

A group of children wearing straw hats and gloves are working in a raised garden bed. One child in a green shirt is using a trowel to dig in the soil. Another child in a blue shirt is holding a blue watering can. The garden bed is filled with mulch and soil. In the background, there are more garden beds and plants.

Natural Learning Initiative

Gardening Activity Guide: **A resource to promote** **vegetable and fruit gardening with young** **children**

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The Natural Learning Initiative, College of Design, NC State
University



Natural Learning Initiative Activity Areas

Creating environments for healthy human development and a healthy biosphere for generations to come



Research & Evaluation

- Post Occupancy Evaluations POEs
- Research studies
- Best Practice indicators



Professional Development

- Annual events and tours
- Regional Symposia
- Higher Education Modules
- Certificate Programs



Design Assistance

- Creation of demonstration, model sites: zoos, botanical gardens, parks, nature centers, childcare, schools, neighborhoods
- Specialized consultation to landscape architects, designers



Comprehensive Projects

Multi-year projects including:

- Design Assistance
- Professional Development
- Evaluation
- Resource Dissemination



Information Communication

- NLI website
- Toolkits
- Online resources, media
- Green Desk



IN OUR GARDEN WE LEARN TO..

PREDICT

PLAN

OBSERVE

WEED AND WATER

MEASURE

PICK

EAT

Gardening!



Research >> Building the evidence

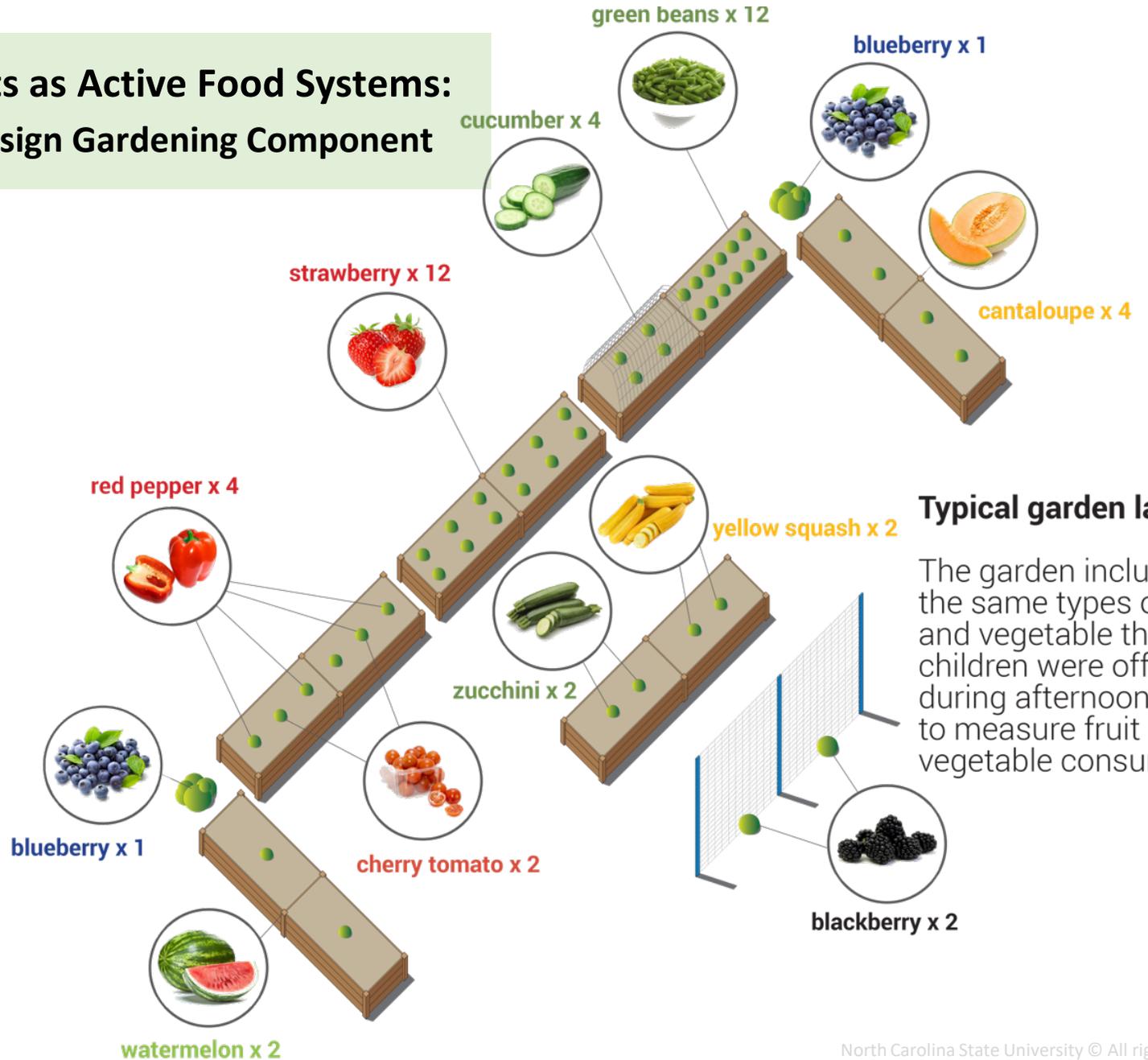
Childcare Outdoor Learning Environments as Active Food Systems: Effectiveness of the Preventing Obesity by Design Gardening Component

USDA – NIFA Integrated Project

Research Randomized controlled trial (RCT) research design to assess the impact of gardening on children's physical activity, fruit and vegetable liking, knowledge, and consumption.

