1st Grade Garden Lessons
(From the Center for Ecoliteracy Curriculum Binder)

1. Dirt vs. Soil (by Edible Schoolyard, Larchmont Charter School, Los Angeles, c. The Lesson Pathway project developed by Education Outside)

2. Leaf Scavenger Hunt (c. The Lesson Pathway Project developed by Education Outside)

3. Garden Detective Sensory Tour 9by Casey Gold, c. The Lesson Pathway Project developed by Education Outside)

4. Fruits vs. Vegetables (by Maria Sayles, c. The Lesson Pathway Project developed by Education Outside)

5. Worm Diner (c. SF Environment)

6. Plant Part Salad (by Marika Bergsund, c. Growing Great: Inspiring Healthy Eating)

7. 1st Grade Learning Garden Lessons (c. Captain Planet's Learning Gardens)

Dirt vs. Soil

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

LESSON SUMMARY

In this lesson, students use magnifying glasses to explore different examples of soils from the garden while learning that soil is full of living organisms while dirt is lifeless decomposed rocks and minerals.

LESSON OBJECTIVES

Students will be able to:

Use a magnifying glass to observe and draw descriptions of small objects or small features of objects.

Explain that decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.

Explain that soil is alive with insects and microorganisms and therefore better for growing plants than dirt.

ASSESSMENTS

Students will correctly describe the difference between soil and dirt

Students will correctly use the words soil and dirt in context

MATERIALS

Magnifying glasses.

Paper and pens to record observations.

Examples of soil and dirt from the garden (ex. finished compost, sample from worm bin, clay dirt).

Preparation

Set-up several different stations each with a different soil sample on a plate (make sure at least one is full of insects and microorganisms and one is lifeless dirt).

At each station have magnifying glasses and paper and pens for student observations.

PROCEDURES

At the Opening Circle

Ask students if there is a difference between soil and dirt.

Introduce lesson for the day.

In the Field

Divide students into groups (number of groups should be the same as number of soil samples).

Have each group go to one of the stations and observe their sample with the magnifying glasses. Students should record their observations.

After five minutes have all the groups switch soil stations. Continue until each group has been to each station.

At Closing Circle

Invite students to share their observations.

Facilitate discussion about the differences between soil and dirt. Ask students what they think plants will grow best in.

RESOURCES

Edible Schoolyard:
http://edibleschoolyard.org/resource/soil-vs-dirt

Leaf Scavenger Hunt

Find a plant with...

Leaves that smell good

Why would a plant have leaves that smell good?
(To get the attention of helpful bugs such as bees.)

Leaves that smell bad

Why would a plant have leaves that smell bad?
(So animals will not eat them.)

Waxy leaves

Why would a plant have tough, waxy leaves?
(Some desert plants have waxy leaves to help keep water inside.)

Thick leaves

Why would a plant have thick leaves? What might the plant store in its leaves?
(Some plants that live in dry places store water in their leaves.)

Spiny leaves

Why would a plant have spiny leaves? Who are they protecting the plant from?
(Some plants have spiny leaves so animals will not eat them.)

Big leaves

Why would a plant have big leaves? What might collect there? What happens to the soil underneath them?
(Some plants have big leaves to collect water, keep the soil underneath the plant moist, and collect more sunlight.)

Leaves that trap insects

Why would a plant have leaves that trap insects? What does a plant do with the insects that it catches?
(The plant digests the insect and gets minerals from it. This is a way for plants to survive in soil with very few nutrients.)

Leaves we like to eat

We eat food from plants every day! What are some leaves that we like to eat?

Option: Do this scavenger hunt as a blind/caterpillar walk. Ask students to get in a line with their hands on the shoulders of the student in front of them. Lead them through the garden, stopping at leaves with interesting textures, shapes, sizes, and smells. Help them feel and smell the leaves, and ask them what they notice and how these characteristics might help the plant.

Find more garden related scavenger hunts at www.lifelab.org/scavenger-hunt

Fruits vs. Vegetables

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

Lesson Summary

In this lesson, students will look at a wide variety of fruits and vegetables to learn how to identify them.

