Plant Life

Teacher's Guide

MESS
Marvelous Explorations through Science and Stories

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Teacher Background Information

What is the focus of this guide?

This guide focuses on the fascinating world of plants. Through books and other print materials, and exploration of actual plants, children will identify plants as living things, examine the parts of plants, experiment with what plants need to live and grow, and appreciate the importance of plants to people and other living things.

What science concepts are covered in this guide?

- There are many different kinds of plants.
- Plants are living things that need water, light, nutrients, and air to survive, and can move, grow, and reproduce.
- Plants have different parts, each with special functions.
- Plants provide people with food, shelter, and other products.
- Gardening and farming are methods of growing plants.

What are plants?

There are more than 350,000 different species of plants on Earth. Tiny green mosses, exotic Venus fly traps, and immense redwood trees are all classified as plants. Given this diversity, what characteristics do plants share?

Most importantly, plants are living things. Plants need water, light, nutrients, and air to grow and survive. Like other living things, plants also are capable of movement. Plants will move toward a light source. A dramatic example is the sunflower.

One characteristic that distinguishes plants from most other living things is the ability to make their own food. This process is called **photosynthesis**. During photosynthesis, plants use the energy from sunlight to convert **carbon dioxide** and water into sugars and **oxygen**, a waste product.

What are the parts of a plant?

Plants have three main parts—roots, stems, and leaves. **Roots** usually grow underground and absorb minerals and water from the soil. The **stem** supports the plant and transports water and nutrients from the roots. **Leaves** contain **chlorophyll**, a light-absorbing green pigment used in photosynthesis.

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Many plants have **flowers** that produce **seeds** to make new plants. Flowers themselves are composed of several parts. Young children can readily learn to identify the **petals**, which are actually brightly colored leaves, and, on some plants, **pollen**.

How do plants reproduce?

Plants reproduce in a variety of ways. Flowering plants reproduce through **pollination**. Pollen is transferred from the male part of the plant to the female part of a flower on the same or a different plant. After pollination, the plant produces seeds. Inside the tough, outer coating of each seed is a baby plant and the food that it needs to grow. With water and the right temperature, a seed will grow or **germinate**.

Pollen can be dispersed by water and wind. Most plants, however, depend on insects, birds, bats, and other organisms to move pollen from place to place. Insects and other animals are attracted to flowers by the color of petals, fragrance of the flower, or nectar produced in the flower. As animals sip nectar, their bodies brush up against the pollen and it clings to them. Pollen is dispersed or spread when the animals move around the flower or visit other flowers.

Some plants can reproduce without pollination. New plants grow from runners or pieces of the plant (strawberries or African violets), **bulbs** (tulips or onions), **rhizomes** (iris or ginger), or tubers (potatoes).

People also help plants reproduce, especially those we like to eat or value for other reasons. People cultivate plants in farm fields, gardens, greenhouses, forests, and other places.

Why are plants important?

Plants play a critical role in the ecosystem. During photosynthesis, plants convert carbon dioxide into oxygen, which humans and other animals need to stay alive. Also, the moisture that evaporates from the leaves of plants accounts for 10% of the water in the atmosphere. Plants are an important source of nutrients for animals, including people. Even if the animal itself does not eat plants, something it eats will eat plants.

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All plant parts are represented in our diet. Radishes and carrots are the roots of plants, celery is a stem, and spinach and lettuce are leaves. Squash, cucumber, and tomatoes are all **fruits**. Peas and corn are seeds, and we eat the flowers of broccoli and cauliflower plants.

Plants provide shelter for many living things. Insects, birds, and other animals make their homes in large and small plants. People use products produced by plants including lumber to build their homes. Many other valuable products including medicines, cotton, rubber, and paper are derived from plants. Even coal comes from ancient, decayed plant matter.

Plants also are an important source of income worldwide. People earn income by growing and selling materials that come from plants. Many other careers involve working with plants as well. Farmers, landscapers, and forest rangers must know a great deal about plants. So must chefs, textile designers, home and boat builders, **botanists**, and numerous other professionals.

What are some common misunderstandings about plants?

Young children often harbor misconceptions about plants. Many children do not think plants are alive. Children's definitions of plants also tend to be overly narrow. They classify flowers and small green vegetation—but not trees or the colorful foods they eat—as plants. And even young children who have experience growing things may believe that seeds are produced in factories.

What are safe and appropriate ways to explore plants with young children?

There are several safety issues to consider when exploring plants with children. One very serious concern is that many plants—even common household plants such as philodendron—are toxic if eaten. It is important to take appropriate steps to avoid accidents. Also, allergies to foods such as nuts and berries are common. We have placed a ⚠ near every experience that involves food to remind you to check for food allergies and to complete the required paperwork.

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Teacher Vocabulary

botanist – a scientist who studies plants

bulb – a modified underground stem and leaves that contain food for the plant

carbon dioxide – a colorless gas in the air that is absorbed by plants during photosynthesis and released when animals breathe

chlorophyll – the green pigment in plants that captures light used in photosynthesis

embryo – an undeveloped plant inside a seed

flower – the reproductive part of a plant composed of petals, stamen, and carpel

fruit – the ripened ovary of a plant that contains a seed or seeds

germinate – to grow from a seed into a plant

herbaceous – a plant with little or no woody tissue

leaf – a green, usually flat, outgrowth from the plant stem; its primary functions are to perform photosynthesis and transpiration

nectar – the sweet liquid made by plants that attracts insects and other animals

oxygen – a gas that plants release; animals need this in order to live

petal – the colorful leaf that surrounds the reproductive parts of a plant

photosynthesis – the process that plants use to convert carbon dioxide, water, minerals, and energy from the sun into starch for food

pollen – a fine powder-like material produced by plants; pollen is the male reproductive cells

pollination – the transfer of pollen from the stamen to the carpel

rhizome – a thickened underground stem that contains stored food for a plant and can sprout new plants

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root – the underground part of a plant that provides support, absorbs water and nutrients from the soil, and stores food for the plant

seed – the part of a plant containing an embryo that will produce a new plant upon germination

stem – the main part of a plant that usually grows upward out of the ground and supports and connects other plant parts

transpiration – the emission of water vapor from the leaves of plants

MESS® Materials for Core and Center Experiences

Materials	Books
Experience 1: Introduction to Plants 2 or more plants photos of plants and non-plants	*Jack's Garden* by Henry Cole *Flower Garden* by Eve Bunting *I Took a Walk* by Henry Cole *Is It Alive?* by Marcia S. Freeman *A Closer Look* by Mary McCarthy
Experience 2: Plant Parts 1 or more potted plants with developed root systems magnifying tools simple poster, illustration, or model showing the parts of a plant	*The Vegetable Garden* by Melvin Berger *Tops and Bottoms* by Janet Stevens
Experience 3: What Is a Seed? collection of seeds and non-seeds (beads, stones, etc.) magnifying tools petri dishes	*Seeds! Seeds! Seeds!* by Nancy Elizabeth Wallace *Ten Seeds* by Ruth Brown *One Bean* by Anne Rockwell *A Seed Is Sleepy* by Dianna Hutts Aston
Experience 4: Where Do Seeds Come From? assortment of fruits (pre-cut) plastic wrap plates or petri dishes magnifying tools	*A Fruit is a Suitcase for Seeds* by Jean Richards *The Reason for a Flower* by Ruth Heller *Pumpkin* Circle by George Levenson *Pumpkins* by Ken Robbins *This Is the Sunflower* by Lola M. Schaefer
Experience 5: From Seed to Plant bean seeds moist paper towels clear plastic cups or sealable bags spray bottle with water magnifying tools camera sunflower life cycle puzzle	*One Bean* by Anne Rockwell *Pumpkin Circle* by George Levenson *How a Seed Grows* by Helene J. Jordan *A Dandelion's Life* by John Himmelman *How Groundhog's Garden Grew* by Lynne Cherry *A Seed Grows* by Pamela Hickman *From Seed to Sunflower* by Gerald Legg *From Seed to Pumpkin* by Wendy Pfeffer *From Acorn to Oak Tree* by Jan Kottke

MESS® Materials for Core and Center Experiences

Materials	Books
Experience 6: Planting Seeds variety of quick sprouting seeds such as grass, bean, and radish seeds plastic cups potting soil spray bottle with water magnifying tools camera	*Growing Vegetable Soup* by Lois Ehlert *Vegetable Dreams/Huerto soñado* by Dawn Jeffers *The Vegetable Garden* by Melvin Berger *Planting a Rainbow* by Lois Ehlert *It's Pumpkin Time* by Zoe Hall
Experience 7: We Eat Plant Parts assortment of fruits and vegetables	*Tops and Bottoms* by Janet Stevens *The Vegetable Garden* by Melvin Berger *Oliver's Vegetables* by Vivian French *Growing Vegetable Soup* by Lois Ehlert *Eating the Alphabet* by Lois Ehlert *Growing Colors* by Bruce McMillan *The Vegetables We Eat* by Gail Gibbons *Eating the Alphabet* by Lois Ehlert *In the Garden: Whose Been Here?* by Lindsay Barrett George
Experience 8: Growing Plants Without Using Seeds toothpicks water 2 clear containers sweet potato and large onion	*How Groundhog's Garden Grew* by Lynne Cherry *Potatoes* by Melanie Mitchell
Experience 9: Plants Need Water a plant spray bottle with water photos of plants and non-plants camera	*The Carrot Seed* by Ruth Krauss *One Bean* by Anne Rockwell *Precious Water* by Brigitte Weninger and Anne Möller *What Is a Scientist?* by Barbara Lehn *The Curious Garden* by Peter Brown

MESS® Materials for Core and Center Experiences

Materials	Books
Experience 10: Plants Grow Toward Light	
plant growing toward the sun 1 or more plants growing upright window or other light source	*How a Seed Grows* by Helene J. Jordan *One Bean* by Anne Rockwell *What Is a Scientist?* by Barbara Lehn
Experience 11: Where Does Our Food Come From?	
photos of fruits, vegetables, farms, orchards, harvest, trucks, trains, grocery stores gardening tools: hand trowel cultivator watering can large and small shovels gloves	*Making Minestrone* by Stella Blackstone and Nan Brooks *The Ugly Vegetables* by Grace Lin *Bread Comes to Life* by George Levenson *Apples, Apples, Apples* by Nancy Elizabeth Wallace *Pie in the Sky* by Lois Ehlert *The Little Red Hen and the Ear of Wheat* by Mary Finch *In the Garden* by Danielle Denega *A Harvest of Color* by Melanie Eclare *The Apple Pie Tree* by Zoe Hall *Harvest Year* by Cris Peterson
Experience 12: Stems	
simple poster, illustration, or model showing the parts of a plant celery stalks with leaves knife water food coloring clear plastic containers magnifying tools	*What Is a Scientist?* by Barbara Lehn
Experience 13: A Closer Look At Leaves	
simple poster, illustration, or model showing the parts of a plant leaves magnifying tools leaf stamps ink pad or paint paper	*Leaves! Leaves! Leaves!* by Nancy Elizabeth Wallace *Fall Leaves Fall* by Zoe Hall *Leaf Man* by Lois Ehlert *Red Leaf, Yellow Leaf* by Lois Ehlert *Autumn Leaves* by Ken Robbins *Leaves* by David Ezra Stein

Materials	Books
Experience 14: Flowers	
a variety of flowers magnifying tools simple poster, illustration, or model showing the parts of a plant	*The Reason for a Flower* by Ruth Heller *Planting a Rainbow* by Lois Ehlert *Flower Garden* by Eve Bunting *A Dandelion's Life* by John Himmelman *A Closer Look* by Mary McCarthy *Stars in the Grass* by Mia Posada
Experience 15: Trees Are Plants	
tree rounds photos of plants and non-plants magnifying tools camera	*The Growing-up Tree* by Vera Rosenberry *From Acorn to Oak Tree* by Jan Kottke *Pie in the Sky* by Lois Ehlert *Red Leaf, Yellow Leaf* by Lois Ehlert *A Grand Old Tree* by Mary Newell DePalma *The Apple Pie Tree* by Zoe Hall *ABCedar* by George Ella Lyon *This is the Tree* by Miriam Moss *Have You Seen Trees* by Joanne Oppenheim
Experience 16: Other Things We Get from Plants	
assortment of items made from plants such as rubber eraser, cotton fabric, baskets, plant-based soap, cork, rope, wooden toys, furniture photos of items made from plants	*The Reason for a Flower* by Ruth Heller

Experience 1

Introduction to Plants

Science Concepts

There are many different kinds of plants.

Plants are living things that need water, light, nutrients, and air to survive, and can move, grow, and reproduce.

Aim

Children will learn there are many different kinds of plants.

Materials

two or more plants
photos of plants and non-plants

Books

Jack's Garden by Henry Cole
Flower Garden by Eve Bunting
I Took a Walk by Henry Cole
Is It Alive? by Marcia S. Freeman
A Closer Look by Mary McCarthy

Vocabulary

clover
corn
flower
grass
green
grow
leaf
light
living
plant
tree
vine
water

Approach

⚠ In advance, review your plants so you can highlight the important features effectively. Some plants are poisonous. Be sure to research which ones are safe and which are not.