Education

Extension



Typical garden layout

The garden included the same types of fruits and vegetable that children were offered during afternoon snacks to measure fruit and vegetable consumption.

Gardening Activity Guide



Gardening Activity Guide
Contents

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- Time to Harvest: Cool Season & Warm Season

Gardening Activities

Preparing

1 Gardening Activities **PREPARING**
Examining Seeds & Plants
About life cycles and what plants do

Description
Examine seeds and plants to gain a greater understanding of how they grow and change. Children can learn from the life cycle of a seed and how it grows into a plant. They can also learn about the life cycle of a plant and how it grows into a seed.

Vocabulary
Seed, Embryo, Cotyledon, Flower, Plant, Stem, Root

Book Suggestion
Seed, Seed, Seed by Gail Gibber

Fun Fact
A seed is a small embryo of a plant that is able to grow into a new plant.

Extension
Ask children to draw a picture of a seed and label its parts. They can also draw a picture of a plant and label its parts.

Oh, how seeds will grow!

2 Gardening Activities **PREPARING**
Sprouting Seeds
Understanding how a seed becomes a plant

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"I love to make plants!" (4-year-old)

3 Gardening Activities **PREPARING**
Preparing Beds
Setting and tending soil

Description
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Feeding our soil to feed our plant!

4 Gardening Activities **PREPARING**
Planting
Learning to nurture life

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Ready ... Set ... Dig in!

Caring

5 Gardening Activities **CARING**
Watering
Experiencing the essential source of life

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Water, water, come and give life!

6 Gardening Activities **CARING**
Weeding
In their world it's a "bad" plant?

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Weeding gardens and feeding our plants!

7 Gardening Activities **CARING**
Observing Plant Growth
Measuring to build STEM skills

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I spy with my little eye ... a leaf float by!

8 Gardening Activities **CARING**
Observing Garden Bugs
Helping to reveal invisible children's world

Description
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Ask children to draw a picture of a seed and label its parts. They can also draw a picture of a plant and label its parts.

Go bug out!

Harvesting and Eating

9 Gardening Activities **HARVESTING AND EATING**
Harvesting
Enjoying the fruits and vegetables of our labor

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Children can learn about the life cycle of a seed and how it grows into a plant. They can also learn about the life cycle of a plant and how it grows into a seed.

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Ask children to draw a picture of a seed and label its parts. They can also draw a picture of a plant and label its parts.

It's harvesting time!

10 Gardening Activities **HARVESTING AND EATING**
Preparing
Enjoying the fruits and vegetables of our labor

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Preparing is caring!

11 Gardening Activities **HARVESTING AND EATING**
Snacking
Yummy! Buen provecho! Bon appétit!

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Vocabulary
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Yummy! Buen provecho! Bon appétit!

12 Gardening Activities **HARVESTING AND EATING**
Taking Home
Sharing is caring

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Children can learn about the life cycle of a seed and how it grows into a plant. They can also learn about the life cycle of a plant and how it grows into a seed.

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Home is where the garden is!

Suggested Activities

From Gardening Activities

Phase I: Preparing



Gardening Activities
PREPARING

Examining Seeds & Plants

About life cycles and what plants do

Description

Examining seeds and plants can start a conversation about life cycles and motivate children to explore the living world around them. Together, we can begin taking steps in early science learning such as classifying, exploring shape, size, color and weight; and the gradual acquisition of scientific knowledge.

Suggested Activities

Classifying Seeds

- Hunt for a variety of seeds outdoors using small cups to collect them.
- Gather inside to discuss where seeds come from and how they produce new plants.
- Ask children to examine and classify seeds based on shape, size, color, and weight.
- Sort the seeds according to source plant (tree, shrub, vine, ground cover, vegetable, fruit, or flower).
- Ask children: do vegetables have flowers?
- Examine seeds that will become plants in your garden.

Examining Plants

- Ask a local nursery or garden center to donate a few potted vegetable plants that are past their prime and unsellable. Explain that these plants will be used to educate future customers!
- In the classroom, divide children into small groups of three or four to a table and give each group a plant out of the pot to examine.
- Encourage children to examine different plant parts (root, stem, leaf, flower, fruit). Ask them to describe what they see and guess what each part does to help the plant grow.
- If possible, replant or compost the example plants.

Vocabulary

Different, Examine, Flower, Garden, Plant, Same, Seed, Tree

Book Suggestion

How a Seed Grows (Helene J. Jordan and Loretta Krupinski) teaches young children how little seeds can become the plants and trees that surround them every day! An informative read.



Fun Seed Facts

- Seeds contain three parts:
 1. A dormant, miniature plant (embryo)
 2. Food storage, which supplies nutrients for the embryo including proteins, carbohydrates, or fats
 3. A seed coat that protects the embryo from diseases, insects, and moisture until it is time to germinate
- Proper temperature, moisture, oxygen, and light lead to germination. First, water is drawn in through the seed coat. Next, the primary root will emerge and eventually sprout root hairs and lateral roots. Then, the stem will emerge with the first leaves of the plant.
- Seeds can vary greatly in size, shape, texture and color. A coconut can be as big as your head, but it is still a seed!

Oh, how seeds will grow!

Phase II: Caring



Gardening Activities
CARING

Watering

Experiencing the essential source of life

Description

Watering helps children learn that water is the source of life. If plants don't get watered, they will wilt and eventually die. Since children love to water, the danger is more likely over-watering, which deprives the roots of oxygen and causes death. Vegetables in well-drained soil are unlikely to be over-watered, making ideal conditions for children.

