Growing and Cooking Fruits and Vegetables at Childcare Centers

Local Foods: Childcare Center Production Gardens 1

This publication summarizes the benefits of fruit and vegetable gardening with children. It includes age-appropriate activities for childcare providers to engage young children in using fresh produce from a production garden for cooking and eating. This is the first of eight publications about childcare center production gardens.

Early childhood educators have an important opportunity to help create positive environments that connect with young children's senses, allowing them to plant, grow, harvest, and ultimately prepare healthy eating experiences. Children develop healthy eating habits and food preferences at an early age. The more engaged children become with hands-on food education, such as gardening and food preparation, the more likely they will prefer and routinely consume fruits and vegetables.[1, 2, 3, 4]

Findings of the Natural Learning Initiative (NLI) Preventing Obesity by Design (POD) program emphasize the significance of gardening for engaging teachers and children in on-site food production.[5] By incorporating a designated production garden in the outdoor learning environment, childcare centers can inspire lifelong healthy eating habits and can become models for the families they serve.

The Centers for Disease Control and Prevention (CDC) recommend a diet high in fruits and vegetables to lower risk for numerous chronic illnesses, including cancer and cardiovascular disease.[6] For most Americans two years and older, specifically preschool age children, vegetable intake falls below CDC recommendations.[7, 8] Natural Learning Initiative (NLI) Preventing Obesity by Design (POD) childcare centers recognize that a well-balanced eating plan containing fruits and vegetables can help children maintain a healthy weight.[9] These centers have embraced and integrated growing, harvesting, and cooking with children into their daily curriculums.

GARDENING AND COOKING ABILITIES OF YOUNG CHILDREN[10]

Classroom activities based on experiences with growing and cooking fruits and vegetables can help young children learn key developmental skills, including:

- **Science skills**: classification, weather, insects, soil, and plant life cycles.
- **Math skills**: counting, measuring, and weighing.
- **Language skills**: describing and comparing color, taste, and texture.
- **Fine motor skills**: mixing, spreading, and chopping.
- **Cognitive skills**: curiosity, cause-and-effect, and problem-solving.

Why is exposure to growing and cooking fruits and vegetables important for young children?

- *Dietary Guidelines for Americans* recommend at least two servings of both fruits and vegetables each day.
- Essential vitamins, minerals, and fiber provided by fruits and vegetables may help prevent chronic diseases.
- Growing, preparing, and eating fruits and vegetables, from their own gardening efforts, can help children develop lifelong healthy eating habits.
- Participating in a full range of gardening from seed to tummy helps children understand the origins of food.

Little fingers loosening roots before planting.

Young children are curious and highly motivated to learn new skills like gardening and cooking. With adult encouragement in a safe, carefully prepared, and supervised environment, growing and cooking abilities can advance rapidly, aligned with age-appropriate activities:

APPROPRIATE ACTIVITIES FOR **TWO-YEAR-OLDS** INCLUDE:

Gardening

- *pushing* child-size wheelbarrows
- *watering* plants with help from a teacher
- *pushing* large seeds, such as beans and peas, into the soil
- *observing* insects and ripening produce

Cooking

- *scrubbing* vegetables and fruits
- *carrying* (unbreakable) items to the table
- *dipping* foods
- *washing* and *tearing* lettuce and salad greens
- *breaking* bread into pieces

APPROPRIATE ACTIVITIES FOR **THREE-YEAR-OLDS** INCLUDE:

Gardening

- *mixing* soil to prepare garden beds
- *planting* large seeds and seedlings
- *filling* up watering cans
- *watering* plants
- *pulling* weeds
- *observing* plant growth
- *comparing* leaf shapes
- *describing* appearance of fruits and vegetables

Cooking

- *pouring* liquids into batter (measured first)
- *mixing* batter or other dry and wet ingredients together
- *shaking* a drink in a closed container
- *spreading* butters or other spreads
- *kneading* dough
- *washing* vegetables and fruit
- *serving* foods
- *placing* things in the trash after cooking or after a meal

APPROPRIATE ACTIVITIES FOR **FOUR- AND FIVE-YEAR-OLDS** INCLUDE:

Gardening

- *shoveling* compost and mulch
- *raking* soil to prepare garden beds
- *planting* small seeds and seedlings
- *harvesting* ripe produce
- *training* and weaving vines onto a trellis or fence
- *collecting* seeds
- *filling* up watering cans
- *watering* plants
- *pulling* weeds
- *identifying* garden insects
- *weighing* produce
- *comparing* shapes and sizes of produce
- *observing* insects and birds
- *drawing* garden scenes or items

Cooking

- *juicing* oranges, lemons, and limes
- *peeling* some fruits and vegetables (bananas and even onions)
- *mashing* soft fruits and vegetables
- *scrubbing* vegetables (potatoes, mushrooms)
- *cutting* soft foods with a plastic knife (mushrooms, hard-boiled eggs)
- *pressing* cookie cutters
- *measuring* dry ingredients
- *cracking* and *breaking* open eggs
- *beating* eggs with an egg beater
- *stirring* ingredients together
- *setting* the table
- *wiping* up after cooking
- *clearing* the table after a meal

Utensils required:

- Plastic cutting board
- Plastic knives for cutting
- Plastic measuring cups
- Stainless-steel or plastic bowls for mixing
- Plastic or wooden spoons for mixing

Children's books about gardening and cooking:

Muncha! Muncha! Muncha! by Candace Fleming, Atheneum Books for Young Readers, 2002

Plant a Little Seed by Bonnie Flemming, Roaring Book Press, 2012

Two Old Potatoes and Me by John Coy, Nodin Press, 2013

Growing Vegetable Soup by Lois Ehlert, HMH Books for Young Readers, 1987

How Groundhog's Garden Grew by Lynne Cherry, Blue Sky Press, 2003

Garbage Helps Our Garden Grow: A Compost Story by Linda Glaser, Millbrook Press, 2010

Grow It Cook It: Simple Gardening Projects and Delicious Recipes, DK Publishing, 2008

Rainbow Stew, by Cathryn Fallwell, Lee & Low Books, 2013

Child and Adult Care Food Program (CACFP) and local food

If your childcare program participates in the Child and Adult Care Food Program (CACFP), you can use the funds for things like purchasing food from farmers' markets and planting edible gardens. Costs associated with growing food to be used in the meal service are allowable. These costs include such items as seeds, fertilizer, labor, and plot rental. See *CACFP Financial Management Guide*.[11]

Pushing a seed into the soil of a raised planter.

TIPS FOR ENGAGING KIDS IN COOKING (*ALSO SEE PUBLICATIONS LF-007-05 AND LF-007-06 IN THIS SERIES*)

- Create a fun and nurturing environment where children have many opportunities to see, touch, smell, and taste the fruits and vegetables they have grown in the garden.
- Focus on seasonal fruits and vegetables being harvested from the garden, those available locally in season, or both. (Also see publications LF-007-03 and LF-007-04 in this series.)
- Model tasting new foods. Children are likely to follow an adult example.
- Encourage children to taste the raw product first, then to taste the cooked product, reminding children that it may take multiple tastings to get used to new foods.
- Encourage young children to say "no thank you" when they do not like a new food, rather than "yucky" or another negative word. "Don't yuck my yum!"
- Supplement harvest from the garden with items from the local farmers market when there is not enough for everyone to enjoy from the on-site garden.
- Make enthusiastic and positive comments about the taste and texture of the new food.
- Compliment and thank children for their care and attention in preparing the delicious food items.
- Lead a positive discussion about the food, including its taste, texture, smell, and color. Discuss how the food was prepared. Ask the children about the ingredients, the recipe, steps taken, and utensils used.
- Discuss appropriate serving sizes, which are smaller than for adults.[12]
- Read children's books that include cooking and gardening activities that can be referenced in the classroom (see sidebar, p.2).

SAFETY PRECAUTIONS

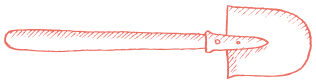
Take special care with food safety.[13] As immune systems are still developing, children are more susceptible to foodborne illnesses than healthy adults. Establish a rule that children thoroughly wash their hands after gardening, after using the toilet, before and after handling food, and whenever hands get dirty. Teach the following hand-washing protocol:

- Wet hands with clean running water (warm or cold) and apply soap.
- Rub hands together to make lather and wash them well, including backs of hands, between fingers, and under nails.
- Rinse hands well under running water.
- Dry hands using a single-use towel.

About the Local Foods series: Childcare Center Production Gardens

This publication in the Local Foods series is the first of eight publications about childcare center production gardens:

1. *Growing and Cooking Fruits and Vegetables at Childcare Centers* (LF-007-01)
2. *Creating Childcare Center Production Gardens* (LF-007-02)
3. *Growing Warm-Season Fruits and Vegetables in Childcare Production Gardens* (LF-007-03)
4. *Growing Cool-Season Vegetables in Childcare Production Gardens* (LF-007-04)
5. *Snacking and Cooking with Warm-Season Produce from Childcare Production Gardens* (LF-007-05)
6. *Snacking and Cooking with Cool-Season Produce from Childcare Production Gardens* (LF-007-06)
7. *Composting in Childcare Production Gardens* (LF-007-07)
8. *Vermicomposting in Childcare Production Gardens* (LF-007-08)



Gardeners working together to plant their summer garden.

Harvesting lettuce for a fresh salad.

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Creating Childcare Center Production Gardens

Local Foods: Childcare Center Production Gardens 2

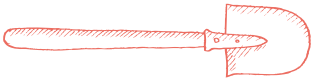
This publication focuses on developing fruit and vegetable production gardens in the Outdoor Learning Environment (OLE) of childcare centers. Included are basic garden design and layout to help childcare centers get started in year-round gardening activities. This is the second of eight publications about childcare center production gardens.

Harvesting beans from a vine-covered teepee.

Outdoor Learning Environment (OLE) is the term used for the licensed outdoor space of childcare centers in the *North Carolina Childcare Center Licensing Rules*. The Natural Learning Initiative (NLI) considers design of the OLE as a preventive health intervention to support children's healthy development, including increased physical activity and adoption of healthy eating habits.

Settings where children and teachers can engage in hands-on fruit and vegetable gardening are an essential best-practice indicator of a high quality OLE.[1] Gardening with children provides numerous opportunities for building the science skills of observation, inquiry, and experimentation. When children participate in growing their own food, they are more motivated to taste, eat, and enjoy the produce resulting from their efforts. Gardening also helps children build an understanding of and respect for nature and our environment.

With some planning, a garden can be designed and installed to suit the needs of children and teachers, providing endless opportunities to enrich the learning environment. Dream big, start small, and have fun!



