2nd Grade Garden Lessons
(From the Center for Ecoliteracy Curriculum Binder)

1. Inside a Seed (Primary Plants, c. 1990 AIMS

2. Seed Growth (color and cut), Seeds, Seeds, Seeds! & Seeds! (exploration pages) (c. Stacy Pavich, Garfield School, OUSD)

3. Vegetable Cousins Salad (by Marika Bergsund, c. Growing Great: Inspiring Healthy Eating)

4. Measuring the Garden/Garden Sketching Activities (c. San Francisco Botanical Society)

5. Exploring Compost Critters (by Amy Mack, c. The Lesson Pathway Project developed by Education Outside)

6. Life Cycle of Compost (by Maria Sayles, c. The Lesson Pathway Project developed by Education Outside)

7. Soil Composition & Discovery (by Edible Schoolyard, Larchmont Charter School, Los Angeles, c. The Lesson Pathway Project developed by Education Outside)

8. Worm Life Cycle (by Kelly Nichols, c. The Lesson Pathway Project developed by Education Outside)

9. Stem, Root, Leaf, or Fruit? (c. Roberta Jaffe, Gary Appel, *The Growing Classroom*)

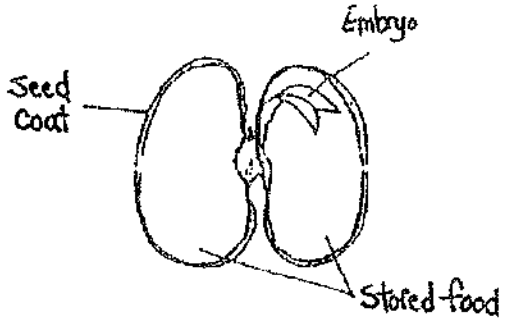
10. Pollinator Flower Garden (c. Growing Great: Inspiring Healthy Eating)

11. 2nd Grade Learning Garden Lessons (c. Captain Planet's Learning Gardens)

Inside a Seed

I. Topic Area
Biological Science: Plants—Seeds

II. Introductory Statement
Students will observe lima beans that have been soaked in water overnight and identify the major parts of the seed.



III. Math Skills
a. Measurement

Science Processes
a. Observing
b. Comparing
c. Recording Data

IV. Materials
Large lima beans or other broad beans

V. Key Question
How can we look inside a seed to see how a plant begins?

VI. Background Information
All seeds consist of two parts, the little plant or embryo and the seed coat. The seed coat protects the developing plant; the embryo is inside the seed. Cotyledons store food. They are the leaves that are attached to the little plant or embryo. When the seed begins to grow, one part of the embryo becomes the root and the rest becomes the upper stem and leaves.

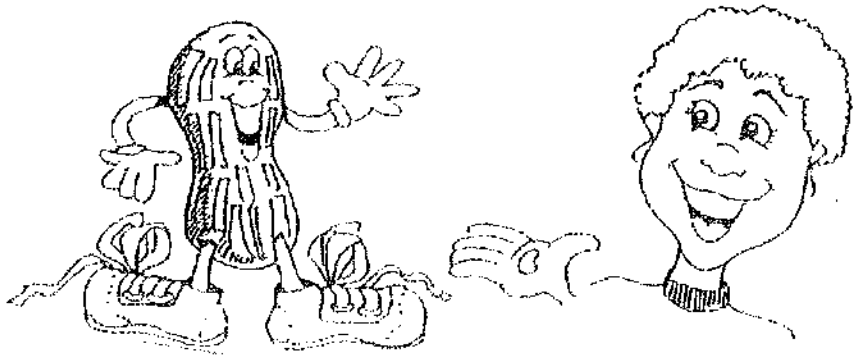
Show a real plant / diagram drawing

VII. Management Suggestions
Large lima bean seeds are easy to handle. Soak the beans overnight so the seed coats are loose and easy to handle.

VIII. Procedure
1. Distribute one water soaked seed and one dry lima bean seed to each student.
2. Observe and describe the dry seed. Describe it in terms of color, texture, firmness, etc. Trace the seed on the ruler and measure its length.
3. How is the wet seed different from the dry seed?
4. Look at the seed coat and find the spot where the seed was attached to the pod. This small hole in the seed coat lets water into the seed. Carefully remove the seed coat and place it to one side. Identify on the worksheet.
5. Carefully split the seed into two parts. Look at the two halves. Identify the embryo. Find the food storage area of the plant.

IX. Discussion
1. What did the dry seed look like? Was the skin wrinkled? Could you find the spot where the seed was attached to the pod? What did it look like?
2. After the seed was soaked, what happened to it? What did the skin you removed look like?
3. Describe the insides of a seed. Can you find the embryo? What does it look like? Can you see the shape of the future leaves?
4. Does the food storage area look the same in all seeds?
5. Do all seeds look alike when split open? Why or why not?

X. Extensions
1. Use red beans to compare with the lima beans.
2. Try other large dicot seeds to see how they compare with the lima bean seed.
3. Open peanuts (roasted or plain). Observe the embryo inside the bean, then eat the evidence.