Suggested Activities

Daily Watering Trips

- Store child-size watering cans near the water source. Take trips to the garden each day to water the plants.
- Use a recycled gallon milk jug to fill watering cans to help children understand and compare relative measurements (volume and weight).
- Discuss the best time of day to water plants and how much water is needed for healthy plant growth.
- Learning how to water plants properly builds children's self-confidence and fine motor skills.

Water Play

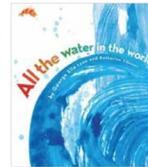
- Fill a water table with water. Add objects such as plastic cups, ladles, and measuring cups to encourage children to practice pouring, lifting, and measuring to enhance their psycho-motor skills.

Vocabulary

Lift, Measure, Pour, Water, Wilt

Book Suggestion

All the Water in the World (George Ella Lyon and Katherine Tillotson) is an inspiring poem about the importance of water for plants, animals, humans, and other living things. The poem includes facts about water and the need for water conservation for the health of all life on earth.



Watering Tips

- Water early in the day.
- Water the soil, not the plant. Many diseases move through water, so avoid splashing soil onto the plant.
- Water deeply in a wide area around the base of the plant to promote root growth.

Water, water, come and give life!

Phase III: Harvesting and Eating



Gardening Activities
HARVESTING AND EATING

Harvesting

Learning patience until things are ripe!

Description

Harvesting helps children imagine themselves as farmers as they enjoy the fruits and vegetables they have grown. For more information on harvesting, refer to the NLI/NC State Extension publication LOCAL FOODS: Childcare Center Production Garden Series, 3. *Growing Warm-Season Fruits and Vegetables in Childcare Production Gardens* (<https://naturalearning.org/Gardening-Series>).

Suggested Activities

Harvest Days

- Be sure to harvest fruits and vegetables as soon as they are ripe to avoid birds and other pests getting to them first.
- Harvest time provides opportunities to carefully observe the color, size, and texture of each type of fruit and vegetable before and after harvesting. Discuss how to pick without damaging the produce. Introduce words such as ripe and unripe, hard and soft, color-related words, and those listed in the vocabulary section shown here.

Creating a Farmer's Market

- After harvesting fruits and vegetables from the garden, create a pop-up farmer's market with the children where they can sell produce to their parents. This reinforces healthy eating practices, encourages math play while buying and selling, and promotes parent engagement.

Vocabulary

Crunchy, Edible, Gather, Hard, Pick, Produce, Ripe, Rough, Smooth, Soft, Sour, Sweet, Wash, Yield

Book Suggestion

It's Harvest Time! (Jean McElroy) is an engaging book that teaches children how fruits and vegetables grow. Use the fold-outs and photos to communicate harvesting practices, discuss plant identification, and introduce plant parts.



Harvesting Tips

- Most fruits and vegetables taste best if allowed to ripen on the plant. However, you may need to harvest a bit early to get them before the birds do.
- Fruits and vegetables often change color as they ripen.
- Harvest early in the morning and keep produce cool until consumed.
- Be gentle. If the vegetable is not easily twisted or pulled off, cut the stem to remove.
- Harvest frequently to prolong the bounty. Each plant's goal is to produce viable seed – once fruits fully mature, the plant no longer needs to produce flowers and fruit.
- Wash hands before and after harvesting.

It's harvesting time!



Gardening Activities
PREPARING

4

Planting

Learning to nurture life

Description

Planting can begin with either seeds or transplants. Transplants are satisfying to use because the plant has already been nurtured by the children. Through planting, children start to take responsibility in caring for other living things. Ask if they have planted before and how it felt. Warm-season gardening starts after the last frost. Timing depends on the type of vegetable and whether it's grown from seed or transplant. Check with your local Cooperative Extension agency to learn more about planting calendars for your area.

Suggested Activities

Planting Seeds

- Discuss why it is much easier to grow some plants from seed, such as beans.
- Talk about spacing seeds so plants don't compete for growth. Use this analogy: if the children in the classroom had to share one cup of water each day, how would they feel?
- Distribute seeds in small cups and a pointed trowel to pairs of children.
- Discuss the best places to plant. One child drags a pointed trowel to create a shallow planting row. The other child, guided by the teacher, drops the seeds at intervals specified on the packet. Both children push a light covering of soil back over the seeds in the row.

Planting Seedlings

- Once weather permits, seedlings can be transplanted to outdoor raised beds. Use newspaper pot seedlings grown in the classroom or transplants from elsewhere.
- Review with the children how they started with seeds, sprouted them with water, grew seedlings in the classroom, and prepared the beds with good soil. Now the season has arrived for planting outdoors.
- Supply each child with their own seedling to plant and care for.

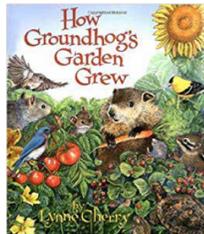
- Discuss what plants and children need to be healthy and grow strong. Is there anything plants need that children don't? And vice versa?
- Observe growing conditions such as sunlight, shelter, and protection from trampling. Ask children: why do we plant in raised beds?
- Ask children: why do we use mulch to cover the soil surface?
- Encourage children to care for their seedlings by watering.

Vocabulary

Care, Growth, Planting, Protect, Seedlings, Shelter, Transplant

Book Suggestion

How Groundhog's Garden Grew (Lynne Cherry) tells a story about a young groundhog learning how to plant and tend her very own garden through each season. Ask children about impressive aspects of the story. Discuss how it relates to their gardening experiences.



