How Does Your Garden Grow?

A primary grade level unit
created by

Kim Van Hook and Lynda Norton
Hillcrest Elementary School
Polk County, FL
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Unit Summary

Dear Teachers,

Kindergarten is a unique time in a child’s life. All kindergarten students are new to the educational process, so it is important that we teach them in a way that they can learn. One of the best strategies a teacher can employ is an integrated curriculum approach. In the unit How Does Your Garden Grow? we utilize this approach to teach students about the production and use of phosphate as it relates to plant growth and food production. The unit not only has many classroom hands-on activities, but also includes the actual preparation, growing, and harvesting of a garden, culminating with a feast from our harvest!

How Does Your Garden Grow? is a fully integrated curriculum lasting about four weeks. A pre-post test is included in the materials and should be administered prior to any instruction. You will be pleased at the success you see when your students successfully complete the post-test. The main lesson of each day revolves around a central theme. This theme guides journal writing as well as shared writing activities. A brief list of shared writing ideas is included on page 58. Let your imagination be your guide to more.

Learning centers are also theme-related and are used as enrichment for previous lessons. As children rotate daily throughout the centers, they have hands-on opportunities for learning and reinforcing previously taught skills. As a classroom management tool we color-code our centers making it easier to be sure each child visits each center during the course of the unit. These learning centers play a vital role in student comprehension and must be used for the unit to be effective. Center directions that we found effective are included in the unit.

Please use this unit How Does Your Garden Grow? as a framework for your classroom plant unit. We know that your expertise will only enhance our ideas, making the unit a great learning tool for your class. If you have any questions feel free to contact us through:

Florida Industrial and Phosphate Research Institute
1855 W Main Street
Bartow, FL 33830
(863) 534-7160
Perspective

Phosphate is essential to every cell in humans, plants, and other animals — every living thing. It is necessary for many of the biochemical molecules and processes that define life itself. As such, phosphate is an important part of lessons concerning life cycles, why living things need food, and how they get their food.

In the early years, it is enough to let students know that farmers use fertilizer to help grow the plentiful and healthy plants that all animals, including humans, need to eat. This fertilizer has phosphate in it. The phosphate allows farmers to grow a greater number of healthy plants on fewer acres of land.

The phosphate, however, is not easy to get. It cannot be produced in a laboratory. It must be mined from the ground. But, before it can be used in fertilizer, it must go through chemical processing to create a soluble substance that plants can take up through their roots. The chemical processing of phosphate rock produces phosphoric acid, used to make fertilizers that are water-soluble.

Kim Van Hook and Lynda Norton took what they learned about phosphate at a Florida Institute of Phosphate Research (FIPR) teacher-training workshop and created this unit for their kindergarten students with the aid of a FIPR mini-grant. They incorporate the role phosphate plays in food production in lessons concerning living things, how they eat and where they get their food. These lessons all correlate to Florida Sunshine State Standards for Education, which outline the learning benchmarks for each grade level.

Kim and Lynda stretch the lessons throughout the day, as is the norm in kindergarten. This means the students are using the subject matter as the basis for art, reading, writing, math and independent learning activities.

This unit should be of benefit to any teacher. It integrates all subject areas and introduces beginning science concepts. Best of all, the teachers all report that everyone learned while having fun.
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Concept Map

Develop the web below with the students as you progress through the lessons in this unit. Show it on an overhead transparency or draw it on large chart paper hung on the wall in the classroom. Students will want to refer to it as you build on their knowledge. It is another great way to show how much students have learned.
Next Generation Sunshine State Standards - Kindergarten

Science Benchmarks
SC.K.N.1.2 Make observations of the natural world and know that they are descriptors collected using the five senses.

SC.K.N.1.3 Keep records as appropriate—such as pictorial records—of investigations conducted.

SC.K.N.1.4 Observe and create a visual representation of an object which includes its major features.

SC.K.N.1.5 Recognize that learning can come from careful observation.

SC.K.P.8.1 Sort objects by observable properties, such as size, shape, color, temperature (hot or cold), weight (heavy or light) and texture.

SC.K.L.14.1 Recognize the five senses and related body parts.

SC.K.L.14.2 Recognize that some books and other media portray animals and plants with characteristics and behaviors they do not have in real life.

SC.K.L.14.3 Observe plants and animals, describe how they are alike and how they are different in the way they look and in the things they do.

Language Arts Benchmarks
LA.K.1.1.1 The student will locate a printed word on a page;

LA.K.1.1.2 The student will distinguish letters from words;

LA.K.1.1.3 The student will identify the separate sounds in a spoken sentence;

LA.K.1.1.4 The student will match print to speech;

LA.K.1.1.5 The student will identify parts of a book (e.g., front cover, back cover, title page);

LA.K.1.1.6 The student will move top to bottom and left to right on the printed page; and

LA.K.1.1.7 The student will name all upper and lower case letters of the alphabet.

LA.K.1.2.3 The student will recognize and produce words that rhyme; and

LA.K.1.4.2 The student will decode simple words in isolation and in context.

LA.K.1.6.1 The student will use new vocabulary that is introduced and taught directly;
LA.K.1.7.1 The student will make predictions about text content using pictures, background knowledge, and text features (e.g., title, sub-heading, captions, illustrations);

LA.K.1.7.2 The student will use background knowledge, supporting details from text, or another source to determine whether a reading selection is fact or fiction;

LA.K.1.7.3 The student will retell the main idea or essential message, identifying supporting details (e.g., who, what, when, where, why, how), and arranging events in sequence; and

LA.K.1.7.4 The student will identify the authors purpose as stated in the text.

LA.K.2.1.3 The student will identify a regular beat and similarities of sounds in words when responding to rhythm and rhyme in nursery rhymes and others rhyming selections.

LA.K.2.2.2 The student will retell important facts from a text heard or read.

LA.K.3.1.1 The student will pre-write by connecting thoughts and oral language to generate ideas;

LA.K.3.1.2 The student will pre-write by drawing a picture about ideas from stories read aloud or generated through class discussion.

LA.K.3.2.2 The student will draft writing by creating a group draft, scripted by the teacher.

LA.K.3.3.1 The student will revise the draft by adding additional details to the draft and checking for logical thinking with prompting.

LA.K.3.4.1 The student will edit for correct use of knowledge of letter/sound relationships to spell simple words;

LA.K.3.4.2 The student will edit for correct use of capital letters to begin important words; and;

LA.K.3.4.3 The student will edit for correct use of end punctuation, including periods, question marks, and exclamation points.

LA.K.3.5.1 The student will produce, illustrate and share a finished piece of writing

LA.K.4.2.2 The student will participate in creating simple summaries from informational/expository text (e.g., graphs, tables, maps)

LA.K.4.3.1 The student will draw a picture and use it to explain why this item (food, pet, person) is their favorite.
LA.K.5.1.1 The student will print many uppercase and lowercase letters of the alphabet and recognize the difference between the two;

LA.K.5.1.2 The student will write from left to right and top to bottom of page;

LA.K.5.1.3 The student will recognize spacing between letters and words;

LA.K.5.1.4 The student will print own first and last name; and

LA.K.5.1.5 The student will understand the concept of writing and identifying numerals.

LA.K.5.2.1 The student will listen carefully and understand directions for performing tasks (e.g., three or four-step oral directions); and

LA.K.5.2.2 The student will listen attentively to fiction and nonfiction read-aloud and demonstrate understanding.

LA.K.6.4.1 The student will use technology (e.g., drawing tools, writing tools) resources to support learning.

Math Benchmarks
MA.K.A.4.1 Identify and duplicate simple number and non-numeric repeating and growing patterns.

MA.K.G.2.1 Describe, sort and re-sort objects using a variety of attributes such as shape, size, and position.

MA.K.G.3.1 Compare and order objects indirectly or directly using measurable attributes such as length, height, and weight.

MA.K.G.5.1 Demonstrate an understanding of the concept of time using identifiers such as morning, afternoon, day, week, month, year, before/after, shorter/longer.

Social Studies Benchmarks
SS.K.E.1.1 Describe different kinds of jobs that people do and the tools or equipment used.

SS.K.E.1.2 Recognize that United States currency comes in different forms.
Next Generation Sunshine State Standards - First Grade

Science Benchmarks
SC.1.E.6.1 Recognize that water, rocks, soil, and living organisms are found on Earth's surface.

SC.1.L.14.1 Make observations of living things and their environment using the five senses.
SC.1.L.14.2 Identify the major parts of plants, including stem, roots, leaves, and flowers.
SC.1.L.14.3 Differentiate between living and nonliving things.
SC.1.L.17.1 Through observation, recognize that all plants and animals, including humans, need the basic necessities of air, water, food, and space.
SC.1.N.1.2 Using the five senses as tools, make careful observations, describe objects in terms of number, shape, texture, size, weight, color, and motion, and compare their observations with others.
SC.1.N.1.3 Keep records as appropriate - such as pictorial and written records—of investigations conducted.
SC.1.N.1.4 Ask "How do you know?" in appropriate situations.
SC.1.P.8.1 Sort objects by observable properties, such as size, shape, color, temperature (hot or cold), weight (heavy or light), texture, and whether objects sink or float.