LOCATION CONSIDERATIONS

The most important considerations when locating a fruit and vegetable production garden are:

Sunlight:

- Observe which areas of the OLE receive sun at different times of the year, and check present sun patterns with children for a few days. Which area gets the most afternoon sun? A vegetable garden will do best in an area that receives full sun for most of the day.

Access:

- Pick an area that is easily accessible from the center building. Closeness makes it easier to pay attention to weeds, insect pests, watering needs, and ripening vegetables.

Soil:

- Fruit and vegetables require nutrient-rich, well-draining soil. If using an existing planting bed, soil samples can be sent to the N.C. Department of Agriculture & Consumer Services, Agronomic Division to determine if any amendments are needed.

Level Ground:

- Relatively flat ground makes construction of beds and circulation in and around them easier.

Water:

- Consider proximity to a potable water source; the closer the better.

Optional considerations:

- Use existing structures like a boundary fence. This provides a protected back to garden beds and a vertical surface for vines such as cucumbers, tomatoes, and beans.
- Provide storage for garden tools and materials. Locate the garden next to existing storage or where new storage can be constructed.

RAISED OR IN-GROUND PLANTING BEDS?

The type of garden bed is important when considering layout (a topic that follows below). The two most common garden types are raised beds and in-ground beds. Raised beds are typically wood-framed structures filled with a garden soil blend and are 9 inches to 2 feet tall. In-ground beds are planted directly in the ground. Each alternative has benefits. Raised beds, however, are often preferred in a childcare setting because of these advantages:

RAISED BEDS

A taller gardening surface:

- Raised beds offer easier access for both children and teachers.

Managed soil quality:

- A blend of half garden soil and half compost helps to optimize soil fertility and drainage.

Plant protection:

- Defined edges make plants less likely to be trampled by little feet.

Long growing season:

- Soil in raised beds tends to warm up sooner in the spring and allows planting of summer crops a few weeks sooner than in-ground planting beds.

Easy to manage:

- Edges define boundaries between adjacent surfaces like lawn to help prevent grass from spreading into the growing bed.

Timber construction:

- Wood framing allows seating, work surfaces, and storage to be integrated into the garden setting.

Diverse planting of vegetables, herbs, and ornamental flowers in a childcare OLE.

IN-GROUND BEDS

Low cost:

- In-ground beds may cost less, but they can require greater investments of time in soil preparation and long-term management.

Spacious:

- An open space is good for sprawling plants, such as sweet potatoes and melons, and for mixing in flowers with fruit and vegetables.

Flexible:

- In-ground beds can be designed as large walk-in gardens. Stepping stone paths allow for a diverse mix of plants in one place. Children and teachers can re-design the garden seasonally by reconfiguring the pathways.

Transplanting seedlings in raised beds.

LAYOUT

Once the general location of the garden has been selected, the number, size, and spacing of garden beds can be decided.

Design tips

- Keep beds narrow so that children can reach the middle of the bed from both sides (no more than 3 to 4 feet wide).
- Space garden beds far enough apart to allow room for children to walk between them (2 to 3 feet is good, 18 inches minimum).

To test the planting bed layout, use spray chalk (available at hardware stores), a garden hose, or a length of rope laid on the ground to mark bed outlines. Or sprinkle flour on the ground in the shape of the beds to ensure the garden bed size and spacing is appropriate for the space.

A-frame support for vines bridging raised beds.

RAISED PLANTING BED CONSTRUCTION

Raised planting beds are fairly simple to construct. Use long-lasting materials such as cedar, redwood, composite, or treated lumber. Do not use railroad ties or older, reclaimed treated lumber to construct raised beds, as these materials may contain hazardous chemicals.

Before constructing raised beds, clear existing vegetation from the garden area. Lay sheets of cardboard on the ground at least a week before construction to help kill existing ground cover.

To build a simple timber raised bed 4 feet wide by 8 feet long and 10 inches tall, purchase three pieces of dimensioned lumber that are 2 inches × 8 feet × 10 inches. Cut one board in half to create the 4-foot end pieces, and use the remaining 8-foot pieces as the longer sides of the bed. Use 4-inch by 4-inch posts cut to 1-foot lengths set vertically in the corners to help stabilize the beds. Fasten boards at 90 degree angles with galvanized screws.

Fill beds to the top with a blend of half good quality garden soil and half compost (available at garden centers, home improvement centers, or local landscape suppliers).

After planting, top beds with 2 to 3 inches of triple shredded hardwood mulch for weed control and moisture retention.

Laying cardboard on the ground to kill weeds and grass before adding soil to the raised bed.

Preschoolers tending the raised-bed garden – and having fun.

IN-GROUND PLANTING BED INSTALLATION

Design options for in-ground planting beds depend on the shape of the available space. Traditionally, an in-ground garden is either square or rectangular in shape, with pathways laid out in a grid and planting beds between paths. Unless the area has been cultivated before, compacted soil will need to be tilled before planting. Amending the soil with good quality compost will help with drainage and soil fertility. Spread 3 to 6 inches of compost evenly over the garden area, and till to a depth of 6 to 12 inches.

Many of the clay-based soils of North Carolina are more acidic than the optimal growing range. A soil test will determine if lime is needed to raise the pH to an optimal range. Soil testing kits can be obtained from your county Cooperative Extension center. More information can be found at: http://www.ncagr.gov/cyber/kidswrld/plant/soiltest.htm.

To control weeds and lawn grass invasion on pathways, cover the ground surface with recycled burlap coffee sacks, cardboard cut to size, wood chips, or stepping stones.

YEAR-ROUND GARDENING

In the South garden space can be maximized to provide year-round gardening and learning opportunities by installing both warm- and cool-season gardens. Refer to other publications in the Local Foods series for additional Information. *Growing Warm-Season Fruits and Vegetables in Childcare Production Gardens* (LF-007-03) and *Growing Cool-Season Vegetables in Childcare Production Gardens* (LF-007-04) provide lists of warm- and cool-season vegetables, growing recommendations, and planting dates. *Snacking and Cooking with Warm-Season Produce from Childcare Production Gardens* (LF-007-05) and *Snacking and Cooking with Cool-Season Produce from Childcare Production Gardens* (LF-007-06) offer child-friendly recipes describing how to prepare and cook OLE garden produce.

For those living in other U.S. Department of Agriculture regions, contact your local Cooperative Extension agent or nurseries for guidance on planting choices for your region.

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Growing Warm-Season Fruits and Vegetables in Childcare Production Gardens

Local Foods: Childcare Center Production Gardens 3

This publication focuses on easy-to-grow, child-friendly, warm-season fruits and vegetables suitable for childcare center gardening. This is the third of eight publications about childcare center production gardens.

Early childhood educators can easily engage children in growing, harvesting, and preparing healthy, fresh fruits and vegetables and at the same time provide numerous opportunities for hands-on learning. This publication provides information on easy-to-grow, child-friendly, warm-season fruits and vegetables suitable for a childcare production garden. For additional information, see other publications about Childcare Production Gardens in the Local Foods series. *Growing and Cooking Fruits and Vegetables at Childcare Centers* (LF-007-01) includes tips for engaging children of varying ages in gardening. *Snacking and Cooking with Warm-Season Produce from Childcare Production Gardens* (LF-007-05) includes simple recipes that can be used by childcare center cooks and educators to engage children in snacking and cooking with fresh, warm-season produce. Enjoying fruits and vegetables from their own gardening efforts can help children develop lifelong healthy eating habits.

Note:
Planting dates noted here are general guidelines and vary by region across North Carolina depending on the average date of last frost. Generally, the coast has an earlier planting date while in the mountains it is necessary to wait for the first spring planting. Varying weather conditions can affect growing times as well. Contact your county Cooperative Extension center for guidance on planting dates, soil testing, and for plant varieties that perform well in your area: http://www.ces.ncsu.edu/local-county-center/.

The crops listed in this publication are warm-season vegetables and fruits that perform well in North Carolina. Those at the beginning of the list are the easiest to grow. Those at the end of the list require more care.

Planting Options

- Direct seed: Seeds are planted directly in the soil.
- Transplants: Small plants (seedlings), usually started in a greenhouse, are planted in the soil.

Growing Guidelines

- Each growing season, mix 1 to 3 inches of good-quality compost into the garden beds before planting.
- Water every day after planting to establish plants. Continue watering every day or every other day as needed throughout the growing season.

Raised beds with a mix of warm-season fruits and vegetables.

Harvesting sweet potatoes.

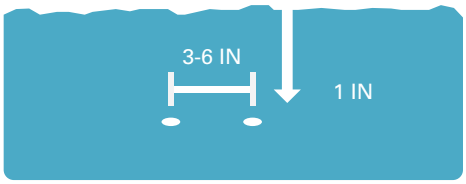
Beans

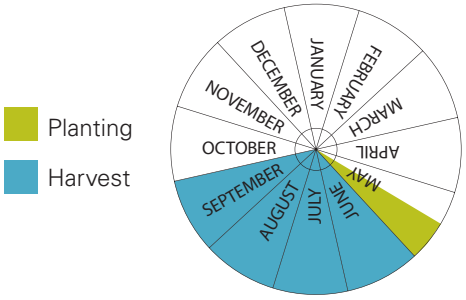
Planting:
Direct seed 1 inch deep and 3 to 6 inches apart in late May. Beans come in two forms: bush and pole. Bush beans stay low to the ground (about 2 feet high and 2 feet wide) and do not need to be trellised. Pole beans form vines and need to be gently guided up a vertical growing structure, such as a teepee, trellis, or fence.

Harvest:
June to September. Harvest beans as soon as they are about 3 to 4 inches long and slightly rounded. Leaving beans on the plant longer results in tough pods with hard seeds in them.

Varieties:
- Blue Lake (green pole and bush forms)
- Tendergreen (green bush form)
- Red Noodle (dark-burgundy pole form. Bean pods grow up to 16 to 20 inches long)

Tips:
Pole beans growing on a well-anchored teepee make a fun play setting!





Tomatoes

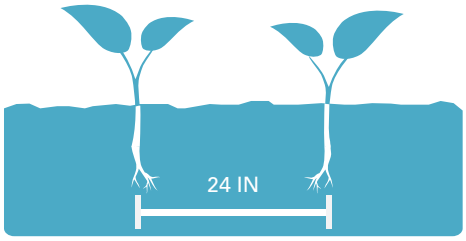
Planting:
Transplant 24 inches apart in late April to May with a staked cage around each plant for support.

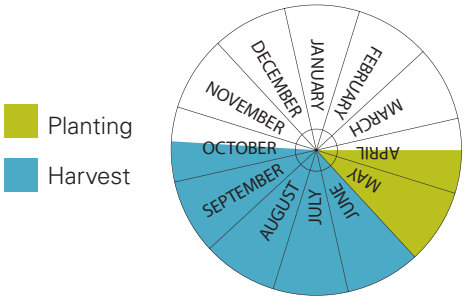
Harvest:
June to mid October. Allow tomatoes to ripen on the vine. They are ripe when they take on their final color.