Planting Tips

- Plant small seeds only ¼ inch deep, larger seeds up to 1 inch deep.
- Do not allow the roots to dry out.
- Carefully remove plants from pots by squeezing sides. Tip plant headfirst between fingers. Keep root-ball/soil intact and cradle in hand to plant.
- Plant transplants in the soil at the same depth as they are in the pot.

Ready ... Set ... Dig in!

Gardening Activity Guide

Phase I: Preparing & Suggested Resources

PLANTS FOR OUTDOOR LEARNING ENVIRONMENTS

28



INFOSHEET

Plants are a critical outdoor learning environment (OLE) best practice. Different species can provide shade, visual screens, wind barriers, and enhance seasonal play opportunities. For children, plants create a magical world where imaginations can endlessly roam. Natural loose parts, such as twigs and seeds, are used as props to stimulate imaginative play. Plants improve outdoor comfort, motivate children to spend more time outside, and add cost-effective play and learning value to the OLE.

PLANT TYPES

Understanding different plant types enables wise plant selection, cost-effective purchase decisions, and efficient installation practices. This *InfoSheet* introduces plant types and guides plant selection to create successful, naturalized OLEs.

Trees provide shade, visual screens, and wildlife habitat. They also serve as key edible landscape components. Specific species, such as fig trees, provide climbing opportunities.



Lush perennial plantings of different textures and height add sensory interest and differentiate settings.



Children playing in lush, tall ornamental grasses that also provide sensory stimulation.

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Plants bring pollinators to OLEs, benefiting the ecosystem.

Shrubs provide interesting foliage, flow fragrance close to the ground for children to enjoy. Some shrub species provide many attract birds, butterflies, and other wildlife.

Vines typically grow fast, climbing up as they encounter—this makes them especially naturalizing fences, arbors, and pergolas such as blackberry or grape, produce edible fruit adding value to an OLE.

Ornamental grasses are tough and afford plants that look good year-round, even during winter season. They are often used to create mazes that can take heavy foot traffic. Or they provide textural variety and play props.

Groundcovers can be used to naturalize including areas under trees and shrubs. Consider some herbs ("steppables") that are effective when planted between paving stones.

Perennial flowering plants add diversity fragrance, and texture to the OLE. Perennials provide habitat for diverse wildlife, including birds and butterflies. Many perennials produce beautiful flowers fascinating growth cycles. Consider installing perennials for indoor decoration and play props.

Annual flowering plants are a great way to add color to the OLE, especially when dormant. Annuals allow children to experience the full life cycle, beginning with planting seeds and watching them grow. Consider annuals for cutting flowers or harvesting vegetables.

INDOOR PLANTS FOR HOMES AND CLASSROOMS

20



INFOSHEET

Indoor plants provide numerous benefits to both classroom and home environments, including a reduction in stress levels, improved concentration, and improved air quality. Children enjoy the opportunity to care for plants through watering, pruning, and propagation; pieces of classroom plants can be rooted and sent home with students to engage families. This *InfoSheet* outlines low maintenance indoor plants, light and water requirements, and known levels of toxicity.

LIGHT CONDITIONS

Indoor plants thrive in a variety of lighting conditions depending on their species. Some plants can tolerate a wide variety of lighting conditions, while others have very specific requirements. It is crucial to understand the lighting that a home or classroom has available and choose plants accordingly. Keep in mind that lighting will change with weather and the seasons.

Direct sunlight. If the sun's rays directly hit a plant through a window, that is considered direct sunlight. This is most common in south-facing windows.

Indirect light. Indirect light occurs when the sun's rays are reflected off of something else before hitting the plant. Plants often receive bright, indirect light by being close to windows—place a sheer curtain on windows that receive direct sunlight to prevent plants from getting their leaves burned.

Low light. Low-light conditions indicate that no direct light will touch the plant. Low-light plants can be placed a few feet away from a light source or in a room with artificial light. Low-light doesn't mean "no light," but if a window is unavailable, ambient artificial lights such as incandescent bulbs, fluorescent lights, or LED lights will suffice.

WATERING REQUIREMENTS

Well-draining, high-quality potting soil and proper drainage are crucial for correctly watering indoor plants. Containers for indoor plants should have holes on the bottom to allow water to drain; place a small dish, plate, or shallow container under containers to avoid leaks. Check specific water needs for each plant and keep in mind that over-watering is the most common cause of death for indoor plants. Do not water on a regular schedule; instead, stick your finger in the soil to check if it's moist or dry. Water the soil rather than the plant to avoid mold and rot.



Ivy and pothos cuttings rooted in water



Spider plant offsets can be snipped off and rooted in water or soil

TOXICITY LEVEL

Some common, low-maintenance indoor plants can be toxic if extensively handled or consumed, though symptoms are often mild. Children getting sick by consuming indoor plants is extremely rare, and more commonly occurs in pets. The benefits of connecting children to plants and nature while indoors far outweighs the risks. However, be mindful of where plants are located indoors and the age of children in areas with indoor plants: even mildly toxic plants should never be brought into an infant/toddler area. If a child consumes any part of an indoor plant, call poison control immediately.

Version 1.1

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A breakdown... of Gardening Activities

Phase

Topic

A description
about the topic

Vocabulary that
supports the topic

Suggested
activities to do
with the children

Suggested book
related to the
topic

Fun facts about
the topic



Gardening Activities
PREPARING

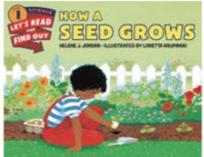
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- Seeds can vary greatly in size, shape, texture and color. A coconut can be as big as your head, but it is still a seed!