Language Arts Benchmarks
LA.1.1.1.1 The student will locate the title, table of contents, names of author and illustrator, glossary, and index; and
LA.1.1.1.2 The student will distinguish informational text (e.g., store sign, stop sign, recipe) from entertaining text (e.g., song, poem).
LA.1.1.6.1 The student will use new vocabulary that is introduced and taught directly;
LA.1.1.6.2 The student will listen to, read, and discuss both familiar and conceptually challenging text;
LA.1.1.6.3 The student will use context clues;
LA.1.1.6.4 The student will categorize key vocabulary and identify salient features;
LA.1.1.6.5 The student will relate new vocabulary to prior knowledge;
LA.1.1.7.6 The student will arrange events in sequence;
LA.1.2.1.4 The student will identify rhyme, rhythm, alliteration, and patterned structures in poems for children;

LA.1.3.1.1 The student will pre-write by generating ideas from multiple sources (e.g., brainstorming, webbing, drawing, group discussion, other activities);

LA.1.3.1.2 The student will prewrite by discussing the purpose for a writing piece; and

LA.1.3.1.3 The student will prewrite by organizing ideas using simple webs, maps, or lists.

LA.1.3.2.1 The student will draft writing by maintaining focus on a single idea using supporting details; and

LA.1.3.2.2 The student will draft writing by organizing details into a logical sequence that has a beginning, middle, and end.

LA.1.3.3.1 The student will revise by evaluating the draft for logical thinking and marking out repetitive text; and

LA.1.3.3.2 The student will revise by creating clarity by marking out repetitive text, adding additional details by using a caret and replacing general words with specific words.

LA.1.3.4.1 The student will edit for correct use of common spelling patterns (e.g., onset and rimes, word families, and simple CVC words) and conventional spelling of high frequency words;

LA.1.3.4.2 The student will edit for correct use of capital letters for the pronoun I, the beginning of a sentence, names, days of the week and months of the year;

LA.1.3.4.3 The student will edit for correct use of commas in dates, items in a series;

LA.1.3.4.4 The student will edit for correct use of singular and plural nouns, action verbs in simple sentences, and singular possessive pronouns (e.g., my/mine, his/her, hers);

LA.1.3.4.5 The student will edit for correct use of subject and verb agreement in simple sentences; and

LA.1.3.4.6 The student will edit for correct use of end punctuation for sentences, including periods, question marks, and exclamation points.

LA.1.3.5.1 The student will produce, illustrate, and share a variety of compositions.

LA.1.4.1.1 The student will write narratives that include a main idea based on real or imagined events, characters, and a sequence of events; and
How Does Your Garden Grow?

LA.1.4.1.2 The student will participate in writing simple stories, poems, rhymes, or song lyrics.

LA.1.4.2.2 The student will participate in recording information from informational/expository text (e.g., lists, graphs, tables or maps);

LA.1.5.1.1 The student will write numbers and uppercase and lowercase letters using left to right sequencing; and

LA.1.5.1.2 The student will use appropriate spacing between letters, words, and sentences.

LA.1.5.2.1 The student will listen attentively and understand directions for performing tasks (e.g., multi-step oral directions), solving problems, and following rules;

LA.1.5.2.2 The student will retell specific details of information heard;

LA.1.5.2.3 The student will listen attentively to fiction and nonfiction read-aloud and demonstrate understanding;

LA.1.5.2.4 The student will use formal and informal language appropriately;

LA.1.5.2.5 The student will communicate effectively when relating experiences and retelling stories read and heard; and

LA.1.5.2.6 The student will participate courteously in conversation, such as asking clarifying questions, taking turns, staying on topic, making eye contact, and facing the speaker.

LA.1.6.4.1 The student will use appropriate available technology resources (e.g., writing tools, digital cameras, drawing tools) to present thoughts, ideas, and stories.

Math Benchmarks
MA.1.G.5.2 Compare and order objects according to descriptors of length, weight, and capacity.

Social Studies Benchmarks
SS.1.A.2.1 Understand history tells the story of people and events of other times and places.

SS.1.A.2.2 Compare life now with life in the past.

SS.1.E.1.1 Recognize that money is a method of exchanging goods and services.

SS.1.E.1.4 Distinguish people as buyers, sellers, and producers of goods and services.
Specific Objectives

A. Key Concepts
1. Plants are living things.
2. Plants need air, water, sun, and nutrients to grow.
3. Plants have roots, stems, leaves, flowers, and seeds.
4. Roots and stems carry nutrients to the leaves, which make food.
5. Flowers make seeds.
6. Seeds of plants will reproduce only the same plant.
7. Phosphate is a nutrient that helps plants grow.
8. Plants are an important resource.
9. Some parts of plants are a source of food.
10. Edible parts of plants are called fruits and vegetables.

B. Core Knowledge Connections
1. Plants and plant growth
2. Taking care of the earth
3. George Washington Carver
4. Classification
5. Familiar sayings
6. Familiar and favorite poems

C. Skills Taught
1. Sorting/classification
2. Prediction
3. Comparison
4. Matching
5. Writing conveys a message
6. Stories have a beginning, middle, and end.
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<td>Carnation</td>
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<td>Constant</td>
<td>Shovel</td>
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<td>Fertilizer</td>
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<td>Flower</td>
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Vocabulary Definitions

Absorption: 1- The taking up and storing of energy, such as radiation, light, or sound, without it being reflected or transmitted.
2- The movement of a substance, such as a liquid or solute, across a cell membrane by means of diffusion or osmosis.
3- The process by which one substance, such as a solid or liquid, takes up another substance, such as a liquid or gas, through minute pores or spaces between its molecules. A paper towel takes up water, and water takes up carbon dioxide, by absorption.

Acorn: Noun: The typically ovoid fruit or nut of an oak tree enclosed at the base by a capule (small, protective cap with stem).

Air: Noun: A mixture of water vapor, nitrogen, oxygen, carbon dioxide, argon and small amounts of other gases.

Blossom: Noun: The flower of a plant, especially of a plant that produces an edible fruit.
Verb: To produce or yield a flower; to flourish or develop.

Bud: Noun: A small axillary or terminal outgrowth on a plant which contains a rudimentary form of leaf or flower or both. An undeveloped or basic stem or branch of a plant.
Verb: To put forth or produce buds.

Carnation: Noun: Any of numerous cultivated varieties of Dianthus Caryophyllus; the plant bears fragrant flowers of various colors.
Adjective: Pink.

Constant: Noun: Any value that does not change.
Adjective: Uniform; unchanging.

Fertilizer: Noun: Any natural or synthetic material that is chemically or naturally produced, including manure and nitrogen, phosphorus, and potassium compounds, spread on or worked into soil to increase its capacity to support plant growth, quality and yield.

Flower: Noun: The blossom of a plant; that part of a seed plant comprising the reproductive organs and any seed envelopes, especially when the seed envelopes are conspicuous in form and color. Also, any variety of plant cultivated because of the beauty of its blossom.
Verb: To blossom or come to full bloom.

Fruit: Noun: The developed ovary of a seed plant, with its contents and accessory parts (examples: pea pod, nut, tomato, pineapple). The edible part of a plant developed from a flower, with any accessory tissues (examples: peach, banana).
Verb: To bear or produce fruit.

**Germination:** Noun: The beginning of growth, as of a seed, spore, or bud. The germination of most seeds and spores occurs in response to warmth and water.

**Hoe:** Noun: A long-handled implement with a thin, flat blade usually set perpendicular to the handle. This tool is used to break up the surface of the ground and to chop off weeds.

Verb: To scrape, weed, or cultivate using a hoe.

**Leaves:** Noun: The plural of leaf, the expanded, usually green organs held by the stem of a plant. Any similar outgrowths of a stem.

**Living:** Adjective: Capable of growing through metabolism and capable of originating changes from within that enable the organism to adapt to its environment. Capable of reproduction and able to carry on these other basic vital processes. Has DNA and is able to evolve.

**Non-living:** Adjective: Inorganic or no longer living. A non-living thing does not breathe, take in nutrients, manufacture its own energy for internal processes, grow, or excrete wastes. A non-living thing cannot reproduce. Does not have DNA.

**Nutrients:** Noun: A substance or compound that provides nourishment (food) or raw materials needed for life processes.

**Oak Tree:** Noun: A tree belonging to the beech family and the genus *Quercus*; its fruit is called the acorn. This tree produces hard, durable wood.

**Phosphate:** Noun: A class of mineral that is the only known source of the element phosphorus. Phosphate is a nutrient that all living things need to survive and grow. Phosphate rock, which cannot be dissolved in water, is mined to be used as a raw material in fertilizers and animal feeds. The resulting final product is a form of phosphate that is water-soluble and usable by plants and animals.