Note:
In North Carolina, growing tomato plants in Outdoor Learning Environments is allowed at licensed childcare centers for children three years of age or older. For more information refer to http://ncchildcare.nc.gov/general/home.asp.

Varieties:
- Super Sweet 100 (red cherry tomatoes, 1 inch in diameter)
- Sun Gold (yellow cherry tomatoes, 1 inch in diameter)
- Juliet (red grape-shaped tomatoes, 1½ inches long, oblong)
- Celebrity (red slicing tomatoes, 3 inches in diameter, bushy plants)

Tips:
Smaller fruited varieties are less prone to splitting and make perfect bite-size snacks for children.





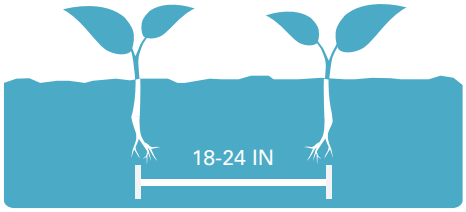
Peppers

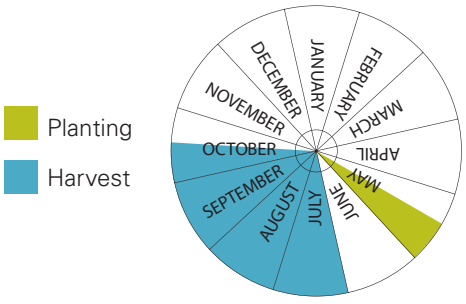
Planting:
Transplant 18 to 24 inches apart in late May, and stake when they get top-heavy.

Harvest:
July to mid October. All varieties start out green. Some stay green and others, depending on the variety, turn red, yellow, orange, or purple. Peppers are fully ripe and sweetest when they reach their final color.

Varieties:
- Better Belle (green)
- Snapper (green that ripens to red, can be eaten at either stage)
- Big Bertha (green that ripens to red, can be eaten at either stage)

Tips:
Pepper plants grow well in containers.





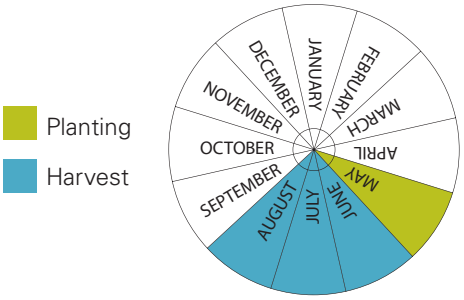
Cucumbers

Planting:
Direct seed 1 inch deep. Place seeds or transplants 10 to 12 inches apart near a trellis structure or in 4-foot rows on the ground in May. Cucumbers are vigorous vines that can be gently guided to grow up a vertical structure, such as a trellis, fence, or cage.

Harvest:
June to August. Harvest when cucumbers are at least 3 inches long and a dark-green color, before they have turned yellow. Cucumbers mature quickly, so be sure to check the plants every day.

Varieties:
- Diva (spineless green, sweet flavor, 6 to 8 inches long)
- Marketmore 76 (green, 8 to 9 inches long)
- Dasher II (green, 8 inches long)
- General Lee (green, 8 to 8½ inches long)
- Burpless (green, 10 inches long, easy to digest)

Tips:
Cucumbers grown up a teepee make a fun play setting for children.



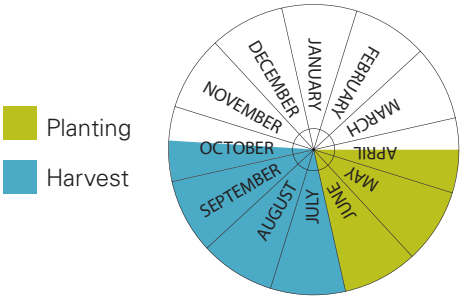
Cantaloupes

Planting:
Direct seed 1½ inches deep. Place seeds or transplants 48 to 60 inches apart once the danger of frost has passed, mid April to June.

Harvest:
July to early October. Harvest approximately three months after planting when the melon's exterior begins to turn from green to tan.

Varieties:
- Athena (standard variety)
- Ambrosia (standard variety)

Tips:
Place a board or piece of plastic under cantaloupes as they develop to prevent insects from boring into the fruit. One or two vines should provide plenty of fruit for a class! Vines need a lot of space and can spread up to 10 feet.



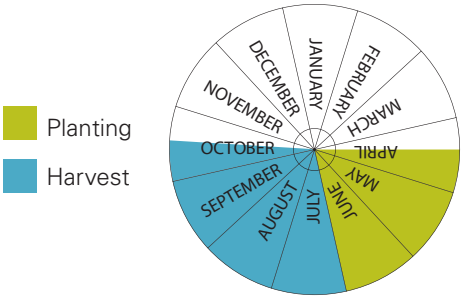
Watermelons

Planting:
Direct seed 1½ inches deep. Place seeds or transplants 48 to 60 inches apart once the danger of frost has passed, mid April to June. Vines need a lot of space and can spread up to 10 feet.

Harvest:
July to early October. Watermelons are ripe when the tendril closest to the fruit on the vine begins to dry out and turn brown and the underside of the melon turns a light yellow.

Varieties:
- Sugar Baby (round, small fruits, 8 inches in diameter, up to 10 pounds, dark-green skin)
- Crimson Queen (round, 10 to 12 inches in diameter, up to 25 pounds, light-green striped skin)
- Ruby (seedless, small fruits, 6 to 8 pounds, light-green striped skin)

Tips:
Place a board or piece of plastic under watermelons as they develop to prevent insects from boring into the fruit. One or two vines should provide plenty of fruit for a class!



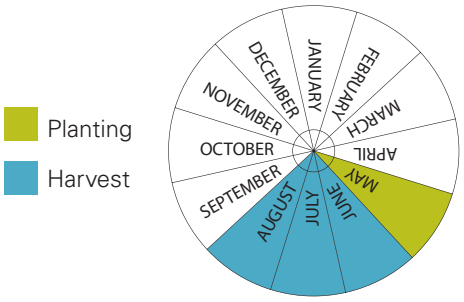
Zucchini

Planting:
Direct seed 1½ inches deep. Place seeds or transplant 36 inches apart in May.

Harvest:
June to August. Zucchini are most tender when picked at 4 to 8 inches long.

Varieties:
- Spineless Perfection (standard green)
- Spineless Beauty (standard green)
- Black Beauty (standard green)

Tips:
Zucchini plants are very high-yielding and can be harvested every day during peak harvest time.



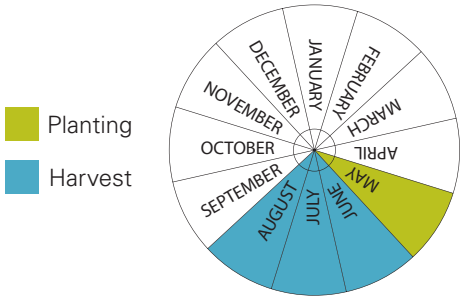
Yellow Squash

Planting:
Direct seed 1½ inches deep. Place seeds or transplants 36 inches apart in May.

Harvest:
June to August. Squash are most tender when picked at 5 to 6 inches long.

Varieties:
- Multipik (yellow straight neck)
- Yellow Fin (yellow straight neck, deep rich yellow)

Tips:
Squash plants are very high-yielding and can be harvested every day during peak harvest time.



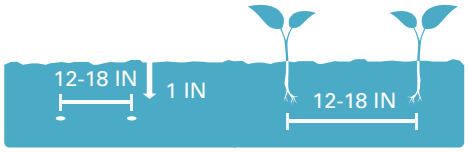
Okra

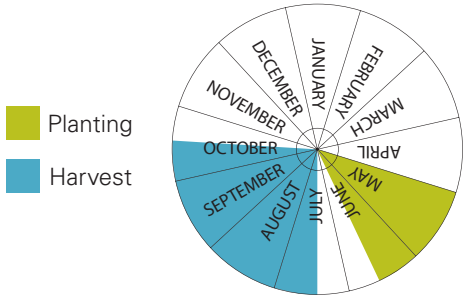
Planting:
Direct seed 1 inch deep. Place seeds or transplants 12 to 18 inches apart in May – early June. If direct seeding, soak seeds in water overnight before planting.

Harvest:
Mid July to mid October when okra pods are 2 to 3 inches long.

Varieties:
- Clemson Spineless (standard green)
- Red Burgundy (purple-red stems and pods)

Tips:
Okra plants grow very fast. Pods can go from the perfect size to overgrown overnight. Pods that get too large can be left on the plant to dry to become a rattle or musical instrument. Okra flowers are very beautiful and fun for children to explore.





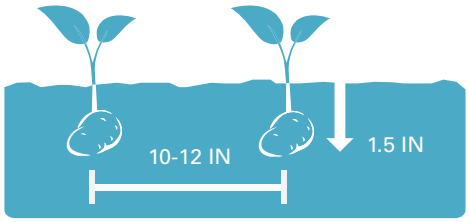
Sweet Potatoes

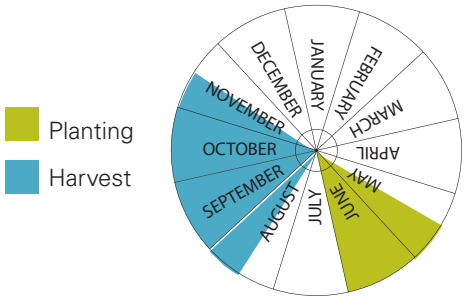
Planting:
Sweet potatoes are started by planting "slips," which are young sweet potato sprouts that have been grown from another sweet potato. They can also be purchased as plants at a nursery or home improvement store. Plant slips or transplants to a depth of 5 inches in rows 10 to 12 inches apart in mid May to June in deep, loose soil or in containers. The plants are a vigorous vine and need room to spread.

Harvest:
Late August to early November. Sweet potatoes are ready to harvest when the vines begin to die and turn brown.

Varieties:
- Covington (standard sweet potato)
- Beauregard (standard sweet potato)

Tips:
When harvesting sweet potatoes from containers, dump the contents of the containers into a wheelbarrow or onto a tarp and let the children have fun rummaging through the soil to find the sweet potatoes.