Suggested Activities

Classifying Seeds

- Hunt for a variety of seeds outdoors using small cups to collect them.
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- Ask children to examine and classify seeds based on shape, size, color, and weight.
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- Ask children: do vegetables have flowers?
- Examine seeds that will become plants in your garden.

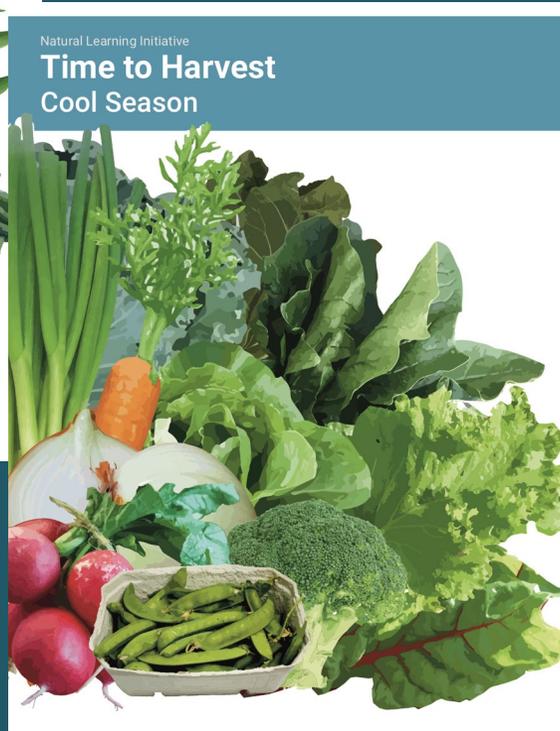
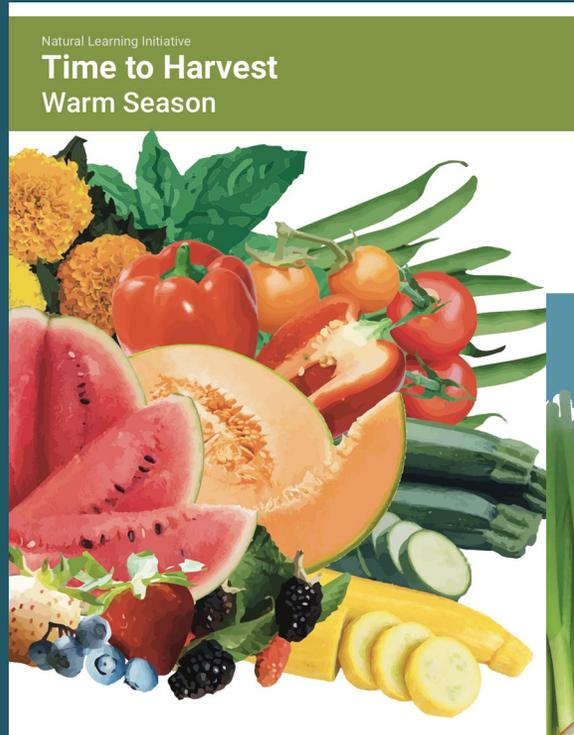
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- Ask a local nursery or garden center to donate a few potted vegetable plants that are past their prime and unsellable. Explain that these plants will be used to educate future customers!
- In the classroom, divide children into small groups of three or four to a table and give each group a plant out of the pot to examine.
- Encourage children to examine different plant parts (root, stem, leaf, flower, fruit). Ask them to describe what they see and guess what each part does to help the plant grow.
- If possible, replant or compost the example plants.

Oh, how seeds will grow!

1 Gardening Activity Guide

Time to Harvest: Cool and Warm Season



Natural Learning Initiative
Cool Season

Spinach

Helpful Tips

- Spinach is best eaten fresh. It loses nutritional value with each passing day. When boiled, many of the nutrients leach into the water.
- Spinach is a good source of vitamin C, vitamin A, and minerals including iron.
- Baby spinach leaves have a sweeter flavor and more tender texture than full-grown leaves.

Harvest

Individual leaves are ready to harvest four to six weeks after planting when they reach at least 4 inches long. Pick from the exterior of the plant to extend the harvest period. Spinach may be stored up to two weeks in a reusable produce container in the refrigerator.



inches—HARVEST SIZE RULER

Gardening Activity Guide 38

Gardening Activities Calendar

Our Gardening Activities

		Month	Year	Center										Teacher
		Preparing			Caring				Harvesting			Weekly Notes		
		Examining seeds/ plants	Sprouting seeds	Preparing beds	Planting	Watering	Weeding	Observing plant growth	Observing garden bugs	Harvesting	Preparing	Snacking	Taking home	List of activities
Week 1	M													
	Tu													
	W													
	Th													
	F													
Week 2	M													
	Tu													
	W													
	Th													
	F													
Week 3	M													
	Tu													
	W													
	Th													
	F													
Week 4	M													
	Tu													
	W													
	Th													
	F													
Week 5	M													
	Tu													
	W													
	Th													
	F													

- A tool to record daily and weekly interactions related to each gardening process.
- Children are active participants in documenting gardening & related activities.

Garden Activity Guide Version 1.2, April 2020

Gardening Activities Calendar



Gardening Activities
PREPARING

Examining Seeds & Plants

About life cycles and what plants do

Description

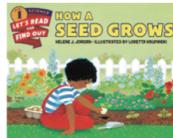
Examining seeds and plants can start a conversation about life cycles and motivate children to explore the living world around them. Together, we can begin taking steps in early science learning such as classifying, exploring shape, size, color and weight; and the gradual acquisition of scientific knowledge.

