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Inch by inch: Making our gardens grow

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FEATURE | *by Rita Beck Neal and Nanci Weinberger*

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"I have a fond childhood memory of picking raspberries with my mother—we did this only once," says Rita. "I was surprised to find that raspberries were on bushes and not in a container in a store. There they were—so many bright red, sweet, juicy raspberries to pick *and* eat. And there were pickers! Somehow that did not deter my interest in harvesting those beautiful raspberries."

Why does this memory stand out? Is it because it was a multisensory experience? Was it the excitement of discovery? It may have been the relaxed pleasure of being a little messy for a change. Perhaps it was as simple as having a joint activity outside with my mother. These ideas suggest that there are many reasons to create gardens with children, including young children in your program.

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"I have pictures bringing my oldest daughter to pick apples before she was walking," continues Rita. And I have pictures of my younger daughter at 13 months sitting in a strawberry patch eating her weight in strawberries. I have also witnessed my eldest daughter eating tomatoes, cucumbers, and edamame directly from our garden, the same vegetables she had turned down at dinner."

There is something transformative about being at the source of our food and witnessing the process of growing week after week. It's something that cannot be conveyed through books or in the classroom. This is experiential, hands-in-the-dirt kind of learning. There is no replacement.

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Why bring gardens to early education programs?

School garden success has a long history, but this success has been found primarily in elementary schools (Blair 2009). Yet child care centers are typically open year-round and therefore are better prepared to enjoy the full bounty that gardens may provide.

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Gardening with young children isn't new (McFarland 2005), but a small national "farm to child care movement" that supports garden programs is growing (Berkenkamp and Mader 2012).

Unfortunately, many teachers are not familiar with gardening and plant science (Blair 2009). The novelty of gardening may be one of the obstacles in bringing gardens to the child care environment. Other obstacles can include concerns about working with children in messy outdoor settings and engaging in strenuous labor.

So why do it? What are the benefits for young children?

1. **Gardening promotes healthy eating.** School programs that have vegetable gardens have been shown to enrich children's understanding about food and nutrition (Blair 2009). Children not only understand food better, but also are eating better by consuming more fruits and vegetables (Bell and Dyment 2008). This is especially important in the preschool years when children's taste preferences are developing (Berkenkamp and Mader 2012). Their early food choices can lead to healthy eating habits and fewer diet-related health risks.
2. **Gardening provides new play options.** Gardens diversify the outdoor environment, introducing new play options (Moore and Wang 1997) and forming the perfect backdrop for nature play. Children can manipulate and play with natural materials, which offer multisensory, fine motor, and gross motor experiences (Moore 2014). Some examples of what children can do:
   - rub the leaves of an herb plant and smell the scent on their fingers,
   - use different sized gardening scoops and their hands to appreciate the properties of the soil, including its tactile properties, and
   - collect and creatively reassemble weeds, twigs, fallen leaves, and acorns that interfere with plant growth.

   Gardens can be the antidote to children's disconnection from nature and put them on a path toward having fun in the natural world (Louv 2008).
3. **Gardening encourages experiential learning.** Gardening offers engaging activities in which children learn by doing. This fits well with all the other ways in which children learn. For example, after being read a book about seeds (*What's This? A Seed's Story*, for example), children can learn about the size and shape of seeds by playing a seed sorting game. The story and the activity prepare children to mindfully handle seeds for planting. Thus, the children are learning in a variety of ways about seeds, including getting hands-on experience studying and planting seeds. Not surprisingly, school gardens have been shown to improve science and math academic achievement for older children (Klemmer, Waliczek, and Zajicek 2005).
4. **Gardening reinforces children's caring.** In gardening, young children have opportunities to see the value and interconnectedness of the natural

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world. When tending a garden, they are putting their nurturing instincts into action. For example, when they water their plants to keep them alive, children may wonder where water comes from and how to make sure there will be enough for the plants' survival. Caring for their garden may extend to other parts of the natural world too. Being involved in gardening projects has been shown to increase children's awareness about the natural world and their role as caretakers (Bucklin-Sporer and Pringle 2011).