Inside a Seed

Scientist _____

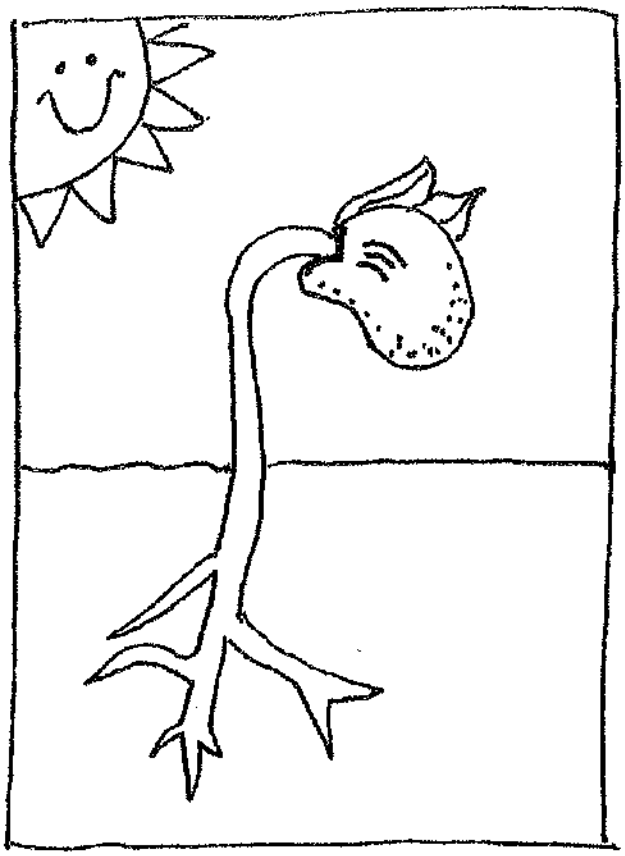
1. _____

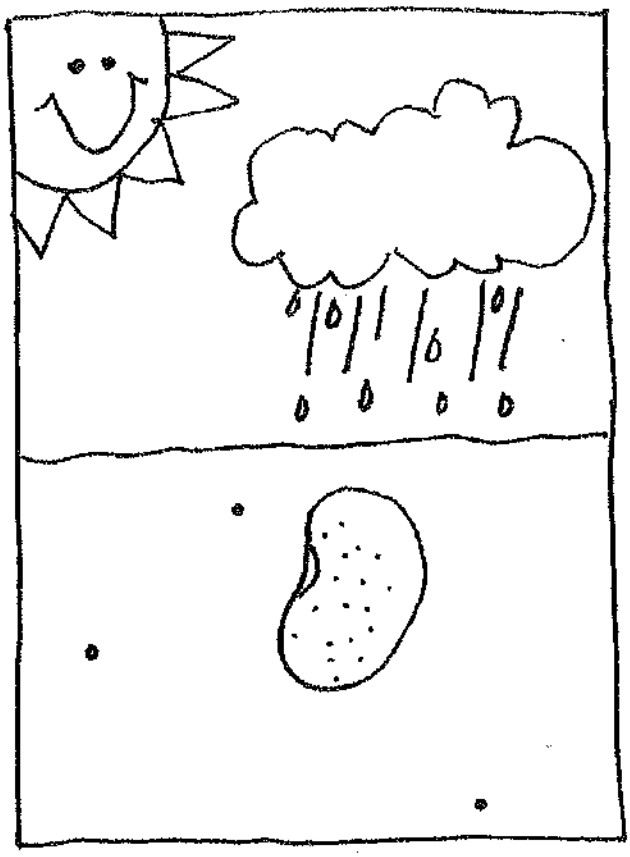
2. _____

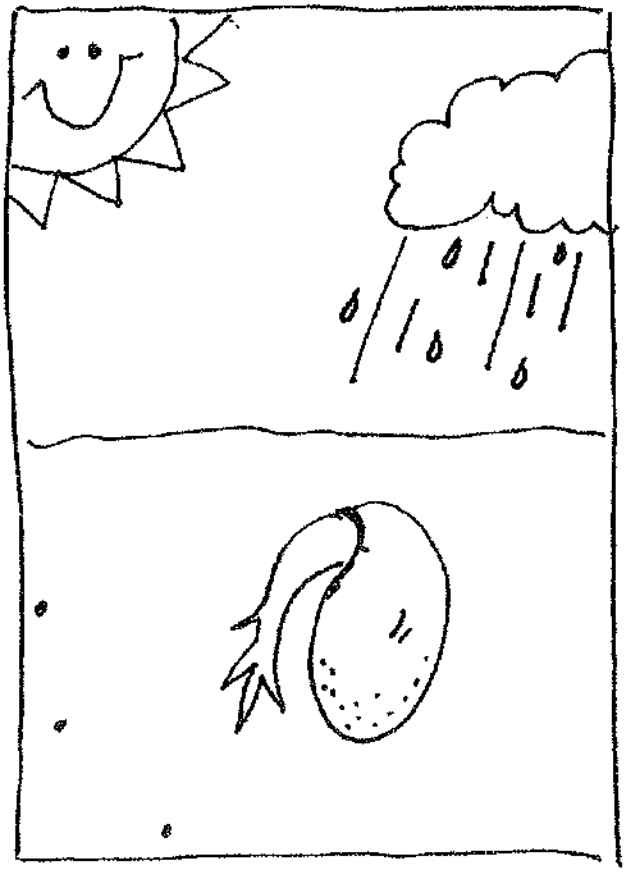
3. _____

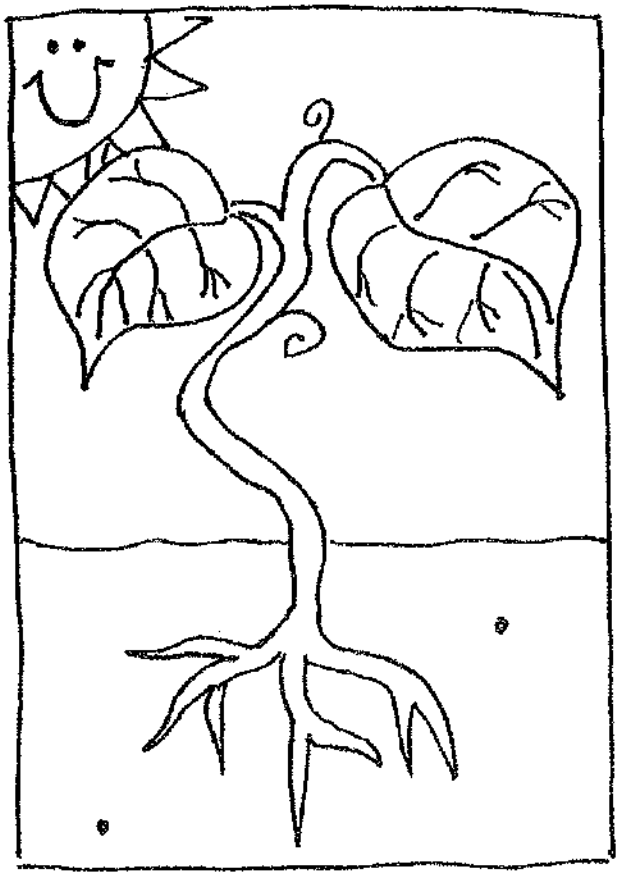
Label the parts: food storage, seed coat, little plant (embryo).

Color, cut out, glue down in order





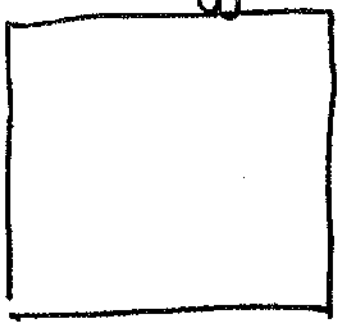




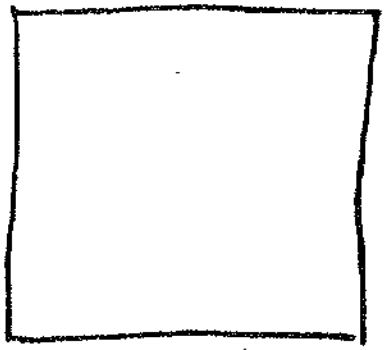
Seeds, Seeds, Seeds!

name _____

1. Draw the biggest seed.



2. Draw the smallest seed.



3. Can you name any of the seed types?

_____

4. Which seeds do you eat? _____

_____

5. How many seeds does it take to cover this line?

	I think:	I count:
Lima 	_____	_____
Garbanzo 	_____	_____
Corn 	_____	_____
Sunflower 	_____	_____
Barley 	_____	_____

6. How many seeds are there in your cup in all?

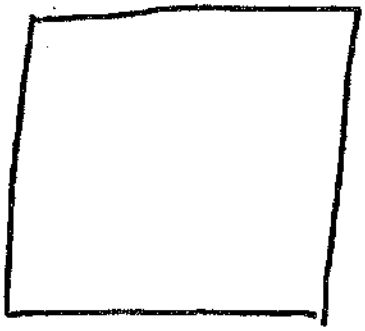
I think _____ I count _____

Seeds!

_____
name

1. Trace the biggest seed.

2. Trace the smallest seed.



3. Do you know the name of any of the seeds in your bag?
If so, write the names. _____

_____

4. What do seeds need to grow?
Circle the correct answers.

Water TV Sun French Fries

Snow Soil Blankets

Second Grade Fall Garden—Vegetable Cousins Salad

Objective:

Students learn that plants reproduce and understand the similarities and differences between two varieties of the same vegetable, as well as the differences between individual plants of the same variety.

California State Content Standards:

1) Science

2a: Understand organisms reproduce offspring of their own kind. The offspring resemble their parents and one another.

2d: Understand there is variation among individuals of one kind within a population.

2f: Understand flowers and fruits are associated with reproduction in plants.

If you do radish observation project:

4b: Measure length, weight, temperature, and liquid volume with appropriate tools and express those measurements in standard metric system units.

4c: Compare and sort common objects according to two or more physical attributes (e. g., color, shape, texture, size, weight).

4d: Write or draw descriptions of a sequence of steps, events, and observations.

4e: Construct bar graphs to record data, using appropriately labeled axes.

4F: Use magnifiers or microscopes to observe and draw descriptions of small objects or small features of objects.

4G: Follow oral instructions for a scientific investigation.

2) Social Science

2.4 Students understand basic economic concepts and their individual roles in the economy and demonstrate basic economic reasoning skills.

1. Describe food production and consumption long ago and today, including the roles of farmers, processors, distributors, weather, and land and water resources.
2. Understand the role and interdependence of buyers (consumers) and sellers (producers) of goods and services.
3. Understand how limits on resources affect production and consumption (what to produce and what to consume).

Lesson Outline:

A. Similarities and differences among people from different families.

B. Different types of specific fruits or vegetables are called "varieties."
C. Similarities and differences among vegetables and fruits of different varieties.
D. Similarities and differences among vegetables and fruits of the same variety.
E. Farmers choose which varieties to plant based on characteristics of different varieties and which characteristics consumers/customers will want to buy.
F. Garden Rules.
G. Planting plans.
H. Plant.

Materials:

Seeds:
Carrots—Thumbelina and Nante or Babette, or one of the new purple varieties of carrot if you can find the seeds!
Radishes—Easter Egg variety pack or Cherry Belle and French Breakfast
Lettuce—Two to four visibly different varieties (color and shape of leaves), i.e. Red Sails, Black Seeded Simpson, Lolla Rossa, Quatre Saisons, Oak Leaf
Broccoli--DiCiccio
Onion Bulbs—red and yellow or white
Peas—Sugar Snap (Cascadia) and Snow Pea (Oregon Sugar Pod I or II)

Transplants (optional):
Edible Flowers—Pansies or violas of different colors

Lesson:

Today we are planting a special salad garden that will teach us about the many different types of salad vegetables that you can try. Everyone will get to plant one type of seed or plant today. Then, you will get to watch your garden grow for the next few months. In January or February after the Winter Holiday break, you will have a special party where you get to harvest all the vegetables from the garden and eat a delicious salad that you grew!

We will be planting a very special type of salad garden today—the Vegetable Cousins Salad Garden. Did you know that just like people from different countries and different families can look different, plants from the same family can look and taste very different. (Pointing to different kids in the class) We are all humans, but as I look around the room I see students with _____ (identify different characteristics of students—i.e. eye or hair color, straight v. curly hair, etc). That is because you all come from different families and have different family histories and ancestors (something you will be studying later in the year . . .).

Similarly, types of plants such as vegetables look different. Not all lettuces are alike—at the market you may see lettuce with all green leaves, leaves with some red on them, almost all red leaves, or lettuce with straight leaves and others with curly leaves. Radishes are the same way—we think of radishes as red, but there are white radishes, half-red/half-white radishes, even some that are white on the outside and red on the inside! These different kinds may taste different as well as look different. Different colors and shapes of vegetables are called "varieties." All the vegetables of the same "variety" look similar because they grow from seeds from parent plants of that same variety.

Vegetables of the same variety share similarities, but they also can have differences. Just like people in the same family may look alike in some ways, but not look alike in other ways, vegetables of the same variety are not all identical. Next time you are at the market, compare the different radishes in

a bunch or the different carrots in a bunch. You will see that some are bigger, some smaller, some darker in color than others, some skinny v. some fat.

A farmer must decide which variety of plants he wants to plant. When he chooses he must consider many things—including which varieties would grow best on his farm and which varieties he thinks people would be most interested in buying. The farmer makes his money only when people want to buy the vegetables that he grows.

Today we will plant several different varieties of each vegetable so that you can see and taste their differences.

SHOWS PACKS OF SEEDS AS YOU TALK ABOUT THEM AND THEIR DIFFERENCES, for example:

Carrots—We will plant carrots that look like traditional carrots (Nante) and some that are little orange balls (Thumbelina), like an orange radish.