Vocabulary

Different, Examine, Flower, Garden, Plant, Same, Seed, Tree

Book Suggestion

How a Seed Grows (Helene J. Jordan and Loretta Krupinski) teaches young children how little seeds can become the plants and trees that surround them every day! An informative read.



Suggested Activities

Classifying Seeds

- Hunt for a variety of seeds outdoors using small cups to collect them.
- Gather inside to discuss where seeds come from and how they produce new plants.
- Ask children to examine and classify seeds based on shape, size, color, and weight.
- Sort the seeds according to source plant (tree, shrub, vine, ground cover, vegetable, fruit, or flower).
- Ask children: do vegetables have flowers?
- Examine seeds that will become plants in your garden.

Examining Plants

- Ask a local nursery or garden center to donate a few potted vegetable plants that are past their prime and unsellable. Explain that these plants will be used to educate future customers!
- In the classroom, divide children into small groups of three or four to a table and give each group a plant out of the pot to examine.
- Encourage children to examine different plant parts (root, stem, leaf, flower, fruit). Ask them to describe what they see and guess what each part does to help the plant grow.
- If possible, replant or compost the example plants.

Fun Seed Facts

- Seeds contain three parts:
 1. A dormant, miniature plant (embryo)
 2. Food storage, which supplies nutrients for the embryo including proteins, carbohydrates, or fats
 3. A seed coat that protects the embryo from diseases, insects, and moisture until it is time to germinate
- Proper temperature, moisture, oxygen, and light lead to germination. First, water is drawn in through the seed coat. Next, the primary root will emerge and eventually sprout root hairs and lateral roots. Then, the stem will emerge with the first leaves of the plant.
- Seeds can vary greatly in size, shape, texture and color. A coconut can be as big as your head, but it is still a seed!

Oh, how seeds will grow!

NC STATE Design NLI NATURAL LEARNING INITIATIVE NC STATE		Preparing			
		Examining seeds/plants	Sprouting seeds	Preparing beds	Planting
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NC STATE Design NLI NATURAL LEARNING INITIATIVE NC STATE		Our Gardening Activities															
		Examining seeds/plants	Sprouting seeds	Preparing beds	Planting	Watering	Weeding	Observing plants	Observing garden bugs	Harvesting	Preparing	Snacking	Taking home	Weekly Notes			
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Resources

COVID SUPPORT RESOURCES: WE'RE ALL IN THIS TOGETHER!

Nature play and learning every day!

MISSION

“Creating environments for healthy human development and a healthy biosphere for generations to come.”



The Green Desk

NLI > Resources > The Green Desk

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The Green Desk



Planning and Planting

The Green Desk



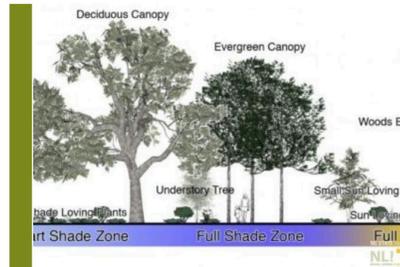
Edible Plants for Play and Learning

The Green Desk



Landscape Plant List

The Green Desk



Landscape Plants for Play and Learning

The Green Desk

Topics:

- Starting Seeds in the Spring
- Sensory Gardens
- Selecting, Installing, and Managing Plants
- Tire Planters
- Theme Gardens
- Children's Vegetable Gardens: Introduction
- And so much more!

INDOOR PLANTS FOR HOMES AND CLASSROOMS

20



INFOSHEET

Indoor plants provide numerous benefits to both classroom and home environments, including a reduction in stress levels, improved concentration, and improved air quality. Children enjoy the opportunity to care for plants through watering, pruning, and propagation; pieces of classroom plants can be rooted and sent home with students to engage families. This Infosheet outlines low maintenance indoor plants, light and water requirements, and known levels of toxicity.

LIGHT CONDITIONS

Indoor plants thrive in a variety of lighting conditions depending on their species. Some plants can tolerate a wide variety of lighting conditions, while others have very specific requirements. It is crucial to understand the lighting that a home or classroom has available and choose plants accordingly. Keep in mind that lighting will change with weather and the seasons.

Direct sunlight. If the sun's rays directly hit a plant through a window, that is considered direct sunlight. This is most common in south-facing windows.

Indirect light. Indirect light occurs when the sun's rays are reflected off of something else before hitting the plant. Plants often receive bright, indirect light by being close to windows – place a sheer curtain on windows that receive direct sunlight to prevent plants from getting their leaves burned.

Low light. Low-light conditions indicate that no direct light will touch the plant. Low-light plants can be placed a few feet away from a light source or in a room with artificial light. Low-light doesn't mean "no light," but if a window is unavailable, ambient artificial lights such as incandescent bulbs, fluorescent lights, or LED lights will suffice.

WATERING REQUIREMENTS

Well-draining. High-quality potting soil and proper drainage are crucial for correctly watering indoor plants. Containers for indoor plants should have holes on the bottom to allow water to drain; place a small dish, plate, or shallow container under containers to avoid leaks. Check specific water needs for each plant and keep in mind that over-watering is the most common cause of death for indoor plants. Do not water on a regular schedule; instead, stick your finger in the soil to check if it's moist or dry. Water the soil rather than the plant to avoid mold and rot.