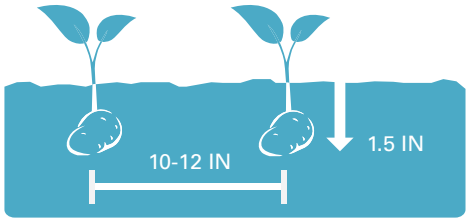
Potatoes

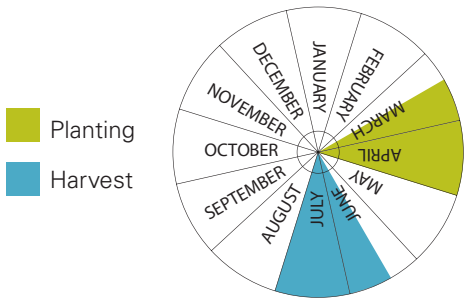
Planting:
Potatoes are started by planting potato "seeds," which are pieces of potatoes that have sprouts on them called "eyes." They can also be bought as small tubers. Plant to a depth of 5 inches in rows 10 to 12 inches apart in mid March to April in deep, loose soil or in containers or grow bags. "Hill up" or add soil on top of the potatoes as the leaves first emerge. Repeat as the leaves emerge again to create a "hill" or mound for the potatoes to grow in.

Harvest:
Late June to July. Potatoes are ready after the plants have flowered and the vines have started to die back.

Varieties:
- Yukon Gold (golden flesh)
- Kennebec (white flesh)
- Red Pontiac (red skin, white flesh)
- Cranberry Red (red skin, white flesh)
- All-Blue (blue skin, blue flesh)

Tips:
If red, white, and blue varieties are grown, the tubers can be harvested in late June or early July, just in time to make patriotic red, white, and blue potato salad!





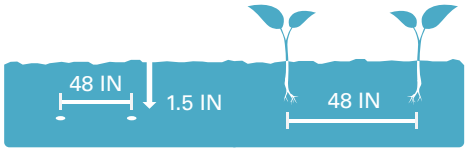
Pumpkins

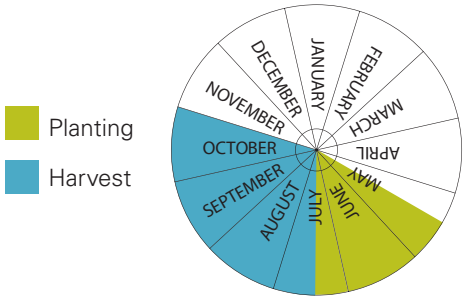
Planting:
Direct seed 1½ inches deep. Place seeds or transplants 48 inches apart in late May to early July. Plant later in the season for a late fall harvest around Halloween.

Harvest:
July to October, when fruits are orange and firm.

Varieties:
- Small Sugar (pie pumpkin)
- Connecticut Field (jack-o-lantern pumpkin)
- Calabaza Triple Treat (jack-o-lanterns and pies)
- Munchkin (mini-pumpkin)

Tips:
One vine of a smaller variety like Munchkin will produce around 14 pumpkins per vine, while a larger jack-o-lantern vine will produce around five pumpkins.





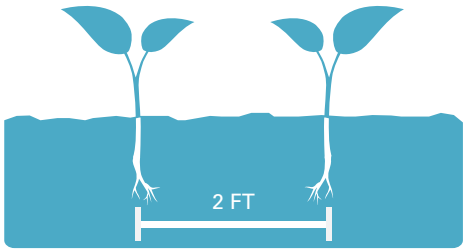
Eggplant

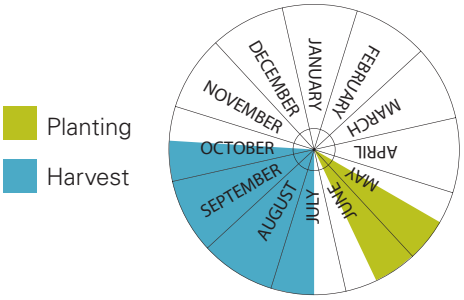
Planting:
Plant transplants 24 inches apart in late May to mid June. Stake when they get top-heavy.

Harvest:
Mid July to mid October. Harvest when eggplants are shiny and firm, but not hard when squeezed gently. Over-ripe eggplants become dull, wrinkled, and spongy to the touch.

Varieties:
- Ichiban or Dairyu (thin, Japanese style, up to 10 inches long, purple-black fruit)
- Nadia (rounded, traditional Italian style, 7 to 8 inches long and 3 to 4 inches wide with dark purple-black fruit)
- Hansel (thin, 3- to 4-inch-long purple fruits, ¾ – 1 inch wide)
- Black Beauty (large rounded fruit, plant produces only four to six fruits)

Tips:
Eggplants can be grown in large containers.





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Growing Cool-Season Vegetables in Childcare Production Gardens

Local Foods: Childcare Center Production Gardens 4

This publication focuses on easy-to-grow, child-friendly, cool season vegetables suitable for childcare center gardening. This is the fourth of eight publications about childcare center production gardens.

Early childhood educators can easily engage children in growing, harvesting, and preparing healthy, fresh fruits and vegetables and provide numerous opportunities for hands-on learning. This publication provides information on easy-to-grow, child-friendly, cool-season vegetables suitable for a childcare production garden. For additional information, see other publications about Childcare Production Gardens in the Local Foods series. *Growing and Cooking Fruits and Vegetables at Childcare Centers* (LF-007-01) includes tips for engaging children of varying ages in gardening. *Snacking and Cooking with Cool-Season Garden Produce From Childcare Production Gardens* (LF-007-06) includes simple recipes that can be used by childcare center cooks and educators to engage children in snacking and cooking with fresh, cool-season produce. Enjoying fruits and vegetables from their own gardening efforts can help children develop lifelong healthy eating habits.

Note:
Planting dates noted here are general guidelines and vary by region across North Carolina depending on the average date of last frost. Generally, the coast has an earlier planting date while in the mountains it is necessary to wait for the first spring planting. Varying weather conditions can affect growing times as well. Contact your county Cooperative Extension center for guidance on planting dates, soil testing, and for plant varieties that perform well in your area: http://www.ces.ncsu.edu/local-county-center/.

The crops listed in this publication are cool-season vegetables and fruits that perform well in North Carolina. Those at the beginning of the list are the easiest to grow. Those at the end of the list require more care.

Planting Options

- Direct seed: Seeds are planted directly in the soil.
- Transplants: Small plants (seedlings), usually started in a greenhouse, are planted in the soil.

Growing Guidelines

- Each growing season, mix 1 to 3 inches of good-quality compost into the garden beds before planting.
- Water every day after planting to establish plants. Continue watering every day or every other day as needed throughout the growing season.

Raised beds with a fine crop of kale (left) and mustard greens (right).

Peas straight from the pod–an instant, tasty snack.

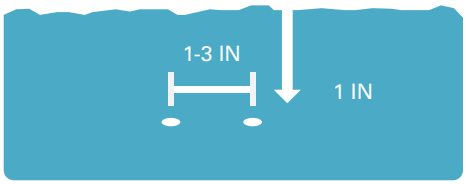
Peas (Sugar/Snow)

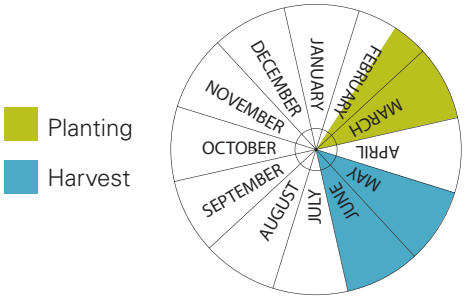
Planting:
Direct seed 1 inch deep and 1 to 3 inches apart late February to March. Gently guide pea vines up a vertical growing structure, such as a bamboo teepee, trellis, or fence.

Harvest:
May to June. Pea pods can be picked earlier to eat the entire pod, or left on the vine until they are round and can be shelled.

Varieties:
- Sugar Snap (eat entire pod or just peas)
- Super Sugar Snap (a mildew-resistant variety, eat entire pod or just peas)
- Snow Bird (snow pea variety, eat entire pod)

Tips:
Peas grown on a well-anchored teepee make a fun setting for play!





Lettuce

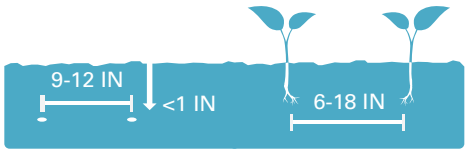
Planting:
Direct seed or transplant in the fall from mid August to late September and in the spring after the danger of a hard freeze has passed. For direct seeding, create a clear flat space in the garden bed. Loosen and smooth the soil with a hard rake. For salad mix or loose leaf lettuce types, sprinkle the seeds onto the soil and gently use fingertips to mix seeds into the top inch of soil. If growing the lettuce as heads, seeds need to be planted 9 to 12 inches apart. Lettuce can also be started as transplants, spacing them 6 to 18 inches apart depending on the variety's requirements on the label.

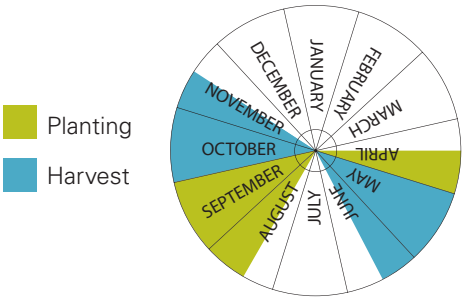
Harvest:

Harvest lettuce as it grows, cutting individual leaves for a salad mix or by harvesting the entire head once it matures. Salad mix or leaf lettuce can be harvested when the leaves are as small as 2 to 3 inches long. To extend the harvest, pick the largest leaves from the exterior of the lettuce head, allowing the smaller central leaves to continue to grow. For harvesting a head of lettuce, allow the plant to mature and cut the head at the base.

Varieties:
- Buttercrunch and Bibb (mild flavor, green leafed, loose head)
- Jericho (romaine type, green leafed, heat tolerant, good for spring planting, forms head)
- Black-seeded Simpson (green leafed, loose head)
- Green Oakleaf (green leafed with slender, deeply lobed leaves that resemble oak tree leaves, loose head)
- Red Sails (red variety, loose head)
- New Red Fire (red variety, loose head)
- Allstar Mix (mix of high performing green and red varieties, leaf lettuce)

Tips:
Lettuce can be grown easily and successfully in containers.





Busy harvesting tasty red leaf lettuce.

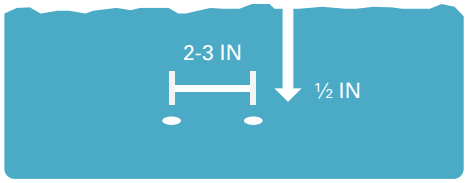
Radishes

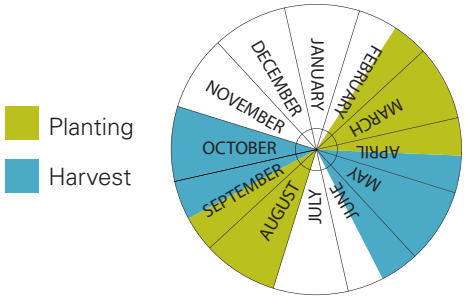
Planting:
Direct seed in the fall to August until mid September and in the spring, mid February to early April. Plant ½ inch deep and 2 to 3 inches apart.