Radishes—Cherry Belle is a traditional round red radish v. French Breakfast is half red/half white. Note: If you plant Easter Egg, they have several varieties in one packet ranging from all purple to all white.

Lettuce—Show the different varieties you will plant and highlight the differences.

Broccoli—We only plant one variety of broccoli, but when it grows you will see it looks different than the broccoli you buy in the store. Instead of one enormous head, it will have a small central head and lots of mini-broccoli heads.

Onions—Red v. white or yellow

Edible flowers—Pansies and violas come in a variety of different shapes, sizes and colors of flowers.

Garden Rules:

1) **IMPORTANT REMINDER Plants can be poisonous:** Plants and flowers in the school garden are safe for eating because we plant them specifically to eat, and we do not use any chemicals or pesticides that would be harmful if eaten.

- NEVER eat a plant or flower you find growing anywhere at school, home or in your neighborhood unless your parent or another responsible adult says it is ok!!!
- Many plants are VERY POISONOUS. Plants are tricky because many look alike. You may think it is a plant that is safe to eat, but it may not be.
- Many people put chemical pesticides on their plants to kill bugs, or they give plants special food called fertilizer that is safe for the plants, but not safe for people. These chemicals are NOT SAFE for people to eat!!!

2) **Quiet voices, no running**—do not disturb the creatures in the garden or the students in nearby classrooms. The garden is a classroom just like all the other classrooms at school. All the same rules as in your classroom--no running, yelling, climbing, pushing, or unruly behavior.

3) **Listen to instructions** and plant as you are told or your plants may not grow. If you plant too many seeds or put the seeds in the wrong place, your seeds will not grow.

Planting Plan:

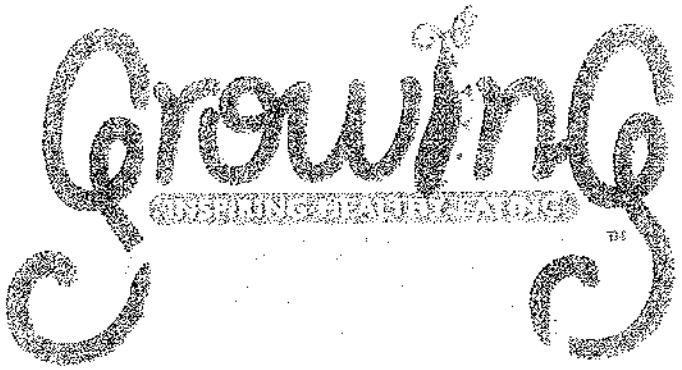
- You will each get to plant one type of seed to plant.
- We will assign each of you the type of seed or plant you get to plant.
- We will tell you where and how to plant your type of seed or plant.
- It doesn't matter what you plant today—the entire class will share the garden.
- HAVE FUN!!!

Planting Directions:

For all seeds: Make rows a 6 inches apart and ¼ inch deep. Have students place seeds 1 inch apart in row. Easiest if you hold seeds and students pinch them from your hand/cup one at a time. Do not let students dig holes for seeds—seeds will be planted too deep and will not grow. Have student pinch dirt closed and gently pat down to cover rows after they place their seeds.

For onion bulbs: Make rows 3 inches apart and ¼ inch deep. Bulbs need to be planted 2" deep, which is the depth to the students second knuckle. Demonstrate to students how to push their finger into the soil just to the first knuckle. Remind them that if planted too deep (i.e. up to the beginning of their palm), the onions will not grow. Have students make their holes in the row. Show them the difference between the top and bottom of the onion bulb. Have them place the bulbs top side up in their holes. Once all the hole are filled, have students pinch the rows closed and pat down.

For transplants: Assign 2-3 students to each transplant. Plant transplants one foot apart. Students to take turns digging hole (remind them only as deep as potted transplant), removing transplant from pot (turn upside down and tap, catching plant as it falls out v. pulling out of pot by neck of plant), and placing in hole, adding and patting down dirt around it.



Second Grade Fall Planting
Vegetable Cousins Garden

Today your 2nd graders planted a Vegetable Cousins Garden. This garden focuses on similarities and differences between two or more varieties of the same plant. We plant two or more varieties of radishes, carrots, edible flowers, and lettuce, along with other salad vegetables. This garden teaches to the California State Content Standards in Life Science. In addition, an expanded study program using radishes in the garden may be used to teach to the State Content Standards in Science Investigation and Experimentation and Math Measurement and Geometry. It can also be used to teach the Social Studies Content Standards in Economics on food production and competition among sellers, and connects to the year-long second grade focus on ancestors.

California State Content Standards:

1) Science—Life Science:

2a: Understand organisms reproduce offspring of their own kind. The offspring resemble their parents and one another.

2d: Understand there is variation among individuals of one kind within a population.

2f: Understand flowers and fruits are associated with reproduction in plants.

In addition, the radishes are a wonderful tool for scientific study to satisfy the Investigation and Experimentation Science Standards. Radishes have a thirty-day life cycle. By visiting the garden weekly, students can visually observe and their growth, stage of life cycle, and height. This study would allow the students to make a comparison between the two varieties and to master the life cycle of a plant. In addition, the students can make observations of animals and insects in the garden, weather conditions, and record soil and air temperature. The students can analyze the data they collect and look for relationships, differences, and trends. This study was done with great success in previous years by the second graders at Pacific School. This study supports the following California State Science Standards—Investigation and Experimentation:

4b: Measure length, weight, temperature, and liquid volume with appropriate tools and express those measurements in standard metric system units.

4c: Compare and sort common objects according to two or more physical attributes (e. g., color, shape, texture, size, weight).

4d: Write or draw descriptions of a sequence of steps, events, and observations.

4e: Construct bar graphs to record data, using appropriately labeled axes.

4F: Use magnifiers or microscopes to observe and draw descriptions of small objects or small features of objects.

4G: Follow oral instructions for a scientific investigation.

2) **Math:** This radish study could also be used to support State Math Standards

MEASUREMENT AND GEOMETRY

1.0 Students understand that measurement is accomplished by identifying a unit of measure, iterating (repeating) that unit, and comparing it to the item to be measured.

1.1 Measure the length of objects by iterating (repeating) a nonstandard or standard unit.

1.2 Use different units to measure the same object and predict whether the measure will be greater or smaller when a different unit is used.

1.3 Measure the length of an object to the nearest inch and/or centimeter.

3) Social Studies:

By planting multiple varieties of each vegetable, this garden can be used to support lessons on the Economic Standards. Why do farmers grow different varieties of the same vegetables? Why are scientists and farmers constantly developing new varieties of these same vegetables? Are the varieties available in markets today the same as our ancestors ate? How do different varieties create competition among food sellers? These questions relate to the following California State Social Studies Standards:

2.4 Students understand basic economic concepts and their individual roles in the economy and demonstrate basic economic reasoning skills.

1. Describe food production and consumption long ago and today, including the roles of farmers, processors, distributors, weather, and land and water resources.
2. Understand the role and interdependence of buyers (consumers) and sellers (producers) of goods and services.
3. Understand how limits on resources affect production and consumption (what to produce and what to consume).

Please visit the garden throughout the fall and winter to watch the garden grow. We will plan a harvest party in late winter.

of San Francisco Botanical Garden Society

Garden Sketching Activities

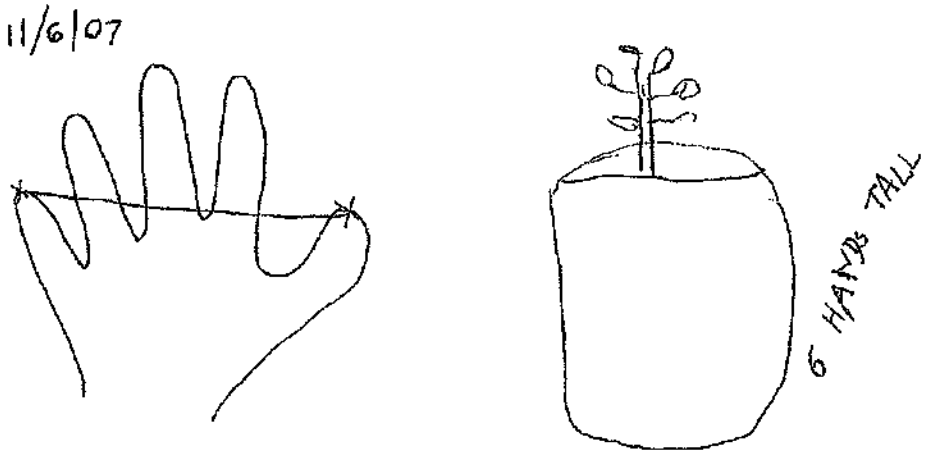
Measuring in the garden

Objective – children measure objects using their bodies

Children can use their bodies to measure objects in their environment. Hand spans are a suggested unit, but feel free to use whatever is appropriate for the plants you are observing.

1. Review the concept of measurement with children.
2. Demonstrate how your hand span can be used to measure a nearby object, then let children compare with their own hand spans.
3. Briefly explore the area, asking children to measure plants, plant parts and objects in the garden with their hand spans. Challenge them to find one plant or plant part that is the same size as their hand span.
4. Distribute the journals, pencils, and clipboards.
5. Remind children that this is "science sketching" which means they will draw only what they see, looking for lines, patterns, and shapes.
6. Tell children that their journals should include the following:

   - the DATE
   - a life size sketch of their HAND SPAN (tracing is fine)
   - a sketch of one thing they MEASURED in the garden
   - a NOTE OF THE SIZE of the object, in hand spans



Exploring Compost Critters

Created by Amy Mack, Garden Educator
West Portal School Elementary, San Francisco Unified School District

LESSON SUMMARY

In this lesson, students will learn about composting with the FBI by collecting and observe examples of fungus, bacteria and invertebrates to build a compost pile.