**Rake:** Noun: An implement for farm, garden, or yard which consists of a shaft and a head with a row of teeth. This tool is used to smooth the surface of ground or for gathering into a pile such material as hay or fallen leaves.

Verb: To gather, draw, or remove material from the ground using a rake; to clear, smooth, prepare, or scrape.

**Resources:** Noun: Supplies; sources of help that can be drawn on when needed.

**Root:** Noun: The part of the body of a plant that grows downward into the soil, anchoring the plant and absorbing nutrients and moisture.

Verb: To implant or establish.
### Seeds:
**Noun:** The fertilized, matured ovule of a flowering plant, containing an embryo or rudimentary plant.
**Verb:** Sowing (scattering) seeds into soil.

### Sheath:
**Noun:** A close fitting covering or case; a closely enveloping plant structure, such as the covering a leaf base makes when it forms a vertical coating to surround the stem.

### Shovel:
**Noun:** An implement consisting of a broad blade or scoop attached to a long handle. This tool is used for removing loose matter, such as dirt or deep snow, and depositing it somewhere else.
**Verb:** To take up, remove, and reposition using a shovel.

### Soil:
**Noun:** The portion of the earth’s surface made up of disintegrated rock and decomposed plant and animal material.

### Sprouts:
**Noun:** Shoots of a plant; new growths, either from germinating seeds or from rootstocks, tubers, buds, etc.
**Verb:** Begins to grow as a plant from a seed; puts forth buds or shoots.

### Stake:
**Noun:** A stick or post pointed at one end, used for driving into the ground to serve as a boundary mark or as a support for a climbing plant.
**Verb:** To use a stake as a marker or plant support.

### Stem:
**Noun:** The ascending axis of a plant, whether above or below ground, which ordinarily grows in a direction opposite to the root. The stalk that supports a leaf, flower, or fruit.

### Valuable:
**Adjective:** Of significant usefulness or importance, worthy.

### Variable:
**Noun:** An event, condition, or factor that can be changed or controlled in order to study or test a hypothesis in a scientific experiment.
**Adjective:** Changeable, alterable, capable of variation. In biology, deviating from the usual type.

### Vegetable:
**Noun:** Any non-woody plant whose fruit, seeds, roots, tubers, bulbs, stems, leaves, or flower parts are used as food. The edible parts of a plant.

### Water:
**Noun:** A transparent, odorless liquid without taste that is a compound of hydrogen and oxygen. Its chemical formula is $\text{H}_2\text{O}$. By weight it contains more than 11% hydrogen and more than 88% oxygen. Snow, rain, oceans, lakes, and rivers all contain water.
**Verb:** To furnish with a supply of water. To add moisture to soil to encourage crop growth.

### Weed:
**Noun:** A wild plant that is valueless or troublesome or poses harm to health, especially an unwanted plant that grows profusely on cultivated ground and crowds out or hurts a wanted crop.
**Verb:** To remove or root out unwanted plants.
Primary Level Vocabulary Definitions

Absorption: Moving food into the cells of an animal or plant.

Acorn: An oak tree’s seed.

Air: A mixture of clear, colorless gases. Most of air is nitrogen. Human beings and other animals breathe the oxygen in air.

Blossom: Noun: A flower.
Verb: To bud into a flower.

Bud: Noun: A part of a plant that a leaf or flower will grow from.
Verb: To make flowers.

Carnation: A plant that bears fragrant flowers of many colors.

Constant: Noun: Any value that does not change.
Adjective: Stays the same; unchanging.

Fertilizer: Material added to soil to make plants grow better, faster and produce bigger crops.

Flower: Noun: A plant’s blossom, containing its seeds.
Verb: To come into full bloom.

Fruit: Noun: The main edible part of a seed plant. (examples: tomato, pineapple).
Verb: To make an edible part of a plant. “The apple trees will fruit in a few weeks”

Germination: A plant’s sprouting into shoots from a seed or bulb.

Hoe: Noun: Long-handled tool used to break up soil.
Verb: To use a hoe.

Leaves: The part of a green plant held by the stem.

Living: Something that is alive and is made of cells, able to take in food, grow and change, exchange gases, get rid of wastes, make babies, move and adapt to the environment.

Non-living: Never alive or no longer alive.

Nutrients: Vitamins and minerals found in foods that help living things grow.

Oak tree: A strong hardwood tree. Its fruit is the acorn.

Phosphate: Phosphate is a nutrient that all living things need to survive and grow.
Rake: Noun: A tool with teeth, used for gathering material on the ground in the yard or garden.
Verb: To gather materials or smooth and clear the ground using a rake.

Resources: Materials found in or on the earth that can be made into useful things. Resources can also be money, information, or people with skills that help others.

Root: Noun: The part of the plant that grows downward into the soil, where it takes in nutrients and water.
Verb: To get established in one spot.

Seeds: Part of a plant that grows into a new plant.

Sheath: A close-fitting covering or coat on a plant or seed.

Shovel: Noun: A long-handled tool designed to move material, such as dirt or snow, from one place to another.
Verb: To remove or deposit using a shovel.

Soil: The portion of the earth’s surface made up of disintegrated rock and decomposed plant and animal material.

Sprouts: New plant growths.

Stake: Noun: A stick or post pointed at one end, used for driving into the ground to mark a boundary or to be a support for a climbing plant.
Verb: To use a stake as a marker or plant support.

Stem: The part of a plant that grows in a direction opposite to the root. The stalk that supports a leaf, flower, or fruit.

Valuable: Very useful or important. Expensive.

Variable: Able to change.

Vegetable: Any non-woody plant whose fruit, seeds, roots, tubers, bulbs, stems, leaves, or flower parts are used as food. The edible parts of a plant.

Verb: To give a supply of water. To add water to the soil to help plants grow.

Weed: Noun: A wild, unwanted plant that is valueless or troublesome or poses harm to health. It grows out of control and crowds out or hurts a wanted plant.
Verb: To remove or root out unwanted plants.
Lesson 1: Introduction to Plants
Authors: Kim Van Hook & Lynda Norton

Introduction:
Plants are living things that need nutrients such as phosphate to survive and grow. Plants have many parts that do things for the plant, people and the environment. Plants are able to reproduce themselves by making seeds or sprouts. Farmers grow plants for food or other things people need, using special tools to control how and where the plants grow.

This lesson assesses students’ prior knowledge about plants; it also begins to build the foundation for students’ understanding of why plants are an important source of energy that help people survive and grow. People have learned to grow plants by observing nature and using tools.

Activity:
Introduce vocabulary using literature and real objects.

Estimated Time:
1 hr. 45 min.

Grade Level:
K-1

Standards:
LA.K.1.4.2   LA.K.1.6.1   LA.K.1.7.1   LA.K.2.2.2   LA.K.4.2.2   LA.K.5.2.2
SC.K.P.8.1   SS.K.E.1.1

LA.1.1.6.1   LA.1.1.6.2   LA.1.1.6.3   LA.1.1.6.4   LA.1.1.6.5   LA.1.4.2.2
LA.1.5.2.6   SC.1.L.14.1   SC.1.L.14.2

Objectives:
The student will…
1. Build background knowledge about plants.
2. Identify things associated with plants.
3. Use various resources to gather information.
5. Participate in group discussion.

Vocabulary:
rake   sprouts
shovel   soil
hoe   blossom
seeds   bud
weed   stake
Materials:
Plant
Chart paper
Markers
K-W-L Chart
Collection of plant-related objects
(tools, seeds, gloves, soil, flowers, etc.)
Large bag to hold the items listed above
Growing Vegetable Soup by Lois Ehlert

Procedure:
1. Introduce vocabulary words by pointing to parts on a real plant. First ask them to name the parts, then say the names aloud and have the students repeat them.
2. Talk briefly about the plant and discuss color, texture, leaves, size, shape, etc.
3. Complete a *K-W-L* chart by recording all the things students know and don’t know about plants and formulate questions about plants that they would like an answer for.
4. Display and identify plant-related items as a group and discuss each item’s relationship to plants or growth. Guide the discussion to focus on the needs of plants.
5. Read the story *Growing Vegetable Soup* by Lois Ehlert. Linger on pages and allow time to make comments, focusing on the parts of the plant.
6. Allow students time to interact with *Growing Vegetable Soup* bulletin board by matching seed packets to corresponding vegetable name.

Analysis/Conclusion:
Teacher Observation

Teacher Notes
Prepare a *K-W-L Chart* on large paper.
Gather plant-related items into a bag.
Create an interactive bulletin board.
Write names of different vegetables on sentence strips.
Cut out construction paper flowerpots.
Glue popsicle sticks in center of pots.
Attach velcro above the popsicle stick.
Attach velcro to seed packets for matching to sentence strips by pots.
Know/ Want to Know/Learned Chart

<table>
<thead>
<tr>
<th>What I know about plants</th>
<th>What I want to know about plants</th>
<th>What I learned about plants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>
Template for the “Growing Vegetable Soup” Board
Lesson 2: Living and Non-living
Authors: Kim Van Hook & Lynda Norton

Introduction:
Every living thing performs the same kinds of activities or functions using specialized parts of its body. All living things obtain food from the environment, process the food so it is useful to the body, then remove waste products from the cells. All living things absorb materials into body fluids or cell membranes and transport them to all their cells. Energy is stored and released for the cells to use for chemical activity. When the cells increase in size and number, a living thing grows. Plants, like all living things, produce offspring that resemble the parent plant. Each living thing and its systems control all these life activities of acquiring nutrients, transporting nutrients, respiration, excretion, synthesis, growth and reproduction.