Lesson Objectives

Students will be able to:

- Learn about how to distinguish between a fruit from a vegetable
- Identify the names of a number of fruits and vegetables

Assessments

Students will:

- Label and illustrate two fruits or vegetables in the worksheet
- Label the part of the plant of two fruits or vegetables

Materials

- Activity Worksheets
- Clipboard and pencils
- Colored pencils
- Assortment of fruits and vegetables, such as:

- apple
- orange
- banana
- tomato
- cucumber
- pear
- broccoli
- squash
- carrot
- beet
- onion
- garlic
- leek
- celery
- lettuce
- chard
- herbs (rosemary, oregano, thyme)
- pea pod
- sunflower
- potato

Before You Begin

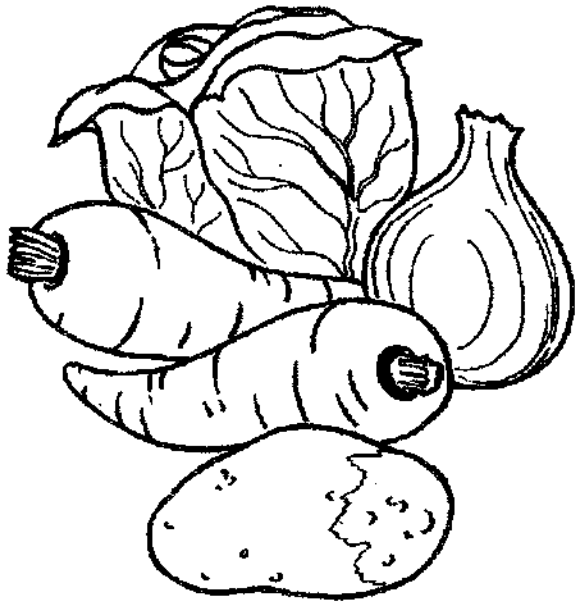
Find as many fruits and vegetables as you can from your garden for the lesson, looking for as much assortment as possible that come from different parts of the plant: root, tuber, stem, leaf, fruit, flower or seed. Gather other samples from the school lunch (from the share table) as examples or purchase from a grocery store.

PROCEDURES

1. Gather the class together and begin by reading the book: **The Fruit is a Suitcase for Seeds** by Jean Richards and/or **Tops and Bottoms** by Janet Stevens.
2. Discuss: What's the difference between a fruit and a vegetable?
   A fruit is what a flower becomes after it is pollinated. The seeds for the plant are inside the fruit. Vegetables are other plant parts. Carrots are roots. Asparagus stalks are stems. Lettuce is a leaf. Foods we often call vegetables when cooking are really fruits because they contain seeds inside.
3. Have the fruits and vegetables in a basket and pull them out one by one and ask the students to raise their hand if they think they are a fruit or vegetable. Identify each one and talk about what part of the plant it comes from.
   Put the plants out on display and pass out the clipboards. Have the students select any fruit or vegetable to identify and illustrate. When they are finished, select a second that is a different plant part.
4. Encourage the students to focus on accurately drawing the objects, emphasizing looking at the shape, color and lines.

RESOURCES

Biology of Plants
http://www.mbgnet.net/bioplants/parts.html



Garden Detective Sensory Tour

Created by Casey Gold, Garden Educator
Hayes Valley Farm, San Francisco

LESSON SUMMARY

This activity empowers youth to awaken their senses and discover their surroundings in a bright new way. Sensory tour *has* been performed at Hayes Valley Farm and on urban excursions around San Francisco; *can* be performed anywhere!

LESSON OBJECTIVES

To learn *experientially about the five senses [sight, hearing, touch, smell and taste]*; to activate use of each sense, both independently and interdependently; to become keen observers and active participants in our surroundings.

MATERIALS

- Many curious young farmers
- 1-2 sensory tour guides
- Small basket for collecting discoveries (optional)

PROCEDURES

Class Discussion

*Discussion is held pre-tour, as a group, and in a circle.

What are our five senses? [Does anybody feel they possess a sixth sense?] Can you name examples of things that characterize each sense? Which sense is your strongest? Which sense do you use most often? Which sense do you use least often? If you had to-Which sense would you give up and why? What do you think would happen if we had to give up one of our five senses?