Plan now for fall and spring gardens

If adding a garden to your program sounds intimidating, consider going slowly, keep it simple, and take it one step at a time. Remember that you don't have to do it alone. Resources are all around.

Get inspired by browsing through the videos, books, and organizations listed at the end of this article. Think about getting your families involved. Planning the garden is a wonderful way to build interest with the children and parents. Let families know about your plans to start a garden, asking for help that you may need. A weekend garden work day could be a great community-building opportunity. Some parents may like doing the manual work, while others may prefer to fundraise for supplies instead.

Let's break it down into steps.

Step 1. Plan the garden. Show children pictures of different types of gardens and ask them to consider the options. The options might include a butterfly garden, an herb garden, or a vegetable garden. Fruit plants such as strawberries and blueberries are also popular choices. Invite children to make a collaborative collage of the plants they are interested in growing.

Decide on the scale and the location of the garden. If squirrels, rabbits, or other animals inhabit the area, fencing may be necessary.

If garden beds don't work for your setting, consider raised beds or containers. Container gardening is a great way to have plants outside without needing to dig into the ground. Flower pots, good soil, and a sunny location are what s needed. If outdoor access is limited, you can grow plants inside. Containers, soil, and sunny windows are all that's needed.

What's important is to have a space that gets at least eight hours of sun every day.

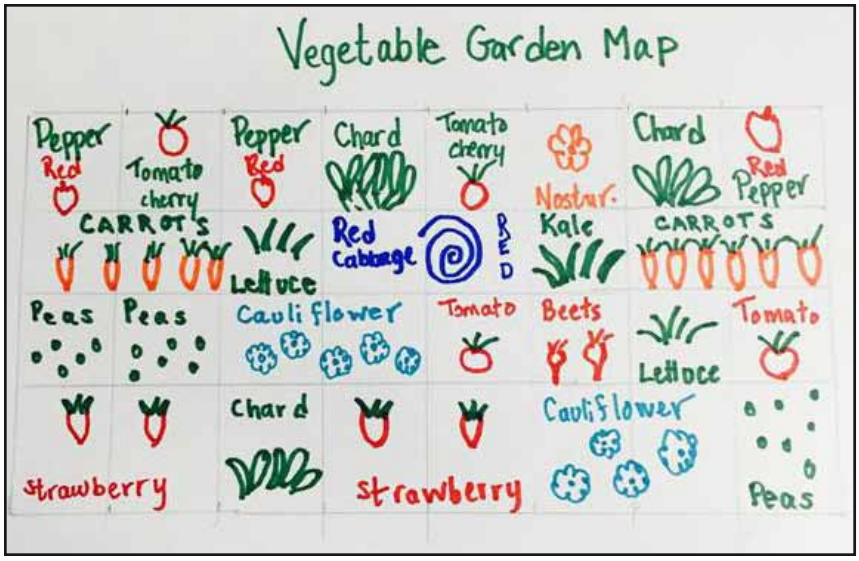
Step 2. Map the garden. Mapping your garden is visually appealing for the children, and it's what seasoned gardeners do in the winter prior to spring planting. Use simple drawings or stickers to create a colorful map. You can find a good digital-map-planning program at the website of a Vermont gardening supply company, www.gardeners.com/on/demandware.store/Sites-Gardeners-Site/default/KGP-Design.

Step 3. Buy seeds or plants. When choosing your garden plants or seeds to grow, consider the following:

- how many days to maturation,
- how tall the plants will grow,
- whether the plants will thrive in sun or shade, and
- when to plant (after the possibility of frost?).

Help children research these variables for each plant, according to your geographical area. In Texas, for example, see "Easy Vegetables to Grow" on the Texas A&M AgriLife Extension website, https://agrilifeextension.tamu.edu/solutions/easy-vegetables-to-grow/.