The world we live in is made up of living and non-living things. All living things have unique features in common such as the ability to grow and get rid of wastes and reproduce. This activity will help students become aware of what is living and non-living as they practice sorting and classifying.

Activity:
Introduce the concept of living things and their functions and indicate if an object is living or non-living using a visual sign.

Estimated Time:
30 min.

Grade Level:
K-1

Standards:
SC.K.L.14.1  SC.K.N.1.3
SC.1.N.1.4  SC.1.L.14.3  SC.1.L.17.1

Objectives:
The student will...
1. Understand that plants are living things.
2. Know that all living things perform the same functions.
3. Differentiate between living and non-living things.
4. Sort and classify pictures of things as living or non-living.

Vocabulary:
living
non-living
**Materials:**
- Pictures of living/non-living objects
- Plant
- Doll
- Chart paper
- Tongue depressors
- Green and brown paper
- Leaf pattern
- *Living and Non-living Objects* worksheet
- *Comparison Chart: Is it Living?*

**Note:** Make sure the shades of green and brown paper are very different for color-blind students.

**Procedure:**
1. Introduce key concept of living things and their functions by showing students the doll and comparing it to a person with various parts and functions. *Questions for discussion:* “What makes this object living?” “How do we know it is living?” “What do all living things do?”
2. Brainstorm with students on the topic “How can you tell if something is living or non-living?”. Write responses on a chart paper table with columns labeled “living” under the happy face and “non-living” under the sad face. Summarize responses and give the definitions of living and non-living.
3. Students make living vs. non-living indicator sticks by first tracing the leaf pattern shape on green paper and then turning the pattern over and tracing the pattern on brown paper.
4. Cut out both leaves and glue a leaf to each side of the tongue depressor.
5. Show pictures to students one at a time and ask students to decide whether the object is living or non-living. *If you show a living thing, students should hold up the green leaf. If you show a non-living thing, students should hold up the brown leaf.*
6. Place the pictures on the chart under the appropriate column of “living” or “non-living”.
7. Show the plant last as a review to recall previous discussion and define what makes a plant a living thing.

**Analysis/Conclusion:**
1. Take the students outside and have them look around to locate a living item and a non-living item.
2. Have students explain why each item is either living or non-living.
3. Finally, have students complete *Living/Non-living Objects* worksheet. (see pages 31 and 32)

**Teacher Notes:**
Create a two-column chart with the labels “living” and “non-living”.
Make ten leaf patterns out of file folders.
Gather pictures of items that represent living and non-living things.
Leaf Template

Directions: Copy this page onto hard stock paper. Have students trace them onto green construction paper. Then turn the leaves over and trace them onto brown construction paper. Glue both colors of leaves onto the tongue depressors. Show pictures of living and non-living things to the class. Students should hold up the green side of the leaf if the object is living or the brown side of the leaf if the object is non-living.
Living and Non-living Objects

**Directions:** Color each object and cut out the squares. Paste the objects that are living in the column with the happy face. Paste the objects that are non-living in the column with the sad face.
Comparison Chart: Is It Living?

<table>
<thead>
<tr>
<th>![Smiley Face]</th>
<th>![Sad Face]</th>
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Lesson 3: What a Plant Needs to Grow
Authors: Kim Van Hook & Lynda Norton

Introduction:
Plants need air, water, sun and soil to provide the nutrition they need to grow and survive. Through their leaves plants soak up light energy that is trapped by a pigment called chlorophyll. The roots of the plant soak up nutrients from the soil and water and transport them to all the cells. Nutrients are substances that provide what the plant needs to grow and thrive. Nitrogen, phosphorus and potassium are among the essential elements plants need to grow. Leaves need nitrogen in order to have enough chlorophyll so the plant can make its own food. Phosphorus and potassium are needed for strong roots, stems and flowers.

Phosphorus, provided through phosphate is also important because it provides and stores the energy in the form of a protein called adenosine tri-phosphate or ATP, to make food for the plant and carry out cell processes.

Every living thing has basic needs that must be met for survival and growth. This lesson will introduce this concept through observations of plants.

Activity:
Students plant seeds in plastic bags and add water, then record their predictions and observations.

Estimated Time:
45 minutes

Grade Level:
K-1

Standards:
LA.K.1.6.1  LA.K.3.2.2  LA.K.3.3.1  LA.K.5.2.1  LA.K.5.2.2  SC.K.N.1.3
SC.K.P.8.1
LA.1.1.6.1  LA.1.1.6.2  LA.1.1.6.3  LA.1.1.6.4  LA.1.1.6.5  LA.1.5.1.1
LA.1.5.1.2  LA.1.6.4.1  SC.1.L.17.1

Objectives:
The student will…
1. Understand that plants need air, water, sun, and soil.
2. Identify requirements for plant growth by labeling diagram.

Vocabulary:
air  water
soil  nutrients
germination  acorn
oak tree

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Materials:
Plastic bags
Paper towels
Lima bean seeds
Stapler
Water
Mist spray bottle

Now I Know All About Seeds by Susan Kuchalla

Plant Needs Worksheet

Procedure:
1. Place folded paper towel in the bottom of a plastic bag. Staple towel in middle to make a shelf.
2. Gently place seed on folded paper towel shelf. Dampen towel with a mist spray bottle.
3. Close bag and label with student’s name. Staple the top of the bag to bulletin board.
4. Allow students to make predictions regarding plant growth.
5. Read the vocabulary words aloud and have students repeat them.
6. Begin a plant growth diary and record daily entries showing observations of seed germination.
7. Read Now I Know All About Seeds aloud.

Follow with discussion about plant needs; highlighting air, sun, soil and water.

Assessment:
Student will complete What a Plant Needs worksheet.

Teacher Notes:
Fill spray bottles with water.
Write on bag “Seed With Water”.
Copy a class set of the worksheet What a Plant Needs.
What a Plant Needs

Directions: Cut out the words. Paste each word in the box next to the object the word identifies.
Lesson 4: What about Water?
Authors: Kim Van Hook & Lynda Norton

Introduction:
Water is a raw material that the plant uses to make its food. The roots of the plant soak up water and nutrients, such as phosphate, from the soil and transport them to the cells. The cells use the energy stored from the sun to convert water and carbon dioxide into a sugar, which the plant then uses for food. This process, called photosynthesis, also releases oxygen that other living things breathe in.

Water is also evaporated out of the plant through respiration and transpiration that occur in the leaves. Water is essential for living things to continue to survive and grow. This activity is an extension. It uses comparison to introduce the effects of manipulating a variable in an experiment.

Activity:
Students plant seeds in plastic bags without adding water, then record their predictions and observations and make comparisons to the watered seeds.

Estimated Time:
30 minutes

Grade Level:
K-1

Standards:
LA.K.1.6.1 LA.K.3.2.2 LA.K.3.3.1 LA.K.5.2.1 LA.K.5.2.2
SC.K.N.1.3 SC.K.P.8.1

LA.1.1.6.1 LA.1.1.6.2 LA.1.1.6.3 LA.1.1.6.4 LA.1.1.6.5
LA.1.5.1.1 LA.1.5.1.2 LA.1.6.4.1 SC.1.L.14.2 SC.1.L.17.1

Objectives:
The student will…
1. Understand plants need water to grow.
2. Conduct an experiment to observe plants’ use of water.
3. Compare plant growth between two plants watered at different rates.
4. Learn scientific terms of constant and variable.

Vocabulary:
canstant
variable

Materials:
Ziploc bags
Paper towels
Lima bean seeds
Stapler

**Procedure:**
1. Create another seed in a baggie using the directions from lesson 3 but have the students omit the water.
2. Guide the group in discussion of possible outcomes of plant growth without water.
3. Students will observe and compare the seed growth in the seed with water to the seed without water.
4. Observations will be recorded in the students’ plant growth diary.

**Assessment:**
Teacher observation of student journals.

**Teacher Notes:**
Write on bags “Seed Without Water”

*The germination process will take 7-15, days depending on the type of seeds you use.*
Lesson 5: Parts of a Plant
Authors: Kim Van Hook & Lynda Norton

Introduction:
Plants are made up of many parts. Each part has a special function or job it does to help the plant survive and grow. The root absorbs water and dissolves mineral salts from the soil. The root also anchors the plant in the soil and acts as transport and storage depot for raw materials and food. The stem holds up the leaves and the flower. Tubes found in the stem store and transport materials between the leaves and the roots. All the functions for food production occur in the leaves of the plant. Leaves contain chlorophyll, the substance that absorbs light and acts as a catalyst to convert water and carbon dioxide into glucose, through photosynthesis. The leaf also regulates the amount of water in the plant by absorption and evaporation. Reproduction of the plant takes place in the flower. The petals attract insects to pollinate the flower so the eggs will become fertilized and produce seeds that will later grow into new plants.