Harvest:
Late September until the first frost and early April to early June. Radishes are ready to harvest when you can see their rounded tops peeking through the soil. Radishes mature very quickly and are usually ready to harvest within four to six weeks after planting.

Varieties:
- Easter Egg (mix of red, purple, and white, round roots)
- Cherry Belle (red round roots, ¾ inch wide)
- Sparkler (round roots, 1 inch wide, red on top and white on the bottom with speckles in between)

Tips:
Radishes make great container vegetables.



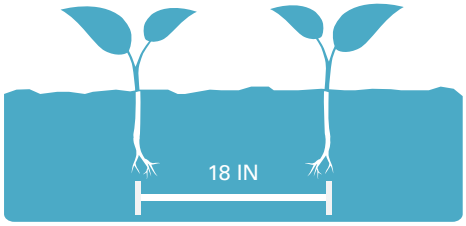


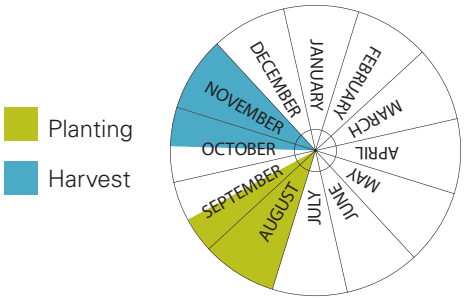
Broccoli

Planting:
Plant transplants 18 inches apart in August to mid September.

Harvest:
Cut broccoli floret in mid October to November when it reaches a desirable size (usually around 3 inches wide). After cutting the main floret, additional smaller florets (1 to 2 inches across) will begin to grow and can be harvested until the plant begins to flower.

Varieties:
- Packman Hybrid (standard variety)



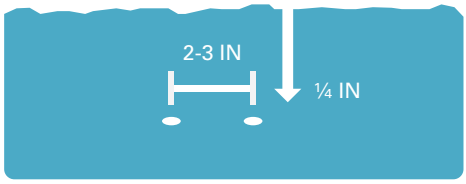


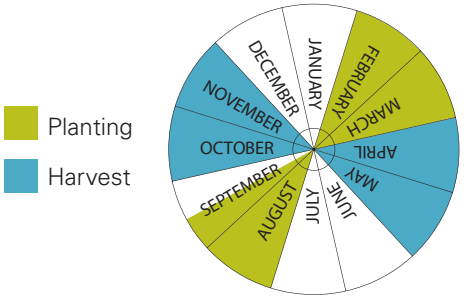
Carrots

Planting:
Direct seed ¼ inch deep and 2 to 3 inches apart in deep, loose soil in the fall from August to mid September and in the spring from early February to late March. If the seedlings sprout too closely together, thin them by cutting some off at the base with garden shears.

Harvest:
Carrots take around eight to 10 weeks to mature and are ready when they reach a thickness of ½ inch to 1 inch. They will also begin to slightly rise out of the soil, with their orange "shoulders" just visible.

Varieties:
- Nantes type (6- to 7-inch-long roots, grows well in heavy soils)
- Atlas (small round roots)
- Little Finger (4-inch-long roots)
- Purple Haze (purple roots, 7 to 8 inches long)





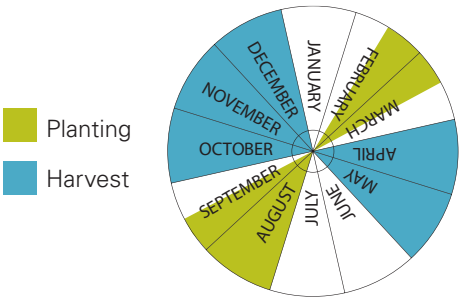
Kale

Planting:
Direct seed in the fall from August to mid September and in the spring from mid February to mid March. Sprinkle the seeds onto the soil, and use fingertips to mix seeds into the top ½ inch of soil. Kale is also commonly transplanted, spacing plants 6 inches apart.

Harvest:
Expect a medium harvest in October to December, followed by a larger harvest in April to May (until the plant starts to flower). To extend the harvest, pick the largest leaves from the exterior, allowing the smaller central leaves to continue to grow.

Varieties:
- Dwarf Siberian (curly-leafed kale)
- Winterbor (curly-leafed kale)
- Red Russian (large leaves with purple-red veins, reaching 2 to 3 feet)
- Lacinato or Toscano type. Also called Italian or dinosaur kale, this type has narrow leaves with a texture that resembles a dinosaur's skin and is not as cold hardy as the Dwarf Siberian and Winterbor varieties.

Tips:
Kale becomes sweeter after the first frost, so harvest after the first frosty night.



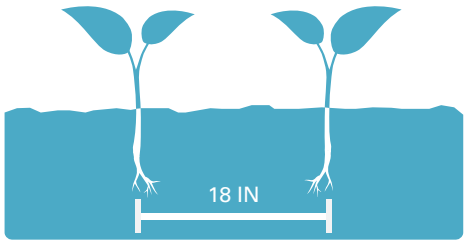
Collard Greens

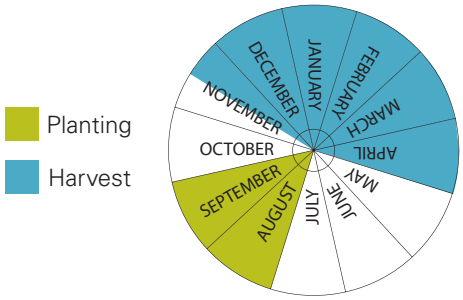
Planting:
Plant transplants 18 inches apart in August to September.

Harvest:
Pick larger exterior leaves from mid November to April or until plants start to flower.

Varieties:
- Georgia (cold hardy, nonheading)
- Flash (nonheading, slow to flower in spring)

Tips:
Collard greens become sweeter after the first frost, so wait to harvest until after the first cold night.



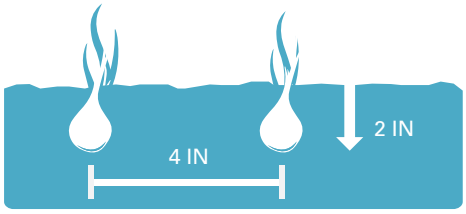


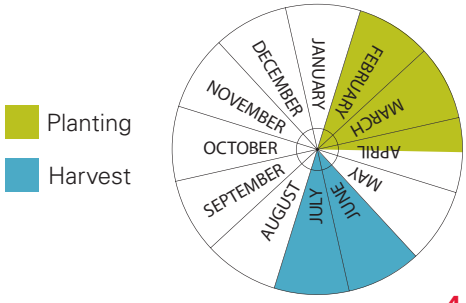
Onions

Planting:
Plant individual onion bulbs (called sets) 2 inches deep and 4 inches apart in February to early April.

Harvest:
Onions are ready when the bulbs have reached a desired size and the tops of the plants have yellowed and started to fall over. Harvest in June to July by pulling out of the soil, shaking the soil off, and allowing them to cure or dry in a warm, dry location.

Varieties:
- Walla Walla (4-inch-wide, yellow-skinned sweet onion, does not store well)
- Texas Sweet (3-inch-wide, white-skinned sweet onion)



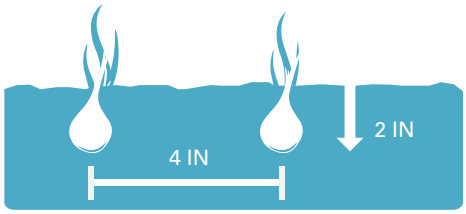


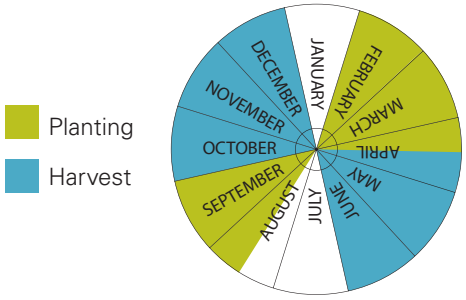
Spring Onions, Scallions, and Green Bunching Onions

Planting:
Plant individual small onion bulbs (called "sets") 2 inches deep and 4 inches apart from mid August to September and from February to early April.

Harvest:
October to December and mid April to June when bulbs reach ½ inch in diameter. Dig below the onions with a pitchfork to more easily pull them out.

Varieties:
- Beltsville Bunching (standard green onions)
- Evergreen Bunching (standard green onions)





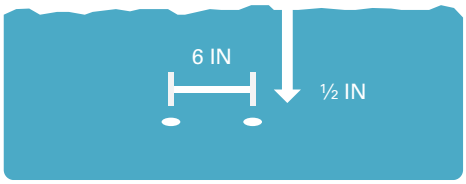
Spinach

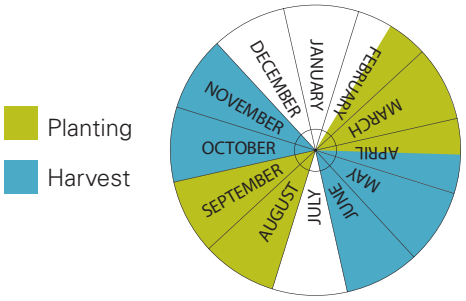
Planting:
Direct seed in the fall when days become cooler, usually in August to late September and in late February to early April. Plant seeds ½ inch deep and 6 inches apart.

Harvest:
Individual leaves are ready to harvest four to six weeks after planting. Pick from the exterior of the plant to extend the harvest period.

Varieties:
- Space (upright, smooth plants with medium-green, round leaves)
- Melody (large, triangular dark-green leaves)
- Bloomsdale (dark-green curled leaves)

Tips:
Spinach can tolerate shade and can be planted under taller crops.





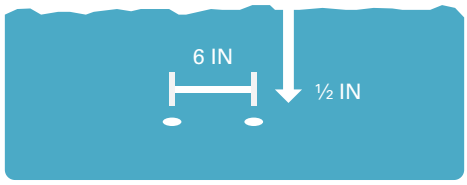
Chard

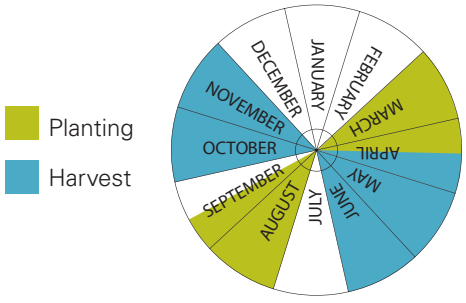
Planting:
Direct seed in August to mid September and March to early April. Plant seeds ½ inch deep and 6 inches apart.