Begin the experience by explaining that you are going to spend the next few weeks learning about plants. Show the children a plant and encourage them to share what they already know about plants. Ask: *What can you tell me about this plant? What color is this plant? Where might we find a plant like this? What does this plant need to live and grow?*

Show the children a different plant and encourage the children to describe how the two plants are alike and different: *How are these two plants the same? Tell me how they are different. Are these plants living things? How do you know?*

To further illustrate the diversity of plants, show the children photos of other plants. Help the children label them (e.g., grass, tree, flower, corn). Explain that there are many different types of plants in the world and that they can look very different from each other.

Review your rules for exploring nature, then go outdoors and look for different types of plants. Talk about how the various plants are alike and different and how all plants need water and light to live and grow.

Extension

Go outdoors to investigate the variety of plants in your school yard. Take photos of the different plants that you find.

Science Center

Place the plant and non-plant photos in the Center and ask the children to sort the cards into piles of plants and non-plants. As the children sort the photos, help them identify the items pictured.

Integrated Experiences

Literacy 1: Help the children describe their favorite plant using drawings and words.

Literacy 2: Using words and pictures, create a field guide of plants that can be found on the school grounds.

Literacy 3: Create a class display of plants that begin with the letters of the alphabet studied this month or all of the letters studied to date.

Math: To help children further appreciate the diversity of plants, use string or another informal measuring tool to illustrate the average sizes of various plants.

Creative Arts (Art): Have the children look through magazines to find pictures of plants to make into a collage.

Social and Emotional: Discuss different occupations associated with plants such as florist, botanist, forester, farmer, or landscaper.

Physical Health and Development (Health): Discuss plant safety rules. Explain that some plants are poisonous and children should never put plants in their mouths unless an adult tells them it is safe.

Experience 2

Plant Parts

Science Concept
Plants have different parts, each with special functions.

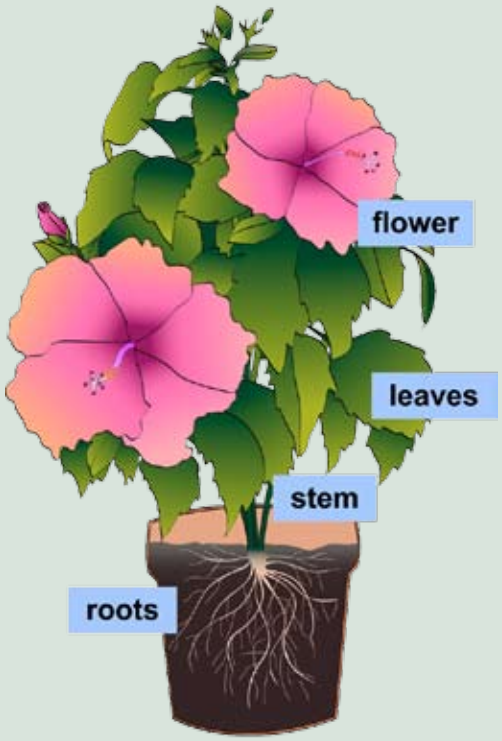
Aim
Children will learn the common parts of a plant: roots, stem, leaves, and flowers.

Materials
one or more potted plants with developed root systems
magnifying tools
simple poster, illustration, or model showing the parts of a plant

Books
The Vegetable Garden by Melvin Berger
Tops and Bottoms by Janet Stevens

Vocabulary
flower
leaf
roots
soil
stem
veins

Approach
- In advance, loosen the plant from the sides of the pot so that you can remove it easily.
- Begin your examination of the plant by looking at the leaves. Explain that the leaves use light to make food for the plant. Point out the veins and have the children examine them closely with magnifying tools.
- Then turn the children's attention to the stem. Introduce the term *stem* and explain that the stem helps hold the plant up and carries water and minerals from the roots to the other parts of the plant.
- Gently pull the plant from the pot and brush the dirt away from the roots. Introduce the term *roots* and explain that roots absorb water and minerals from the soil. Encourage the children to examine the roots with magnifying lenses. Focus their attention on the tiny root hairs at the ends of the roots.
- Review the names and functions of the different parts of the plant using a simple poster, illustration, or model that shows the parts of a plant.



Extension

Go outdoors and identify the parts of plants that you see.

Science Center

Leave the unpotted plants at the Center for children to explore further using magnifying lenses.

Integrated Experiences

Literacy 1: Help the children describe their exploration of plant parts in their journals using words and pictures or create a class science log.

Literacy 2: Have the children create their own Parts of a Plant poster by drawing or pasting pre-cut shapes onto a sheet of paper. Help them label the parts.

Math 1: During the investigation, use formal or informal measuring tools to compare the length of the stem and the length of the roots.

Experience 3

What Is a Seed?

Science Concepts

Plants are living things that need water, light, nutrients, and air to survive, and can move, grow, and reproduce.

Plants have different parts, each with special functions.

Aim

Children will examine a variety of seeds.

Materials

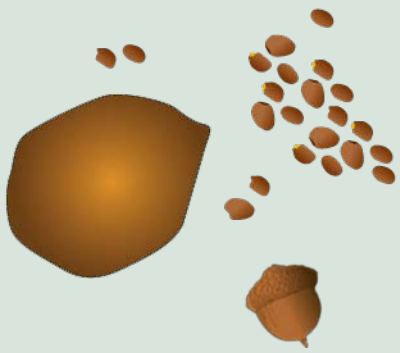
collection of seeds and non-seeds (beads, stones, etc.)
magnifying tools
petri dishes

Books

Seeds! Seeds! Seeds! by Nancy Elizabeth Wallace
Ten Seeds by Ruth Brown
One Bean by Anne Rockwell
A Seed Is Sleepy by Dianna Hutts Aston

Vocabulary

seed
petri dish



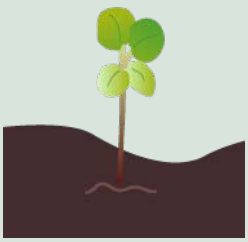
Approach

⚠ In advance, gather a variety of seeds. Place small seeds in petri dishes. Some seeds are poisonous. Be sure to research which ones are safe and which are not.

Begin by reviewing what the children have already learned about plants.

Show the children the collection of seeds. Encourage the children to think about what these small things might be: *Have you ever seen things like these before? What are they? Where do we find them?*

Explain that they are all seeds. Ask the children to compare the seeds: *Which seed is the largest? Which is the smallest? What color is this seed?*



Tell the children the names of the seeds that you are familiar with. Explain that if the seeds are buried in the ground and provided water, and the temperature is right, they will grow to be plants. Talk about how people sometimes plant seeds, but that seeds in the natural world are spread by the wind and moved around by animals such as squirrels and birds.

Extension

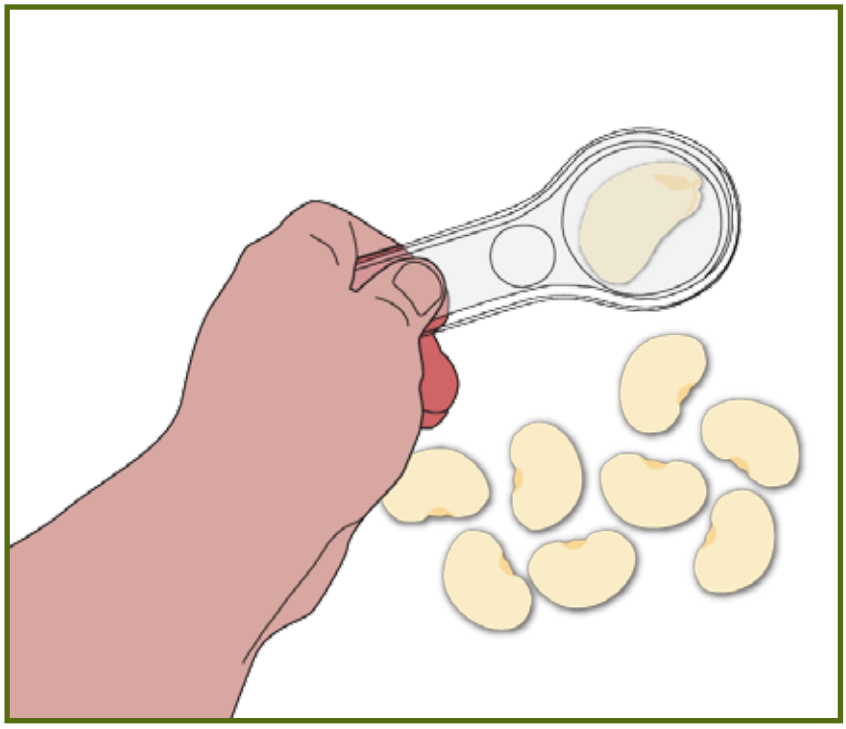
Look for seeds on the playground. Watch squirrels and birds as they hunt for and eat seeds.

Science Center

Place a variety of seeds and magnifying tools in the Center for further exploration.

Integrated Experiences

Creative Arts (Art): Have the children create seed collages by gluing seeds onto paper.



Experience 4

Where Do Seeds Come From?

Science Concepts
Plants have different parts, each with special functions.

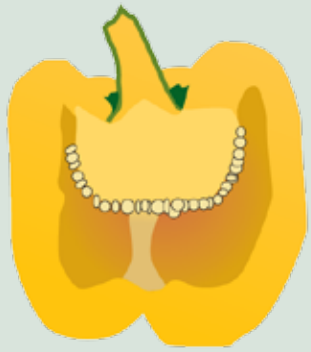
Aim
Children will explore the seeds in fruits and vegetables.

Materials
assortment of fruits (pre-cut)
plastic wrap
plates or petri dishes
magnifying tools

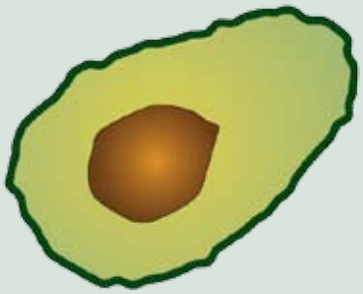
Books
A Fruit is a Suitcase for Seeds by Jean Richards
The Reason for a Flower by Ruth Heller
Pumpkin Circle by George Levenson
Pumpkins by Ken Robbins
This Is the Sunflower by Lola M. Schaefer

Vocabulary
half
inside
outside
seeds
whole
names of different fruits

Approach
⚠ In advance, check for food allergies and complete the required paperwork. Cut open a variety of fruits that have seeds. Select items that provide an interesting contrast in seed size and shape (e.g., bell peppers, pumpkin, avocado). Wrap with plastic wrap to maintain freshness and to allow the children to see the whole item first.



- Introduce the fruits one by one. Help the children name each one and encourage them to share their opinions about the food.
- Open one of the items and help the children locate the seeds. Encourage the children to describe the seeds in terms of size, color, and number.



- As you introduce new items, ask questions such as: *Do you think this will have a seed inside? What color will it be? Will there be one or many seeds*?
- After you have examined all of the seeds, review how the seeds are alike and different.

Extension
Explore the seeds in a greater variety of edible plants.

Science Center
Place the seeds collected from the foods in the Center for the children to explore further.

Integrated Experiences

Literacy: Have the children draw pictures of the fruits and vegetables both whole and cut to reveal the seeds. Help them label their drawings.

Math 1: Count the number of seeds found in each item. For foods with many seeds, count in groups of 10.

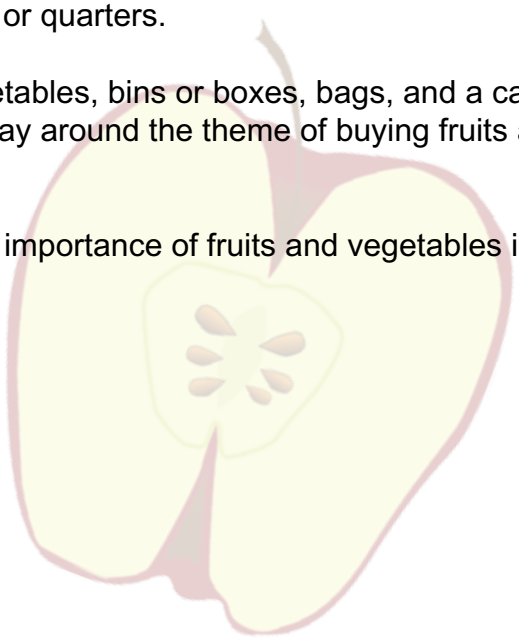
Math 2: Place your fruits and vegetables in order from the fewest to the greatest number of seeds or in categories such as “1 seed,” “some seeds,” and “many seeds.”

Math 3: Prepare recipe cards (e.g., 10 strawberries, 11 pieces of banana) and have the children use them to create a salad from real fruits or pictures or drawings of fruits.

Math 4: Help the children cut a fruit snack into halves or quarters.

Creative Arts (Dramatic Play): Place plastic fruits and vegetables, bins or boxes, bags, and a cash register in the Dramatic Play area to encourage pretend play around the theme of buying fruits and vegetables.

Physical Health and Development (Health): Talk about the importance of fruits and vegetables in a healthy diet.



Experience 5

From Seed to Plant

Science Concept
Plants are living things that need water, light, nutrients and air to survive, and can move, grow, and reproduce.

Aim
Children will sprout a bean seed.