LESSON OBJECTIVES

Students will be able to:

- Identify examples of compost critters around the schoolyard garden
- Reflect on and narrate that decomposition occurs in nature

ASSESSMENTS

Students will

- Work cooperatively with their partners.
- Demonstrate safe and gentle behavior when handling creatures.
- Summarize their role in the compost pile activity.

MATERIALS

- Clipboard per student or pair
- Compost Critter Handout
- Garden trowels
- "Bug boxes" (clear magnifying box with lid in FOSS kits) or clear plastic containers with lids

BEFORE YOU BEGIN

Prepare materials to create a small compost pile, including green and brown materials:

Greens	Browns
Grass clippings	Straw
Coffee grounds/tea bags	dried leaves
Vegetable and fruit scraps	Pine needles
Trimmings from perennial and annual plants	Twigs, chipped tree branches/bark
Annual weeds that haven't set seed	Sawdust
Eggshells	Corn stalks
(No dairy, milk or oil since this attracts vermin)	Paper (newspaper, printing paper, paper plates and napkins)
	Corrugated cardboard

PROCEDURES

Part One: Introduction to the FBI (15 min)

1. Ask students what they know about the garden FBI – fungus, bacteria, and invertebrates. Explain that the FBI helps to break down organic material to make compost, which can be added to soil to help plant grow. Make a list of some of the FBI that live in the school garden.
2. Send students or pairs out into the garden to look for, capture, examine, and share compost critters.
3. Have the students check off the creatures they find on the "most wanted" list.
4. Explore under logs or branches to find mushrooms or fungus.
5. Have the students come back together to look at all the creatures that they collected.

Part Two: Building a Compost Birthday Cake (30 min)

1. Discuss how to build a compost pile using "greens" and "browns" mixed together.
2. Have the students help add the layers to the pile.
3. Let the students collect flowers and sticks (for candles) to decorate the compost Birthday Cake.
4. Sing Happy Birthday together to the Compost pile!

Next class visit: Revisit the compost pile the next time the students visit to see if their predictions are correct.

RESOURCES

Get more info and the "Composting with the FBI" fact sheet from:
http://sfenviron.nentkids.org/teacher/fact_sheets.htm

Do the Rot Thing Composting Curriculum:
http://www.highfieldscomposting.org/miscPDF/Do%20the%20Rot%20Thing.pdf

Life Cycle of Compost

Created by Marie Sayles, Garden Educator
Sunset Elementary, San Francisco Unified School District

Lesson Summary

In this lesson, students will learn about the differences between composting with the green bins and creating a compost pile or bin in a schoolyard. They will draw a diagram illustrating the "life cycle" of compost, from food scraps, to decomposers, back to compost/soil for the garden.

Lesson Objectives

Students will be able to:

Understand the benefits of composting.
Understand and explain the process of decomposition in a compost bin or pile.
Identify examples of compost critters in a compost pile.

Assessments

Students will be able to:

Name two benefits of composting locally.
Identify two creatures that live in a compost bin.

Materials

Samples from lunch compost scraps (banana peel, paper cups, plant cuttings, etc).
Pictures or illustrations of decomposers (Fungus, Bacteria, Invertebrates)
A google map showing the route from San Francisco to Vacaville.

Before You Begin

Read up on where the San Francisco green bin waste goes and the process of turning it from green waste to compost at the Jepson Prairie compost facility at http://sfenvironmentkids.org/4Rs/rot/rot_from.htm. This process requires trucks to pick up the green bin waste, drive to Vacaville, before turning into compost and being driven back to San Francisco to be used local farmers, for parks or schools, or in our school garden.

Procedures

1. Gather students together and ask them to turn to a partner and discuss where they think food scraps go when you put them in the Green Bin ("pair share" for 1-2 minutes).
2. Discuss their ideas together and introduce the process of the Green bin waste getting picked up by a truck and taken to the Jepson Prairie Composting Facility in Vacaville (a distance of 64 miles).
3. Using a whiteboard, draw the stages of the "life cycle" as you discuss them. Let the students guide the discussion. Stages include: 1) gather food scraps & green waste 2) put into Green Bin 3) truck picks up waste and drives to compost facility 4) waste put into rows and covered, then "visited" by the FBI/decomposers, who turn it into compost/soil 5) newly made compost put back onto truck and driven to farm/park/garden 6) compost makes soil healthy to grow new plants.
4. Ask students, in the same pair share, to discuss how we could make the compost process even better (more environmentally friendly) and bring their ideas back to class discussion. Tease out "making our own compost pile" if no students offer that option.
5. Review your life cycle of compost and take out the stages that won't be necessary if you have a school garden compost pile. Put an X through the "driving" stages at both ends.
6. Hand out the worksheets and let the students (individually or in pairs/teams) draw there own version of the Life Cycle of Compost. Make sure they include at least 3-4 decomposers.

Resources

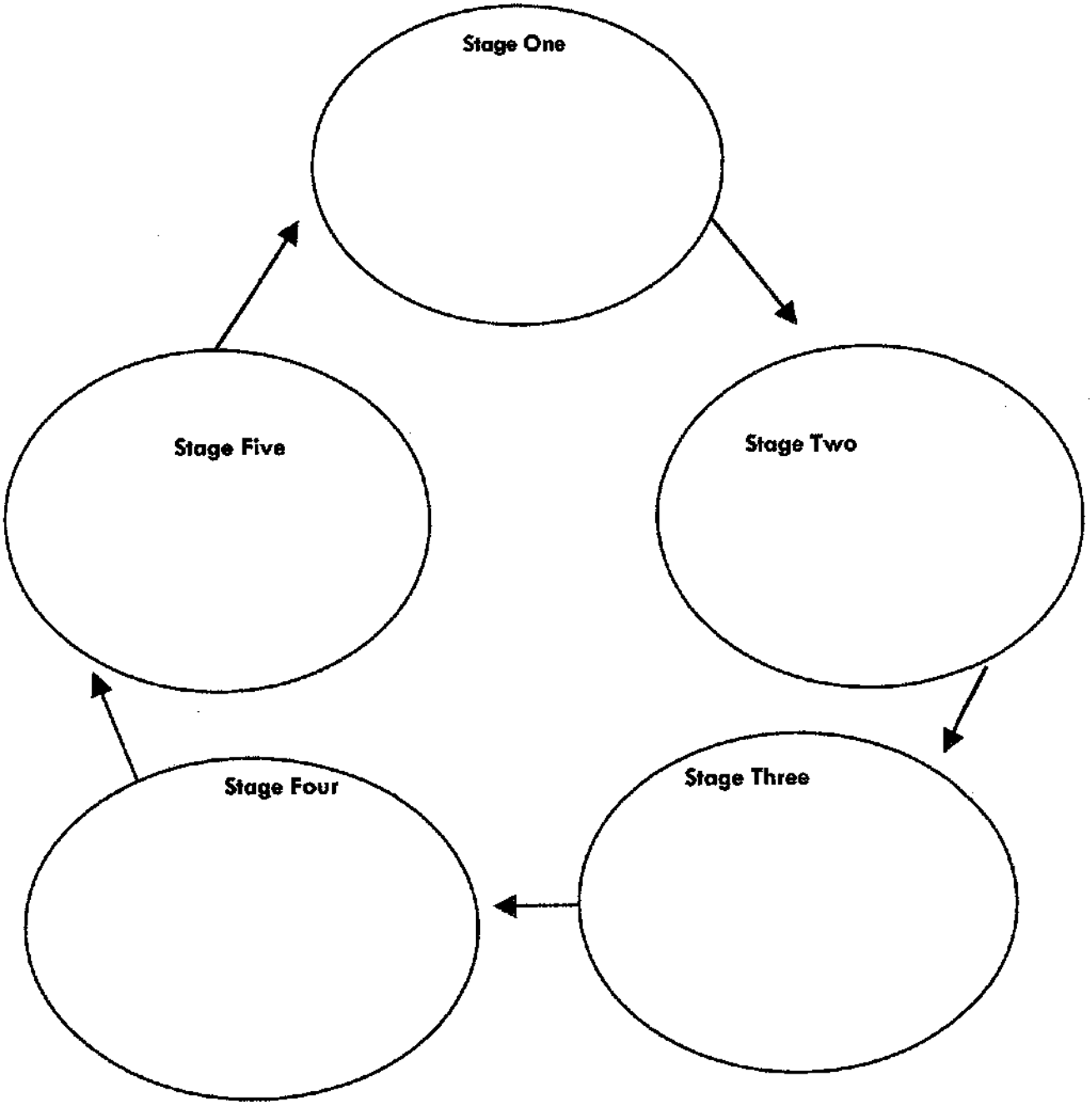
For more information, go to the SF Environment website at:
http://sfenvironmentkids.org/teacher/fact_sheets.htm
The Dirt on Composting factsheet
Composting with the FBI factsheet

Information on Jepson Prairie Composting Center
http://sfenvironmentkids.org/4Rs/rot/rot_from.htm

Name _____ Date _____

Life Cycle of Compost Bin

Our compost starts with leftover food scraps and garden waste, gets put into a compost bin or pile, gets eaten by decomposers (the FBI), turns into rich, dark compost, and we put it back into our garden to grow more garden vegetables and fruits.