Harvest:
Individual leaves are ready to harvest four to six weeks after planting. To extend the harvest, pick the larger exterior leaves, leaving the smaller interior leaves to continue growing.

Varieties:
- Bright Lights (a colorful mix of red-, green-, and yellow-stemmed chard that will turn the garden into a rainbow)
- Ruby Red (dark-green with stunning red veins)

Tips:
This beautiful vegetable brings a pop of color to flower beds.



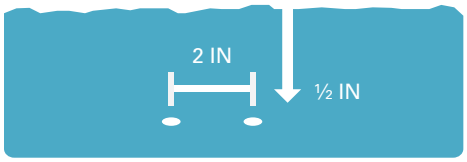


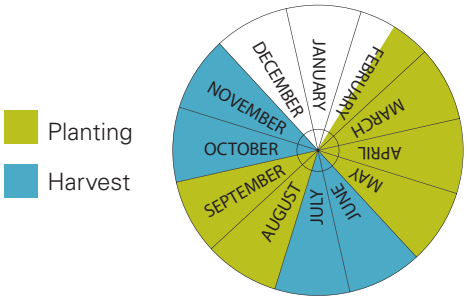
Mustard Greens

Planting:
Direct seed ½ inch deep and 2 inches apart in August to September and from mid February to May. Sprinkle the seeds onto the soil, and use fingertips to gently mix seeds into the top inch of soil.

Harvest:
Individual leaves are ready to harvest four weeks after planting.

Varieties:
- Florida Broadleaf (mild flavor, broad leaves)
- Southern Giant Curled (heavily curled, bright-green leaves)





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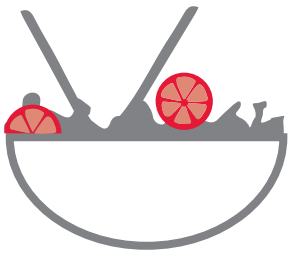
Snacking and Cooking with Warm-Season Produce from Childcare Production Gardens

Local Foods: Childcare Center Production Gardens 5

This publication includes simple recipes that childcare center cooks and educators can use to engage children in snacking and cooking with fresh warm-season fruits and vegetables from on-site production gardens and elsewhere. This is the fifth of eight publications about childcare center production gardens.



The first publication in this series, *Growing and Cooking Fruits and Vegetables at Childcare Centers* (http://content.ces.ncsu.edu/childcare-center-production-gardens-1-growing-and-cooking-fruits-and-vegetables-at-childcare-cente/), provides age-appropriate suggestions for engaging young children in food preparation.

The third publication in the series, *Growing Warm-Season Fruits and Vegetables in the Childcare Production Garden* (http://content.ces.ncsu.edu/childcare-center-production-gardens-3-growing-warm-season-fruits-and-vegetables-in-the-childcare-p/), shares easy-to-grow, child-friendly, summer season fruits and vegetables suitable for a childcare production garden.

This publication provides a set of simple recipes for snacks and prepared dishes incorporating production garden produce for children to enjoy.

Salad Recipes

MELON SALAD

Serves 12 to 14

- 1 cantaloupe
- 1 honeydew melon
- 1 small watermelon
- 2 tablespoons honey
- 2 tablespoons lemon juice
- Fresh mint leaves for garnish

Cut any combination of melons into cubes or balls. Combine fruit in a large serving bowl. In a small dish, combine honey and lemon juice. Stir well. Pour over melons and toss to mix. Garnish with mint leaves. Cover and refrigerate until ready to serve.

CUCUMBER, TOMATO, AND BASIL SALAD

Serves 6 to 8

- 2 cucumbers, sliced into rounds or chopped
- 2 large tomatoes, cut into bite-sized pieces
- 1 cup basil leaves, chopped
- 2 tablespoons olive oil
- 1 tablespoon balsamic vinegar
- Salt and pepper

Gently toss all ingredients together in a bowl, add salt and pepper to taste, and serve.

Searching for ripe tomatoes.

Enjoying fresh cucumbers from the garden.

Dip and Salsa Recipes

CUCUMBER DIP

Yield: 2 cups

- ½ cup plain yogurt
- ½ cup light sour cream
- 1 cup chopped cucumber
- 3 tablespoons chopped fresh dill
- 1 tablespoon grated garlic (optional)
- ¼ teaspoon salt
- ¼ teaspoon pepper

Combine yogurt, sour cream, cucumber, dill, garlic, salt, and pepper. Serve with crackers, tortilla chips, carrot sticks, or cucumbers that are sliced into sticks or rounds.

FRESH TOMATO SALSA

Yield: About 3 cups. Easily scale the recipe up to make additional servings.

- 1 fresh tomato, diced
- ½ medium onion, finely chopped
- 1 green bell pepper, diced
- 2 tablespoons chopped cilantro
- ½ teaspoon cumin
- 1 lime

Combine chopped vegetables and cumin in a bowl. Cut lime in half and squeeze juice over top of the mixture. Cover and refrigerate 30 minutes to 24 hours to allow flavors to blend.

FRUIT SALSA

Serves 20 to 24

- 3 pint containers of raspberries
- 3 pint containers of blackberries
- 1 pint container of strawberries, stems removed and diced

Use whatever fruit combination you have on hand to mix and match.

Mix all ingredients in a medium-large mixing bowl until well combined. Allow to chill in the refrigerator for 30 to 60 minutes. Serve with cinnamon chips or graham crackers.

Tip: To create your own tortilla chips, cut whole wheat tortillas into wedges, lay on a baking sheet, and bake at 350°F for approximately 12 minutes.

Cooked Vegetable Recipes

ROASTED GREEN BEANS

Serves 4 to 6

- 1½ pound fresh green beans
- 2 tablespoons olive oil
- Salt and pepper

Preheat oven to 400°F. Toss green beans with olive oil; add salt and pepper to taste. Arrange in an even layer on a foil lined baking sheet and roast in the oven for about 10 minutes.

ROASTED OKRA

Serves 4 to 6

- 20 fresh okra pods, tops removed and sliced ¾ inch thick
- 1 tablespoon oil
- 2 teaspoons salt
- 2 teaspoons black pepper

Preheat oven to 425°F. Place okra in a bowl and mix lightly with oil, salt, and pepper. Arrange okra slices in one layer on a foil lined baking sheet. Bake about 10 minutes or until lightly browned.

Organizing diverse ingredients for Eggplant Pizza. *Photo credit Rosalind Blair*

Preparing Eggplant Pizza. *Photo credit Rosalind Blair*

EGGPLANT PIZZA

Serves 4 to 6

- 1 large eggplant, cut into ¼ inch thick round slices
- 1 teaspoon oregano or other herb from the garden, or Italian seasoning
- 1 cup pizza sauce or Fresh Tomato Sauce (see recipe pg. 3)
- 1 cup shredded mozzarella
- 1 ounce pepperoni, sliced
- Salt and pepper

Preheat oven to 400°F. Spread the pizza sauce over the eggplant slices, and season with herbs and salt and pepper to taste. Top the eggplant with cheese and pepperoni. Roast the eggplant pizzas until they just start to turn tender, about 15 to 20 minutes.

Cooked Vegetable Recipes (Continued)

ZUCCHINI MINI MUFFINS

Makes about 24 small muffins

- ⅓ cup all-purpose flour
- ½ cup packed dark brown sugar
- 1 teaspoon baking powder
- 1 teaspoon ground cinnamon
- ½ teaspoon salt
- ¼ teaspoon ground allspice
- ⅔ cup shredded zucchini (1 medium zucchini)
- 3 tablespoons vegetable oil
- 2 tablespoons butter, melted
- 2 tablespoons milk
- 1 teaspoon vanilla extract
- 1 large egg, lightly beaten

Preheat oven to 400°F. Combine dry ingredients (first six ingredients) in a large bowl. Combine wet ingredients (zucchini and remaining ingredients) in a small bowl. Add the zucchini mixture to the flour mixture and stir lightly—do not over mix. Divide batter into small muffin cups lined with muffin papers. Bake at 400°F for 10 minutes. Confirm doneness when an inserted toothpick comes out clean.

ZUCCHINI FRITTATA

Serves 10 to 12

- 1 pound new potatoes
- 2 ounces butter
- 1 large onion, chopped
- 3 zucchinis, thinly sliced
- 8 eggs
- 3 ounces Parmesan cheese, finely grated
- 1 tablespoon fresh mint leaves, chopped
- ⅛ teaspoon pepper

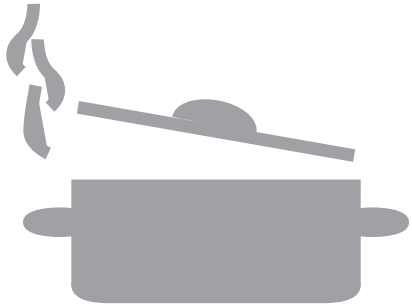
Boil potatoes for 10 min or until soft; let them cool, then cut them in half. This can be done ahead of time and the potatoes stored in the refrigerator until ready to use. Melt butter in pan, add onion, and cook until soft. Add zucchinis and cook 5 minutes. Stir in the potatoes and cook another 5 minutes until zucchinis are soft. Crack eggs into the bowl and add cheese, mint, and pepper. Whisk together with a fork. Pour the eggs over the mixture in the pan and turn the heat down as low as possible. Cook about 5 minutes or until eggs are set. Serve warm or at room temperature.

FRESH TOMATO SAUCE

Yield: about 3 cups. Easily scale the recipe up to make additional servings.

- 1 tablespoon olive oil
- 1 small onion, finely chopped
- 1 clove garlic, finely chopped
- 2 pounds whole ripe tomatoes, chopped

Warm the oil in a large pan over medium heat. Add the onion and garlic, cover, and cook for about 4 minutes until the mixture is soft but not browned. Add the tomatoes, reduce the heat, cover, and cook for about 15 minutes or until the tomatoes have collapsed. Remove from the heat. Use on pizzas or reheat before serving.



Carefully grating zucchini. *Photo credit Rosalind Blair*

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Snacking and Cooking with Cool-Season Produce from Childcare Production Gardens

Local Foods: Childcare Center Production Gardens 6

This publication includes simple recipes that childcare center cooks and educators can use to engage children in snacking and cooking with fresh cool-season vegetables from on-site production gardens and elsewhere. This is the sixth of eight publications about childcare center production gardens.

The first publication in this series, *Growing and Cooking Fruits and Vegetables at Childcare Centers* (http://content.ces.ncsu.edu/childcare-center-production-gardens-1-growing-and-cooking-fruits-and-vegetables-at-childcare-cente/), provides age-appropriate suggestions for engaging young children in food preparation.