My and potato cuttings rooted in water



Indoor plant offsets can be snipped off and rooted in water or soil

TOXICITY LEVEL

Some common, low-maintenance indoor plants can be toxic if extensively handled or consumed, though symptoms are often mild. Children getting sick by consuming indoor plants is extremely rare, and more commonly occurs in pets. The benefits of connecting children to plants and nature while indoors far outweigh the risks. However, be mindful of where plants are located indoors and the age of children in areas with indoor plants: even mildly toxic plants should never be brought into an infant/toddler area. If a child consumes any part of an indoor plant, call poison control immediately.

Version 1.1

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GROWING EDIBLES IN CONTAINERS

10



INFOSHEET

Container gardening is a practical, low cost, space-efficient, and child-friendly approach to growing fresh produce at home, schools and in childcare centers. Children delight in growing and eating their own food. Research shows that repeated experience with healthy food options increases the likelihood of learning healthy eating habits. Using containers can be a permanent, flexible gardening strategy or a short-term first step towards a larger scale installation. Either way, containers are great for growing tasty herbs, delicious salad lettuce, succulent strawberries, and much more (see listing, p.2). Success depends on six key considerations.

- 1. Container selection**
Edible plants can be grown in purchased, repurposed or recycled containers, as long as they meet two basic requirements: enough space for fully mature plants and adequate drainage (holes drilled in container bottom). Recycled or purchased 5-gallon paint pails (10" dia.) are a sturdy, inexpensive, temporary or permanent choice. Handles make them easy to carry around. Repurposed dish pans, tubs, children's wagons and splash pools, canvas bags, and even boots or shoes can work. Store-bought "grow bags" are another inexpensive choice. Available in different sizes, they are foldable and easy stored when not in use. Engage children in decorating containers to encourage ownership.
- 2. Suitable edible plants**
Many annual edibles and some perennial edibles can be grown in containers, guided by USDA hardiness zone constraints (see 4, below). Plants can be grown directly from seed or as transplants (see companion Infosheet: Making Newspaper Seedling Trays and Starting Herbs Indoors). Plants that spread, such as melons and pumpkins, are not recommended. For plants that climb, such as peas, beans, and cucumbers, provide vertical support using stakes, cages, trellises, or adjacent fences to grow on. Plants with similar needs can share the same container if large enough. Many annual edibles make tasty micro-greens (see "M" listing, p.2).
- 3. High-quality growing medium**
Usually called "potting mix," high-quality growing medium is critical to ensure that plants thrive in containers. Purchase in 2-cu-ft. bags from local garden supply stores. Using exclusively native soils



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Infosheets

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Natural Learning at Home®



01. Benefits of Engaging Children with Nature

Infosheets



02. Top Ten Activity Settings For Outdoor Learning

Infosheets



03. Affordable Settings and Components

Infosheets



04. Gathering Settings

Infosheets

NLI Media

**Making a Terrarium**

Terrariums are a fun way to bring nature indoors. Using easily found and inexpensive materials, you can create a small world of wonder for children and adults alike.

**Creating a Fairy Garden**

Fairy gardens are homes for elves, fairies, and other beings of children's imagination. They provide enchanted places that stimulate creative and dramatic play in make believe settings.

**Design Concept**

The NLI design team engages teachers, caregivers, and stakeholders in a community-centered design process that is grounded in innovative, accessible, and low-cost strategies to create high-quality play and learning settings.



Robin Moore
Director, Natural Learning Initiative
NC State University

Designer Overview by Professor Robin Moore

Robin C. Moore, Dipl. Arch, MCP, Hon. ASLA, Hon. IPA is a Professor of Landscape Architecture and Director of the Natural Learning Initiative, College of Design, NC State University.

**Looping Primary Pathway**

Primary pathways promote physical activity by facilitating running, chase games, and wheeled toy use. They provide circulation throughout the outdoor learning environment and connect play settings for children and teachers alike.

**Play and Learning Setting**

A diversity of play and learning settings is key to high-quality outdoor learning environments. A variety of settings encourages children to be more physically active, play cooperatively, and engage in outdoor learning.

**Outdoor Classrooms**

Outdoor classrooms facilitate unique learning experiences that connect children to the natural world. Indoor-outdoor curriculum connections allow children to reflect on their outdoor experiences and share their observations.

**Farm to Child Care**

Farm to Child Care brings North Carolina grown fruits and vegetables into child care facilities for meals and snacks. Centers that grow their own fresh foods strengthen experiential learning opportunities for children in the

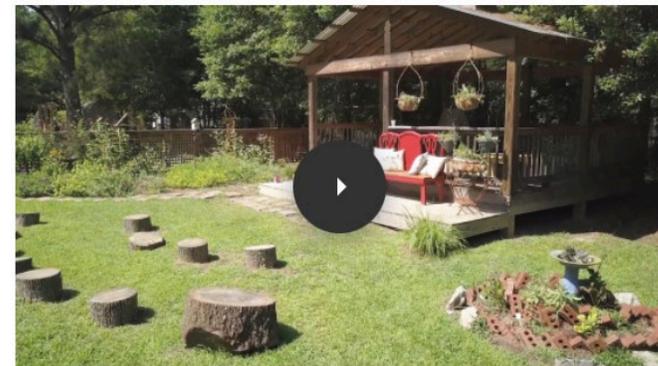
**Garden Planning and Caring**

Gardening allows children to experience every stage of growth from planting to harvest. Raised beds, container gardens, and edible shrubs are critical components for designing high-quality edible landscapes for children.

NLI's Videos on Gardening

**Garden Harvesting, Preparing, Snacking**

Children who grow their own fruits and vegetables are more likely to try and enjoy new foods. Harvesting, snacking on, and preparing fresh foods help children build healthy eating habits that can last a lifetime.