Soil Composition & Discovery

Created by
The Edible Schoolyard at Larchmont Charter Schools, Los Angeles, California

LESSON SUMMARY

In this activity, students build off of their knowledge of the rock cycle by digging into garden soil and distinguishing amongst the different components of soil.

LESSON OBJECTIVES

Students will be able to:

Recall the process of erosion and weathering that leads to the breaking down of rocks
List the four main components of soil
Identify organic matter and mineral matter in the soil

ASSESSMENTS

Students will be able to:

Use hand lenses to discover the components of soil
Correctly distinguish between what is organic matter and what is mineral matter
Correctly identify insects living in the garden soil
Define in own words the terms organic matter and mineral matter

MATERIALS

Soil Station
Hand lenses
Shovels (optional)
Copies of the soil components pie chart
Garden insect resources

BEFORE YOU BEGIN

Clear out or prepare a garden bed so that there will be enough room for each student
Make copies of the soil components handout, one for each student
Draw the soil components pie chart on the white board in the garden
Set up the soil station with shovels and lenses

PROCEDURES

At the Opening Circle

Introduce the lesson for the day.

Ask students to recall the rock lessons from their classroom.

Ask students to think why rocks would be important for the garden and why gardeners are concerned with rocks.

Ask students what they *think* soil is made up of.

Explain to students the pie chart and the other components that makes up soil.

In the Field

Lead students to the soil station.

Have students dig with the shovels and pick up a handful of soil.

Using lenses and their senses, ask students to begin to categorize the different components of soil.

Using their soil components handout, have each student record what they found, making sure it falls correctly under the heading "organic matter" or "mineral matter."

If students discover insects, have them look through the garden insect resources in order to discover which insect they have found.

RESOURCES

Edible Schoolyard:
http://edibleschoolyard.org/resource/soil-composition-and-discovery

Worm Life Cycle

Created by Kelly Nichols, Education Outside Corps Member,
Hillcrest Elementary School, San Francisco Unified School District

LESSON SUMMARY

In this lesson, students examine worms at different life stages and diagram each stage.

LESSON OBJECTIVES

Students will be able to...

Identify each stage of worm development.
Understand the definition of "diagram."
Draw a diagram of each stage of the worm life cycle, identifying body parts.
Use magnifying glasses to more closely observe worms.

ASSESSMENTS

Students will...

Understand the concept of life cycles.
Produce an accurate drawing of each stage of worm development.

MATERIALS

Worm bin/worms
Diagrams of worm life cycle and worm anatomy
Containers
Magnifying Glasses
Paper
Pencils
Crayons or Colored Pencils
Clipboards

BEFORE YOU BEGIN

Search in your worm bin for worm eggs, baby worms, juvenile worms, and adult worms and place each in separate containers.
Make sure there are enough pencils, magnifying glasses, and paper for each student.

PROCEDURES

Ask students to define the word "cycle" and identify the stages of the human life cycle.

Ask students if they know the stages of the worm life cycle.

Show diagrams of worm life cycle and worm anatomy. Ask students to note attention to detail and labels.

Break students into four groups. Have groups rotate along life cycle stations, using magnifying glasses to observe worms and start drawing diagrams.

Give time for students to finish drawing and labeling diagrams.

Ask students to regroup and prompt students to share diagrams and discuss some of the differences they noticed in the different life stages.

RESOURCES

Worm life cycle and anatomy diagrams (Examples:
http://www.teara.govt.nz/en/earthworms/3/1;
http://jklsciencelab.weebly.com/uploads/2/0/6/4/2064940/7919916_orig.jpg?113)

OTHER IDEAS

Have students find, identify, and categorize the life cycle stages themselves instead of separating them from the worm bin beforehand.

INDOORS ❀ GRADES 2-4 ❀ FALL, WINTER, SPRING ❀ ACTIVITY

Stem, Root, Leaf, or Fruit?

DESCRIPTION

Students classify foods they eat according to plant parts and make a vegetable and dip snack.

OBJECTIVE

To identify and classify the parts of food we eat.

TEACHER BACKGROUND

In the culinary world, we define fruits as sweet and vegetables as not sweet. In the world of science, however, vegetables and fruits are separated differently. A fruit is the part of the plant that develops from the fertilized ovary (or, in essence, from the pollinated flower) and has the seeds inside it. Under this definition, fruits include: pumpkins, peppers, cucumbers, avocados, tomatoes, eggplant, apples, string beans, and anything else that has seeds inside. "Vegetable" is not a botanical term but a catch-all category used to describe non-fruit plant parts we eat, such as celery, spinach, and carrots.

MATERIALS

- ❀ Science journals
- ❀ Sample of fresh spices from list of answers at end of activity
- ❀ Produce for snack (one item from each plant part category — for example: carrots, celery, spinach, broccoli, cucumbers, and sunflower seeds)
- ❀ Dip for snack (cottage cheese, hummus, etc.)
- ❀ Cutting board and knives

PREPARATION

Make up a picture chart of foods and spices that will be available in the classroom for this activity (see the Food Categories chart on the next page).

CLASS DISCUSSION

Name some plants that you eat. *(List responses on the board.)* Do you eat the whole plant or part of it? Let's list the different parts of plants. *(root, stem, leaf, flower, fruit, and seed)* Do you think we eat all of these different parts? *(Record predictions.)* Can you name the different parts of the plants we listed that you eat? *(List the part name(s) next to each plant.)*

ACTION

1. Group students in pairs and have them refer to the picture chart of foods and spices.
2. Have students make six category headings in their science journals: root, stem, leaf, flower, fruit, and seed.
3. Tell them to write each food in one of the categories, according to what part of the plant we eat. For example, a walnut is a seed, an eggplant is a fruit, and so on.)

4. To introduce students to the wonderful world of spices, have them use their senses to explore the samples you have collected.

5. Challenge students to try classifying the spices. This tends to be a little more difficult for students, so if they cannot put the spices in categories, guide them through.

6. Now have students enjoy their new knowledge. Have them cut up produce and make a dip using the cottage cheese or hummus. They may want to experiment with adding a small amount of spices to the dip. Be sure that they name the part of the plant they are eating.

WRAP UP

What is your favorite vegetable? Which part of that plant is it? What is your favorite root, stem, leaf, flower, fruit, and seed?

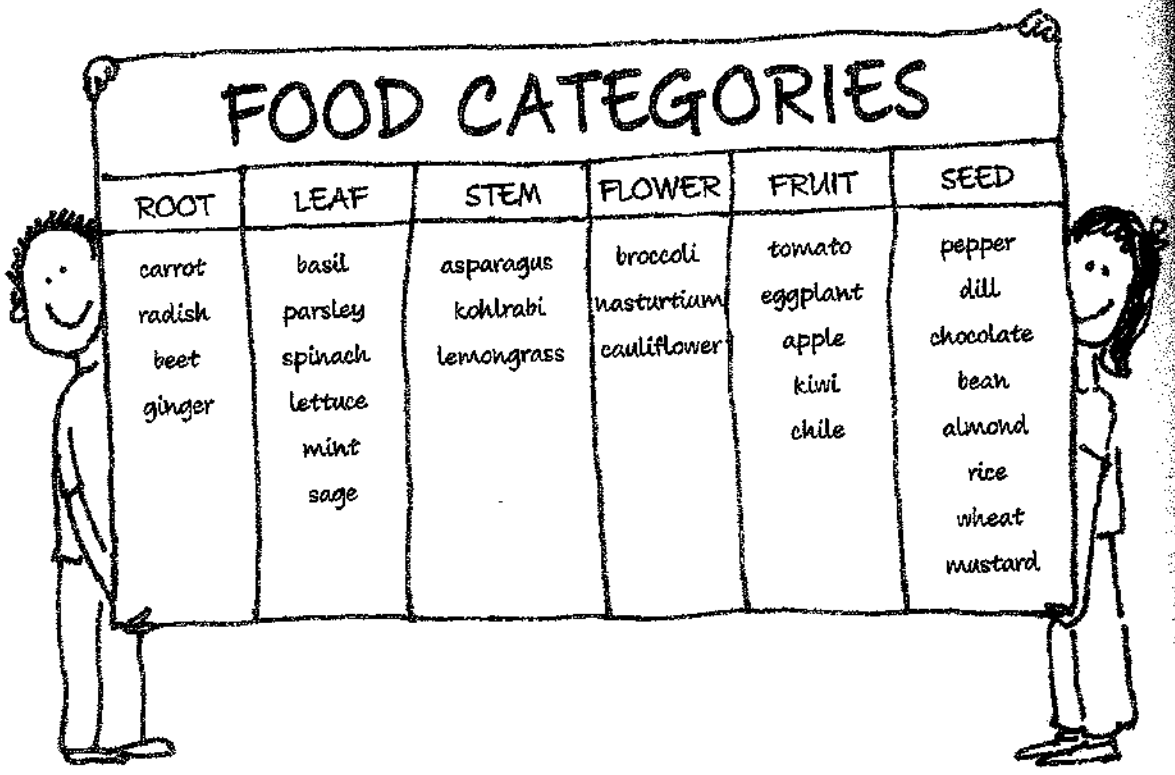
DIGGING DEEPER

1. Have students describe their last meal in terms of plant parts. For example, a peanut butter and jelly sandwich would be ground-up seeds *(peanut butter)* and crushed fruit *(jelly)* on ground-up and baked seeds *(bread)*.