Action

The tour begins with the group remaining in circle formation. The guide asks participants to imagine what they will **see** on the tour. [This ignites the imagination.] The guide asks participants to close their eyes (or look down if they feel uncomfortable closing their eyes) and observe their sense of **hearing**. "What do you hear? What *don't* you hear? Are these sounds familiar? Close by? What do they tell you about where we are?" The group begins walking across the terrain, respectfully shouting out and listening to observations. The guide uses "What, How, When, and Why" questions to prompt the participants to continue processing their surroundings. "What does this **feel** like, **smell** like, **taste** like?"

Wrap Up

The leader interlaces observations with one another, using single remarks to explain the comprehensive environmental system in which we live. After ample sensory walk time, the group ends back where they began.

OTHER IDEAS

Digging Deeper

The group may use bandannas as blindfolds to heighten sense of sight deprivation. May collect artifacts along the way to take home and share their favorite environmental observations with family and friends.

Fruit vs. Vegetable

Name: _____ Room ____

Name of plant _____

Write TWO words to describe your plant: _____ _____

What part of the plant? **Fruit** **Seed** **Stem** **Leaf** **Root** **Tuber**

Name of plant _____

Write TWO words to describe your plant: _____ _____

What part of the plant? **Fruit** **Seed** **Stem** **Leaf** **Root** **Tuber**

Worm Diner

SF Environment
Our home. Our city. Our planet.

Grades K-2 Meets Grades K-4 Standards

Lesson Summary

Students learn what to feed red worms in a compost bin.

Overview

In this lesson, students will:

- Distinguish plant-based foods from animal-based foods.
- Create a chart that serves as a menu of foods red worms can eat.

Time

30-45 minutes for lesson

Background

Compost is nutrient rich soil created from the breakdown of food and plant scraps. By turning leftover food waste into compost we can continue nature's cycle of returning nutrients back to the earth. Compost helps plants grow strong and healthy without the use of chemical fertilizers and reduces the amount of waste sent to landfills.

Compost can be made at school or home using a worm bin. A worm bin is easy to make and creates a perfect place for red worms to eat **plant-based food** scraps and excrete them into *castings* or compost. Castings is just a fancy word for worm poop! If you're feeding worms in a worm bin, only give them plant-based foods like fruits, vegetables and dry bread. Although worms can eat meat and dairy products, it takes them a long time to do so, and these lingering animal foods will make a smelly mess in your worm bin! For this reason, we treat red worms in a bin like they are *vegans*. A **vegan** is someone or something that only eats plant-based foods. A vegan is also an *herbivore*. Red worms cannot eat metal, glass or plastic, so it's important to keep these items out of a worm bin. Too many foreign objects in a worm bin, including trash like Styrofoam, are harmful and may cause worms to stop producing compost.

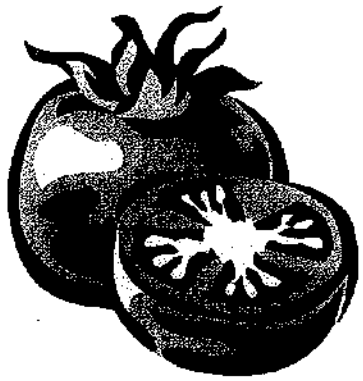
Unlike worm compost bins, the green bins that the City of San Francisco has provided to residents for curbside pick up, can accommodate all food scraps including animal-based foods. In fact, the green bins can accept anything that came from a plant or an animal. This includes items like meat, bones, milk cartons, dirty pizza boxes, used paper napkins and eggshells. While worm compost bins are a great way to learn about the natural cycle of decomposition, and create nutrient rich castings for use on houseplants or in gardens, San Francisco's green bin system is an effective way to divert thousands of tons of organic matter from the landfill. Compost created from the green bin system is used at local wineries and farms and helps rebuild the topsoil in a natural manner free of synthetic chemical fertilizers.