Many seed and nursery companies offer free catalogs that the children can look through to decide which plants to grow. See below for classroom seed resources. Some companies will supply schools with free seeds.



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Be aware that some plants are poisonous or hazardous and must be avoided. To identify, use online resources such as Cornell University's website, http://poisonousplants.ansci.cornell.edu.

Step 4. Prepare the soil and plant seeds. This step offers a perfect opportunity for involving parents and volunteers. Consider appointing one person to lead and coordinate the effort, such as a Master Gardener. To find a contact person in your state, see http://ahsgardening.org/gardening-resources/master-gardeners.

Inform parents by email, Facebook, or printed handouts. Invite volunteers from local garden clubs, youth organizations such as Scouts, and college service organizations.

Preparing the soil is key for the success of the garden. Each spring the soil needs to be amended or fertilized to create the best growing medium. A local university Extension lab can test the soil at little or no cost. In Texas, find more information about submitting samples as http://soiltesting.tamu.edu/. Allow a week or more to receive results. The test results may include information about fertilizers for your soil type.

Compost is a wonderful way to add nourishment to soil. See the "Taking it further" section below for ideas on starting a school compost bin.

Once you have fertilized the soil, mark the rows or containers with the names of the plants. It can be hard to distinguish seedlings, and it's exciting for the children to see and name the plants that are growing. Placing the seed packets on large ice cream sticks is a good way for preschool children to identify seedlings.

Plant the seeds in the soil as directed on the packets. You may wish to start the seeds in small pots indoors before transplanting them to beds or containers. If you're new, you might want to begin with tomato and marigold seeds, which are fairly easy to start indoors.

Step 5. Tend the garden. Maintaining healthy soil is the best way to keep pests away. Companion planting can help protect many vegetable and fruit crops. For instance, dill and basil planted among the tomato plants can help deter tomato pests. Planting nasturtiums and marigolds help to deter aphids and bring color to the garden. For more information on companion planting, see www.motherearthnews.com/organic-gardening/companion-planting-guide-zmaz81mjzraw.

Watering and feeding the garden is also vital. Provide small watering cans, spades, gloves and other tools in small sizes for the children.

Activities can take place near the garden. Go into the garden, water, and then read a book or hunt for insects. The garden shows us that nature makes a great classroom. Experiment with the sun exposure and watering, and notice pests, soil, and drainage. You are giving children the experience of gardening with everything it entails.

Step 6. Harvest from the garden. Harvesting can be an ongoing activity. Encourage the children to attend to the plants' many stages of growth. Observe

PHOTO BY RITA NEAL

leaves, blossoms, and buds as the plants grow and unfold into viable harvest-ready food.

Harvest days can be just one crop at a time or many depending upon many factors including the seeds you planted. Take care in harvesting just as in tending the garden. Many plants continue to grow after the first harvest, other plants have many blooms that mature at different rates. Care and attention is key.

Even when plants do not thrive, children will learn the fragile nature of plant life and explore why.

Step 7. Eat, cook, and celebrate. Traditionally harvest is connected with celebration. The farm family and workers spend days in the fields gathering the harvest, and then it is time to relax and enjoy. A celebration is always fun and a great way to complete the circle of growing.

Depending on when your plants mature, you can have a snow pea or snap pea harvest in late spring and early summer or a basil pesto in summer. Zucchini, a prolific summer squash can be used in dozens of recipes.

In autumn, hard squash can be made into pie, or sliced and roasted with seasoning. Carrots are a favorite raw or cooked, and both squash and carrots and any other fall vegetable can be used in a fall harvest festival.

Cooking activities

Simple recipes, like those below, enable children to prepare food they will enjoy making and eating. Search your own collection or the Internet for recipes that use your garden harvest.

Be sure that children wash their hands before handling any utensils or food, and have them wash vegetables and berries from the garden as well. Caution: Have adults use kitchen machinery such as a food processor or blender and a hot plate for sautéing.