2. Sing Roots, Stems, Leaves *(found at the beginning of this section)*

3. Have students design a meal composed only of one category. How would they enjoy such a meal?

4. Have students plant a garden bed according to the plant parts they eat, with a section for each category.



Second Grade Grade Spring Lesson

Pollinator Flower Garden

Objective:

1) Students will learn the role of flowers and pollinating birds and insects in the garden and that different pollinators have different needs.
2) Students learn the lifecycle of the butterfly and that butterflies have different needs during the different cycles.

California State Content Standards:

1) Science—Life Science

2. Plants and animals have predictable life cycles. As a basis for understanding this concept:

b. Students know the sequential stages of life cycles are different for different animals, such as butterflies, frogs, and mice.

c. Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.

d. Students know there is variation among individuals of one kind within a population.

e. Students know light, gravity, touch, or environmental stress can affect the germination, growth, and development of plants.

f. Students know flowers and fruits are associated with reproduction in plants.

Lesson Outline:

A. Lesson
   a. What is a Pollinator?
   b. How do you attract a Pollinator?
   c. Lifecycle of a Butterfly
B. Garden Rules
C. Planting Plans
D. Plant

Seeds/Supplies
(suggested varieties--any combination of quick growing plants in various colors and variety will work):

Pink: Cosmos, zinnia, bee balm, aster
Red: Red sunflower, zinnia, sages (Salvia)
Orange: calendula, marigold, milkweed (monarch caterpillar food), Mexican sunflower (Tithonia)
Yellow: Dill, black-eyed susan, gallardia, marigold, coreopsis
Blue/Purple: Bachelor's Buttons, verbena, cupid's dart, pincushion (Sciabiosa), coneflower (Echinacea), sages (Salvia)
White: Yarrow, cosmos, Shasta daisy

**We recommend planting seedlings started indoors or purchasing nursery transplants. Depending on the weather and conditions, some flower seeds germinate/grow slowly, and you may not get sufficient flowers by June if you sow seed directly.

Lesson:
Pollinators are insects and animals, such as bees, butterflies, flies, hummingbirds, and moths, that serve an important role in the garden.

1) Pollinators do their important work without even knowing it!
   a. Pollinators seeking nectar from flowers for their own food pick up pollen on their bodies
   b. When they fly to the next flower, they spread the pollen to those flowers, which is called "pollinating" the flowers.
   c. Pollinating the flowers helps the plants because plant flowers must be pollinated in order for the plants to reproduce by making new seeds.

1) Pollinators attracted to flowers by two things:
   a. Color of flowers—pollinators flying by see bright colors in the garden. Many pollinators are picky eaters and will go to only one color of flower, such as monarchs which like orange or yellow. Night blooming flowers are usually white so that the night pollinators (such as moths) can see them in the dark.
   b. Scent of flowers—the sweet smell of flowers attracts passing pollinators. Night-blooming flowers like jasmine use very strong scent to attract night pollinators.

2) Different pollinators like different shaped flowers. Butterflies need a landing pad—big wide-faced flowers such as cosmos or dill or yarrow to land on so they can drink the nectar. Hummingbirds like deep flowers that make use of their long skinny beaks.

3) Butterflies are unique types of pollinators because they have a special lifecycle.
   a. Lifecycle: They lay their eggs in the garden, the eggs hatch into caterpillars, the caterpillars eventually form chrysalis, and finally the chrysalis opens to release the new butterfly. (THIS IS THE MOST SIMPLE DESCRIPTION OF THE LIFECYCLE—WE DO NOT HAVE TIME DURING OUR LESSONS TO TEACH A COMPLETE LESSON ON BUTTERFLY LIFECYCLES).
   b. To attract butterfly pollinators to the garden, garden must feed both caterpillars and butterflies —leaves for caterpillars/flowers for butterflies. Dill, marigold, zinnia and yarrow are good

plants because they feed both. Monarch caterpillars only eat one type food—milkweed—so monarchs will only lay eggs on milkweed plants.

Planting Directions:

Planting seeds:

1) Make rows a 6 inches apart and ¼ inch deep.

2) Plant seeds by placing in row 1 inch apart—most seeds are very small like lettuce or carrots. Bigger seeds (Mexican sunflower, cosmos) can be planted 2 inches apart. Do not have students dig a hole for their seeds.

3) Have students pinch and pat to cover rows after they place seeds.

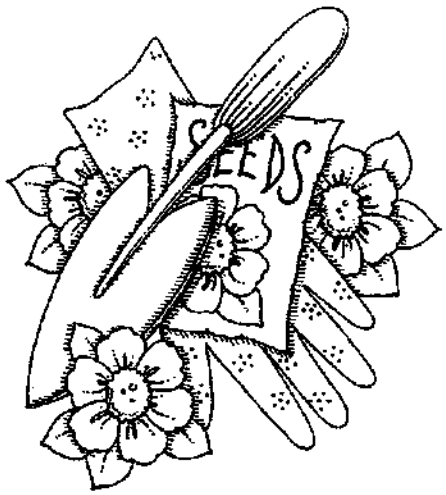
Planting seedlings: BEST TO DEMONSTRATE THIS IN GARDEN BEFORE LETTING STUDENTS PLANT

1) Follow spacing recommended for each variety.

2) Have students dig hole as deep as seedling pot.

3) Demonstrate to students how to remove seedling from container—turn upside down with fingers on either side of seedling and tap bottom of container until seedling comes out. REMIND THEM NEVER TO PULL OUT BY STEM!!

4) Place seedling in hole and gently pat in dirt all around.



Second Grade Grade Spring Lesson

Pollinator Flower Garden

Today your class will be planting their spring garden to attract pollinators such as butterflies, bees, and hummingbirds. The goal is to plant a garden of colorful flowers that will lure the pollinators in. Please a moment with your class in the next few days to note how many pollinators are in the garden area at the beginning of the growing season. If the garden does not have any flowers in bloom, you should not see very many. As the season progresses and the flowers come into bloom, visits the garden regularly to compare the number of pollinators you see as the flowers come into bloom.

Please remind your students not to pick the flowers. If the flowers are gone from the garden, the pollinators will not come! You may want to have them make "Do Not Pick the Flowers—Pollinators at Work!" signs to remind others as well.

Due to time constraints, we provide only a very simple review of the butterfly lifecycle during this lesson. We hope that you will use this lesson as either a beginning for or a review of a more detailed study of this fascinating process.

California State Content Standards:

1) Science—Life Science

2. Plants and animals have predictable life cycles. As a basis for understanding this concept:

b. Students know the sequential stages of life cycles are different for different animals, such as butterflies, frogs, and mice.

c. Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.

d. Students know there is variation among individuals of one kind within a population.

e. Students know light, gravity, touch, or environmental stress can affect the germination, growth, and development of plants.

f. Students know flowers and fruits are associated with reproduction in plants.

c. Students know how to identify major structures of common plants and animals (e.g., stems, leaves, roots, arms, wings, legs).

Please visit the garden regularly to watch your garden grow! We will hold an Open House in June to talk to your students about their garden.

2nd Grade Learning Garden Lessons: Student Pre- and Post-Test

Date: _____ Name: _____ School: _____

Circle one: PRE or POST

Help a Sister Out

What three plants did Indians plant together:

_____ _____ _____

Adopt a Plant

In what season do some trees lose their leaves? _____

In what season do some plants grow new leaves? _____

Rotting Away

What happens to dead plants?_____

What eats or breaks down rotting logs? _____

Healthy Eating

What is a healthy thing to eat? _____

Why is that food healthy to eat? _____

Going Outside Do you like to go outside at school?

Learning Do you like learning things outside ?

What do you like to learn about?_____

NOTE TO TEACHERS: Please mail this pre- or post-test to Captain Planet Foundation at 133 Lucky Street, Atlanta, GA 30303. Cobb Co. teachers may send tests to Sally Creel via CCSD mail. Include teacher name to be included in a drawing for prizes and resources. Also, we'd appreciate your tips and suggestions on Learning Garden lessons you teach: http://captainplanetfoundation.org/learninggarden-resources/

Lesson 1: Adopt A Plant

CAPTAIN PLANET'S LEARNING GARDENS

Grade
2

Standards
S2L1.a

Time
(4)30-45 minute periods, one each season

Supplies
- Seasonal observations chart
- Laminated signs identifying class tree/vegetable
- Clipboards
- Book about seasonal changes, such as *A Tree for All Seasons* by Robin Bernard

Environmental conditions:
- A tree that is easily accessible to the classroom
- A vegetable plant that is easily accessible to the classroom

Overview
Students connect with seasonal changes and cycles through observing specific plants throughout the school year, comparing and contrasting a tree and a vegetable.

Guiding Question
How do seasons affect the life cycles of living things?
How is the life cycle of a tree different from that of a vegetable?

Engaging Students
Go outside and choose a tree and a vegetable plant to adopt as a class for the whole year.

Exploration
Students decide on important variables to record for tracking seasonal changes in their plants.

Explanation
Students can describe how seasonal changes affect plants in different ways.
Students can describe the life cycle of a plant.

Environmental Stewardship
Decide on something to do to support your chosen tree or plant (such as watering during drought, providing mulch, compost or organic fertilizer, transplanting seedlings to better places).

Pick a Citizen Science project to join (Monarchs Across GA, Project Bud Break, Journey North, etc).
Project Budburst: http://neoninc.org/budburst/getstarted_budburstobserver.php
Journey North: http://www.learner.org/jnorth/
Tulip project: http://www.learner.org/jnorth/tulip/index.html
The monarch project: http://monarchsisterschools.org/overview.htm

Evaluation
Student journal complete for each season.