Materials
bean seeds
moist paper towels
clear plastic cups or plastic sealable bags
spray bottle
magnifying tools
camera
sunflower life cycle puzzle

Books
One Bean by Anne Rockwell
Pumpkin Circle by George Levenson
How a Seed Grows by Helene J. Jordan
A Dandelion's Life by John Himmelman
How Groundhog's Garden Grew by Lynne Cherry
A Seed Grows by Pamela Hickman
From Seed to Sunflower by Gerald Legg
From Seed to Pumpkin by Wendy Pfeffer
From Acorn to Oak Tree by Jan Kottke

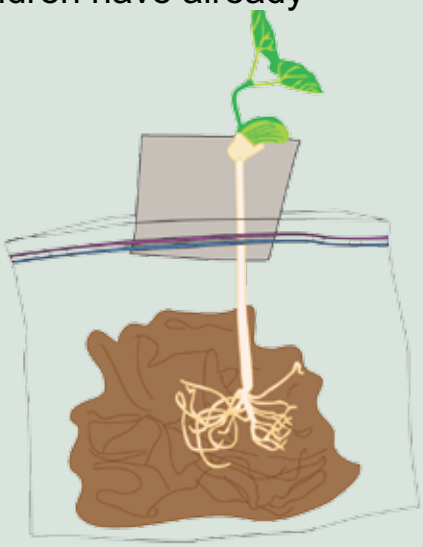
Vocabulary
bean
root
seed
sprout
stem
sunflower

Approach
⚠ In advance, check for food allergies and complete any required paperwork.

Begin by reviewing what the children have already learned about seeds. Find out what the children know about how plants grow by asking questions such as: *Have you ever seen a plant grow before? What happens when a plant grows?*

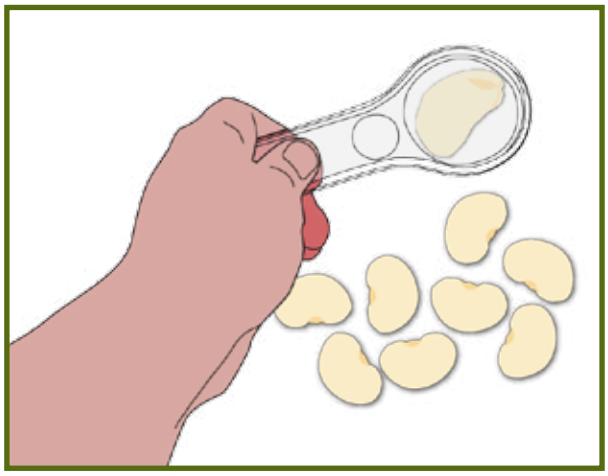
Explain that you are going to watch the changes that happen when a plant grows from a seed.

Place a ball of damp paper towel in a clear cup or plastic bag. Place 3 - 6 seeds around the sides. Mist the paper as needed to keep it damp.



Extension

Once the beans have sprouted, have the children plant them in small cups of soil to take home or continue to observe in the classroom.



Science Center

Place the sprouting seeds in a location where the children can observe them. Add the sunflower life cycle puzzle to the Center.

- Each day, talk about any changes that you observe: *What did the bean look like yesterday? What does it look like today? How does it look different?* Take photos to document the changes you see. Talk about the sequence of the changes.
- You may wish to save some of your sprouting bean plants for Experience 10.

Hint!

Place several beans in each cup because some beans may not sprout. Those that do should begin to sprout in about 3 days and develop a leaf within a week.

Experience 6

Planting Seeds

Science Concepts

There are many different kinds of plants.

Plants are living things that need water, light, nutrients, and air to survive, and can move, grow, and reproduce.

Aim

Children will learn that a seed will always grow into the kind of plant it came from.

Materials

variety of quick sprouting seeds such as grass, bean, and radish seeds
plastic cups
potting soil
spray bottle with water
camera
magnifying tools

Books

Growing Vegetable Soup by Lois Ehlert
Vegetable Dreams/Huerto soñado by Dawn Jeffers
The Vegetable Garden by Melvin Berger
Planting a Rainbow by Lois Ehlert
It's Pumpkin Time by Zoe Hall

Vocabulary

plant
soil

Approach

- Begin by reviewing what the children have already learned about how plants grow. Show the children some of the seeds from the packets. Encourage them to share any experiences they may have had with growing plants from seeds: *Have you ever planted a seed before? What do we need to do to help these seeds grow into plants?*
- Draw the children's attention to the illustrations on the seed packets. Explain that each packet holds a different type of seed. Encourage the children to think about the kind of plant that will grow from each type of seed: *This is a cucumber seed. What kind of plant do you think will grow from it? What will grow from a radish seed?*
- Plant several of each type of seed in different cups of soil. Label the cups with the type of seed and water the plants as needed. If possible, place in a sunny location.
- As the plants grow, draw the children's attention to how the plants look different. Explain to the children that seeds will always grow into the same kind of plant from which they came.

Extension

Plant a variety of flower seeds in a window box, container, or garden. Encourage the children to watch the seeds as they sprout and identify them by comparing the shape of the leaves with the pictures on the seed packages.

Science Center

Place the cups with the seeds in the Center and encourage the children to observe the plants as they grow.

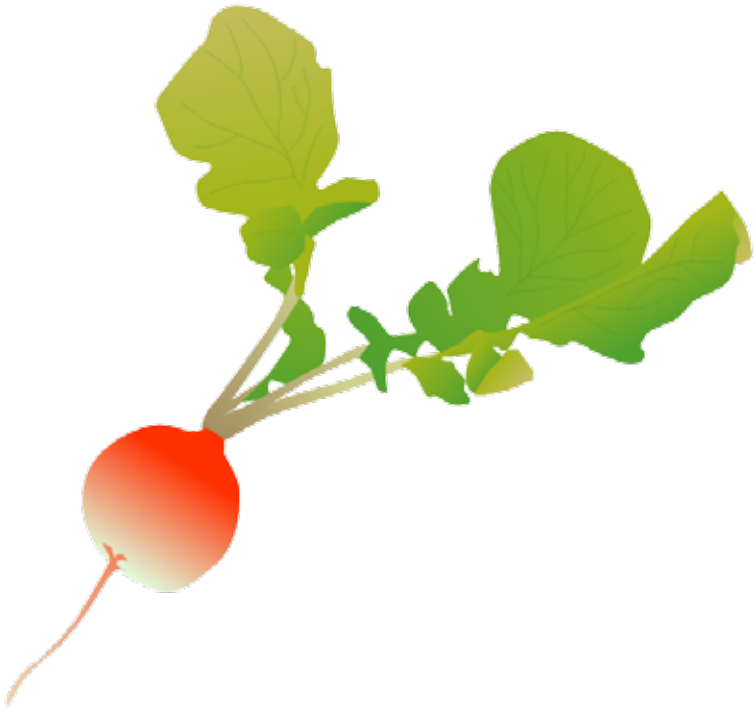
Integrated Experiences

Literacy 1: Document planting the seeds and the growth of the plants in a class science log. Supplement with photographs and children's illustrations.

Literacy 2: Recite the rhyme, "Mary, Mary, Quite Contrary."

Math: Help the children count the seeds as they plant them in the cups.

Creative Arts (Music and Movement): Sing "Are You Growing?"



Experience 7

We Eat Plant Parts

Science Concept
Plants provide people with food, shelter, and other products.

Aim
Children will learn that many of the foods they eat come from parts of plants.

Materials
assortment of fruits and vegetables

Books
Tops and Bottoms by Janet Stevens
The Vegetable Garden by Melvin Berger
Oliver's Vegetables by Vivian French
Growing Vegetable Soup by Lois Ehlert
Eating the Alphabet by Lois Ehlert
Growing Colors by Bruce McMillan
The Vegetables We Eat by Gail Gibbons
Eating the Alphabet by Lois Ehlert
In the Garden: Whose Been Here? by Lindsay Barrett George

Vocabulary
flowers
leaves
roots
seeds
stem

Approach
⚠ In advance, check for food allergies and obtain a nutrition activity approval.

- Show the children the food that you have gathered and help them identify each item. Encourage the children to share their ideas about each: *What is this? Do we usually eat it warm or cold? Do you like how it tastes?*
- Explain that each of the foods is a part of a plant. For example, talk about carrots as roots, lettuce as leaves, and broccoli as a flower.
- Help the children generate a list of other foods that come from plants including fruits, vegetables (juices, salads), nuts, and grains (bread, crackers).

Extension 1

⚠ Make a salad using leaves (lettuce), stems (celery), flowers (broccoli), and fruits (tomatoes).

Extension 2

⚠ Make vegetable soup. Help the children wash the vegetables, measure the ingredients, and pour into the soup pot. Cook and serve.

Integrated Experiences

Literacy: Create a class "Food Diary" in which the children list each of the foods derived from plants that they have eaten over the course of a week. Use words and pictures.

Math 1: Create a chart listing vegetables that are often on the menu or otherwise familiar to children. Graph the children's favorites.

⚠ Math 2: Peel several oranges. Count the number of sections in each orange. Compare to see if all oranges have the same number of sections. Count the number of sections with seeds.

Creative Arts 1 (Music and Movement): Sing "Oats, Peas, Beans and Barley Grow."

Creative Arts 2 (Dramatic Play): Provide props such as gardening tools and empty seed packets in the Dramatic Play area to encourage the children to pretend to grow a garden.

Creative Arts 3 (Dramatic Play): Place props such as aprons, cooking utensils, and plastic foods in the Dramatic Play area to encourage the children to pretend to cook a meal.

Experience 8

Growing Plants Without Using Seeds

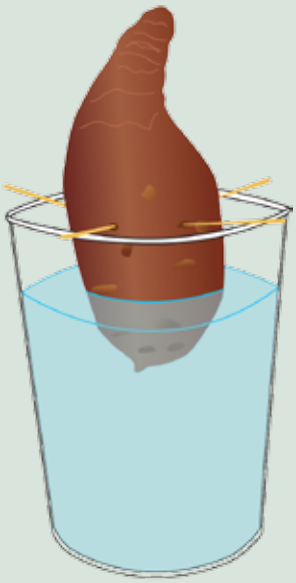
Science Concept
Plants are living things that need water, light, nutrients, and air to survive, and can move, grow, and reproduce.

Aim
Children will explore how to grow plants without using seeds.

Materials
sweet potato
large onion
toothpicks
water
2 clear containers

Books
How Groundhog's Garden Grew by Lynne Cherry
Potatoes by Melanie Mitchell

Vocabulary
bulb
onion
runner
sweet potato
tuber
vine



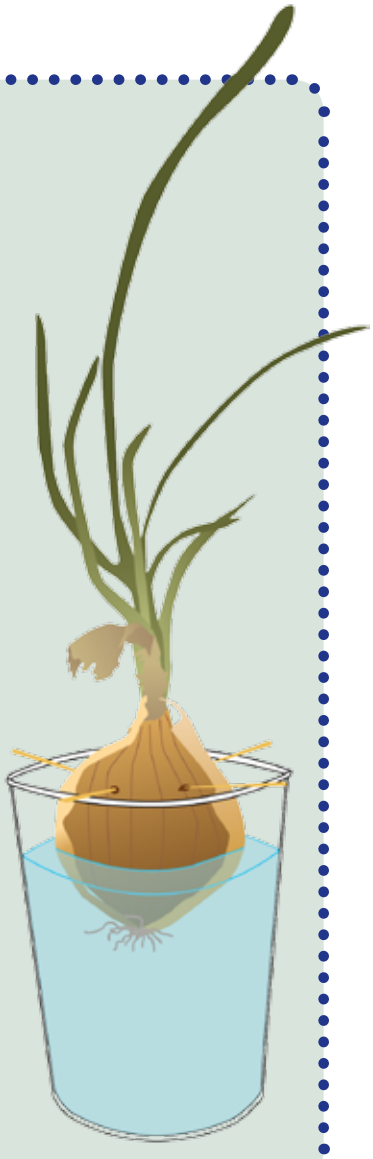
Approach
⚠ In advance, check for food allergies and complete any required paperwork.

Review what the children have learned about seeds. Ask if they can think of any other ways to grow new plants, besides from seeds. Explain that you are going to do an investigation to see if it is possible to grow plants without using seeds.

Show the children the sweet potato and the onion. Help them stick toothpicks around the middle of the sweet potato and place on the edge of a clear container. Add water to the cup until just the very bottom of the sweet potato is wet. Place the potato in a sunny location. Keep the water at the same level during the entire activity.

Try sprouting the onion in the same way. Put just enough water in the cup to wet the bottom of the onion bulb.

Have the children observe the plants, especially the roots, as they grow.



Extension

Help the children grow a new houseplant from a plant clipping. ⚠ Bring in a clipping from a houseplant. Be sure to do research to ensure that the plant is not toxic. Place the cut end of the plant in a jar of water. When the roots are about 2 inches long, transfer the plant to a pot with soil.

Science Center

Place the sweet potato and onion in the Center and have the children watch for changes.

Integrated Experiences

Literacy: Help the children describe what happens in their journals using words and pictures or create a class science log.

⚠ Math 1: Help the children measure the growth of the roots and leaves on the two plants and graph the results.

⚠ Math 2: Before growing the sweet potato, have the children count the “eyes.” Then, after the leaves start to grow, have the children count the leaves that came from the “eyes” and compare.

Creative Arts 1 (Art): Decorate empty milk cartons and use as planters.

Creative Arts 2 (Dramatic Play): Have the children pretend to be farmers, using the plastic gardening tools and gloves.

Social and Emotional: Visit a garden and look at root crops such as carrots, beets, radishes, or potatoes.