Vegetables and lemony hummus

- Tomato
- Cucumber
- Bell pepper

Provide serrated plastic knives for children to cut the harvested vegetables, and paper plate for serving them with hummus.

- Juice from 1 lemon
- 3 tablespoons extra virgin olive oil
- 1 ½ teaspoons salt
- ½ teaspoon pepper
- ¼ cup water
- 2 garlic cloves
- 2 cans chickpeas (garbanzo beans), rinsed and drained

Invite children to measure the first six ingredients and empty into a food processor or blender. Meanwhile, an adult opens and drains the chickpeas, and then pours them into the blender. The adult processes the mixture until thick, but spreadable. Add more water to thin if it is too thick. Makes 6 to 8 servings

Bruschetta with sautéed greens

- 1 baguette or other roll cut into ½-inch-thick slices
- 1 bunch Swiss chard, spinach, kale, or other cooking green, washed and de-stemmed
- 1 shallot or ½ small onion, finely minced
- salt and pepper to taste
- 3 tablespoons olive oil
- Olive tapenade and goat cheese (optional)

Demonstrate how to cut off stems from the greens. Invite children to continue removing the stems and then chop the greens into large (2-inch) slices.

An adult adds one tablespoon of olive oil to sauté pan and heats until warm. Add onion or shallot and sauté until translucent. Add greens and cook until wilted. Add salt and pepper to taste. Allow to cool slightly.

Heat oven to 350 degrees F. Invite children to brush each baguette slice with olive oil and place on a sheet pan.

An adult places the baguette slices in the oven and toasts for about five minutes until light brown. Cool.

Just before serving, have children top each baguette slice with a healthy portion of greens.

Optional: Dress up the bruschetta with a thin layer of olive tapenade or soft goat cheese on the baguette slice.

Taking it further with garden-themed activities

Consider doing the activities below at different times of the year. Use the resources at the end of the article for more information.

Compost

All unused plant matter from the garden, as well as vegetable peelings from the kitchen, can go into a compost bin. It is a wonderful opportunity to teach the lesson of conservation by using all available resources to make home-grown

compost fertilizer for your garden beds and containers.

Compost has four essential components:

- green plant matter, such as carrot tops, fledgling plants, and wilted lettuce,
- brown plant matter, such as brown leaves and straw,
- water, and
- air.

One popular compost bin is a rectangular shape with four sides and a top and bottom. The top lifts to add water and turn the mixture, and a small hatch on the side near the bottom allows easy access to add green and brown matter and remove ripened compost from the bottom.

Play garden

Having an area with soil and tools allows children to play garden without the necessary restrictions that the production garden has. Encourage children to dig, mix, and explore creatively. This area can be a small corner of the playground or garden area clearly marked off for creative experimentation. You may want to start gardening with a play garden to build interest in gardening.

Seed sorting

Gather seeds from packets or the bulk bins of your nearest health food market. (Yes, those beans, peas, and sesame seeds are proper seeds) Provide an ice cube tray or other sorting tray and plastic tweezers, and encourage children to sort mixed seeds. This activity can stimulate focus and hand-eye coordination as well as fine motor skills.

PHOTO BY SUSAN GAETZ

Science: Parts of a seed

Soak lima beans overnight. The next day, take apart the seed to identify the seed coat (outer layer), embryo (tiny plant), and endosperm (starchy food that feeds the embryo as it emerges out of the soil).

What am I eating?

Many a snack or lunch has foods that can be an example of a plant part. Carrot is a root, celery is a stem, broccoli is a flower, lettuce is a leaf, apple is a fruit, and corn, peas, and wheat are seeds. What are you eating?

Sunflower power

Growing sunflowers is a great treat for children. Sunflowers can be planted from seeds, grow from 5 to 9 feet tall, and have large, bright blooms. Bees and birds are attracted to the large bloom, so the children can observe these visitors.