Growth occurs in a cycle with identifiable stages. Each part of the plant contributes to the changes in the cycle. Through independent observations and use of technology, students will learn that changes occur over time.

Activity:
The teacher will provide direct instruction on the parts of the plant with time for individual practice identifying the stages of the plant life cycle.

Estimated Time:
30 minutes

Grade Level:
K-1

Standards:
LA.K.1.6.1 LA.K.5.2.1 LA.K.5.2.2 MA.K.G.3.1 MA.K.G.2.1
MA.K.G.5.1 MA.K.A.4.1 SC.K.L.14.3
LA.1.1.7.6 SC.1.L.14.2 SC.1.L.17.1

Objectives:
The student will...
1. Know that plants have many parts and each part has a function.
2. Label a diagram of a plant to identify its parts.
3. Work independently in centers using a laser disk player.

Vocabulary:
root
leaves
stem
flower
Materials:
Bean and Plant by Christine Back
Parts of a Plant and the Soil It Grows In transparency
Copies of Parts of a Plant and the Soil It Grows In worksheet
Laser disk player
Cornet Laser series
Sequence of a Life Cycle worksheet

Procedure:
1. Read the book Bean and Plant to the class.
2. Pay special attention to the illustrations on the pages explaining the parts of a plant.
3. After completing the book introduce new vocabulary. Put the Parts of a Plant and the Soil It Grows In transparency on the overhead.
4. Label the parts of a plant as a whole group.
5. Introduce the laser disk player to the students. Show them how to scan the bar codes in the book Bean and Plant.
6. Allow class time for students to work individually in the learning center to complete the Life Cycle Sequencing Activity worksheet.

Analysis/Conclusion:
Students will complete Parts of a Plant and the Soil It Grows In worksheet as an independent activity.

Teacher Notes:
Copy a class set of the worksheet Sequence of a Life Cycle.
Prepare written and pictorial directions on how to use the laser disk player.
Set up a learning center with the laser disk player, disk, book and worksheet.
Prepare the overhead transparency Parts of a Plant and the Soil It Grows In.
Parts of a Plant and the Soil It Grows In
Parts of a Plant and the Soil It Grows In Activity

Directions: Color the plant. Cut out the words and glue each on the line next to the part of the plant that it represents.

flower  soil  leaves  seed  stem  roots

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Life Cycle Sequence Activity

**Directions:** Color each picture and cut them out. Paste the pictures in the order that shows how a plant would grow.
Lesson 6: How Plants Get Food
Authors: Kim Van Hook & Lynda Norton

Introduction:
Plants make their own food by converting water and carbon dioxide into sugar called glucose through a process called photosynthesis. Through tiny holes, the leaves of the plant take in carbon dioxide from the air. The roots absorb water and transport it up to the leaves through the stems. A substance on the leaf called chlorophyll traps energy from the sun and acts as a catalyst to start the chemical activity that produces glucose and releases oxygen as a byproduct. The leaves can make other nutrients such as proteins, oils, fats, and vitamins. When too much glucose is produced, the leaves will convert the glucose to starch and store it in the roots.

Observe a plant’s root and stem system carrying nutrients to other parts of the plant that will be used for growth and reproduction.

Activity:
Teacher demonstration of placing carnations into a vase of colored water for students to observe absorption (Note: This experiment should be done in the morning so that absorption has time to occur)

Estimated Time:
30 minutes

Grade Level:
K-1

Standards:
LA.K.1.2.3  LA.K.2.1.3  LA.K.5.2.2  SC.K.N.1.5
LA.1.2.1.4  SC.1.L.14.1  SC.1.L.17.1

Objectives:
The student will…
1. Understand that roots and stems carry nutrients to the leaves.
2. Observe the absorption of dye, representing nutrients, through the stem into a plant.

Vocabulary:
absorption
carnation

Materials:
Four white carnations
Food coloring (assorted colors)
Four clear vases or tall glasses for carnation
What Your Kindergartner Needs To Know by E.D. Hirsch, Jr.
Chart paper with the following poems:
Rain, Rain Go Away; April Rain Song;
It's Raining, It's Pouring

Procedure:
1. Review the previous vocabulary using the Parts of a Plant and the Soil It Grows In transparency. Focus on the roots, stem, leaves, and flowers.
2. Explain that nutrients are food for the plant found in soil and water. Ask students how the nutrients will enter the plant and feed it.
3. Encourage student discussion about the absorption of the nutrients into the different parts of the carnation.
4. Place a carnation into each vase of colored water and allow them to sit. Throughout the day, the parts of the carnation will change to the color of the water.
5. Read and recite the poems while waiting for the flowers to change colors.

Analysis/Conclusion:
1. Have students draw a picture of what they see.
2. Have students explain to you what just happened.

Extension:
Have students create their own poetry

Teacher Notes:
Prepare a piece of chart paper by writing the words to the poems on it.
Fill vases with water and add a different color of food coloring to each vase
Read What Your Kindergartner Needs To Know by Ed Hirsch, Jr.
Poetry Page

It’s Raining, It’s Pouring

It’s raining, it’s pouring.
The old man is snoring.
He went to bed, ‘cause he bumped his head
And he didn’t get up until the morning.

Rain, Rain, Go Away

Rain, rain, go away.
Come again another day.
So Johnny can go outside and play.

April Rain Song

Let the rain kiss you
Let the rain beat upon your head with silver liquid drops
Let the rain sing you a lullaby
The rain makes still pools on the sidewalk
The rain makes running pools in the gutter
The rain plays a little sleep song on our roof at night
And I love the rain.
Lesson 7: Fertilizer Affects Plant Growth  
Authors: Kim Van Hook & Lynda Norton

Introduction:
Farmers use fertilizer to help grow the plentiful and healthy plants that humans and other animals need to eat. Fertilizer has phosphate in it. The phosphate allows farmers to grow a greater number of healthy plants on fewer acres of land. Phosphate, however, is not easy to get. It cannot be produced in a laboratory. It must be mined from the ground. Before phosphate can be used in fertilizer, it must go through chemical processing to create a soluble substance that plants can take up through their roots. The chemical processing of phosphate rock produces phosphoric acid that is used to make fertilizers that are water-soluble.

Farmers have learned to control the growth of certain plants that we use for foods by adding to the soil a fertilizer that contains nutrients such as phosphate.

Activity:
After teacher-directed instruction about fertilizer, students create a collage that shows plants grown with fertilizer and plants grown without fertilizer.

Estimated Time:
90 minutes

Grade Level:
K-1

Standards:
LA.K.1.1.1  LA.K.1.1.2  LA.K.1.1.3  LA.K.1.1.4  LA.K.1.1.5  LA.K.1.1.6  LA.K.5.2.2  SC.K.N.1.5  LA.1.1.1.1  LA.1.1.1.2  SC.1.L.17.1

Objectives:
The student will…
1. Understand that the use of fertilizer can alter food production and plant growth.
2. Make a comparison collage of plants grown with and without fertilizer.

Vocabulary:
fertilizer
nutrients
phosphate

Materials:
Big book (teacher made) How Fertilizer Helps Plants Grow
Chart paper
Markers
Bag of fertilizer
Gardening magazines
Glue sticks
Scissors
Paper

*Comparison Chart: Fertilizer or No Fertilizer?*

**Procedure:**
1. Refer to student-grown bean plants in bags. Ask students how many beans they would need to have a satisfying meal. Would the one or two beans growing on their plants fill them? Record answers on chart paper.
2. Write down students’ answers to the question “What are ways that we could enhance the growth of the beans if we planted a garden on the school grounds?”
3. After discussion, if fertilizer has not been mentioned, tell students what it is used for as you display a bag of fertilizer to be used in the garden.
4. Read the teacher-made big book. After reading, point out how fertilizer improves plant growth.
5. Distribute gardening magazines and comparison chart.
6. Students will select pictures from magazines and place them under the appropriate heading.

**Analysis/Conclusion:**
Teacher observation of student-made collages.

**Extension:**
Make big books and place them at a center with crayons. Students can make their own fertilizer book and draw pictures to illustrate the words on each page.

**Teacher Notes:**
Make copies of *Comparison Chart: Fertilizer or No Fertilizer?*
Make a fertilizer book using 11 x 17 paper. Make sure to leave enough room above each sentence (there will be two on each page) for students to illustrate.

- Page 1 – Title
  How Fertilizer Helps Plants Grow
- Page 2 –
  All plants need nutrients to help them grow.
  Plants get nutrients from the soil you know.
- Page 3 –
  Plants remove so many nutrients from the land that they must depend on farmers to give them a hand.
  Farmers give plants extra food all year long.
- Page 4 –
  This fertilizer helps the plants grow big and strong.
  With fertilizer, plants produce larger crops.
Comparison Chart: Fertilizer or No Fertilizer?