Experience 9

Plants Need Water

Science Concept
Plants are living things that need water, light, nutrients, and air to survive, and can move, grow, and reproduce.

Aim
Children will investigate what happens when a plant does not receive water.

Materials
a plant
spray bottle with water
photos of plants and non-plants
camera

Books
The Carrot Seed by Ruth Krauss
One Bean by Anne Rockwell
Precious Water by Brigitte Weninger and Anne Möller
What Is a Scientist? by Barbara Lehn
The Curious Garden by Peter Brown

Vocabulary
die
living
wilt

Approach
⚠ Some plants are poisonous. Be sure to research which ones are safe and which are not.

- Show the children the plant. Review with the children the concepts of living and nonliving. Ask the children for their ideas about what the plant needs in order to live.
- After the children have offered their ideas, ask them how you could find out for sure if the plant would need water to survive.
- Take a photo of the plant and write down the date that you begin your experiment.
- As a group, check the plant every day. Take photos to document any changes in the plant.
- Once the effects of the lack of water are clear, compare how the plant looks now to the photos from before. Encourage the children to describe the changes they see: *How does this plant look different from what it looked like before?*
- Review the importance of water to all living things. Try watering the plant to see if it will recover. Encourage the children to check on the plant daily and describe any changes they see.

Extension

Follow up on other questions children might have about the growing conditions of plants. (e.g., Do plants grow better with music? Does fertilizer help? Can a plant get too much water?)

Science Center

Place the plant/non-plant photos in the Center for the children to sort.

Integrated Experiences

Literacy: Create a class log describing the experiment.

Creative Arts (Dramatic Play): Place props such as plastic plants, watering cans, pots, sand, rocks, and a cash register in the sand and water table to encourage pretend play around a "Garden Shop" theme.

Social and Emotional: Discuss careers in plant care, such as a gardener or a landscape worker.

Physical Health and Development (Health): Discuss the importance of drinking enough water every day.

Experience 10

Plants Grow Toward Light

Science Concept
Plants are living things that need water, light, nutrients, and air to survive, and can move, grow, and reproduce.

Aim
Children will observe that plants grow toward light.

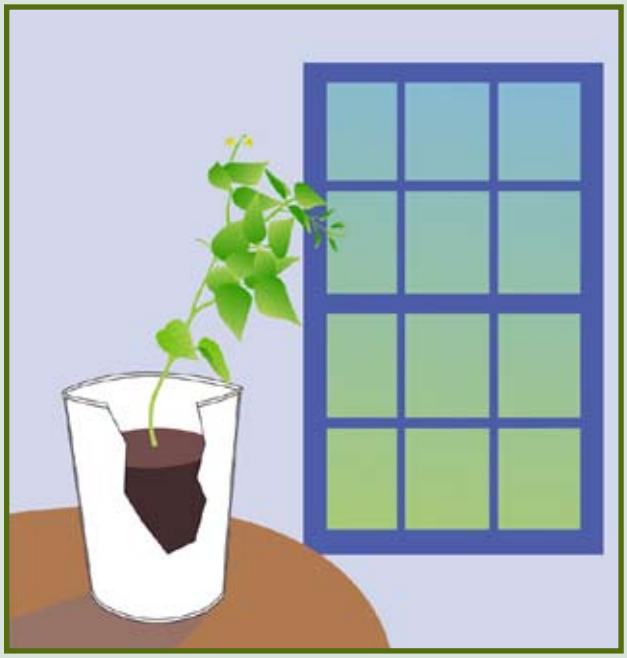
Materials
plant growing toward the sun
1 or more plants growing upright
window or other light source

Books
How a Seed Grows by Helene J. Jordan
One Bean by Anne Rockwell
What Is a Scientist? by Barbara Lehn

Vocabulary
green
leaves
light

Approach
⚠ In advance, review your plants so you can highlight the important features effectively. Some plants are poisonous. Be sure to research which ones are safe and which are not.

- Two or three weeks in advance, place a plant near a window or outdoors so that it will grow toward the sun.
- Review with the children what they already know about what plants need to live and grow. Explain that plants use water and light to make food. Show the children a plant that has been growing toward the sun. Draw the children's attention to the fact that the leaves and/or flowers are facing one direction. Explain that the plant was placed so that it only received sunlight from one direction. Talk about how the plant grew to get the light that it needs to make food.



- Place the plant near a window or outdoors so that it will now receive sunlight from the opposite direction. Keep the plant in the same position. Observe the plant over time to see if the plant begins to grow in the other direction.
- Repeat the experiment using plants that start out growing upright.

Extension

Find two plants of the same type. Keep one plant in a light location and place the other in a drawer or other dark spot. Water each as needed. Observe how the plant in the dark location loses its green color over time.

Science Center

Place the plant/non-plant photo cards in the Center for the children to sort.

Integrated Experiences

Literacy: Help the children describe the experience in their journals using words and pictures, or create a class science log.

Experience 11

Where Does Our Food Come From?

Science Concept

Plants provide people with food, shelter, and other products.

Gardening and farming are methods of growing plants.

Aim

Children will learn about the process of getting food from the farm to the supermarket.

Materials

photos of fruits, vegetables, farms, orchards, harvesting, trucks, trains, grocery stores
gardening tools:
- hand trowel
- cultivator
- watering can
- large and small shovels
- gloves

Books

Making Minestrone by Stella Blackstone and Nan Brooks
The Ugly Vegetables by Grace Lin
Bread Comes to Life by George Levenson
Apples, Apples, Apples by Nancy Elizabeth Wallace
Pie in the Sky by Lois Ehlert
The Little Red Hen and the Ear of Wheat by Mary Finch
In the Garden by Danielle Denega
A Harvest of Color by Melanie Eclare
The Apple Pie Tree by Zoe Hall
Harvest Year by Cris Peterson

Vocabulary

bread, crop, cultivator, factory, farm, food, fruit, gloves, grocery, orange, ship, shovel, store, supermarket, tomato, train, trowel, truck, vegetable, watering can

Approach

Use photos and gardening tools to support a conversation about where our food comes from and how it gets to us. Encourage the children to share their ideas and experiences by asking questions such as: *Where do oranges come from? How does the orange juice get in the container? Where does bread come from? How do we make bread? How do tomatoes turn into tomato sauce?*

Extension 1
Take a field trip to a farm or orchard.

Extension 2
Plant a garden.

Integrated Experiences

Literacy: Ask the children to draw a picture of a garden containing their favorite foods. Help them to label the foods in the garden.

Creative Arts 1 (Dramatic Play): Place the gardening tools in the dramatic play or outdoor area to encourage pretend play about farming.

Creative Arts 2 (Music and Movement): Sing “Old MacDonald.”

Creative Arts 3 (Dramatic Play): Place empty food containers such as fruit and vegetable cans, frozen food boxes, and oatmeal boxes in the dramatic play area. Add a cash register, paper bags, and a small shopping cart, to encourage the children to play “Store.”

Creative Arts 4 (Dramatic Play): Collect cardboard boxes of different sizes. Have the children decorate them to pretend they are food delivery vans.

Physical Health and Development (Health): Talk about the importance of washing our food before we eat it.

Experience 12

Stems

Science Concept
Plants have different parts, each with special functions.

Aim
Children will explore how water moves up a stem.

Materials
celery stalks with leaves
knife
water
food coloring
clear plastic containers
simple poster, illustration, or model showing the parts of a plant
magnifying tools

Books
What Is a Scientist? by Barbara Lehn

Vocabulary
absorb
celery
stalk
stem

Approach
⚠ In advance, check for food allergies and complete required paperwork.

Using a poster, illustration, or model, review with the children the parts of a plant. Show the children a stalk of celery and explain that the stalk is the stem of that plant. Explain that one of the jobs of the stem is to bring water to the other parts of a plant.

Explain that you can observe how water moves through stems. Place freshly cut celery stalks in a clear plastic container. Have the children help measure and pour 2 cups of water into the container.

Add enough food coloring to the water to make it very dark. As the celery sits in the colored water, ask the children to predict what is going to happen: *When we come back tomorrow, are the celery and the water going to look the same? What do you think will be different? Why do you think that?* Leave the celery sitting in the water for at least one day.

Extension

Repeat the experiment using 2 white carnations and 3 containers. Fill 2 containers with about 1 1/2 inches of darkly colored water and the third one with the same amount of clear water. Cut the stems of the carnations to about 4 inches and place the cut carnation in a glass of colored water. Carefully split the stem of the second flower, all the way to the flower head. Put one half of the split stem in the second container of colored water, and the other half in the container of clear water. Leave for 24 hours, then observe the color changes.

Science Center

Place the celery experiment in the Center. After the color has been absorbed, encourage the children to examine the colored veins with magnifying lenses.

The next day, have the children examine the celery stalk and leaves. Cut open the celery stalk so the children can examine the colored water in the celery. Ask them to describe the changes that occurred. Talk about how the colored water moved up through the stalk.

Hint!

This experiment works best if you cut an inch or so off the bottom of the celery first. Note: it will take about one day for the water to move up the celery.

Experience 13

A Closer Look at Leaves

Science Concept
Plants have different parts, each with special functions.

Aim
Children will explore leaves.

Materials
simple poster, illustration, or model showing the parts of a plant
leaves
magnifying tools
leaf stamps
ink pad or paint
paper

Books
Leaves! Leaves! Leaves! by Nancy Elizabeth Wallace
Fall Leaves Fall by Zoe Hall
Leaf Man by Lois Ehlert
Red Leaf, Yellow Leaf by Lois Ehlert
Autumn Leaves by Ken Robbins
Leaves by David Ezra Stein

Vocabulary
leaf
leaves
vein

Approach
! Some leaves are poisonous. Be sure to research which ones are safe and which are not.

- Review with the children what they have already learned about the parts of a plant using a poster, illustration or model.
- Show the children a leaf and point out the veins on the leaf. Explain that the veins carry water from the stem. Review the idea that leaves use light and water to make food for the plant.
- Explore leaves further using the leaf stamps. Have the children make leaf prints using a variety of stamps. Encourage the children to examine the prints carefully by asking questions such as: *Can you show me the veins on this leaf? Is this leaf more round or more pointed?*

Extension

Review your rules for exploring nature before going outdoors to see what kinds of leaves you can find. Compare the sizes, shapes, and colors of the leaves that you find.

Science Center

Place an assortment of leaves in the Center along with magnifying tools for further exploration.

Integrated Experiences

Literacy: Have the children add leaf prints or leaf rubbings to their journals. Help them label the leaves.

Creative Arts 1 (Art): Gather a collection of fallen leaves and have the children finger paint the leaves. Then press the leaves on paper to make prints that show the leaf shape and veins.

Creative Arts 2 (Art): Gather a collection of fallen leaves and have the children glue them to paper head bands to make leaf crowns.

Physical Health and Development (Health): Talk with the children about poison ivy. Help them learn to identify the plant with pictures and teach them the rhyme “Leaves of Three, Let it Be.”

Experience 14

Flowers

Science Concept
Plants have different parts, each with special functions.

Aim
Children will explore flowers.

Materials
a variety of flowers
magnifying tools
simple poster, illustration, or model showing the parts of a plant

Books
The Reason for a Flower by Ruth Heller
Planting a Rainbow by Lois Ehlert
Flower Garden by Eve Bunting
A Dandelion's Life by John Himmelman
A Closer Look by Mary McCarthy
Stars in the Grass by Mia Posada

Vocabulary
flower
leaves
petal
pollen
stem

Approach

⚠ In advance, obtain cut flowers. Note: Some flowers are toxic. Be sure to research which flowers are safe and which are not.

Begin by showing the children the flowers and asking the children to share any experiences they may have had with flowers: *Where do you see flowers? Where do they come from?*

Talk with the children about the difference between flowers that grow in gardens or out in nature and flowers that we can buy at a store. Explain the importance of not hurting plants that grow outdoors because they are important sources of food and shelter for insects and other animals. However, farmers also grow flowers for people to enjoy and it is alright to touch those.

In small groups, explore the outer parts of the flowers. Using the poster, illustration, or model help the children identify the stems, leaves, and petals. Ask the children to describe how the different parts look, feel, and smell. Have the children look for the pollen in the flowers.

Have the children use magnifying tools to examine the flowers more closely.

Extension

Dissect other types of flowers. Encourage the children to compare the various parts of the different types of flowers.

Science Center

Place cut flowers and magnifying tools in the Center for further exploration.

Integrated Experiences

Literacy 1: Have the children diagram the parts of a flower in their journals. Help the children label the diagrams.

Literacy 2: Create a classroom display with drawings or photographs of flowers that correspond to different letters of the alphabet.

Math: Play “Concentration” with flower seed packets. Gather two identical sets of five different plant seed packets. Mix up the packets and lay them face down on a table. The children take turns turning over two packets. If they match, remove the pair and have the player take another turn. If they don’t match, the next child turns over two packets. The goal is to try to remember where the matching packets are.

Creative Arts (Dramatic Play): Place plastic plants and vases, plant care items, and a cash register in the Dramatic Play area to encourage children to play “Flower Shop.”

Social and Emotional: Take a field trip to a florist shop or the plant section of a supermarket.

Experience 15

Trees Are Plants

Science Concept

There are many different kinds of plants.

Plants have different parts, each with special functions.

Aim

Children will explore trees.