In the fall the sunflowers will dry and wilt on the stem. Cut 1 inch of the stem with the head of the sunflower and remove the seeds by shaking gently or using your fingers. If the seeds don't fall out easily, let the head dry longer inside.

Save the seeds for planting next spring, put them in a bird feeder, or eat them as a snack. You can also cut the sunflower blooms and place them near the garden to feed the birds.

Insect investigation

Before starting this activity, talk to children about respect for all life in the garden including insects. This investigation is for looking only; we do not harm or touch the insects because many are helpful to the plants in our garden.

Insects are all around us; we just need to know where to look.

Provide small magnifying glasses, and encourage children to look for insects, using the list below:

- Under boards or rocks: ants, crickets, beetles, and termites
- On plants: grasshoppers, beetles, flies, aphids, and leafhoppers
- In the air: butterflies, moths, flies, bees, wasps, and beetles
- In or around flowers and ornamental plants: beetles, bees, wasps, ants, aphids, walking sticks, butterflies, and moths

Photograph the insects with a digital camera or your cell phone, and examine the photos in the classroom. Identify the insects using a book such as the *Kaufman Field Guide to Insects of North America*, or on an Internet site, such as www.insectidentification.org/.

Water for the garden

Install a rain gauge near the garden. Invite children to record the amount of rain weekly and chart the amounts on a graph. Comparing the amounts to the status of the plants (green and vibrant or yellow and wilted) will help them to know how much water the garden needs.

Tiptoe through the garden

Creating stepping stones and signs for the garden. Establish rules for how to step through the garden without harming the plants.

Visit the garden to identify shapes and colors of the growing plants. Invite children to use paper and crayons to diagram the garden shape and record their color findings

Garden journals

Chronicling the garden process through photographs and children's drawings and quotes can be a lively takeaway for the children and parents. The journal can also be an important resource for future gardens.

Use large chart paper to record the date and type of each seed planted. Include the seed packet or a picture of the plant and a sample seed. Add details about when the plant emerges from the soil and when it is harvested. Contrast how fast and slow the different plants emerge and can be harvested.

Growing plants without seeds

Some plant can grow without seeds. This activity is easy and fun to do inside during the cold winter months. Simply place the plant part in water, as described below, near a window at room temperature, and watch what happens. Change the water as needed. Experiment with other plant parts.

Carrot: Save about ½ inch of the orange carrot top, and place it in a saucer with water. Leaves will appear.

Celery. Save about 3-4 inches of the celery base, and place it in a saucer of water. The celery will start sprouting new stalks.

Scallions. Place the white and root end of scallions into a clear glass of water. Green shoots will grow within a few weeks.

Sweet potato: Place a small sweet potato in a clear glass with the bottom half below the water. Suspend the top half above the water by sticking toothpicks in

the sides and resting them on top of the glass. Add water to keep the level constant. Observe the potato growing roots.

Romaine lettuce: Save about 1 inch of the base of a bunch and place in a shallow dish of water. Watch the leaves regenerate.

Helpful organizations and websites

Agriculture Extension programs (state universities). Often have a Master Gardener program that can assist with community inquiries. Texas A&M has a list of programs listed by county, https://agrilifeextension.tamu.edu/programs/volunteer-programs.

Farm to Preschool. Supports the child care community in efforts to develop healthy food practices, including gardening programs, www.farmtopreschool.org/home.html.

High Mowing. Organic Seed Company. Lots of helpful and easy-to-print charts of gardening information, www.highmowingseeds.com.

Life Lab. Provides professional development to support children's connection to nature and healthy eating through garden-based education. Newsletter and on-site workshops and consultations, www.lifelab.org.

Kids Gardening. Supports school garden programs with educational resources, garden building guidelines, and grants, www.kidsgardening.org.

Natural Learning Initiative. Affiliated with the College of Design, North Carolina State University. Works to encourage children to experience the natural environment by providing educational resources and design guidance on gardening and other topics, https://naturalearning.org.