CONTEXT FOR LESSON ACTIVITIES

Standards

(outcomes: observe seasonal changes in plants; describe life cycle of a plant)

GPS Science

S2L1. Students will investigate the life cycles of different living organisms.

a. Determine the sequence of the life cycle of common animals in your area: a mammal such as a cat or dog or classroom pet, a bird such as a chicken, an amphibian such as a frog, and an insect such as a butterfly.

b. Relate seasonal changes to observations of how a tree changes throughout a school year.

c. Investigate the life cycle of a plant by growing a plant from a seed and by recording changes over a period of time.

Next Generation Science Standards

Core Idea ESS1: Earth's Place in the Universe

ESS1.B Earth and the Solar System

Core Idea LS1 From Molecules to Organisms: Structures and Processes

LS1.A Structure and Function

LS1.C Organization for Matter and Energy Flow in an Organism

Background Information

http://www.ecokids.ca/pub/eco_info/topics/forests/types_of_trees.cfm

Difference between annual, perennial:

http://wonderopolis.org/wonder/whats-the-difference-between-annuals-and-perennials/

Recommended Reading: *A Tree is Nice* by Janice May Udry

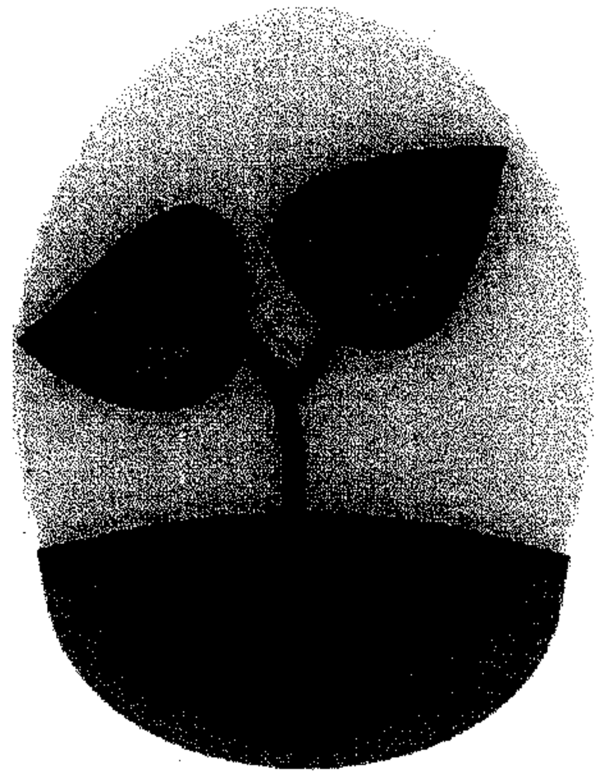
The Important Book by Margaret Wise Brown

PROCEDURES FOR LESSON ACTIVITIES

- Outside: as a class, choose a tree and a vegetable to observe throughout the year. Or, split the class into groups and allow each group to choose its own tree and vegetable.
- Identify the adopted plants with laminated signs.
- Make a journal entry recording important variables and observations, such as:
  - Drawing of the plant
  - Description of the leaves
  - Description of overall appearance
  - Leaf/bark rubbing
  - Measurements:
    - Trunk circumference
    - Height of vegetable
  - Existence of fruits/seeds
  - Is it alive?
  - Day length
- Predict how the plants will change throughout the year.

_________________'s Class Tree

_________________'s Class Vegetable



Name:_____

Date:_____

Name of Plant:_____

Write or draw your plant each season

Fall	Winter
Spring	Summer

Assessment for Adopt a Plant

Student Name(s): _____ **Date:** _____

Object Mastered → / Benchmark or Performance Measure ↓	 5 pts	 4 pts	 3 pts	 n/a	TOTAL POINTS
Student describes seasonal changes of a tree					
Student describes seasonal changes of an annual vegetable					
Student can explain the life cycle of a plant					
TOTAL in LAST BOX →					_ /25 pts

Lesson 2: Rotting Away

Grade
2

Standards
S2L1.b,d S2E3

Time
(1-2) 45 minute periods

Supplies
(per student)
Materials:
- Book: *Log Hotel* by Anne Schreiber
- Garden Journals
- Compost Critters
- Loupes/magnifying glasses

Environmental conditions:
- Rotting log
- Compost pile

Overview
Students compare and contrast rotting logs and compost piles to recognize that the materials that make up all living organisms follow a pattern of being borrowed from the earth and returning at death through the interaction of a special community of organisms.

Guiding Question
What can I do in the garden? What do I need to know?
How can I take advantage of natural cycles in the garden?
Why doesn't the forest floor fill up with dead trees?

Engaging Students
What happens to plants and animals when they die? Why don't they stay in the same form after they die?

Exploration
Look around the school yard for evidence of decomposition. Find a rotting log, explore the compost pile.
Look specifically for mycelia (fungi).

Explanation
After living organisms die, decomposers (mushrooms, bacteria, other microorganisms) use them as food. In a compost pile and rotting log, decomposers turn materials into nutrients that plants can use to grow and thrive.

Debriefing
Living organisms don't just disappear after death, they become recycled by decomposers and feed the next cycle of life. Gardeners make use of natural cycles to support their garden. The compost pile is similar to decomposition on a forest floor.

Environmental Stewardship
Build a Hugelkultur garden bed: http://www.richsoil.com/hugelkultur/
This kind of gardening mimics a forest floor and doesn't need to be watered. This is a way to grow vegetables that conserves water usage.
See attached hugelkultur cross sections.

Evaluation
Draw pictures of decomposers seen in the compost pile and the rotting log.

CONTEXT FOR LESSON ACTIVITIES

Standards

(outcomes: compare and contrast rotting logs and compost piles; recognize effects of decomposition)

GPS Science

S2L1. Students will investigate the life cycles of different living organisms.

b. Relate seasonal changes to observations of how a tree changes throughout a school year.

d. Identify fungi (mushroom) as living organisms.

S2E3. Students will observe and record changes in surroundings and infer the causes of the changes.

a. Recognize effects that occur in a specific area caused by weather, plants, animals, and/or people.

Next Generation Science Standards

Core Idea LS2: Ecosystems, Interactions, Energy and Dynamics

LS2.B Cycles of Matter and Energy Transfer in Ecosystems

Background Information

http://web.archive.org/web/20030621193413/http://www.cfe.cornell.edu/Compost/why.html

Soil Food Web:

http://www.geography4kids.com/files/land_foodchain.html

Recommended Books:

Life in a Rotten Log by Malcolm Penny:

http://books.google.com/books/about/Life_in_a_Rotten_Log.html?id=ict4teiq0EcC

Who Eats What? By Patrcia Lauber: http://books.google.com/books/about/Who_eats_what.html?id=FzbPUQtUo4IC

A Log's Life by Wendy Pfeffer

Compost Critters on p. 15-17: http://www.highfieldscomposting.org/miscPDF/Do%20the%20Rot%20Thing.pdf

Attached fact sheet about decompostion

PROCEDURES FOR LESSON ACTIVITIES

Procedure:

- Begin your lesson by reading the book; Log Hotel by Anne Schreiber. Ask the students if they know what a life cycle is. Then see who can describe the life cycle of the tree.
- Next, pass out the coloring worksheet to the students. Ask if any of these organisms where mentioned in the story. See if they can then explain the jobs of these organisms. The concept to aim for is that the same pattern of organisms is repeatedly found under rotting logs. This pattern shows the close relationship that these organisms (pill bugs, earthworms, millipedes, and fungi) have to one another and to the log. Each member of the recycling community plays a key role in the division of labor that turns wood fiber into soil.
- Tell the students that they will take a walk to the Nature trail. On the walk they will be looking for rotting logs and evidence of living organisms on and under the logs. Stress the importance of being careful not to damage or disturb the rotting log's cycle. If no Nature trail is available, find or bring in a rotting log. Also, if there is a compost pile, examine that as well.
- Students may explore in groups. Have them stop and record in their journals what they find before moving on.
- Return to the classroom and have students share what they found.
- Conclude lesson by coloring worksheet and adding it to their garden journal.

Rotting Away Background Info

Background
http://www.bsu.edu/eft/treetops/p/teachers/classroom_rottingLog.html

Dead logs on the forest floor may look untidy, but one-fifth of all woodland creatures reside in them. All kinds of plants and animals make their homes in different parts of the log. Some of these animals help to further the decomposition process of the log. The log actually becomes a mini-habitat, perfect for studying the relationships among decomposers, the soil community, and green plants.

A rotting log is a prime example of how a once-living organism replenishes the soil with nutrients and is recycled back into nature. In nature, death does not mean uselessness. Death and decomposition play important roles in the cycles of nature. As plants and animals die and decay, they are broken down to become a basis for new life. Through this process, the soil is renewed over and over again.

The elements that help break down dead materials are called decomposers. Examples of these include bacteria, fungus, lichens, moss, weather, insects, worms, and other scavengers.

Background
http://utah.agclassroom.org/files/uploads/estore/unit_dirt.pdf

Soil is one of our most useful natural resources. From the soil we get food, clothes and materials for the houses we live in. From gardens and truck farms we get vegetables. Fruit grown on trees and vines come from orchards, groves, and vineyards. Trees also give us valuable lumber and the wood can also be used to make paper, paints and numerous other products. Planted field crops of wheat and corn are used for making flour to make our bread, crackers, pasta, and so many other foods. Nuts and berries come from our farms and forests.