Materials

tree rounds
photos of plants and non-plants
magnifying tools
camera

Books

The Growing-up Tree by Vera Rosenberry
From Acorn to Oak Tree by Jan Kottke
Pie in the Sky by Lois Ehlert
Red Leaf, Yellow Leaf by Lois Ehlert
A Grand Old Tree by Mary Newell DePalma
The Apple Pie Tree by Zoe Hall
ABCedar by George Ella Lyon
This is the Tree by Miriam Moss
Have You Seen Trees by Joanne Oppenheim

Vocabulary

bark
branches
leaves
roots
trunk

Approach

- Begin by encouraging the children to share what they know about trees: *Where can we find trees? What do trees look like? Do all trees look the same?*
- Show the children pictures of trees from the set of plant/non-plant photos. Explain that trees are plants. Talk about the ways that trees and other plants are alike.
- Review your rules for exploring nature and go outdoors to explore trees. Find a tree and help the children identify its parts. Explain the jobs of the roots, trunk, branches, and leaves.
- Encourage the children to touch the bark. Ask: *Can you describe how it feels?*
- Pass tree rounds to the children and explain to them that the rounds are slices of a tree's trunk. Use magnifying tools to look closely at the rounds. Draw their attention to the rings on the tree rounds. Explain that a tree forms a new ring every year, so the age of a tree can be determined by counting the tree rings.

Extension 1

Give the children a new view of trees: spread a sheet on the ground and have the children lie down and look up the trunk to the branches and leaves.

Science Center

Place the tree rounds and magnifying tools in the Center for the children to explore. Draw their attention to the tree rings and the texture of the bark.

Extension 2

Find two trees of different sizes and types and compare how they are alike and different.

Integrated Experiences

Creative Arts (Art): Use paper and crayons to make bark rubbings.

Experience 16

Other Things We Get from Plants

Science Concept
There are many different kinds of plants.

Plants provide people with food, shelter, and other products.

Aim
Children will learn about everyday things that come from plants.

Materials
assortment of items made from plants such as: rubber eraser, cotton fabric, baskets, plant-based soap, cork, rope, wooden toys, furniture
photos of items made from plants

Books
The Reason for a Flower by Ruth Heller

Vocabulary
plant and product names (e.g., pine tree, wood, flannel, basket, etc.)

Approach
- In advance, search for some items in the classroom that are made from plants such as pencils, paper, furniture, etc.
- Begin by reviewing what the children have already learned about why plants are important to people and other living things.
- Explain that another reason plants are important is that many things we use everyday are made from plants. Give some examples using familiar items in the classroom.
- Continue the discussion using the plant product photos and collection. Explain that we use cotton to make fabric, oil from plants to make soap, and wood from trees to make toys, furniture, and even houses. Erasers and other rubber things are made from rubber trees. Plants also provide cork and the material that we use to make baskets.
- Go around the classroom and find other items made from plant products.

Extension

Go on a field trip to a lumber yard or home improvement center to learn more about how wood and other plant products are used in our everyday lives.

Science Center

Place the plant products and photos in the Center. Encourage the children to match the photo with the appropriate item.

Integrated Experiences

Literacy: Make a chart that lists items in the classroom made from plant products.

Social and Emotional: Have a basketmaker visit the classroom to demonstrate the craft.

MESS® Take-Home Kit Information/Experience Card

Plant Life

Welcome to the Plant Life *MESS*® Take-Home Kit. This page suggests ways to further explore what your child has been learning at school.

In this Kit you will find:

- *Eating the Alphabet* by Lois Ehlert

This alphabet book shows fruits and vegetables for every letter from A to Z. At the end of the book is a glossary that explains how to pronounce the names of the fruits and vegetables.

- 2 matching photo sets of 8 fruits and vegetables: tomatoes, strawberries, radishes, carrots, onions, squash, cucumbers, and beans

This month, your child is learning:

- Plants provide people with food.
- Farming and gardening are ways of growing plants we eat.

How to use this book:

- Point to the letter of the alphabet and help your child name it. Emphasize the first letter sounds as you read the words.
- Encourage your child to name the different fruits and vegetables and their colors. Talk about how you prepare fruits and vegetables to eat and which ones are your child's favorites.

How to use the photo cards:

- Play a game of Memory: Spread the cards out face down. Take turns turning over the cards, two at a time. If the cards match, remove them from the game. If they don't match, turn them face down again. Continue until all the cards have matches.

To further support your child's learning:

- Visit a produce stand or the produce section of a supermarket. Talk about the fruits and vegetables you see.
- Plant a garden in your yard or a few plants in a container.

Plant Life

Recommended Books

Aston, Dianna Hutts. *A Seed Is Sleepy*. San Francisco, CA: Chronicle Books, 2007. A single sentence (per double-page spread) in large cursive writing assigns a rather human characteristic to seeds, and in the process, introduces wonderful vocabulary (adventurous, clever, naked). The balance of each spread contains beautiful detailed illustrations of a seed or seeds that show that attribute. Smaller type provides more scientific text. The variety and wonder of so many seeds is fascinating (even the endpapers are packed and labeled).

Berger, Melvin. *The Vegetable Garden.* Northborough, MA: Newbridge Educational Publishing, 2007. "Do you know how to plant a vegetable garden?" Thus begins a simple, step-by-step text and photograph lesson on vegetable gardening. Photos of below-ground root growth are particularly useful. Questions for further discussion and some fun facts are listed at the end.

Blackstone, Stella, and Nan Brooks. *Making Minestrone.* New York: Barefoot Books, 2000. Young friends gather to make soup, but their mission starts in the garden where most of the soup ingredients can be found. A simple rhyming text and colorful illustrations packed with details describe the soup-making process. Vegetables are generally familiar ones. Plenty of cleaning, slicing, and frying (though no measuring) goes on at the gathering. A recipe that serves four is provided.

Brown, Peter. *The Curious Garden*. New York: Little, Brown and Company, 2009. While exploring his desolate city one day, a little boy named Liam discovers some struggling flowers. He decides to care for them. With his watering and pruning and some help from the sun, the garden gradually transforms the dark, gray city into a lush, green world. The captivating illustrations remind us that nature can be found in the most surprising places. The authors attribute human motives to the garden in a few places, and the message that a single person can make a difference may need to be tempered with words of caution for young listeners.

Brown, Ruth.*Ten Seeds*/*Diez semillas*. New York: Alfred A. Knopf, 2001. A counting book with minimal text and richly detailed illustrations demonstrates what happens when ten sunflower seeds encounter a variety of animals (including people). Under sometimes stressful conditions, the plant life cycle continues. The coated paper and simple format make this a particularly useful book for the youngest "readers."

Bunting, Eve. *Flower Garden*. San Diego, CA: Harcourt Brace, 1994. Beautiful, richly colored oil paintings show a little girl and her father buying the "ingredients" for a window box flower garden. A simple rhyming text adds the explanation that this activity is mom's birthday surprise. The city street scenes also provide detail for conversation.

Plant Life

Cherry, Lynne. *How Groundhog's Garden Grew*. New York: Blue Sky Press, 2003. In this richly illustrated book, Squirrel teaches Groundhog everything Groundhog needs to know to grow many different vegetables in his own big garden. They collect seeds, wait for appropriate weather, till the soil, plant seeds (and sprouted potatoes and seedlings), label rows, care for the growing plants, harvest the crops, and share the bounty. Text is ample but packed with information. Illustrations—including endpapers—are richly detailed.

Cole, Henry. *I Took a Walk*. New York: Greenwillow Books, 1998. People see many things, but do we really observe closely? This book encourages observation by asking readers to find specific things in the woods, meadow, stream, and pond. While many of the specifics are animals, it is the lush plant scenes that first catch your eye and can be the topic of fruitful conversation—without ever opening the foldout pages that reveal more animals. For those who want specifics, a key in the back identifies their exact location in each scene.

Cole, Henry. J*ack's Garden*. New York: Mulberry Books, 1995. With beautifully detailed illustrations, this story tells what happens in Jack's flower garden. All the plants may not be familiar to young gardeners, but the planting process is the same. A minimal but cumulative text and border illustrations with appropriate labels stimulate conversation as the garden develops. A concluding page gives advice for starting your own flower garden.

Denega, Danielle. *In the Garden*. New York: Scholastic, 2001. Readers are invited to visit this garden where vegetables, fruits, herbs, and flowers all grow. Sections highlight where different kinds of vegetables are grown, with a small fold-out edge providing additional information about specific plants—and sometimes an animal found there. Words like "gourd" are introduced in context, but text is generally sparse. At the end are an overhead map of the garden and a key to the names of all the plants and animals, with encouragement to find them on the previous pages.

DePalma, Mary Newell. *A Grand Old Tree*. New York: Arthur A. Levine Books, 2005. This tree's life cycle includes flowers, fruit, seeds, leaves, visitors, weather, and dying, all over time. Text is simple and straightforward. Illustrations are cheerful watercolors filled with enough detail to encourage continuing observations. Together they generate conversation about what makes the tree "grand."

Eclare, Melanie. *A Harvest of Color*. Brooklyn, NY: Ragged Bears, 2002. Beautiful color photographs and more-than-enough text tell the story of several young friends as they plant and tend a vegetable garden. Text provides the story on several levels and can be edited easily. The children eventually celebrate their success at the end of the summer by fixing a salad (recipe included) from their own vegetables.

Plant Life

Ehlert, Lois. *Eating the Alphabet*. Orlando, FL: Voyager Books, 1988. This colorful book is an alphabetical tour of the world of fruits and vegetables, from apricots and artichokes to yams and zucchini. Text is limited to upper- and lower-case letters and labels for each of the plant parts illustrated. A glossary provides pronunciations and a few details about each fruit/vegetable.

Ehlert, Lois. *Growing Vegetable Soup*. New York: Harcourt Children's Books, 2004. "Dad says we are going to grow vegetable soup." What follows are boldly-colored, cut-paper illustrations and minimal text that show how to grow vegetables to make "the best soup ever." Equipment and vegetables are all labeled, showing another use of print.

Ehlert, Lois. *Leaf Man*. New York: Harcourt, 2005. A man made of leaves blows away, traveling wherever the wind takes him. Great illustrations creatively use a variety of leaves and encourage readers to use their imaginations. Sharp eyes will find fun surprises among the leaves. Endpapers provide identification of the various leaves in the story. ALA Notable Book

Ehlert, Lois. *Pie in the Sky.* Orlando, CA: Harcourt, 2004. "I've never seen pies growing on trees. Wouldn't that be something?" A conversation could begin here, and continue throughout the story as subtext on each page details everything you can see—except a pie. Colorful collages support the growing knowledge that this is a story about a cherry tree and eventually a cherry pie. Except for a piecrust recipe, all the details, including measurements, are ready for a hands-on project to follow the reading.

Ehlert, Lois. *Planting a Rainbow*. San Diego, CL: Harcourt Brace, 1988. Bold illustrations and simple sentences describe the yearly cycle and process of planning, planting, and picking flowers in a garden. Labels throughout show another use of print.

Ehlert, Lois. *Red Leaf, Yellow Leaf*. San Diego, CA: Harcourt Brace, 1991. Through the eyes of a child and using beautiful, informative collage illustrations, the life story of the tree growing in the yard is told. A plant's life cycle and seasonal changes are highlighted. Identification labels thoughout introduce vocabulary. 1992 NSTA Outstanding Science Trade Book for Children

Finch, Mary. *The Little Red Hen and the Ear of Wheat/La gallinita roja y la espiga trigo.* Brooklyn, NY: Barefoot Books, 1999. In bold colors and simple text, a little red hen finds a grain of wheat. She then plants, waters, harvests, mills, and bakes it into a tasty loaf of bread—all without the aid of her house-mates the rooster and mouse. They are, however, quite willing to help her eat it.

Plant Life

Freeman, Marcia S. *Is It Alive?* Northborough, MA: Newbridge, 2002. “How can you tell what is alive?” From this initial inquiry, living things are described as things that grow, reproduce, need food and water, excrete waste, and move. Good examples compare living and nonliving things, and introduce the idea that some things once lived but now are nonliving. Microscopic cells are suggested as the ultimate standard of “living.”

French, Vivian. *Oliver’s Vegetables*. New York: Orchard Books, 2005. “I don’t eat vegetables. . . I only eat french fries.” During a week-long visit with his grandparents, Oliver agrees to eat other vegetables only if he can’t identify the potatoes in the garden. As the week passes, carrots, spinach, rhubarb, cabbage, beets, and peas are pronounced not only edible, but “delicious.” A close observer will note that Oliver eventually ate roots, tubers, leaves, stems, and fruit: not bad for a boy who does not eat vegetables!

George, Lindsay Barrett. *In the Garden: Who’s Been Here?* New York: Greenwillow Books, 2006. During their excursion to the garden, two children and their dog find clues that other animals are, or have been, benefitting from the familiar plants there. Large, richly colored illustrations invite close observation and follow-up conversation. Additional information about the featured animals is provided.

Gibbons, Gail. *The Vegetables We Eat.* New York: Holiday House, 2007. “Look at all the vegetables” is putting it mildly! This book is packed, at pre-school conversation level, with text and pictures about those plants called vegetables. Nutrition; different vegetable groups, based on the edible part; and growing vegetables, both at home and on farms, are all presented. Text appears on two levels, a sentence or two at the bottom of most pages, and then labeling and additional information within the illustrations. Colorful pictures, while not photographs, are realistic looking. Some of the smaller and busier ones work better in small groups.