Real School Gardens. Works with schools to design and build school gardens and develop garden curriculum, www.realschoolgardens.org.

Seeds of Change. Organic Seed Company. Supports school garden programs through annual grants, https://seedsofchangegrant.com.

The Edible Schoolyard. A network for preschool and school programs to create and share curricula on garden and kitchen programs, http://edibleschoolyard.org/.

Whole Kids Foundation. A charitable organization created by Whole Foods Market to support healthy food choices for children. This includes educational and grant opportunities for school gardens, www.wholekidsfoundation.org.

For further reading

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For viewing and listening

Watch Us Grow, brief video from Real School Gardens. All about what is grown and why in one school garden, www.realschoolgardens.org/.

The Garden Song and five other videos from Growing Minds: Farm to School, http://growingminds.org/.

Building a Garden for Preschoolers from Georgia Organics, https://vimeo.com/75768835.

How We Can Eat Our Landscapes, Ted Talk (2012) by Pam Warhurst, cofounder of Incredible Edible, www.ted.com/talks/pam_warhurst_how_we_can_eat_our_landscapes.

Seed Starting with Children podcast from National Gardening Association, https://garden.org/ideas/view/dave/2781/ATP-Podcast-107-Seed-Starting-with-Children/.

Recommended young children's books about gardening

Bugs

Beetle Bop by Denise Fleming (2007)

Bugs, Bugs, Bugs by Bob Barner (1999)

Bumble Bee, Bumble Bee, Do You Know Me? by Anne Rockwell

(1999)
Hey, Little Ant! by Hannah and Phillip M. Hoose (1998)
The Grouchy Ladybug by Eric Carle (1977)

Compost

Compost Stew: An A to Z Recipe for the Earth by Mary McKenna Siddals and Ashley Wolff (2014)
Garbage Helps Our Garden Grow: A Compost Story by Linda Glaser and Shelley Rotner (2010)

Flower garden

Planting a Rainbow by Lois Ehlert (1988)
The Flower Garden by Eve Bunting and Kathryn Hewitt (1994)

Gardens

How Groundhog's Garden Grew by Lynne Cherry (2003)
Inch by Inch: The Garden Song by David Mallett and Oran Eitan (1997)
Maisy Grows a Garden by Lucy Cousins (2013)
Our Community Garden by Barbara Pollak (2004)
The Little Gardener by Emily Hughes (2015)
The Surprise Garden by Zoe Hall and Shari Halpern (1999)

Plants

One Bean by Anne Rockwell and Megan Halsey (1999)
Plant Secrets by Emily Goodman and Phyllis Limbacher Tildes (2009)
Stems and Roots by David Schwartz and Dwight Kuhn (1998)
Two Old Potatoes and Me by John Coy and Carolyn Fisher (2013)
Sylvia's Spinach by Katherine Pryor and Anna Raff (2012)
Weeds Find a Way by Cindy Jensen-Elliot and Carolyn Fisher (2014)

Seasons

And Then It's Spring by Julie Fogliano (2012)

Seasons and seeds

What's This? A Seed's Story by Caroline Mockford (2007)

Seasons in the garden

Strega Nona's Harvest by Tomie dePaola (2012)
Up in the Garden and Down in the Dirt by Kate Messner and Christopher Silas Neal (2017)

Seeds

A Seed Is Sleepy by Dianna Hutts Aston and Sylvia Long (2014)
Flip, Float, Fly: Seeds on the Move by JoAnn Early Macken and Pam Paparone (2016)
Flowers and Showers: A Spring Counting Book by Rebecca F. Davis (2006)
The Carrot Seed by Ruth Krauss and Crockett Johnson (2004)
The Tiny Seed by Eric Carle (2009)
Van Gogh and the Sunflowers by Laurence Anholt (2007)

Vegetables

Growing Vegetable Soup by Lois Ehlert (1990)
The Vegetables We Eat by Gail Gibbons (2008)

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