefits from the fertilizing action of the beans.
- **Squash:** This sister spreads along the ground preventing weeds from growing and keeping the soil moist. Squash leaves choke out weeds, keeping the other two sisters happy.
- **Beans:** The final sister provides vital nutrients (nitrogen) to the soil through root nodules under the ground. Beans ensure her other sisters grow to their fullest.

Did You Know?

- Raised beds warm earlier in the season and provide more drainage than a traditional garden.
- Corn was grown in Manitoba as early as 1400 A.D.
- The Tewa, a tribe in the Southwest United States, often included a 4th sister, the Rocky Mountain bee plant, to attract bees to pollinate their crops.
- In and around the Great Lakes, whitefish were traditionally buried in the ground as fertilizer for the three sisters.
- The largest pumpkin ever grown was over 800kg! The pumpkin was grown in Ormstown, Quebec.

Things to Think About

- 1. Amount of sun.** Plants are often picky when it comes to sunlight. The best Three Sisters gardens are planted in full sun areas.
- 2. Type of soil.** The amount of sand, silt, or loam in your soil will affect its drainage or water retention. The pH will also affect which plants thrive. The best soil for vegetables is one with a high amount of humus and equal amounts of sand, silt and loam.
- 3. Garden variety.** There are many different species of each type of vegetable you can plant. Double check which variety is the right choice for your school.
- 4. Size of plot.** Since corn and squash grow relatively large, a Three Sisters garden requires a minimum of 10 by 10-foot space.
- 5. Harvesting period.** Try to find vegetables that will ripen while students are at school.



There are many varieties of beans, corn and squash that will mature while students are still in school. The chart below has information to get you started:

Sister	Variety	Seeding	Harvest Period	Additional Information
Corn	Choose popcorn or flour varieties	June 1 or when soil is 15 C	Fall	Takes up a lot of space, ideal for large garden
Squash	Pumpkin	June 15		All squash are large and spreading. Ensure there is enough space in the garden
	Buttercup			Green buttercup was developed in 1932 by North Dakota State University
	Old Hubbard Squash			Grows BIG! 20-30 lbs
	Acorn Squash			Native to North America and can be traced back to 4000 B.C
	Spaghetti Squash			Harvest when it is between 2 and 5 lbs and the skin is golden
	Butternut	June 8		This squash yields more fruit than most other squashes
Beans	Scarlet Runner	June 1		Delicious vine bean that can be eaten green or dried. In Europe, the roots are also eaten.
	Dry Bean	June 1		Bush bean – Dry bean
	Navy bean	May 20-24		
	Pinto bean			
	Red, White, Kidney Bean			
	Dutch Brown			
	Cranberry bean			
	Great Northern			
	Pinto Bean			
	Pink Bean			
Jacob's Cattle				

Note: There have been years that Manitoba has had frost as late as June 5th. As long as the seedlings do not emerge before the last frost, they can be seeded in late May. If transplanting, it is advisable to wait until mid-June. For the three sisters, seeding directly to soil is much easier than starting your plants indoors.

Do's and Don'ts

- **Do** shelter the garden from wind. A living border such as a hedge can offer protection while providing bird and insect habitat.
- **Do** rotate the crops in your garden. A four-year rotation will help maintain soil nutrient levels and keep your garden growing strong.
- **Do** use high quality soil. A 3:1 mix with compost should provide your plants with the nutrition they need for the first few years. Add compost every year to keep the soil fertile.
- **Don't** let weeds take over. Weed as often as possible to ensure your vegetables get the maximum amount of nutrition and sunlight. Try planting a few sprawling plants such as zucchini or add mulched leaves to help reduce the amount of weeding and retain soil moisture.
- **Don't** pay for water. Collect water in a rain barrel to reduce your school's watering costs and help the environment by reducing clean water usage. Keep soil moist but not soaked during seed germination.
- **Don't** plant too close together. Squash are not only spreading plants, they can also grow quite large. Ensure you follow the spacing requirements outlined on your seed packages.

Three Sisters Chili Recipe

Ingredients:

- 1 squash (spaghetti or butternut) roasted in the oven/microwave, skinned & cubed
- 1 cup of beans, soaked eight hours then boiled until tender
- 1 cup of chickpeas, soaked eight hours and boiled until tender
- 4-6 fresh tomatoes, or one large can tomatoes
- 1 cup sweet corn, fresh cut off the cob, frozen, or canned
- 1 onion, diced
- 1 cup water, apple juice, lager, or cider
- 3 tbsp apple cider vinegar (or lime juice)
- 2 tbsp chili powder
- 1.5 tsp each of cumin, allspice, and coriander
- 1 tsp cocoa
- 1 dash black pepper

Add a sprig of fresh cilantro (but only if you have it!)