Hall, Zoe. *Fall Leaves Fall.* New York: Scholastic, 2000. Two siblings joyfully watch and try to catch leaves, followed by stomping, kicking, collecting, comparing, and raking them into a pile to jump into. The colorful illustrations show maple, ginkgo, sassafras, beech, and oak leaves. The last page describes leaf growth from spring to winter, and mentions that some leaves do not change color or fall from trees in autumn.

Hall, Zoe. *It’s Pumpkin Time*. New York: Blue Sky Press, 1994. The purpose of growing pumpkins for this young brother and sister is obvious from the beginning: their favorite holiday is Halloween and they plant seeds in a jack-o-lantern patch. Colorful painted-paper collages and appropriately limited text provide the details of how pumpkins are grown from seed to harvest—or carving in this case.

Plant Life

Hall, Zoe. *The Apple Pie Tree*. New York: Blue Sky Press, 1996. In spite of the apple emphasis in the title, the children's tree has multiple uses in this book about growth and change. But the best part of the tree is the pie prepared in the autumn at picking time. Colorful collage illustrations detail the seasonal changes described in the appropriate text. Animal (including two children) activities add observation interest. The author's apple pie recipe and information about the role bees play in apple growth are included.

Heller, Ruth. *The Reason for a Flower*. New York: Grosset and Dunlap, 1983. Vivid illustrations and simple but accurate (except for the mushroom at the end) rhythmic text explain the purpose for flowers—seed production. The variety of ways seeds travel, how they grow, and their uses (including non-food) also are discussed.

Hickman, Pamela. *A Seed Grows: My First Look at a Plant's Life Cycle*. Toronto: Kids Can Press, 1997. This gentle story tells about Sam and the seed he plants, in the cumulative style of "the House that Jack Built." Fold-out pages hide more detailed information about plant growth and gardens, and/or suggest things for children to find in the pictures. The small-book format limits the book's use to small groups or individuals, but still provides opportunities for detailed conversations.

Himmelman, John. *A Dandelion's Life*. New York: Children's Press, 1988. Who would guess that so much could happen to a dandelion during one year? From a dandelion seed's initial float through the air and ride on the chipmunk, through sprouting and flowering, through various visitors (including a lawnmower), the dandelion lives to bloom again and again. Text is limited to one or two sentences per page, but the action is in the realistically detailed illustrations that encourage keen observations and conversation.

Jeffers, Dawn. *Vegetable Dreams*/*Huerto soñado*. Green Bay, WI: Raven Tree Press, 2006. A little girl's dream about a garden, plus an elderly neighbor willing to help, begin a lesson in gardening and friendship. The harvest is so bountiful that tomato and pickle canning is possible. Text is arranged with English on the top half of left-hand pages and Spanish on the bottom. Full-page illustrations on the opposite pages are impressionistic pastels which are different from most children's books. An English/Spanish vocabulary is added.

Jordan, Helene J. *How a Seed Grows*/*Como crece una semilla.* New York: HarperCollins, 1992. Directed by a young girl, readers learn about seeds, beginning with the idea that different plants grow from different seeds. Using the 12 bean seeds that she plants in temporary containers, she shows how the seeds change as they grow, giving directions about light and water along the way. A final page outlines an experiment showing the effects of water/non-water and light/dark on plant growth.

Plant Life

Kottke, Jan. *From Acorn to Oak Tree*. New York: Children's Press, 2000. Simple text and close-up photographs explain how an oak tree grows from an acorn (oak seed) and then produces more acorns. Other plant titles in this small format series include *From Seed to Pumpkin* and *From Seed to Dandelion*.

Krauss, Ruth. *The Carrot Seed*/*La semilla de zanahoria.* New York: HarperCollins/Scholastic, 1945. Simple four-color line drawings illustrate the story of a young boy who plants and tends to a seed that grows into a huge carrot, in spite of his family's pessimism. The size of the eventual growth could be a fun topic for discussion. Also available in big-book format.

Lehn, Barbara. *What Is a Scientist?* Brookfield, CT: Millbrook Press, 1998. Simple text and color photographs describe how scientists learn from their senses, observe details, ask questions, communicate their findings, and have fun as they experiment. Children demonstrate each of the tasks. 1999 NSTA Outstanding Science Trade Book for Children

Legg, Gerald. *From Seed to Sunflower*. Danbury, CT: Franklin Watts, 1998. Sunflowers begin as seeds. Their germination, roots, growth, flowers, pollination, and withering are the story followed in this book that ends with more seeds for next spring. Illustrations are bright, close-up, and labeled. Text is sometimes ample, but can be edited as appropriate for young children. Additional facts, a glossary, and index are at the end.

Levenson, George. *Bread Comes to Life: A Garden of Wheat and a Loaf to Eat.* Berkeley, CA: Tricycle Press, 2004. After several pages of yummy-looking breads, beautiful color photographs of wheat seeds begin the process of making those products. Close-ups and simple poetic text filled with descriptive words show ripe heads of grain, measuring tools, ingredients, dough, and all the steps in-between. Several projects, including a recipe with directions for "any four-year-old, with an adult helper," are added.

Levenson, George. *Pumpkin Circle*/*El circulo de las calabazas*. Berkeley, CA: Tricycle Press, 1999. Poetic rhyming text explains how a pumpkin patch changes when a seed becomes a plant which grows fruit and produces more seed. Oranges, greens, blacks, and browns make striking contrasts in the photographs, some so close up that you can see the hairs on the vines. A concluding page provides more detail about growing pumpkins. 2000 NSTA Outstanding Science Trade Books for Children

Lin, Grace. *The Ugly Vegetables*. Watertown, MA: Talewinds, 1999. A young girl (who helps her mother plant seeds) notices several differences among the neighborhood gardens, both as they are planted and in the results. Neighborhood appreciation for the delicious soup her mother makes from the "ugly" Chinese vegetables in their garden means changes in everyone's garden next year.

Plant Life

Lyon, George Ella. *ABCedar; an Alphabet of Trees*. New York: Orchard Books, 1989. Minimal but poetic text and earth-tone illustrations provide alphabetical examples of various tree leaves and fruits/seeds. Human hands holding the leaves allow relative size comparisons. Small black and white people and trees also provide relative size and shape information. An uppercase alphabet runs across each double-page spread. Because the text is so minimal, careful observation and conversation are required.

McCarthy, Mary. *A Closer Look*. New York: Greenwillow Books, 2007. Bold collage illustrations and simple, sparse text place an emphasis on observation. An isolated part of an object is shown with encouragement to "look!" Pages following then pull back for a second and third look before revealing a ladybug (albeit "a bug"). A flower and hummingbird are treated similarly, until all three are put together on a plant, and eventually in a flower garden.

McMillan, Bruce. *Growing Colors*. New York: HarperCollins, 1988. The colors of the natural world are taught in vivid photographs of fruits and vegetables. Text is limited to one uppercase, color word per double-page spread. One smaller photograph of the appropriate plant is opposite a large, close-up photo of a plant part of that color. A key in the back matches colors, mini-photos, and fruits/vegetables, but most will be familiar.

Mitchell, Melanie. *Potatoes*. Minneapolis, MN: Lerner Publlications, 2003. Photographs and simple text explain the life cycle of potatoes (a common non-seed vegetable). The book concludes with an illustrated potato life cycle, several additional potato facts, glossary, and index. The Life Cycles series includes a similar book on tulips, another non-seed plant.

Moss, Miriam. *This Is the Tree*. Brooklyn, NY: Kane//Miller, 2000. Africa's baobab tree is a great example of a plant providing both shelter and nourishment for numerous animals. Its strange look is attention-getting, even within these two-dimensional colorful, detailed illustrations. The final two pages about the tree's parts provide additional information for teachers. 2001 NSTA Outstanding Science Trade Books for Children

Oppenheim, Joanne. *Have You Seen Trees?* New York: Scholastic, 1967. Brilliant watercolors add to the delight of this rhythmic, rhyming celebration of trees in all seasons. Each scene is worthy of a conversation about the details pictured there, even the silly literal-names page. The concluding facts about 16 different trees may interest children.

Peterson, Cris. *Harvest Year*. Honesdale, PA: Boys Mills Press, 1996. Children from all over the country can see something familiar in this photographic essay. While the specific months and locations will not mean much to young children, the variety of crops will help them understand where our food comes from. Text is ample, but just looking closely at the photos can encourage conversation.

Plant Life

Pfeffer, Wendy. *From Seed to Pumpkin*. New York: HarperCollins, 2004. Step by step, from a farmer planting seeds through harvest and preparing for next season's crop, this book shows how a pumpkin seed grows into a pumpkin. The text provides some detail, but in simple explanations that could become topics for conversation. Included at the end are instructions for roasting pumpkin seeds and an experiment to show how plants drink water.

Posada, Mia. *Dandelions: Stars in the Grass*. Minneapolis, MN: Carolrhoda Books, 2000. Weed or "noble breed?" The placement and color of appropriately limited rhyming text about the dandelion's life cycle almost becomes part of the artwork. Close-up illustrations are gentle and yet vibrant earthtones. More dandelion facts, a recipe, and science activities are provided at the end of the book. 2001 NSTA Outstanding Science Trade Book for Children

Richards, Jean. *A Fruit is a Suitcase for Seeds*. Minneapolis, MN: First Avenue Editions, 2006. Using the metaphor of a suitcase, the book describes how fruits protect and disperse seeds. Illustrations show fruits with one seed, many seeds, and seeds on the outside. The difference between fruits and vegetables is also addressed. The book can serve as a good beginning to planting seeds or dissecting fruits and vegetables.

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Robbins, Ken. *Autumn Leaves.* New York: Scholastic, 1999. This album of autumn leaves includes the leaves of 12 varieties of trees shown in life-size full-color photographs on one page, with a photograph of the tree or some of its branches facing it. The crisp and colorful photographs are accompanied by one or two simple sentences describing a characteristic of the leaves. An explanation for why leaves turn color concludes this wonderful resource. 2000 NSTA Outstanding Science Trade Book for Children

Robbins, Ken. *Pumpkins*. New Milford, CT: Roaring Brook Press, 2006. Striking photographs tell the story of the pumpkin that typifies the autumn season. Accompanying text is appropriately limited but adds adequate narration. Also included are the steps for turning pumpkins into jack-o-lanterns and using them at Halloween.

Rockwell, Anne. *One Bean.* New York: Walker and Co., 1999. A young boy and girl discover what happens to a bean as it is soaked, planted, watered, re-potted, and eventually produces pods with more beans inside. Gentle, realistic drawings provide details to be observed even beyond the seed project. The text is an appropriately simple narration of a plant's life cycle.

Rosenberry, Vera. *The Growing-up Tree*. New York: Holiday House, 2003. When Alfred is only a little baby, his mother plants several apple seeds. Thereafter, the lives of the apple tree and Alfred calmly parallel each other, until both die during the same storm. Yet both live on in the offspring around them. Watercolor drawings are bright, stylized and show growth in both the tree and boy.

Plant Life

Schaefer, Lola M. *This Is the Sunflower*. New York: Greenwillow Books, 2000. The tall sunflower that stands in the garden eventually provides seeds for the songbirds that, in turn, spread the seeds so new sunflowers can grow. The cumulative text has compelling rhythm and some rhyme. Watercolor illustrations sometimes change perspective but provide a sense of movement. Both the sunflower life cycle and the role of the birds in the process will make interesting conversation. A bird identification key and additional sunflower facts conclude the book.

Stein, David Ezra. *Leaves*. New York: G.P. Putnam's Sons, 2007. A curious young bear wonders about the falling leaves during his first autumn. He thoughtfully but unsuccessfully tries to put them back on the trees. His child-like joy at discovering tiny new leaves in the spring is wonderful. Text is spare and perfect for the watercolor-looking illustrations. They too are minimal but filled with the details that inspire close observations and conversation.

Stevens, Janet. *Tops and Bottoms*. San Diego, CA: Harcourt Brace, 1995. In this vertically formatted story, a lazy bear eventually learns from an industrious rabbit family that different parts of different plants are edible, and he needs to pay attention to which is which. The mixed-media drawings are perfect stimulation for conversation about both the gardening experience and the trickster theme. 1996 Caldecott Award Honor Book

Wallace, Nancy Elizabeth. *Apples, Apples, Apples*. Delray Beach, FL: Winslow Press, 2000. A rabbit family enjoys a day picking apples at Long Hill Orchard. A chart helps them decide what kind of apples they want for their various projects. Along the way, Mr. Miller provides apple information and Minna recalls some things she read in her apple book. An applesauce recipe, apple print instructions, song, and page of apple sayings are included. Good descriptive words fill the text, while cut-paper illustrations add detail.

Wallace, Nancy Elizabeth. *Leaves! Leaves! Leaves!* New York: Marshall Cavendish, 2003. Mama Bear teaches Buddy Bear about leaves as they explore the outdoors during all the seasons. Useful scientific tools are available to aid their work. Colorful cut-paper illustrations and simple, accurate, conversational text tell the story. Both text and pictures contain enough detail to stimulate observations.

Wallace, Nancy Elizabeth. *Seeds! Seeds! Seeds!* New York: Marshall Cavendish, 2004. Buddy Bear, with his mother's help, explores the packages of seed activities he receives in an unexpected box from his grandfather. Clean cut-paper illustrations and accurate text tell the story as he creates a seed collection. Illustration details provide opportunities for observing and even reading the accompanying labels, instructions, etc.