Vocabulary

- Plant-based food
- Animal-based food
- Compost
- Vegan

Materials

- Examples of food scraps such as apple cores, carrot tops, half eaten toast, beans, pasta, meat, cheese, etc. Use actual samples of food or the drawings included in this lesson plan.
- *Worm Diner Take-Out Menu* worksheet: One copy for each student. (Gr. K-1)
- Crayons or markers
- *The Dirt on Composting* Student Fact Sheet (Gr. 3-4) and Reading Comprehension Questions
- Gram Scale
- Tape



Preparation

- Read background information.
- Prepare examples of the different food scraps listed above.
- Locate a place to sort the food items with students. A desk or floor will work if you are using actual food samples. You can also use a two-column chart to tape on the food scrap drawings. *See sample at the end of the lesson plan.*
- Have students read the Student Fact Sheet, *The Dirt on Composting*, and have them answer the reading comprehension questions.

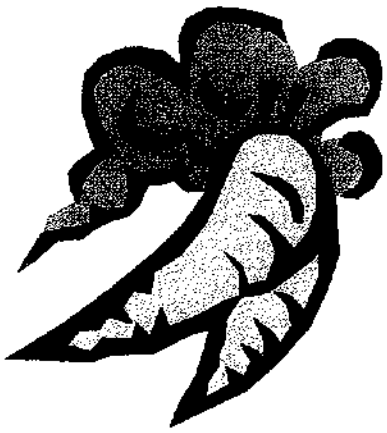
Pre-Activity Questions

Tell students they are going to learn how to feed their leftover food to worms in a worm bin. But first explain that they need to learn where food comes from.

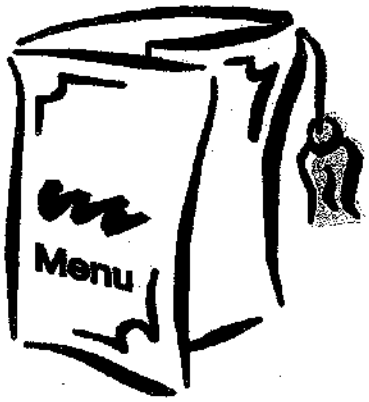
1. What kinds of foods do you like to eat? (*Take all answers)*
2. What is this food made from? (*Take all answers, but the main answers are animals and/or plants. Explain that cheese and milk come from cows and that fruits and vegetables come from plants.)*
3. What fruits or vegetables are in your snack or lunch today?
4. Do they come from plants? *(Yes)*
5. Are there any foods in your snack or lunch like meat, bologna, cheese or milk?
6. Where do these foods come from? (*Animals like cows and chickens*)
7. Do these animal-based foods come from plants? *(No)*

Classroom Activity

1. Tell students that today they are going to learn how to feed their pet worms that live in the class worm bin. Just like all living things, red worms need air, water, and food to live.
2. Tell students they are going to pretend to open up a Worm Diner or restaurant. They will need to make a menu that lists foods that worms can eat. This is what will be fed to the worms living in the worm bin.
3. Explain to students, that worms do not have teeth. Instead, they scoop up their food with their mouth and swallow it whole. Explain that although worms can eat any thing that came from a plant or animal, that the worms eating at the Worm Diner are *vegans*. A vegan is someone or something that only eats foods from plants. That means that these worms should only eat plant-based food like fruits, vegetables, beans, nuts, and grains like rice and wheat that get turned into pasta, bread, cookies and crackers.
4. Explain that if you feed animal foods at the Worm Diner, that the food in the worm bin will get very smelly and stinky before the worms can eat it. The worms that will eat at the Worm Diner need students to make sure the food on the menu is only made from plants.



5. Begin sorting the foods into two piles by holding up one of the food samples. Ask students if the food comes from an animal or a plant and then ask them if it should be served at the Worm Diner.
6. Place foods that worms can eat in a pile labeled "Worm Diner-Yes," and the foods that worms cannot eat in a "Worm Diner—No" pile. Encourage active student participation by giving individual students a food item and asking them to place it into the correct pile
7. Ask students to make a chart with pictures and words that shows what to feed and what not to feed the red worms.
   - Brainstorm a list of items that are common in students' snacks and lunches; write each item on a separate scrap piece of paper; place all the scrap papers in a hat/container and let students each take one.
   - Ask students to draw their item and write its name underneath the drawing.
   - Use the sample chart at the end of the lesson plan or create your own large chart on butcher paper that includes two columns and the headings "Okay to Feed Worms" and " Not Okay to Feed Worms."
   - Have students glue their drawings in the appropriate column.
   - Hang the chart by your worm bin.