<table>
<thead>
<tr>
<th>Fertilizer</th>
<th>No Fertilizer</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Happy Face" /></td>
<td><img src="image2.png" alt="Sad Face" /></td>
</tr>
</tbody>
</table>

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Lesson 8: Where Does Fertilizer Come From?
Authors: Kim Van Hook & Lynda Norton

Introduction:
The mineral phosphate was formed during the Miocene Epoch, beginning when Florida was still covered by water. Two processes of precipitation and chemical reactions formed the phosphate that we currently mine today. Millions of years ago, the ocean was rich with nutrients, especially phosphate. First, conditions in the seawater caused dissolved phosphate to solidify and settle in a sedimentary layer on the ocean floor. Later, the water receded and birds and other animals were able to live and die on the sedimentary layer of phosphate. Molecules of excrement, bones and teeth reacted with the phosphate and created an even richer phosphate deposit. Today, phosphate and the sand and clay found with it are dug out of the ground.

To make fertilizer, miners dig phosphate out of the ground and separate the phosphate from the sand and clay by washing, screening and flotation. The phosphate is then reacted with sulfuric acid to make phosphoric acid. Phosphoric acid is water-soluble and plants can easily take it up by their roots. Phosphoric acid is the main ingredient that is mixed with nitrogen and potassium to make fertilizer.

Phosphate is a mineral that formed millions of years ago. It is mined and processed into fertilizer products in Central Florida. Students will be introduced to a sequence of events in a story as they learn about this local resource.

Activity:
Students illustrate the beginning, middle and end of a teacher-made big book.

Estimated Time:
30 minutes

Grade Level:
K-1

Standards:

Objectives:
The student will…
1. Know that some fertilizers are made from phosphate.
2. Identify phosphate as a resource mined in Florida.
3. Create drawings of The Phosphate Story, with a beginning, middle and end.
**Vocabulary:**
ocean
mine
phosphate
resource

**Materials:**
Teacher-made big book *The Phosphate Story*
Paper
Crayons

**Procedure:**
1. Display fertilizer in a clear plastic bag.
2. Ask what students think fertilizer is made of and where it comes from, and record responses.
   a. Recall events in the story.
   b. Have students create drawings of the beginning, middle and end of *The Phosphate Story*.

**Analysis/Conclusion:**
Teacher observations of students’ illustrations.

**Teacher Notes:**
Create a big book on 11 x 17 paper. Make sure to leave enough room above each sentence for student’s illustrations.

Page 1 – Title
The Phosphate Story

Page 2 –
Phosphate gives energy to all living things so they can survive and grow.
Long ago Florida lay deep beneath the sea. The sea was full of fish.

Page 3 –
When the water drew back it revealed our land.
Today, beneath this land we find a mineral called phosphate.

Page 4 –
We must dig into the ground to get the rocks that contain the phosphate. This is called mining.
The phosphate helps animals, plants, and people grow.
Lesson 9: Where Seeds Come From
Authors: Kim Van Hook and Lynda Norton

Introduction:
Seeds are formed when special parts in the flower are pollinated and fertilized. An egg from an ovary found in the pistil is fertilized by a pollen grain located in the anther of the stamen. Insects, wind, water, and birds all help to pollinate plants. As the fertilized egg or ovule begins to grow, the outer covering starts to become hard. This protective covering is called the seed coat. When an ovule is ripe, it is called a seed. The seed contains the plant embryo, food tissue and the hard outer wall. Seeds are important in plant reproduction. They are a food source for animals, including people who eat the seeds and plants grown from the seeds. Seeds are also used for other things such as flavoring, medicines and raw materials in industry. All the other parts of a plant develop from the seed when it sprouts. Seeds come in a variety of sizes, shapes, textures and colors.

Seeds allow a plant to reproduce and are also a source of food for birds and mammals, including people. Students use science process skills to understand the parts of a seed.

Activity:
Teacher reads the books *The Tiny Seed* by Eric Carle and *Carrot Seed* by Ruth Krauss. Using what they have already learned, students create an original big book featuring a main character who is encouraged to learn that his seed will grow into a plant.

Estimated Time:
45 minutes

Grade Level:
K-1

Standards:
LA.K.3.1.1 LA.K.3.1.2 LA.K.3.2.2 LA.K.3.3.1 LA.K.3.4.1
LA.K.3.4.2 LA.K.3.4.3 LA.K.3.5.1 LA.K.5.1.1 LA.K.5.1.2
LA.K.5.1.3 LA.K.5.1.4 LA.K.5.1.5 LA.K.6.4.1 SC.K.L.14.1
LA.1.3.2.1 LA.1.3.2.2 LA.1.3.3.1 LA.1.3.3.2 LA.1.3.4.1
LA.1.3.4.2 LA.1.3.4.3 LA.1.3.4.4 LA.1.3.4.5 LA.1.3.4.6
LA.1.3.5.1 LA.1.4.1.2 LA.1.5.1.1 LA.1.5.1.2 LA.1.6.4.1
SC.1.L.14.2 SC.1.L.17.1

Objectives:
The student will…
1. Know that seeds come from flowering plants.
2. Understand that seeds are transported in a variety of ways.
4. Create an illustration of the seed cycle.
5. Dissect a flower to observe the seeds.
Vocabulary:
seedpod

Materials:
The Tiny Seed by Eric Carle
Carrot Seed by Ruth Krauss
Sunflowers or another similar flower with well-defined centers or seed pods (lilies, roses, irises)
Sentence strip containing the saying:
“April showers bring May flowers”
Pictures of: people planting seeds, birds eating seeds, squirrels hiding nuts

Procedure:
1. Introduce new vocabulary and review the Parts of the Plant and the Soil It Grows In transparency. Emphasize that the job of the flower is to make seeds.
2. Share with the class the story The Tiny Seed by Eric Carle and emphasize the seed coming out of the flower, and growing into a plant of the same variety.
3. In a whole group setting the teacher will dissect a large flower and ask students to point out the seed.
4. Place children in small groups, giving each group a flower. Have groups dissect their flowers to observe the seeds and review The Tiny Seed by Eric Carle.
5. Display and discuss pictures of ways seeds can be planted. Refer to The Tiny Seed as needed.
6. Finally, introduce the saying “April showers bring May flowers,” and discuss its meaning.
7. Create a class big book entitled Watermelon Seed. Make this a book in which the character is encouraged that his seed will grow.

Analysis/Conclusion:
Students will make a beginning, middle, and end illustration of Watermelon Seed.

Extension:
1. As a culminating activity to the seed lesson, read the book Carrot Seed by Ruth Krauss.
2. Students draw their own picture of a seed growing into a plant and write about it.

Teacher Notes:
Prepare sentence strips
Lesson 10: From Acorns to Mighty Oaks
Authors: Kim Van Hook & Lynda Norton

Introduction:
Living things that have survived in an environment have certain traits that are suitable to that environment. When living things reproduce, these traits are passed on to their offspring. Seeds carry information about these traits inside their shells. When each seed grows into a plant, the plant will have the same traits as its parent plant (the source of that seed). Therefore, the offspring of living things are similar to the parents in looks and behavior and will be able to live in the same environment as their parents.

Observing different types of seeds, creating a graph of different characteristics of seeds and designing a garden plot to provide practice for students in interpreting math.

Activity:
Students will sort and classify seeds according to texture, color and size and will create graphs.

Estimated Time:
60 minutes

Grade Level:
K-1

Standards:
LA.K.3.1.1  LA.K.3.1.2  LA.K.3.2.2  LA.K.3.3.1  LA.K.3.4.1  LA.K.3.4.2
LA.K.3.4.3  LA.K.3.5.1  LA.K.4.2.2  LA.K.5.1.1  LA.K.5.1.2  LA.K.5.1.3
LA.K.5.1.4  LA.K.5.1.5  LA.K.6.4.1  MA.K.G.2.1  MA.K.G.3.1  SC.K.N.1.3
SC.K.N.1.5  SS.K.E.1.1

LA.1.3.1.1  LA.1.3.1.2  LA.1.3.1.3  LA.1.3.2.1  LA.1.3.2.2  LA.1.3.4.1
LA.1.3.4.2  LA.1.3.4.3  LA.1.3.4.4  LA.1.3.4.5  LA.1.3.4.6  LA.1.3.5.1
LA.1.4.2.1  LA.1.5.1.1  LA.1.5.1.2  LA.1.6.4.1  MA.1.G.5.2  SC.1.N.1.2
SC.1.N.1.3  SC.1.P.8.1

Objectives:
The student will…
1. Understand seeds of plants reproduce plants of the same kind.
2. Plant a garden and observe the growth of bean seeds.
3. Write about planting the garden and illustrate it in a journal.
4. Sort seeds according to different attributes and create a graph.
5. Construct a mobile of the life cycle of an oak tree.