Plant Life

Weninger, Brigitte and Anne Möller. *Precious Water: A Book of Thanks*. New York: North-South Books, 2000. A clear glass of water is the introduction to "all things need water." While plants do not dominate the examples, they are represented. Collage pictures and limited text are sufficiently detailed for good discussion.

Other Recommended Books

Arnold, Katya. *Let's Find It!* New York: Holiday House, 2002. An author who learned to love nature as a child has written a book to inspire other children to look around indoors and out. Each double-page spread includes one page of objects—plants and animals—to find in the scene painted on the opposite page. For those who want more, identification and classification information is on the final pages.

Carle, Eric. *The Tiny Seed*. Saxonville, MA: Picture Book Studio, 1987. With typical Eric Carle-styled illustrations, this book roughly explains the life cycle of a seed: the seed travels great distances and barely escapes disaster, grows into an enormous flower, and eventually goes to seed.

Carlstrom, Nancy White. *Wild Wild Sunflower Child Anna*. New York: Aladdin Books, 1991. Joyous poetry and soft watercolor illustrations show a young girl as she laughs, dances, and explores her way through the garden.

Child, Lauren. *I Will Never Not Ever Eat A Tomato*. Cambridge, MA: Candlewick Press, 2000. Picky-eater Lola is convinced to eat foods she is sure she doesn't like after her brother Charlie provides some wonderfully inventive descriptions–carrots become "orange twiglets from Jupiter," tomatoes are "moonsquirters." Creative mixed-media drawings and conversational text provide silly, but fun, incentive to talk about colors, shapes, and even healthy eating!

Coats, Laura Jane. *Alphabet Garden*. New York: Macmillan, 1993. Readers can follow a little boy and his cat as they point out—alphabetically—various plants, animals, and a few non-living things in their yard. Each gentle double-page scene is accompanied by two upper- and lower-case letters, a word and its picture beginning with each letter, and a sentence about those objects. While the book is small for a large group, it would be a fun seek-and-find game for one or two children.

Eclare, Melanie. *A Handful of Sunshine.* Brooklyn, NY: Ragged Bears, 2000. Accompanied by simple text, this photographic essay shows a little girl as she tills the soil, plants, and grows a very tall sunflower. Photographs are large and close-up, allowing easy observation and conversation about the process.

Eisenstein, Marilyn. *Kate Can't Wait.* Plattsburgh, NY: Tundra Books, 2001. An impatient little girl and her family move to the country. A gift of strawberry plants becomes a lesson in waiting for good things to happen.

Plant Life

Fleming, Denise. *Lunch*. New York: Henry Holt, 1992. A very hungry, very messy mouse makes his lunch from the colorful fruits/vegetables that he finds on the kitchen table. The simple text —one descriptive word and one color associated with each food item—support vocabulary growth.

French, Vivian. *Oliver's Fruit Salad*. New York: Orchard Books, 1998. After a visit to his grandfather's garden, young Oliver rebels at the idea of canned food. When his mother provides fresh fruit from the grocery store, he refuses that too. Only clever grandparents who promote their "special" fruit salad convince him to try the "yummy" concoction. Appropriate-length text supports bright, childlike acrylic paintings. Conversation about healthy eating or food preservation and a hands-on salad-making project are naturals with this book.

Ganeri, Anita. *From Seed to Sunflower*. Chicago: Heinemann Library, 2006. A sunflower has big, yellow flowers and grows from a large seed. Step-by-step, from one seed to a full-grown but dying plant, the life cycle story is told. Colorful close-up photographs show the process, while some text (bracts, florets) can be read one section at a time or edited.

Garden Friends. New York: DK Publishing, 2003. Animals provide help to and are helped by plants. Examples of 12 small animals are pictured with the plants they frequent. Text is sparse, but labels provide information. Close-up photographs are presented first in isolation and then farther away in context.

Gibbons, Gail. *From Seed to Plant*. New York: Holiday House, 1991. Brightly colored illustrations and two-level text explain the variety of seeds, how a seed is formed, and how it grows into a new plant. Some early additional information will be beyond the needs of young children, but can be edited out easily. Plentiful labels throughout are useful. A seed-planting project is illustrated, and a concluding page of fun facts support additional conversation.

Gibbons, Gail. *The Seasons of Arnold's Apple Tree*. San Diego, CA: Harcourt Brace, 1984. As the seasons change, Arnold shares numerous activities that revolve around his special apple tree. Text is appropriately limited and illustrations are bright with sufficient detail to keep listeners involved. Small inserts provide additional information as appropriate (like honeybee use of apple blossoms or an apple pie recipe). The wisdom of Arnold's tree-climbing activities may generate discussion.

Glaser, Omri. *Round the Garden*. New York: Harry N. Abrams, 1999. This story, in simple text and colorful, digitally created illustrations, follows a tear on its journey through the water cycle until its appearance at a dinner table. The book links together a number of science concepts, including the role of water in plant growth.

Plant Life

Hammersmith, Craig. *Watch It Grow*. Minneapolis, MN: Compass Point Books, 2002. Flowers, grasses, and trees are all plants. Flowers are used to identify plant parts, then seeds and growth are discussed. Directions for growing seedlings are added, as are a glossary, index, and where to learn more.

Harris, Calvin. *Pumpkin Harvest*. Mankato, MN: Capstone Press, 2008. The crisp weather of fall signals harvest time for pumpkins that can be made into scarecrow heads, carved jack-o-lanterns, or sweet pie. Readers are asked to suggest other signs of fall. Text is sparse, but the large photographs encourage conversation. A glossary and additional places to learn about pumpkins are added.

Hewitt, Sally. *Plants and Flowers*. New York: Children's Press, 1998. Packed with plant information, plus things to do and think about, this book provides basic information about how plants grow and their many uses. Photographs, include some close-ups/in isolation and some showing a larger context. Readers will need to find the appropriate topic and edit accordingly.

Inches, Alison. *Corduroy's Garden*. New York: Viking, 2002. Once you get past the talking/moving teddy bear, the idea that different seeds produce different plants is good plant science. The characters created by Don Freeman demonstrate the care that plants need, including watering. Drawings contain details that encourage conversation as the drama unfolds.

Katzen, Mollie. *Salad People and More Real Recipes*. Berkeley, CA: Tricycle Press, 2005. The author/illustrator of Pretend Soup has added another 20 healthy, child- and family-tested recipes, many with plant ingredients. Each recipe is presented twice: two pages for the adult helper and two pages of a pictorial version for children. Safety is again highlighted in all recipes which include Tiny Tacos, Rainbow-Raisin Cole Slaw, Counting Soup, and Corny Corn Cakes.

Keller, Holly. *Cecil's Garden*. New York: Greenwillow Books, 2002. Cecil's excitement about planting a garden is somewhat dulled by disagreements about what seeds to plant and where. But after visiting his dysfunctional neighbors—the mice and moles—Cecil's new perspective helps the rabbit friends plant their garden. Lengthy-looking conversational text provides detail that provokes interesting reader/listener conversations (not necessarily about plants). Gentle illustrations provide observation opportunities as the garden progresses from dirt plot to dining room table.

Krementz, Jill. *A Very Young Gardener.* New York: Dial Books for Young Readers, 1991. A precocious six-year-old tells her story of flower and vegetable gardens. Colorful close-up photographs and accompanying descriptions show her planting seeds, bulbs, eyes, and seedlings; watering and weeding; and harvesting and consuming. Productive conversation about the photos can easily be substituted for the sometimes ample text.

Plant Life

Loki. *Jake Greenthumb*. New York: Mondo, 2002. Jake is such a good gardener that his room becomes a jungle with all the plants people have asked him to care for. The problem is resolved when he gives the people back their plants.

Lunis, Natalie. *A Closer Look*. New York: Newbridge Publishing, 1999. Fascinating close-up photographs, many of plants and animals, introduce the detail that magnifying glasses, binoculars, and telescopes can provide. Text is limited and includes questions and directions to involve the reader and initiate discussion. A glossary, index, and several questions for scientist-like thinking are included.

Lunis, Natalie, and Nancy White. *A World of Change*. New York: Newbridge Educational Publishing, 1999. The idea of change is shown with plant and animal life cycles, water states, weather, camouflage, and some non-natural examples depicted in large, colorful photographs and text containing more thought-provoking questions than statements. Some changes like erosion are beyond the understanding of young children, but all the examples can increase their awareness of change.

Maass, Robert. *Garden*. New York: Henry Holt, 1998. This photographic essay is a testament to the joys of patient gardening. The close-up shots of worms, wheelbarrows, and children working are good conversation starters as readers pore over the details in some pictures (other photos will be too distant and detailed for youngsters). 1999 Outstanding Science Trade Book for Children

McMillan, Bruce. *Counting Wildflowers*. New York: Mulberry Books, 1986. Close-up photographs of wildflowers illustrate the numbers 1-20. Each photo is accompanied by the appropriate numeral, colored dots to signify the number, and the word for that number (in uppercase only). Flowers are identified in small letters on each page, plus a key with additional information is at the end. 1986 ALA Notable Children's Book

Medearis, Angela Shelf. *Seeds Grow!* New York: Scholastic, 1999. Two young children plant some sunflower seeds; provide the needed soil, sun, and water to help them grow; and enjoy the results. The first-reader text is basic, and cartoon illustrations are simple enough for easy observation and conversation. Several paper-and-pencil follow-up activities are provided at the end.

Mockford, Caroline. *What's This?* New York: Barefoot Books, 2000. A bird and then a little girl find a seed they do not recognize. Upon planting, the seed sprouts and grows so tall it has to be staked up. A "magnificent" sunflower blooms eventually, allowing the little girl to share seeds, and thus sunflowers, with everyone in her class. The drama of the unknown and vibrant acrylic illustrations inspire conversation about this developing story.

Plant Life

Morton, Christine & Sarah Barringer. *Picnic Farm*. New York: Holiday House, 1998. Two children tour a farm, finding many plants and animals grown there. Their trip ends with a picnic where they enjoy many of the farm's products. The text is very simple and rhythmic, and uses good descriptive vocabulary. Childlike illustrations are bright and sufficiently detailed to generate good conversation.

Muntean, Michaela. *A Garden for Miss Mouse*. Milwaukee, WI: Garth Stevens Publishing, 1982. Miss Mouse is a very adept gardener—tilling, planting, weeding, etc. She is bored with her small garden, however, and makes plans for a larger one. When fantastic garden growth eventually prevents her from leaving her house, she has to call on her friends to harvest and consume the riches. Once readers accept the idea of mice gardening, the rhyming text is informative, and the cartoon-like illustrations are filled with details to discuss.

Pallotta, Jerry. *The Flower Alphabet Book.* Watertown, MA: Charlesbridge Publishing, 1988. Colorful flower illustrations listed alphabetically (with an extra "f" to discuss flowering fruit and non-fruit trees), plus the upper- and lower-case letters, accompany several sentences of information about each flower. Borders usually depict an object or event related to that flower. Artist's notes at the end provide additional information.

Pike, Norman. *The Peach Tree*. Owings Mills, MD: Stemmer House Publishers, 1983. Nature is out of balance after the Aphis sisters find the Pomeroy family's young peach tree. The balance is restored when ladybugs are added to the mix, saving the wilting tree and making the Pomeroy family happy again because they are looking forward to sweet peaches.

Pomeroy, Diana. *One Potato: A Counting Book of Potato Prints*. San Diego, CA: Harcourt Brace, 1996. Potato prints of mostly familiar fruits and vegetables provide counting practice from one to ten, then by tens to fifty, and finally one hundred. Leaves of each plant are shown also. Instructions for making potato prints are provided at the end.

Robinson, Fay. V*egetables, Vegetables!* Chicago: Children's Press, 1994. Vegetables are introduced via the senses of sight, smell, and taste. Clear, close-up photographs and simple text show examples of the different parts of the vegetables that can be eaten. How the vegetables are grown and prepared for eating also are discussed. Typical of small-book formats are the glossary and index at the end.

Rockwell, Anne. *Apples and Pumpkins*. New York: Simon & Schuster Books for Young Readers, 1989. Two fall highlights—apple picking and pumpkin gathering—are rolled into one visit to the Comstock Farm. Text is very simple. Illustrations are fall colors with enough detail to encourage conversation. The pumpkin was carved into a jack-o-lantern in preparation for Halloween.

Plant Life

Saunders-Smith, Gail. *Beans*. Mankato, MN: Pebble Books, 1998. Simple phrases (no upper-case letter or punctuation) act as labels for photographs showing the life cycle of beans. Close-up photos in this small-format book begin with seed packets or pods to suggest where gardeners can acquire their seeds. Then the seeds are planted, new bean pods are harvested, and cut up beans end up in a bowl.

Saunders-Smith, Gail. *Seeds*. Mankato, MN: Pebble Books, 1998. Using close-up photographs and limited text, this small-format book describes how flower-bearing plants begin as seeds. The variety of sizes and shapes in different kinds of seeds, how they grow, and how they are planted (by people, animals, wind, etc.) are all topics for discussion.

Schaefer, Lola M. *We Need Farmers*. Mankato, MN: Pebble Books, 2000. With one sentence per double page and one corresponding photograph on the opposite page, this small-format book provides examples of the work crop and animal farmers do to produce the food we eat. While the fruit, onions, and eggs may be familiar products to young children, the corn and grain fields, pig lot, and cow-milking may be new to many.