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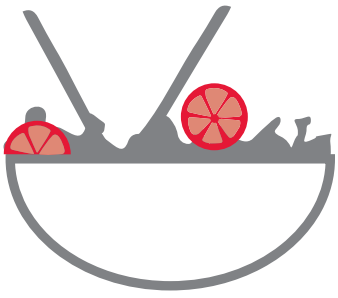


SALADS MADE EASY

Salads can be easily created by using seasonal greens and vegetables harvested from the on-site production garden.

Greens

- Spinach
- Baby kale
- Mixed lettuces
- Baby chard

Vegetables

- Carrots
- Onions
- Broccoli
- Peppers: red, yellow, orange, purple
- Tomatoes
- Green peas
- Sugar snap peas
- Summer squash

SUGAR SNAP PEAS

Raw or lightly cooked

- Eat them raw with a favorite dip.
- Lightly steam and stir in with buttered pasta, parsley, and garlic.
- Roast with olive oil and salt under a broiler until crisp-tender and lightly browned on the edges; drizzle with a few drops of toasted sesame oil before serving.

ROASTED VEGETABLES

Try various combinations from the roasted vegetables chart below. Choose items that are in season and harvestable from the garden. Increase the amount of oil and seasoning as the quantity of vegetables is increased.

Try these combinations:

- Sweet potatoes and garlic pepper seasoning
- Red potatoes, garlic and rosemary
- Eggplant and parsley
- Carrots and parsley
- Potatoes with cauliflower, onions, and rosemary

ROASTED VEGETABLE CHART

VEGETABLES

Use 4 cups of one or more

- Broccoli
- Red potatoes
- Sweet potatoes
- Carrots
- Onions
- Peppers
- Eggplant
- Zucchini
- Squash
- Acorn squash

SPICES/HERBS

Use 2-3 teaspoons of one or more

- Chili powder
- Rosemary
- Cumin
- Garlic cloves
- Curry powder
- Sage
- Parsley
- Cinnamon
- Garlic pepper seasoning

OILS (choose one)

Use 1 tablespoon

- Olive oil
- Canola oil
- Corn oil

Salad Recipes

MAKE YOUR OWN SALAD DRESSING

3 tablespoons of lemon juice or any vinegar

- Lemon juice
- Balsamic vinegar
- Rice vinegar
- Cider vinegar

½ cup (or less) oil

- Olive oil
- Canola oil
- Safflower oil
- Vegetable oil

½-1 tablespoon of herbs and condiments

- Herbs from garden
- Shallots
- Dijon mustard
- Garlic
- Parmesan cheese

Salt and pepper to taste

KALE SALAD

Serves 12 to 16

- 1 large bunch kale (about 1 pound), washed
- 4 ounces parmesan cheese, grated
- 2 ounces golden raisins
- 2 lemons, juiced
- ½ cup olive oil
- Salt and fresh black pepper

Fold several kale leaves lengthwise and using the point of a chef's knife, cut away the thick center stems and discard. Roll the remaining stack of de-veined leaves into a tight cigar shape and slice into strips. Alternately, have children help prepare by tearing the kale into bite size pieces. Toss the kale with the cheese and raisins. Whisk the lemon juice and olive oil in a small bowl and pour over the salad. Season with salt and pepper to taste. Let the salad sit at room temperature for 10 minutes before serving.

Stirring kale and dressing for a winter salad.

Roasted Recipes

ROASTED SWEET POTATOES

Serves 4 to 6

- 2 to 3 medium sweet potatoes, peeled
- 1 tablespoon olive oil
- ½ teaspoon curry powder
- ¼ teaspoon ground cumin
- ⅛ teaspoon ground cloves
- ½ teaspoon salt
- ¼ teaspoon pepper

Preheat oven to 425°F. Cut sweet potatoes in half lengthwise; cut each half into six wedges. Combine sweet potato wedges, olive oil, and spices in a bowl. Toss gently to coat. Place wedges in a single layer on a baking sheet. Bake until very tender. Serve warm.

ROASTED BROCCOLI AND RED PEPPERS

Serves 8 to 10

- 5 cups fresh broccoli florets (about 1 large head)
- 1 red bell pepper, cut into bite-sized pieces
- 2 teaspoons olive or vegetable oil
- ½ teaspoon lemon pepper
- 1 clove garlic, minced

Preheat the oven to 400°F. Add broccoli, pepper, oil, lemon pepper, and garlic to a self-sealing plastic bag; shake until ingredients are combined (or mix together in a bowl). Spread the mixture out in an even layer on a baking sheet. Engage young children by having them shake the bag of vegetables and place them on a baking sheet. Bake until vegetables are tender enough to pierce with a fork, 15 to 20 minutes. Serve warm.

ROASTED KALE CHIPS

Serves 6 to 8

- 1 bunch kale
- 1 tablespoon olive oil
- 1 teaspoon salt

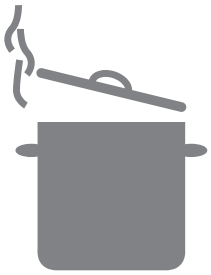
Heat oven to 300°F. Line a baking sheet with parchment paper. Wash kale and dry well. With your hands, remove and discard the thick stems from the kale. Tear leaves into bite-sized pieces. Drizzle kale with olive oil and sprinkle with salt. Toss to coat. Arrange kale pieces in a single layer on the baking sheet. Bake 10 minutes or until edges are slightly brown but not burnt.

Braised Recipe

BRAISED COLLARD GREENS

Serves 6 to 8

- 1 large bunch or 2 small bunches collard greens
- 2 tablespoons extra virgin olive oil
- 1 large onion, diced
- 2 cloves garlic, minced
- ½ teaspoon red pepper flakes
- Salt and freshly ground pepper
- ⅓ cup apple cider vinegar
- 1 tablespoon dark brown sugar



To remove stems from collards, stack five or six leaves in a pile and make two long cuts on either side of the ribs from near the top of the leaves down to the stem end. Pull the stems free from the leaves. Cut leaves in half lengthwise, stack the halves, and cut crosswise into ½-inch slices. Repeat with all leaves. Submerge the collards in water in a large bowl or fill a sink with cold water and let rest for a few minutes. Gently lift the collards from the water, leaving the dirt behind.

In a large sauté pan over medium heat, add olive oil and diced onions. Reduce heat to low and cook for 10 minutes until onions are tender and transparent. Add garlic and red pepper flakes, and cook for 1 minute more. Increase heat to medium and add greens. Stir until greens become wilted.

When the greens have wilted, add the cider vinegar, sugar, and salt and pepper to taste; stir. Cook until the vinegar reduces a bit and greens are tender, about 15 to 20 minutes. Taste and adjust for seasoning until a good balance of sweet, sour, and spicy is achieved. Serve warm.

Sautéed Recipes

SAUTÉED COLLARD GREENS

Serves 8 to 10

- 2½ pounds collard greens
- 1 tablespoon unsalted butter
- 1 tablespoon olive oil
- 2 cloves garlic, chopped
- Salt and pepper
- 1 teaspoon fresh lemon juice

Remove and discard stems and center ribs of collard greens. Cut leaves into 1-inch pieces. In a pot of boiling water, cook collards 15 minutes and drain in a colander, pressing out excess liquid with the back of a wooden spoon. In a 12-inch heavy skillet, heat butter and oil over medium-high heat and stir in garlic, collards, and salt and pepper to taste. Sauté collard mixture, stirring until heated through, about 5 minutes. Drizzle collards with lemon juice and toss well. Serve warm.

SAUTÉED MUSTARD GREENS

Serves 6 to 8

- 1 tablespoon olive oil
- 1 medium onion, chopped
- 1 clove garlic, chopped
- 1½ pounds mustard greens, washed and chopped
- Freshly ground black pepper
- 2 tablespoons Dijon mustard
- 1 cup chicken stock

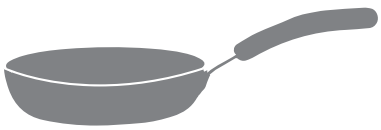
Heat olive oil in a large pot over medium heat. Add onion and garlic, and sauté until tender and fragrant. Mix in the mustard greens. Cook until greens have wilted, about 3 minutes. Add pepper to taste. In a small bowl, whisk the Dijon mustard with the chicken stock. Add mixture to the wilted greens and cook until the liquid has almost evaporated. Serve warm.

SAUTÉED SWISS CHARD (OR SPINACH)

Serves 6 to 8

- 1 onion, finely chopped
- 1 clove garlic, minced
- 1 bunch Swiss chard greens, chopped (about 4 cups)
- Parmesan cheese, grated
- Toasted bread or crackers

Sauté onions and garlic until onions are clear. Add chopped chard. Continue to sauté until greens are limp. Squeeze the juice out. Spoon greens onto toasted bread or crackers. Sprinkle with Parmesan cheese and bake for a few minutes at 325°F. Serve immediately.



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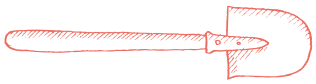
Composting in Childcare Production Gardens

Local Foods: Childcare Center Production Gardens 7

This publication is a how-to guide for starting a garden-related standard compost bin in a childcare center Outdoor Learning Environment (OLE). Included is guidance on design, construction, and management of compost bins as well as curriculum connections. This is the seventh of eight publications about childcare center production gardens.



Composting is an easy, natural way to recycle and absolutely fascinates children as they begin to understand nature as a process of transformation. Compost can be made from most organic materials, such as leaves, kitchen scraps, and Outdoor Learning Environment (OLE) trimmings. The finished compost can be used as a soil amendment, mulch, or both, to improve the health of soil and therefore of plants.

Compostable organic materials are commonly referred to as "browns" and "greens." Browns are sugar-rich carbon sources that provide energy to microorganisms, absorb excess moisture, and provide structure to the compost. Greens are protein-rich nitrogen sources that provide energy and moisture to microorganisms (Figure 1).

NITROGEN (GREEN)

- Grass clippings
- Vegetable scraps
- Fruits
- Coffee grounds and filters
- Tea bags and tea leaves
- Rinsed eggshells
- Old herbs, spices
- Flowers, dead blossoms
- Freezer-burned vegetables, fruits
- Aquarium water, algae, plants

CARBON (BROWN)

- Leaves, twigs, yard trimmings
- Yarn, thread, string, rope
- Paper rolls (towel, toilet, gift wrap)
- Straw, hay, corn cobs
- Newspaper, non-glossy paper
- Pizza and cereal boxes, paper egg cartons
- Grains, cereal, crackers
- Paper bags, baking cups
- Sawdust, wood bark and chips
- Bamboo skewers, toothpicks

Figure 1. Appropriate "greens" and "browns" for making compost.