Vocabulary:
Review of past concept-related vocabulary
How Does Your Garden Grow?

Materials:
I’m A Seed by Jean Marzollo
Garden tools
Variety of seed packets
Chart paper
Garden journals
Seed graph
Oak leaf pattern
Acorn pattern
Scissors
Tag board
Yarn
Pencil
Glue
Ruler
Hole punch
Orange construction paper
Sentence Strip containing the saying “Great oaks from little acorns grow.”

Procedure:
1. Display a variety of seeds. Discuss differences in color, texture, and size. Give each student an assortment of seeds (approx. 25).
2. Have students, at their desks, sort their seeds by various attributes such as size and color.
3. Next, have students make predictions about what plants will grow from these seeds.
4. Write students’ responses on chart paper.
5. Read the book I’m a Seed by Jean Marzollo.
6. Develop a diagram for the garden layout on chart paper. Decide where to plant each seed type.
7. Reinforcing the concept that the seeds of plants reproduce the same plants. Create an oak tree life cycle mobile and introduce the saying “Great oaks from little acorns grow” to the class.

Analysis/Conclusion:
Students will illustrate the planting of the garden for the first entry in their individual garden journal.

Extension:
Have the students plant the seeds in a designated spot on the school campus. Have the ground already plowed. Have parents there to help supervise activities.

Teacher Notes:
Cut enough leaf and acorn patterns for students to share.
Write the words “Great oaks from little acorns grow” on a sentence strip.
Copy 12 journal pages per student.
Garden Planting Day

The day spent working in the garden is a busy, fun and rewarding day. It will require some equipment, pre-planning and preparation. This activity requires assistance from parents and other school staff. Many of the items needed will be requested in a letter home to parents about planting day about one week before the event. With a little organization and forethought it will be a great day for all participants, worth of all the work.

To begin this project you need to consider a good space for the garden. Things to consider when choosing a location for the garden are:

1. Amount of sunshine and water
2. Traffic through the area
3. Proximity to the classroom
4. Proximity to the school playground
5. Size of the garden being planted

After selecting the area we had a parent come to the school about a week before planting day to prepare the ground with a roto-tiller. The parent only tilled the area; later, the students removed the clumps of weeds, etc.

For the planting day, we decided to divide the classes into small groups. We would facilitate the day somewhat like centers. Each small group would move from one area to another on a 20-minute rotation time. The areas or stations the groups would rotate through would include:

1. Garden Area – working and planting with teachers
2. Playground – free play
3. Worm Table – large table with about 5 boxes of bait worms dumped on it!
4. Books on Blankets – shaded area to sit and look at garden books
5. Dirt Dessert Recipe (Snack) – An easy option to use is chocolate pudding snack packs. (see page 57)

It is important to make sure every student has a tool to work with in the garden. Have rakes, hoes, shovels and trowels available and let students trade when they are done with a tool.

Since we are combining two classes for this project we have approximately 50 students. With five areas for them to travel to, we will have five groups of about 10 children, which is a much more manageable size group to work with. Get creative and name each group after a vegetable. Make name tags for the groups to wear to help the volunteers identify the children.

Approximately one week before planting day, send a letter home to parents asking for their help. Things to include in the letter are:

1. Request parent volunteers to help supervise a station
2. Request to borrow gardening tools
3. Directions on how tools should be labeled and delivered to school
4. Recommendations on how students should dress for planting day

With five groups rotating through five stations every 20 minutes, including some time to move from one area to another, the entire time planting will be about two hours. We like to assign two people to each station. Teachers staff the garden so you need about nine volunteers. One volunteer is what we call the bell ringer. It is the bell ringer’s job to watch the clock and ring the bell every twenty minutes, and call out “change time”! The remaining eight volunteers are assigned to the other areas or stations and help the students rotate from one area to another when the bell rings. You have to know your parents a little as it takes someone special to man the worm table. Not only is it a little dirty, but it is also the most exciting for the kids!

The garden area is the teaching station on planting day. Approved parent volunteers easily handle the other stations. We divide the garden into five areas so that the last group has as much to do as the first. It is a hot, fun, dirty, time! Wear your old clothes and shoes and be prepared for exhaustion! It is in the garden that we teach each group how to handle tools safely. We explain that they must never leave the hoe or rake with the tines sticking up. We explain how the worms are important to the garden and what their job is in cultivation. The students get to remove clumps of weeds and plant seeds and small seedling plants. They water what they have planted and learn that too much water is bad for the plants. Remember that they are learning hands-on today and it is exciting! They are only there for 20 minutes so let them explore a little as well as listen a little and work a little. Be prepared for some plants to get stepped on and broken. It is OK! When the students have gone home, you can repair the garden if you need to. Really, the best lesson for them is to see that the broken plants do not grow!

MAKE LEARNING FUN!

After all groups have gone through all stations it will be the end of the day—if you are smart—and students will be going home. You will be exhausted but renewed after two hours of seeing children learn, as they learn best through hands-on experiences.

Our final process comes a few days after planting when we add the fertilizer to one side of the garden. We take the whole group out to the garden and add the fertilizer with the children watching. This only takes a few minutes and we decided it is best for us to handle the fertilizer. After adding fertilizer to half of the garden we put stakes in each side labeled “fertilizer” or “no fertilizer”.

Now it is time to watch the garden grow. Both classes tend the garden as it grows. Pulling weeds is a great release for kids who need to get out and stretch a little. Watering needs to occur as necessary. The pride the students will show in the garden is very rewarding. We have enjoyed our garden each year. We have done it in the spring and in the fall. We can’t say we like one better than the other! Make sure you plant the garden early enough to harvest before the end of the year! Believe it or not one of our first gardens was not ready to pick until after school was out. Oh well … that is when we learned that planning is important!
**Dirt Dessert Recipe**

1 8½ inch plastic flower pot  
Plastic flowers  
1 garden trowel  
Lots of gummy worms  
1 package Oreo cookies, crushed  
1 8 oz. package cream cheese  
1 c. powdered sugar  
8 oz. Cool Whip  
1 large box of chocolate pudding  
1 chocolate cake (baked, cooled, and crumbled up)

Layer 1: (soil layer) Spread crushed Oreo cookies into the bottom of plastic flower pot, reserving 1 cup for Layer 5.

Layer 2: Combine cream cheese, sugar, and Cool Whip. Mix and spread over Layer 1. "Plant" flowers as you add layers.

Layer 3: Mix pudding with a little less milk than the directions require so the pudding is thicker. Spread over Layer 2.

Layer 4: Bake cake mix and allow to cool. Once cooled, crumble over Layer 3. Add gummy worms here.

Layer 5: (soil layer again) Spread reserve cup of crushed Oreo cookies over Layer 4, then top with more gummy worms and remaining flowers.

Serve this yummy "SOIL" with a garden trowel and enjoy!!!!!

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Concept Journal Entries

Directions: Introduce these statements to students for journal writing after each activity they pertain to. Have students respond to the statements in their own words or drawings.

Plants are living things that grow towards sunlight.

Plants need water, light, air, nutrients and soil to grow.

Plants have many parts such as roots, stems, leaves, flowers and seeds.

Roots anchor the plant in the soil. They carry water and nutrients to the stem.

Stems grow above the ground and carry water to the plant.

Leaves grow on the stem and make food for the rest of the plant.

Insects help make new plants by moving the pollen from plant to plant.

Seeds produce plants of all kinds.

Phosphate comes from deep in the ground.

Phosphate is made into fertilizer. Fertilizer helps plants grow healthy and strong.

All living things need phosphate.

Some parts of plants are edible.

The part of the plant that contains the seed is called the fruit.
Oak Leaf and Acorn Template
Lesson 11: Seeds as Food
Authors: Kim Van Hook and Lynda Norton

Introduction:
Seeds store nutrients inside that other living things can eat to get energy. This energy is used to carry out all the life activities of the living thing, such as growing.

Seeds are a source of food that humans and some animals depend on every day for survival and growth. By processing seeds we create new edible products.

Activity:
Students observe the parts of a seed by examining peanuts then make peanut butter following a recipe.

Estimated Time:
2 hours

Grade Level:
K-1

Standards:
LA.K.3.1.2  LA.K.3.1.1  LA.K.3.5.1  LA.K.5.1.1  LA.K.5.1.2  LA.K.5.1.3  LA.K.5.1.4  LA.K.5.1.5  LA.K.6.4.1  SC.K.N.1.4  LA.1.3.5.1  LA.1.4.1.1  LA.1.4.2.1  LA.1.5.1.1  LA.1.5.1.2  LA.1.5.2.1

Objectives:
The student will…
1. Understand that we get food from seeds.
2. Discover that many seeds are food.
3. Make peanut butter following a recipe.