Directions:

- Put ingredients together in a slow-cooker, set on high, and cook 6 hours OR, in a stockpot, bring ingredients to a boil, reduce heat, and simmer 1 hour.
- Add 500g of any meat or fish, if desired. Place in slow cooker 3 hours before serving, in stockpot 1 hour before serving.

Recipe provided by Jeff Buhse.

Three Sisters in the Curriculum

GETTING THE SOIL READY

Before your students plant, ensure the soil is rich with nutrients. Have students remove any weeds, turn-over the soil and add compost (or fertilizer). Make sure there is little chance of rain before you add compost or fertilizer to limit the amount of runoff.

MINI GARDENERS

Transform your students into gardeners. Discuss the needs of living things and build a plant maintenance chart. Designate one section of the garden or one vegetable of garden to your class and have them plant their own corn, bean and/or squash. Nominate different students each week to tend to the garden or do it as a class.. Other things to think about: Help the beans grow by attaching the runners to the corn. Ensure the corn is growing straight upwards using pegs and string. Create drainage for standing water in the garden.

GARDENING SCIENCE

Record the growth of the garden by drawing it and measuring plant height every week. Place rain gauges in the garden and record weekly rainfall. Have students calculate how much water their garden is receiving. Place thermometers in the garden. Record the daily temperatures. Graph the results. Have students determine whether additional watering is necessary based on the precipitation data you've gathered.

WEEDS AND MORE WEEDS

Although the squash will prevent weeds from taking over the garden, it will take a few weeks before the squash can establish itself enough to help the other sisters. In the meantime, weeding is an important part of keeping the garden healthy. Discuss what weeds are with the students and send students to the garden to pick weeds (making sure they don't accidentally pick the growing three sisters!). Weekly weeding is often enough to ensure the garden stays healthy and strong.

GETTING THE GARDEN READY FOR SUMMER

Once the Three Sisters garden has a foothold, it will require very little maintenance other than periodic watering. Have families volunteer to look after the garden over the summer. Ask the community for help in maintaining the garden. Ensure there is a water schedule and system in place before the summer begins.

FEAST ON THE HARVEST

Succotash is a delicious meal that was historically made from a Three Sisters garden. Succotash comes from the Narraganset word *msikwatash*. It consists primarily of corn, beans and peppers and was a popular choice of meal during the Great Depression. Create a meal from the harvest for everyone to share.

HERITAGE/HEIRLOOM SEEDS

Keep some of the seeds from your squash, corn and beans for next year. (Note: Only take seeds from the healthy plants.) Sort and select intact seeds. Rinse and dry the seeds and place in a cool, dark place for next year (there is no need to wash bean or corn seeds). Discuss what heritage seeds are with the students. Discuss the notion that the seeds you plant today may have come from plants that the students' great grandparents grew in their garden. Discuss sustainability in food production.

HARVEST THE GARDEN

The garden should be ready for harvesting in September or early October after students return to school. If the garden was divided per grade, the kindergarten or pre-school classes can partake in harvesting by taking the plot planted by the previous, oldest grade – who have moved onto another school. Have students collect the edible parts of the plant. All other plant parts can be placed in the compost to help return nutrients to the soil next year. Dry corn stalks do not compost well. Try selling the stalks as fall yard decorations for a school fundraiser!

HISTORY OF THE THREE SISTERS GARDEN

Have students research the history of the Three Sisters in North America. Discuss the farming of corn, beans and squash by indigenous communities. Discuss domestication. Have students research their favorite sister (of any variety) and create a presentation based on their findings from the garden and their research. Present in the garden next to their sister of choice. Build interpretive signs for the garden.

Curriculum Links

There are many curriculum links that can be made while managing a garden. Here are a few links that are easy to connect to:

Science: Kindergarten Cluster 0; Grade 1: Characteristics and Needs of Living Things; Grade 2: Growth and Changes in Animals, Air and Water in the Environment; Grade 3: Growth and Changes in Plants, Soils in the Environment; Grade 4: Habitats and Communities; Grade 5: Maintaining a Healthy Body, Weather; Grade 6: Diversity of Living Things. **Social Studies:** Active and Democratic Citizenship, Managing Information and Ideas, Critical and Creative Thinking, Communication; Kindergarten: Me, The World Around Me; Grade 1: My Environment, Connecting with Others; Grade 2: Our Local Community; Grade 3: Connecting with Canadians; Grade 4: Living in Manitoba, History of Manitoba; Grade 5: First Peoples, Early European Civilization; Grade 6: Canada Today: Democracy, Diversity and Influence of the Past. **Math:** Statistics and Probability, Shape and Space. **English:** Discover and Explore, Clarify and Extend, Use Strategies and Cues, Plan and Focus, Select and Process; Organize, Record and Assess; Generate and Focus, Present and Share, Develop and Celebrate Community; Encourage, Support and Work with Others. **Visual Art:** Art, Language and Tools, Creative Expression in Art, Valuing Artistic Experience, Understanding art in Context.