Adding "greens" to a compost bin.

INAPPROPRIATE ITEMS

These organic materials should *not* go into the compost:

- Dog or cat feces and litter
- Dirty diapers
- Used facial or toilet tissue
- Animal matter (meat, fish, bones, fats, grease, lard, oils, eggs, butter, milk, yogurt, and sour cream)
- Yard trimmings treated with chemical pesticides
- Diseased or insect-infested plants
- Black walnut tree leaves or twigs
- Weeds that have gone to seed or have invasive roots
- Charcoal ash, coal, and wood ash
- Pressure-treated lumber, pressed wood, and plywood
- Magazines, catalogs, wrapping paper, greeting cards with metallic inks, and photographs

Manufactured tumbler with easy access provides a practical composting option for childcare center production gardens.

COMPOST BIN TYPES

Composting units can be purchased as manufactured items or they can be constructed from scratch. Manufactured units are available as "tumblers" or "bins" of various types, prices, pros, and cons. Substantial information is available online to help make a decision.[1] Visit the North Carolina Cooperative Extension composting web page to learn about types of compost bins that can be constructed.[2] An uncontained "compost pile" is not recommended for childcare centers as it is challenging to manage and may be disallowed by sanitation or licensing rules.

LOCATION

Place the compost unit in a convenient location more than six feet from buildings or wooden structures, in a flat, open space protected from floods or runoff to surface waters or wells. To help the unit retain moisture, choose a shaded area within reach of a garden hose.

MAKING COMPOST

A simple compost recipe combines leaves, grass, food scraps, and coffee grounds at a 2-to-1 ratio of browns and greens. To help make the compost hot, dust small amounts of one or more of the following (in meal form) on top of the greens: alfalfa, bone, hoof, blood, soybean, canola, or cottonseed. Alternatively, add a mixture of water and molasses, sugar, syrups, or flat soft drinks to help activate your compost.

Chop materials into small pieces so they will decompose faster. Run a lawn mower over leaves before or after raking. Add some small twigs, branches, or other rigid materials to provide structure and ventilation to the compost.

If using a compost bin, alternate brown and green layers, making the brown layers twice as thick as the green ones. Thoroughly water each layer to ensure even moisture distribution. Toss in a handful of soil on each layer to introduce more microorganisms. Top the whole pile with five inches of browns to prevent flies and other pests and provide a filter for odors.

Chopped food waste makes great compost.

Multi-compartment, enclosed compost bins in a childcare center OLE.

The decomposition process will slow down if there is too little or too much moisture. About 50% moisture is needed; this means the compost should feel like a wrung-out sponge. If the compost gets too wet, add dry leaves, shredded paper, or sawdust.

Compost needs ventilation. To aerate a compost bin, turn the material with a digging fork, if possible. If this is too difficult, poke the compost layers with a broom handle to help air flow. Aerating once a week will hasten the composting process.

If the bin is left alone, it takes one or two years to create compost. Compost can be ready in several months if aerated weekly. The compost volume will shrink 20% to 70% depending on the types of organic materials it contains. NC Cooperative Extension provides additional resources about composting.[3]

When ready for use, coarse, undecomposed materials can be separated from finished compost using a simple screen made with half-inch mesh hardware cloth and a wooden frame. Place the screen on top of a wheelbarrow or inclined at an angle on the ground. Load the screen with compost and use your gloved hand or a square-end shovel to scrape the compost against the screen. Remove the screen to reveal sifted compost. Materials too large to pass through the screen may be added back into the compost bin.

USING COMPOST

Compost can be used with potted plants, childcare center gardens, lawns, shrubs, and trees. In clay soils, compost improves aeration and drainage and makes soil easier to work with hand tools. In sandy soils, compost increases water-holding capacity and increases soil aggregation. Compost encourages healthy root systems and may help to suppress some plant diseases and pests.

COMPOSTING ACTIVITIES

After several weeks, organic material can be taken from the bottom of the compost bin to observe macro-organisms, such as earthworms, mites, springtails, ants, centipedes, beetles, and millipedes.[4] Centipedes should not be handled because they may bite and inject venom that can be a problem for people with insect allergies.

In addition to being engaged in making compost, children can explore the biological process of decomposition. Billions of microorganisms and a lesser number of visible creatures do the work of composting,[5] which children can observe, describe, and try to identify. Preschoolers can take a sample from the compost bin with the teacher and use a microscope to see bacteria, fungi, and nematodes.

Finished compost ready to add to planting beds.

Child learning conservation habits by adding watermelon rind to compost bin.

Metal mesh sides provide good ventilation for the compost.

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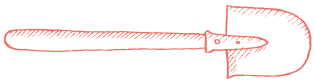
Vermicomposting in Childcare Production Gardens

Local Foods: Childcare Center Production Gardens 8

This publication is a how-to guide for starting a garden-related vermicomposting bin in a childcare center Outdoor Learning Environment (OLE) or indoors. Included is guidance on design, construction, and management of vermicomposting bins as well as curriculum connections. This is the eighth of eight publications about childcare center production gardens.



Vermicomposting is the process of using earthworms and decomposing organic matter, such as food waste and leaves, to enrich soil and add nutrients. Organic matter is consumed by earthworms and excreted as castings.

Vermicompost is a mixture of castings and decomposing organic materials. Adding vermicompost to soil improves its structure, helps water to permeate and stay next to plant roots, and helps roots to spread by loosening soil particles. Vermicompost increases plant growth and crop yields and decreases attacks by insects and plant diseases. Feeding food waste to earthworms, not putting it in the trash or washing it down the sink, supports a healthy environment.

USING THE CORRECT EARTHWORMS

There are more than 9,000 species of earthworms worldwide, but only four species are suitable for vermicomposting in the United States. The species used by most people is *Eisenia fetida* (commonly called red wigglers). To start the process, one pound of worms (about 1,000) purchased from a worm grower are needed for each square foot of surface area of the bin. The worms can consume about one-quarter to one-third of their body weight daily.[1] Contact your local North Carolina Cooperative Extension center for a list of local worm growers.

SETTING UP A WORM BIN

Worm bins can be purchased or constructed of wood, or a plastic storage bin can be installed in a classroom or outside in the Outdoor Learning Environment (OLE) garden. Consider installing both bin types to increase experiential learning. Because red wigglers like temperatures of 55°F to 80°F, outdoor bins must be placed in the shade and protected from cold and heat. To insulate an outdoor worm bin in winter, place one or more of the following items inside the bin: dryer lint, old socks, or pieces of blanket, fleece, or carpet. The outside of the bin can be covered by hay bales, blankets, or insulating board, leaving space for oxygen to enter.

Bedding is needed for the worms to live in and for users to bury food scraps. Bedding should be a non-toxic material that holds moisture and allows air to circulate. Shredded paper, such as newspapers, white office paper, and cardboard, is used

Observing worms in a vermicompost bin.

Learning about earthworms through vermicomposting provides a fascinating experience for children.

Burying food scraps under moistened, shredded newspaper bedding.

SAFETY

It is important to use good safety practices to protect the health of all involved. After touching earthworms or the inside of the worm bin, children and teachers should wash their hands with soap. Use a three-pronged garden tool to pull back the bedding to bury food and see the earthworms. This safety measure helps keep the organic materials from getting under your fingernails.

HARVESTING VERMICOMPOST

Earthworm castings will build up on the bottom of the worm bin. Vermicompost will be ready to harvest after three or four months. Three harvesting methods are described in *Worms Can Recycle Your Garbage*.[2]

USING VERMICOMPOST

A little bit of vermicompost goes a long way! Vermicompost can have significant effects on plant growth, health, and resistance to disease and pests. For plants and seedlings, combine one part vermicompost to four parts potting medium so that vermicompost is 20% of the soil mix. As a top dressing, incorporate ½-inch deep vermicompost around the drip line (where water would drip off the plant and land on the soil).

Red wigglers with newspaper bedding.

most often as bedding. Soak shredded paper in water for 10 minutes and wring out before putting it in the worm bin. Earthworms need moist bedding so their bodies do not dry out. Add one handful of soil to provide grit to aid in earthworm digestion. No more than one handful of soil should be added to the bin because red wigglers do not live in the soil (they live in leaf and manure piles).

Fill the worm bin one-third to halfway with moistened bedding. Gently place the worms on top of the bedding and allow them to burrow underneath on their own. Wait a couple of days before feeding the worms. You may need to keep the bin in a 24-hour lighted space for a few days to prevent the worms from trying to leave the bin before they get adjusted to their new environment.

Worms can be fed vegetables, fruit, coffee grounds, eggshells, torn open tea bags, and some types of leftovers. *Do not* feed them meat, grease, bones, dairy products, cat or dog feces, spicy foods (hot peppers, onions, and garlic), citrus fruits, sugary foods, or fresh grass. *Always* bury the food under one to two inches of bedding. No food waste should be visible inside the bin.

Adding vegetable scraps to feed the worms.

FUN WITH WORMS!

Children are fascinated by earthworms and eager to examine them. Form small groups of two to six. Provide each group with a moistened paper towel and place a small handful of earthworms on it. For the next 20 minutes or so, children will entertain themselves observing the worms. Caution them to treat the worms gently and keep them on the paper towels so their skins stay moist (although it's okay to hold them for a little while). The teacher may periodically mist the worms to keep them moist. The activity may be repeated several times, while asking students questions (see sidebar).

Children also enjoy examining earthworm egg capsules. They are about the size of a grain of rice, lemon-shaped, shiny, and light brown. Inside a red wiggler egg capsule are two to seven baby earthworms, and on average, three will hatch.

In a handful of material from a worm bin, children may also observe tiny decomposer organisms such as sow bugs, springtails, pot worms, black soldier flies, earwigs, and mites. Magnifying lenses will help children examine these creatures. For more activities, see *Vermicomposting: A 5th Grade School Enrichment Curriculum* (it can be modified for any age): http://www.bae.ncsu.edu/topic/vermicomposting/pubs/ag-464-vermi-curriculum.pdf.

Some questions to engage children while having fun with worms:

- How does the worm feel to the touch? Dry or slimy?
- What does the worm do when you touch it?
- Which end is the head or tail, and how can you tell?
- Can you see the worm's mouth?
- Where are the worm's eyes? (They don't have any.)
- How does the worm move?
- Does the worm smell?
- What color is the worm?
- Does it have any markings?
- Can you see through the skin? What do you see?
- Does the worm have a swollen band (clitellum) around it?

Be sure children wash their hands after handling earthworms.

Worms working away to make vermicompost.

Adding food waste to a worm bin indoors is a fun activity – don't forget to cover it with bedding!

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