Our animal food also comes from the soil. Cows eat grass, hay, silage, and grain to produce milk, meat, and leather products. All animals eat plants; plants grow in the soil. In addition to the products listed above, animals supply us with by-products that are used in paints, camera film, pet food, rubber, crayons, lotions, soaps, leather, medicines, and, the list is long.

The fuel that warms our houses comes indirectly from the soil. Coal is made from plants that grew ages ago. Oil and gas also originate from organic materials, possibly including the remains of animals. Some of these things grew in the soil at one time or lived on things that grew in the soil.

Fish from the sea, rivers and lakes live on plants (some on other fish). And these plants require dissolved minerals that are washed into the sea, rivers, and lakes from the soil.

There are a few exceptions to linking things back to the soil. Here are a few examples: a volcano, the ocean (even though plants are part of the water cycle), and the sky (although plants give off oxygen for the air in the atmosphere).

SHORT FILM WORKSHEET

The Rotten Truth About Forest Decomposition

Rotten Standing Tree

Sometimes a fungus will attack just the inside or heartwood of a dead tree. This will make the tree rot from the inside out. That can be good for forest animals as it provides tree cavities for birds and small mammals to raise young. Once a tree falls to the forest floor it can become a protective home to snakes, salamanders, insects, worms, centipedes, rodents and shrews.

Rotten Logs and Stumps

Rotting trees and vegetation on the forest floor hold water like a sponge and will keep the forest from drying out in a long dry spell of no rain (drought), that might kill plants and trees and lead to forest fires. In the same way, they also keep too much rain from causing damage to the forest from run off, erosion (washing away the topsoil), and flooding.

As standing trees rot, they also become an important place for lichens and mosses to grow. When they finally fall, they can open up a sunny spot in the forest. This allows sun to finally reach the forest floor that has been in shade for many years. Seeds that lied dormant in the shade suddenly sprout and grow. Seedlings compete and grow quickly to fill the gap and take their place in the forest canopy – the fastest growing trees winning out. This is part of forest succession or how a forest ages and changes over time. In this way decomposition plays a role in the life cycle of the whole forest.

The Red Belt Fungus

One of the most impressive looking tree fungi is called red belt fungus. This fungus is called a conk, a hoof-shaped fungus with a brown top with a red band near the edge. Underneath it is white. Red belt fungus causes logs to break down by "cubical rot." If you have walked much in the forest you have probably seen this. It is when, as the tree rots, the inside becomes broken up into cube-shaped pieces. Sometimes you can spot the delicate white mycelium in some of the cracks. Many fungi can cause cubical rot, their tiny mycelium breaking down the rotting wood into cubes. Look for it on your next hike.

www.exploringnature.org www.makingtrackschallenge.com

Hugelkultur color graphic:
http://www.richsoil.com/hugelkultur/

Lesson 3: Help a Sister Out: Garden Companions

Grade
2

Standards
SS2HS

Time
(2) 45 minute periods

Supplies
(per class)
Books:
- *In the Three Sisters Garden: Native American stories and seasonal activities for the curious child* by JoAnne Dennee
- *Carrots Love Tomatoes* by Louise Riotte
- Seeds for planting a Three Sisters garden or other combination of companion plants

Overview
Students experience Native American culture through using Creek and Cherokee methods of planting a Three Sisters garden.

Guiding Question
How do the garden and I take care of each other?
What is the Three Sisters method of gardening?
Can I apply the Three Sisters method to other groups of plants?

Engaging Students
Tell the Three Sisters story and ask class to guess who the Three Sisters are. What are other ways that people take care of each other like the Three Sisters? Do other plants have ways of taking care of each other? Are there plants that don't do well together?

Exploration
Research 'Companion Planting,' and choose groups of plants to test appropriate for the season.
For example:
May: Corn, beans, squash
Aug/Sept: Lettuce, beets, onions
March: Cabbage, dill, potatoes
Set up an experiment: plant companion plants together and separately and track growth/harvest/overall appearance of the plants growing together versus growing separately.

Explanation
Companion plants, like corn, beans, and squash, help each other grow when planted near each other.

Extension
Write a new Three Sisters story with another set of companion plants.
Act out a skit of the Three Sisters in the garden.

Environmental Stewardship
Research companion plants for vegetables growing in the school garden and plant them.
Observe if companion plants make a visible difference to plant health: track growth/harvest of plants with companions versus without.

Evaluation

Students can explain that Three Sisters gardens were a part of Creek and Cherokee cultures and represent an agricultural method called companion planting.

CONTEXT FOR LESSON ACTIVITIES

Standards

(outcomes: try Indian method of planting; test companion planting)

GPS Social Studies

SS2H2. The student will describe the Georgia Creek and Cherokee cultures of the past in terms of tools, clothing, homes, ways of making a living, and accomplishments.

a. Describe the regions in Georgia where the Creeks and Cherokees lived and how the people used their local resources.

b. Compare and contrast the Georgia Creek and Cherokee cultures of the past to Georgians today.

Next Generation Science Standards

Core Idea LS2: Ecosystems, Interactions, Energy and Dynamics

LS2.A Interdependent Relationships in Ecosystems

Background Information

Facts about Creek Native Americans: http://www.bigorrin.org/creek_kids.htm
Facts about Cherokee Native Americans: http://www.bigorrin.org/cherokee_kids.htm
Three sisters planting guide:
http://www.darrolshillingburg.com/GardenSite/NewsletterPDF/TrainingClass/ThreeSistersGuide_all.pdf
http://faq.gardenweb.com/faq/lists/teach/2003045238014436.html
http://web3.cas.usf.edu/tbsg/gardeningactivities.aspx
Legend of three sisters:
http://web.mnstate.edu/tah/lesson-plans/lesson_plans_for_2008-2009/native_american_vegetable_c_2.html

PROCEDURES FOR LESSON ACTIVITIES

Day 1:

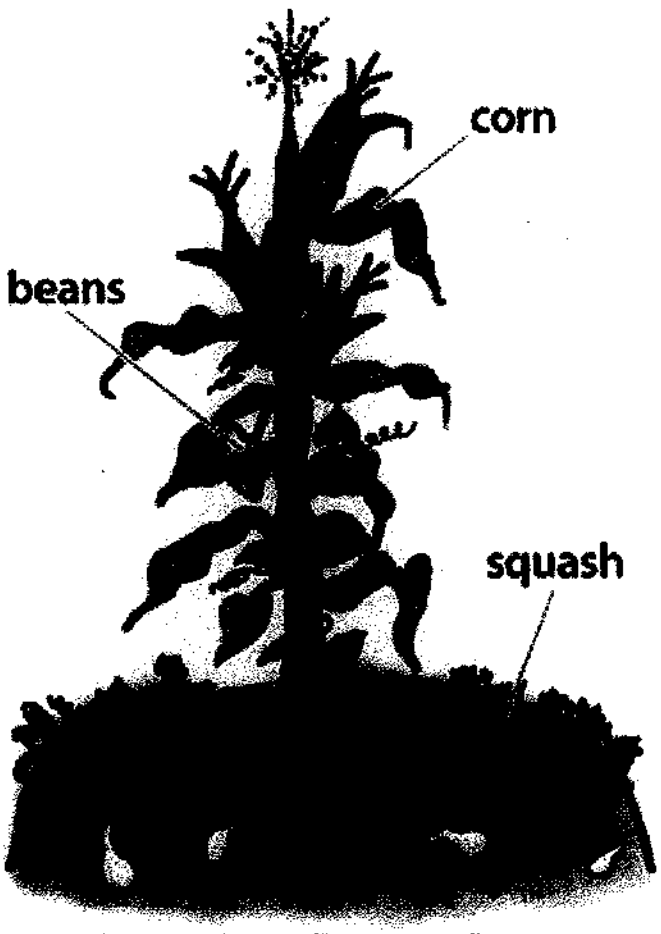
- Read a Three Sisters story in the classroom.
- Share information about Creek and Cherokee culture in Georgia.
- Create a chart comparing Creek and Cherokee agricultural methods.
- Prepare a place in the school garden to plant a Three Sisters garden of corn, beans and squash.
- Or, choose another set of companion plants from the book Carrots Love Tomatoes by Louise Riotte.

Day 2:

- Plant the Three Sisters/Companion Plant garden.
- Act out skits of how the plants help each other grow.
- Develop a plan for caring for the garden as the plants grow.

Plant	Friend	Foe
basil	tomato	rosemary
beans	carrot, strawberry	onion
broccoli (cabbage & cauliflower)	potato, bean, rosemary	strawberry
carrot	tomato, bean	dill
corn	peas, squash	tomato
lettuce	everybody!	none!
peanut	corn, carrot	none!
peas	carrot, pepper	onion, potato
potato	bean, corn	tomato, squash
onion	carrot, pepper	bean
squash family (zucchini & pumpkin)	corn, onion, bean, radish, dill	potato
sunflower	corn, cucumbers	potato
tomato	basil, carrot	corn, potato, dill

http://bloominthyme.com/kid-buzz/lessons-in-organic-gardening/



Direct-Sow, Easy-to-Grow:
*The Ancient **Three Sisters** Method*

http://dwellingintheland.blogspot.com/2008/10/anyone-know-how-to-cure-lapbook-fever.html

Assessment for Help a Sister Out

Student Name(s): _____ **Date:** _____

Object Mastered → / Benchmark or Performance Measure ↓	 5 pts	 4 pts	 3 pts	 n/a	TOTAL POINTS
Describe Creek and Cherokee agricultural methods					
Explain the benefits of companion planting					
TOTAL in LAST BOX →					_ /25 pts