**Incremental Development**

The creation of a high-quality outdoor learning environment doesn't happen overnight. Projects develop in phases as funding, volunteers, and resources become available. A masterplan guides the phasing of projects over many years.

For Early Childhood Educators

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1,400 participants to date

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- Cooperative Extension Agents
- Master Gardeners
- Park and Recreation Professionals
- Volunteers working with early childhood institutions
- Designers

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NLI > Resources

Resources are created, often in collaboration with the Natural Learning Initiative's interdisciplinary partners, to support technical assistance, professional development, and generally to promote the importance of the natural environment in the daily experience of all children. Please use and share.

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Publications

Growing and Cooking Fruits and Vegetables at Childcare Centers

Local Foods: Childcare Center Production Gardens

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 education has an important opportunity to help create positive environments that support each young child's learning, allowing them to plant, grow, harvest, and consume produce. Healthy eating experiences, children develop healthy eating habits and food preferences at an early age. The more engaged children become with produce food education, such as gardening and food preparation, the more likely they will grow and routinely consume fruits and vegetables.

Findings of the Natural Learning Initiative (NLI) Prevalence Study by Design (PDS) program emphasize the significance of gardening for engaging teachers and children in on-site food production. By incorporating a designated production garden in the outdoor learning environment, childcare centers can improve young children's eating habits and gain exposure to fresh produce. The Center for Disease Control and Prevention (CDC) recommends a diet high in fruits and vegetables to lower risk for numerous chronic diseases, including cancer and cardiovascular disease. For young Americans, this diet can also significantly protect age children, vegetable intake falls below CDC recommendations. "Local Learning Initiative (LLI) Prevalence Study by Design (PDS) releases center vignettes

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

- Young Americans do not consume the recommended amount of fresh fruit, although 60% of youth consume some fruit.
- Essential vitamins, minerals, and fiber provided by fruits and vegetables may help prevent chronic disease.
- Growing, preparing, and eating fruits and vegetables, from their own gardening efforts, can help children develop healthy eating habits.
- Participating in a full range of gardening from seed to harvest helps children understand the origins of food.

GARDENING AND COOKING ABILITIES OF YOUNG CHILDREN

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 tasks and textures.
- Fine motor skills: moving, spreading, and weighing.
- Cognitive skills: curiosity, cause-and-effect, and problem-solving.

LEARN MORE...

Infosheets

Children's Vegetable Gardens

An introduction to the location, layout, construction & planting of raised garden beds

Gardening with children provides numerous opportunities for hands-on learning, inquiry, observation, and experimentation. Gardening also helps children build an understanding of and respect for nature and our environment. When children participate in growing edible plants, they are more motivated to taste, eat, and enjoy fruits and vegetables. With some planning, you can design and install a garden that will suit the needs of the children and adults that will be using it. Dream big, start small, and have fun!

Location: Locate the garden in a sunny spot, not too far from the building. Having the garden close to the center of activity makes it easier to keep an eye out for weeds, insect pests, watering needs, and ripe vegetables during harvest time. Before deciding where to locate your garden, pay attention to the sun pattern in your outdoor space for the day. Which area gets the most afternoon sun in the summer? Is that spot relatively flat and accessible? It may be the best location for your new garden.

Other things to consider:

- Proximity to water source - the closer the better.
- Storage for garden tools, such as shovels, watering cans, etc.
- Locating your garden next to existing storage, or in a spot where you can accommodate new storage, is ideal.

Layout: Decide on the size and dimension of your garden beds. It may be helpful to sketch out your plan on grid paper to get an idea of how the garden fits in with the existing elements in your space.

Design Tips:

- Keep beds narrow so that children can reach the middle of the bed from both sides (no more than 3-4 feet wide).
- Space garden beds far enough apart to allow room for children to walk between them (18 inches apart minimum). 2 feet apart is good for 4th grade.
- To test the layout of your garden beds, you can lay a garden hose on the ground to the outline of the beds or sprinkle flour on the ground in the shape of the bed you are imagining to walk what will work for your space.

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Leaflets

Harvest Time

Outdoor Learning Environments Activity Leaflet

Setting: Garden in the outdoor learning environment (OLE)

Activity: Picking Fresh Vegetables

Focus of Activity: Gardening and healthy eating

Curricular Areas:

- Health and physical development: healthy eating, motor development
- Language development and communication: new vocabulary, listening, describing
- Cognitive development: scientific thinking with observation and sensory exploration, conservation/empathy, familiarity with living things, interest in living things

Gardening with young children is one of the best ways to get them interested in healthy eating and where food comes from. Gardening activities also foster STEM skills and language development as children observe, question, and describe changes in the garden over time. Conversation artifacts can also be promoted as children learn how to care for living things.

Engaging Parents:

1. Encourage children to take their parents to the garden and talk about the different vegetables that are growing there and how to tell if they are ripe.
2. After enough vegetables have been harvested, invite parents to try "Taste Tester" or "See How" where children's artwork is displayed and the harvested vegetables are included as ingredients.

Materials: Small containers, healthy vegetable dip such as hummus

Suggestions:

1. Call attention to the difference between vegetables in the garden that are ripe and ones that are not. Use descriptive words. For example, describe ripe pea pods as fat and those that are not ripe as flat. Describe pea tomatoes as red and soft, those that are not ripe as green and hard.
2. Encourage children to taste ripe vegetables and to describe what they taste like.
3. Give each child a container for collecting ripe vegetables.

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