Vocabulary:
sheath

Materials:
A Weed is a Flower by Aliki
Egg carton for each student
Variety of edible seeds (corn, beans, peas, green beans, peanuts)
Sheath of wheat and wheat flour
Blender
Raw peanuts
Vegetable oil
Salt
Magnifying glass for each student  
Recipe for peanut butter on chart paper  
Wheat crackers  
Paper cups  
*The Little Red Hen* by Joseph Jacobs

**Procedure:**  
1. Discuss with the students the various seeds that humans use as a food source.  
2. Show them a display of edible seeds (corn, peas, green beans, and peanut).  
3. Read the story *A Weed Is a Flower* by Aliki.  
4. Give each child ten raw peanuts to shell.  
5. Have each student break open several peanuts and look at the sprout inside, using a magnifying glass.  
6. After examination time, place all peanuts into the blender and add remaining ingredients and follow charted recipe to make homemade peanut butter.  
7. Serve each child some peanut butter on a wheat cracker.  
8. Show the students the wheat sheath. Tell the students that the cracker was made from wheat seeds. Wheat seeds are so hard that we would crack our teeth if we tried to chew them. They must be ground into flour to be used as an ingredient to make food.

**Analysis/Conclusion:**  
Each student will bring in edible seeds from home and make their own seed display in an egg carton.

**Extension:**  
2. Have students draw pictures and write short sentences that explains the process of making wheat into flour.

**Teacher Notes:**  
Check student records for peanut allergies and send a note home to all parents telling them about the activity involving peanuts.  
Place ten peanuts in a small paper cup for each student.  
Write recipe on flip-chart paper.  
Collect a variety of edible seeds
Peanut Butter Recipe

2 C Peanuts
4 Tbsp Vegetable Oil
1 Tsp. Salt

Place all ingredients in a food processor and blend to a creamy consistency. Serve with apples and crackers.
Lesson 12: Fruits and Vegetables
Authors: Kim Van Hook and Lynda Norton

Introduction:
A fruit is the edible fleshy part of the plant that surrounds the seeds. Apples and watermelons are excellent examples of seed packages. Many foods we call vegetables are actually fruits, such as peppers, cucumbers, squash and tomatoes.

Even corn, green beans, and peapods are fruits, not vegetables. Other fruits include figs, pineapples, strawberries and nuts. We can identify vegetables because they are usually parts of the plant that we eat. For example, lettuce is the leaves, carrots and beets are roots and cauliflower and broccoli are immature flowers. Other vegetables are harder to identify as parts of the plant because they have been modified or changed. For example, potatoes are not roots as you would expect but are instead swollen stems that grow underground. Onions are leaves and stems that have grown in a different pattern.

Fruits and vegetables are important food sources. This lesson will provide an opportunity for students to formulate an opinion about fruits by using facts and making observations.

Activity:
Class field trip to a produce section at a grocery store.

Estimated Time:
30 minute pre-field trip
1½ hours post-field trip

Grade Level:
K-1

Standards:
LA.K.3.5.1  LA.K.4.3.1  LA.K.5.1.1  LA.K.5.1.2  LA.K.5.1.3  LA.K.5.1.4
LA.K.5.1.5  SC.K.N.1.2  SC.K.N.1.3  SC.K.N.1.4  LA.1.3.4.6  SS.K.E.1.2
LA.1.3.5.1

LA.1.3.2.1  LA.1.3.2.2  LA.1.3.3.1  LA.1.3.3.2  LA.1.3.4.1  LA.1.3.4.2
LA.1.3.4.3  LA.1.3.4.4  LA.1.3.4.5  LA.1.5.1.1  LA.1.5.1.2  SS.1.E.1.1
SS.1.E.1.4

Objectives:
The student will…
1. Recognize that, in addition to the seed, many other parts of the plant are edible.
2. Identify what part of the plant is vegetable or fruit.
3. Develop an awareness of which foods are fruits and vegetables.
4. Create a list of fruits and vegetables.
5. Select a fruit or vegetable at the produce department.
6. Formulate an opinion of their favorite fruit or vegetable.
Vocabulary:
fruit
vegetable
opinion
fact

Materials:
Required forms and materials for field trip
Students need enough money to purchase a fruit or vegetable.
Chart paper
Markers
Pictures of fruits and vegetables
Fruit and vegetable dips
Notebook paper

Procedure:
1. Introduce vocabulary words by creating a list of fruits and vegetables on chart paper.
2. Review children’s responses and list them under the correct categories on the plant part chart.
3. At this point you will take your class on an enriching learning experience to the produce department at a local grocery store.
4. Students will have the chance to purchase a fruit or vegetable that they want to taste.
5. When you return, have a taste test of vegetables and fruits so that all students can formulate an opinion of their favorite fruit or vegetable and illustrate it.
6. Each child will log his/her like or dislike of a fruit or vegetable by charting it on notebook paper under a happy face or sad face.
7. Allow time for students to share the reasons they liked or disliked a fruit or vegetable. Write down their responses on chart paper.

Analysis/Conclusion:
1. From tasting and observations, students will formulate opinions about what fruit or vegetable is their favorite and then create an illustration of it.
2. Have students complete a cloze sentence that leads them to write what their favorite fruit is and why they liked it.

Teacher Notes:
Field trip forms in at least a month early
Letter home to parents a week before trip
Cloze Sentence 1

My favorite fruit or vegetable is

______________________________

because ____________________________

______________________________

______________________________

______________________________.
Cloze Sentence 2

I like

It is a

I like it because

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Lesson 13: We Need Plants
Authors: Kim Van Hook and Lynda Norton

Introduction:
Natural resources are the materials provided by nature that can be made into products we use. The largest grown non-food crop grown most is cotton because it provides fiber that we use to make many things. Fiber is a natural resource that can be spun into yarns and then woven into fabric. We use fabric to make items we use everyday such as clothing, blankets, curtains, carpeting and other coverings. Seeds and roots are used to create dyes that add color to fabric.

Plants are valuable resources that people depend on. This activity provides students practice in organizing what they have learned about plants by using a graphic organizer.

Activity:
After reading The Giving Tree by Shel Silverstein, students will create a mural of things we make from plants.

Estimated Time:
60 minutes

Grade Level:
K-1

Standards:
LA.K.1.7.2  LA.K.1.7.3  LA.K.1.7.4  LA.K.2.2.2  LA.K.5.2.2
SC.K.L.14.2  SC.K.L.14.3
LA.1.4.2.2  LA.1.5.2.2  LA.1.5.2.3  LA.1.5.2.4  LA.1.5.2.5  LA.1.5.2.6

Objectives:
The student will…
1. Recognize that plants are valuable resources.
2. Create a graphic organizer of plant resources.

Vocabulary:
valuable resources

Materials:
The Giving Tree by Shel Silverstein
Chart paper
Markers
Procedure:
1. Introduce the new words.
2. Read the book *The Giving Tree* by Shel Silverstein. Discuss how the tree was a valuable resource to the boy throughout his life. Ask leading questions such as:
   a. “What kinds of things did the boy ask the tree for?”
   b. “Did the tree give the boy what he asked for?”
   c. “What things did the tree give to the boy?”
   d. “What resources did the tree have to offer?”
   e. “What resources did the boy think were valuable?”
   f. “What did the boy give to the tree?”
3. Display a collection of plant resources like fruits, wood, paper, dye for clothing, vegetables, furniture, cotton clothing, and medicine. Use these items to broaden children's understanding of ways in which plants help people and animals.
4. List these plant resources on the chart paper in categories to create a web.

Analysis/Conclusion:
Create a class web of resources provided by plants.

Preparation:
On chart paper, draw the frame for a concept web. Write the statement “How Plants Help Us” in the center of a large piece of chart paper and draw a circle around it with lines extending outward from the circle.
List of Materials

Plant
Chart paper
Markers
K-W-L Chart
Large bag to hold the items listed above
Pictures of living and non-living objects
Plant
Doll
Tongue depressors
Green, brown and orange construction paper
Leaf pattern
Living/Non-living worksheet
Large and small Ziploc bags
Paper towels
Lima bean seeds
Mist spray bottle
Stapler
Laser disc player
Paper cups
Pictures of: fruits and vegetables
Fruit and vegetable dips
Wheat crackers
Raw peanuts
Vegetable oil
Salt
Blender
Wheat flour
Sheath of wheat
Collection of plant-related objects (tools, seeds, gloves, soil, flowers, etc.)
Magnifying glass
Egg cartons for each student
Variety of edible seeds
4 white carnations
Assorted food coloring
4 clear vases or tall glasses
Bag of fertilizer
Gardening magazines
Glue sticks
Scissors
Crayons
Sunflowers, lilies, roses or irises
Garden tools
Seed packets
Tag board
Yarn
Ruler
Hole punch
Resources


Books
*The Tiny Seed* by Eric Carle
*Carrot Seed* by Ruth Krauss
*The Giving Tree* by Shel Silverstein
*A Weed Is A Flower* by Aliki
*I'm A Seed* by Jean Marzollo
*Bean and Plant* by Christine Back
*Growing Vegetable Soup* by Lois Ehlert
*Now I Know All About Seeds* by Susan Kuchalla
*The Little Red Hen* by Joseph Jacobs

Miscellaneous
Cornet Laser Series
Laser Disk Player