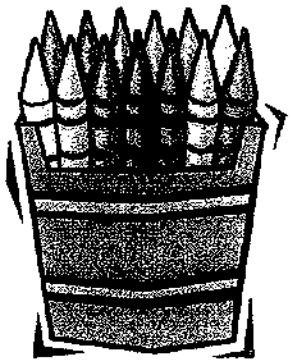


Discussion Questions

1. What happens to the food after the worms eat it? *(They poop it out! Just like all living things, red worms take in nutrients when they eat food, and they excrete or give off "waste.")*
2. Explain that worm poop is called *compost* and it is full of nutrients. Compost is very good for our earth and helps plants grow big and strong. Compost from a worm bin can be collected and placed in a garden or flowerpots.
3. How can red worms help our class reduce what we throw in the garbage? *(They can eat our leftover food that comes from plants.)*
4. Before snack or lunch, divide the class into four teams. Ask each team to bring back one scrap of food about the size of an apple core. These food scraps will be fed to the worms.

Follow-up Activity

1. Write numbers 1 to 6 on note cards or 3"x5" scrap papers and tape them on the top of the worm bin lid, so they create a six-section diagram that students can use as a guide for feeding worms and tracking where the food was placed.
2. Gather food scraps collected by each team; weigh out a half-pound of scraps and bury them in section 1 of the worm bin.
3. Emphasize with students that it is important not to overfeed the worms.

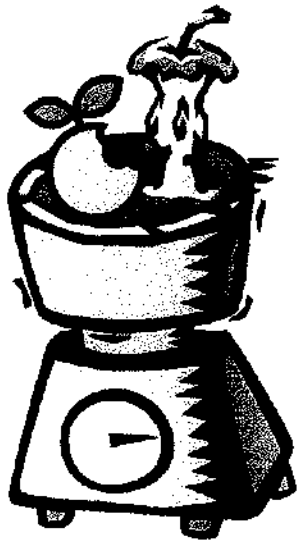


For younger students:

1. Tell students that you need their help a Take Out Menu for the worms.
2. Remind students that worms will only eat food from plants.
3. Give each student a *Worm Food To Go* worksheet and tell him or her to color only the plant-based foods. Ask students to count and write down the number of plant-based food that can be fed to worms.

For older students:

1. Keep a class worm journal next to the bin for students to record data and copy into their own journals.
2. As a class, decide what type of data you will record. Students could record the weight of food added each week, what section of the bin the food was added, and type of food added.
3. After a month, students should use the data to answer questions like: *What plant-based foods do red worms seem to prefer? How much food did the red worms eat in one week? In one month?*



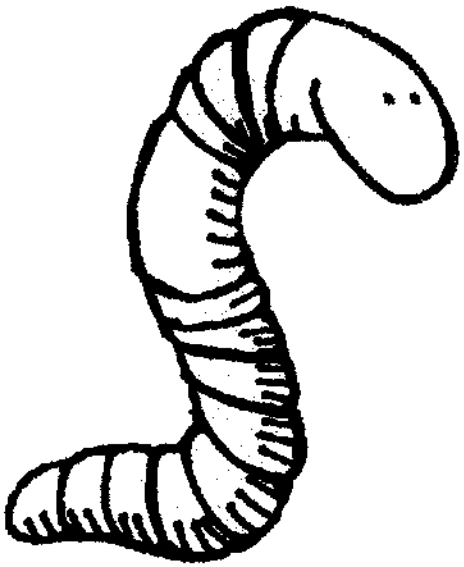
Extensions

- Discuss the differences between feeding worms in a bin in class, which only eat plant-based foods, and using San Francisco's green bin system that accepts all food from plants or animals. Explain that the difference is the green bin takes all things that once came from a plant or an animal. The green bin system uses a different method to break down the food into compost, which is why it can take animal-based foods too.
- Obtain a copy of the poem "Sarah Cynthia Sylvia Stout" by Shel Silverstein from the Internet or library. Read the poem to the class and ask students to identify which items described in the poem could have been composted in a worm bin.