Schuette, Sarah L. *Eating Pairs: Counting Fruits and Vegetables by Twos*. Mankato, MN: Capstone Press, 2003. Simple facts about mostly familiar fruits and vegetables are presented along with large photographs. Numerals and numbers increase by twos to twenty, and then 100 peas cap the counting experience. The right-hand margin of each double-page spread contains the numerals 2 through 20, plus 100, with the number appropriate for that page highlighted. A review counting exercise and information about how/where each item grows concludes the text. A glossary and places to find more information are added.

Serafini, Frank. *Looking Closely across the Desert*. Tonawanda, NY: Kids Can Press, 2008.
—*Looking Closely along the Shore*
—*Looking Closely inside the Garden*.
—*Looking Closely through the Forest*.
This series uses the peepbook idea that paying attention to smaller detail can help you learn about larger things—like nature. Each book contains a series of isolated photographic details with instructions to look closely, plus several possible answers that stimulate conversation. The following double-page spread shows the whole item and more-than-enough identification information for young children. Both plant and animal examples from each habitat are used.

Snyder, Inez. *Beans to Chocolate*. New York: Children's Press, 2003. Like other titles in the How Things Are Made series, this one shows the steps involved in turning various plants into familiar products (sometimes edible, sometimes not)—in this case cacao beans into chocolate candy. Each one or two sentence explanation is accompanied by a large (for small-book format) photograph. Other food product titles include *Milk to Ice Cream*, *Oranges to Orange Juice*, and *Tomatoes to Ketchup*.

Plant Life

Spilsbury, Louise. *Rice*. Chicago: Heinemann Library, 2001. What is rice? What is it good for? How and where is it grown? From field to table, this book answers these questions and more. Text is ample but easily edited by substituting conversation about picture observations. Illustrations are mostly colorful close-up photographs. A food pyramid, rice pudding recipe, glossary, index, and bibliography are included. Other books in this Food series include *Apples, Bread, Eggs, Honey, Milk, Pasta, Potatoes,* and *Pumpkins*.

Stewart, Sarah. *The Gardener.* New York: Farrar, Straus and Giroux, 2000. A series of short letters tell the story of Lydia Grace Fitch, who goes to live with her dour but willing Uncle Jim while her father is out of a job. Her passion for growing things brightens her uncle's dreary bakery, his disposition, and eventually all the neighborhood. Pastel illustrations with black outlines provide detail to be observed carefully and discussed at length. Caldecott Honor Book

Titherington, Jeanne. *Pumpkin Pumpkin*. New York: Greenwillow Books, 1986. Beginning with the single seed that Jamie planted, this story provides step-by-step descriptions of how the seed eventually becomes a carving—and a source for next year's crop. Jamie carefully watches over the pumpkin's growth, as do several other animals. Text is minimal and focused on what is happening in the soft colored-pencil illustrations.

Van Laan, Nancy. *A Tree for Me.* New York: Alfred A Knopf, 2000. Looking for his own tree, a young child climbs five different trees but finds a number of animals already in residence. Simple rhyme, bouncing rhythm, repetitious chorus, and one through five counting are all used to tell the lively story. Bright collage illustrations add fun detail for observing, plus the tree-climbing might be a topic for discussion.

Wallace, Nancy Elizabeth. *A Taste of Honey*. Delray Beach, FL: Winslow Press, 2001. The label on a honey jar leads to the innocent question "where does honey come from?" The question is the first of many that leads backward to bees and flower nectar. Primary text is minmal but information is also provided on signs and labels, and on sidebars. Cut-paper illustrations provide plenty of detail (mostly about honey and bees) for good observation practice and conversation stimulation.

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
Language Development	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TH
Demonstrates increasing ability to attend to and understand conversations, stories, songs, poems.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Shows progress in understanding and following simple and multi-step directions.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Understands an increasingly complex and varied vocabulary.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
For Non-English speaking children, progresses in listening to and understanding English.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Develops increasing abilities to understand and use language to communicate information, experiences, ideas, feelings, opinions, needs, questions, and for other varied purposes.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Progresses in abilities to imitate and respond appropriately in conversation and discussions with peers and adults.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Uses an increasingly complex and varied spoken vocabulary.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Progresses in clarity of pronunciation and towards speaking in sentences of increasing length and grammatical complexity.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
For Non-English speaking children, progresses in speaking English.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
LITERACY																	
Shows increasing ability to discriminate and identify sounds in spoken language.																	•
Shows growing awareness of the beginning and ending sounds of words.																	•
Progresses in recognizing matching sounds and rhymes in familiar words, games, songs, stories and poems.																	•
Shows growing ability to hear and discriminate separate syllables in words.																	

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
LITERACY CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Associates sounds with written words, such as awareness that different words begin with the same sound.																	
Shows growing interest and involvement in listening to and discussing a variety of fiction and nonfiction books and poetry.																	
Shows a growing interest in reading-related activities, such as asking to have a favorite book read; choosing to look at books; drawing pictures based on stories; asking to take books home; going to the library; and engaging in pretend-reading with other children.																	
Demonstrates progress in abilities to retell and dictate stories, to act out stories, and to predict what will happen next in a story.																	
Progresses in learning how to handle and care for books; knowing to view one page at a time in sequence from front to back; and understanding that a book has a title, author and illustrator.																	•
Shows increasing awareness of print in classroom, home and community settings.		•			•	•						•	•	•			•
Develops growing understanding of the different functions of forms or print such as signs, letters, newspapers, lists, messages, and menus.		•			•	•						•	•	•			•
Demonstrates increasing awareness of concepts of print, such as that reading in English moves from top to bottom and from left to right, that speech can be written down, and that print conveys a message.		•			•	•						•	•	•			•
Shows progress in recognizing the association between spoken and written words by following print as it is read aloud.		•			•	•						•	•	•			•
Recognizes a word as a unit of print, or awareness that letters are grouped to form words, and that words are separated by spaces.		•			•	•						•	•	•			•
Develops understanding that writing is a way of communicating for a variety of purposes.																	

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
LITERACY CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Begins to represent stories and experiences through pictures, dictation, and in play.																	
Experiments with a growing variety of writing tools and materials, such as pencils, crayons, and computers.																	
Progresses from using scribbles, shapes, or pictures to represent ideas, to using letter-like symbols, to copying or writing familiar words such as their own name.																	
Shows progress in associating the names of letters with their shapes and sounds.																	
Increases in ability to notice the beginning letters in familiar words.																	
Identifies at least 10 letters of the alphabet, especially those in their own name.																	
Knows the letters of the alphabet are a special category of visual graphics than can be individually named.																	
MATHEMATICS																	
Demonstrates increasing interest and awareness of numbers and counting as a means of solving problems and determining quantity.				•													
Begins to associate number concepts, vocabulary, quantities, and written numerals in meaningful ways.																	
Develops increasing ability to count in sequence to 10 and beyond.				•													
Begins to make use of one-to-one correspondence in counting objects and in matching groups of objects.		•	•		•	•						•	•	•			•
Begins to use language to compare numbers of objects with terms such as more, less, greater than, fewer, equal to.				•													
Develops increased abilities to combine, separate and name “how many” concrete objects.																	
Begins to recognize, describe, compare, and name common shapes, their parts and attributes.	•		•	•									•				

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
MATHEMATICS CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Progresses in ability to put together and take apart shapes.																	
Begins to be able to determine whether or not two shapes are the same size and shape.	•		•	•									•				
Shows growth in matching, sorting according to 1 or 2 attributes such as color, shape or size.			•														
Builds an increasing understanding of directionality, order and positions of objects, and words such as up, down, over, under, top, bottom, inside, outside, in front, and behind.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Enhances abilities to recognize, duplicate and extend simple patterns using a variety of materials.																	
Shows increasing abilities to match, sort, put in a series, and regroup objects according to one or two attributes such as shape or size.			•														
Begins to make comparisons between several objects based on a single attribute.			•														
Shows progress in using standard and non-standard measures for length and area of objects.																	
SCIENCE																	
Begins to use senses and a variety of tools and simple measuring devices to gather information, investigate materials, and observe processes and relationships.	•	•	•	•	•	•	•	•	•	•		•	•	•	•		•
Develops increased ability to observe and discuss common properties, differences and comparisons among objects and materials.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Begins to participate in simple investigations to test observations, discuss and draw conclusions and form generalizations.	•	•	•	•	•	•	•	•	•	•		•	•	•	•		•
Develops growing abilities to collect, describe and record information through a variety of means, including discussion, drawings, maps and charts.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
SCIENCE CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Begins to describe and discuss predictions, explanations, and generalizations based on past experiences.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Expands knowledge of and abilities to observe, describe and discuss the natural world, materials, living things, and natural processes.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Expands knowledge of and respect for their body and the environment.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Develops growing awareness of ideas and language related to attributes of time and temperature.					•	•		•	•	•	•	•				•	
Shows increased awareness and beginning understanding of changes in materials and cause-effect relationships.			•		•	•		•	•	•		•					
CREATIVE ARTS																	
Participates with increasing interest and enjoyment in a variety of music activities, including listening, singing, finger plays, games, and performances.																	
Experiments with a variety of musical instruments.																	
Gains ability in using different art media and materials in a variety of ways for creative expression and representation.																	
Progresses in abilities to create drawings, paintings, models, and other art creations that are more detailed, creative or realistic.																	
Develops growing abilities to plan, work independently, and demonstrate care and persistence in a variety of art projects.																	
Begins to understand and share opinions about artistic products and experiences.																	
Expresses through movement and dancing what is felt and heard in various musical tempos and styles.																	
Shows growth in moving in time to different patterns of beat and rhythm in music.																	

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
CREATIVE ARTS CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Participates in a variety of dramatic play activities that become more extended and complex.																	
Shows growing creativity and imagination in using materials and in assuming different roles in dramatic play situations.																	
SOCIAL & EMOTIONAL DEVELOPMENT																	
Begins to develop and express awareness of self in terms of specific abilities, characteristics and preferences.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Develops growing capacity for independence in a range of activities, routines, and tasks.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Demonstrates growing confidence in a range of abilities and expresses pride in accomplishments.	•	•	•	•	•	•							•	•	•		
Shows progress in expressing feelings, needs and opinions in difficult situations and conflicts without harming themselves, others, or property.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Develops growing understanding of how their actions affects others and begins to accept the consequences of their actions.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Demonstrates increasing capacity to follow rules and routines and use materials purposefully, safely, and respectfully.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Increases abilities to sustain interactions with peers by helping, sharing, and discussion.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Shows increasing abilities to use compromise and discussion in working, playing, and resolving conflicts with peers.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Develops increasing abilities to give and take in interactions; to take turns, and to interact without being overly submissive or directive.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Demonstrates increasing comfort in talking with and accepting guidance and directions from a range of familiar adults.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Shows progress in developing friendships with peers.																	

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
SOCIAL & EMOTIONAL CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Progresses in responding sympathetically to peers who are in need, upset, hurt, or angry; and in expressing empathy or caring for others.																	
Develops ability to identify personal characteristics including gender, and family composition.																	
Progress in understanding similarities and respecting differences among people, such as genders, race, special needs, culture, language, and family structures.																	
Develops growing awareness of jobs and what is required to perform them.																	
Begins to express and understand concepts and language of geography in the contexts of their classroom, home, and community.																	
APPROACHES TO LEARNING																	
Chooses to participate in an increasing variety of tasks and activities.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Develops increased ability to make independent choices.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Approaches tasks and activities with increased flexibility, imagination, and inventiveness.								•	•			•				•	
Grows in eagerness to learn about and discuss a growing range of topics, ideas and tasks.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Grows in abilities to persist in and complete a variety of tasks, activities, projects, and experiences.	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	
Demonstrates increasing ability to set goals and develop and follow through on plans.	•				•	•			•	•							
Shows growing capacity to maintain concentration, despite distractions and interruptions.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Develops increasing ability to find more than one solution to a question, task or problem.	•								•	•							
Grows in recognizing and solving problems through active exploration, including trial and error, and interactions and discussions with peers and adults.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
APPROACHES TO LEARNING CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Develops increasing abilities to classify, compare, and contrast objects, events, and experiences.	•	•	•	•	•	•	•	•	•	•	•	•					•
PHYSICAL HEALTH AND DEVELOPMENT																	
Develops growing strength, dexterity, and control needed to use tools such as scissors, paper punch, stapler, and hammer.																	
Grows in hand-eye coordination in building with blocks, putting together puzzles, reproducing shapes and patterns, stringing beads and using scissors.																	
Progresses in abilities to use writing, drawing and art tools including pencils, markers, chalk, paint brushes, and various types of technology.																	
Shows increasing levels of proficiency, control and balance in walking, climbing, running, jumping, hopping, skipping, marching and galloping.																	
Demonstrates increasing abilities to coordinate movements in throwing, catching, kicking, bouncing balls, and using the slide and swing.																	
Progresses in physical growth, strength, stamina, and flexibility.																	
Participates actively in games, outdoor play and other forms of exercise that enhance physical fitness.																	
Shows growing independence in hygiene, nutrition and personal care when eating, dressing, washing hands, brushing teeth and tolieting.																	
Builds awareness and ability to follow basic health and safety rules such as fire safety, traffic and pedestrian safety, and responding appropriately to potentially harmful objects, substances and activities.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

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