CA State Standards

Gr. K Science 1a • Math A1.1
Gr. 1 Science 1c • Math S1.1
Gr. 2 Science 3e • Math S1.1
Gr. 3 Language Arts R2.3 • Math N2.8, MG1.1
Gr. 4 Science 2c • Language Arts R2.2 • Math N3.0

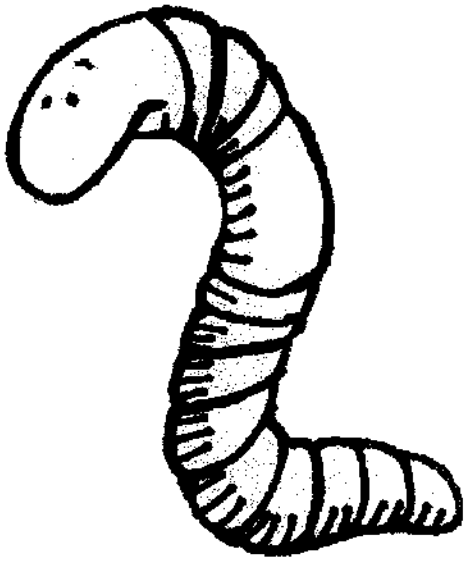
WORM DINER



YES!

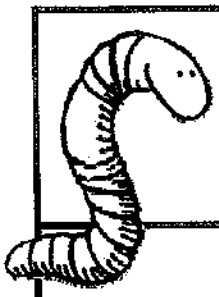
WORM DINER

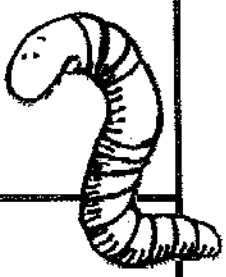
NO!

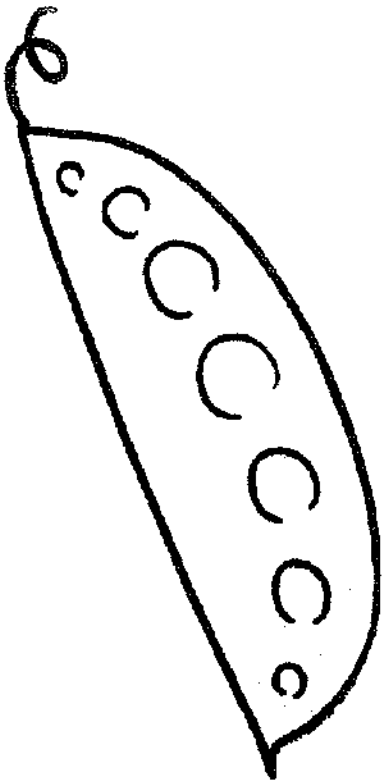


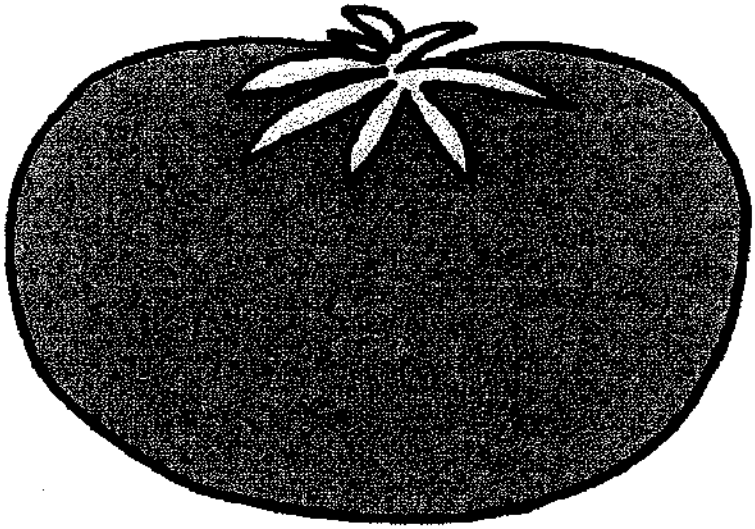
WORM DINER MENU

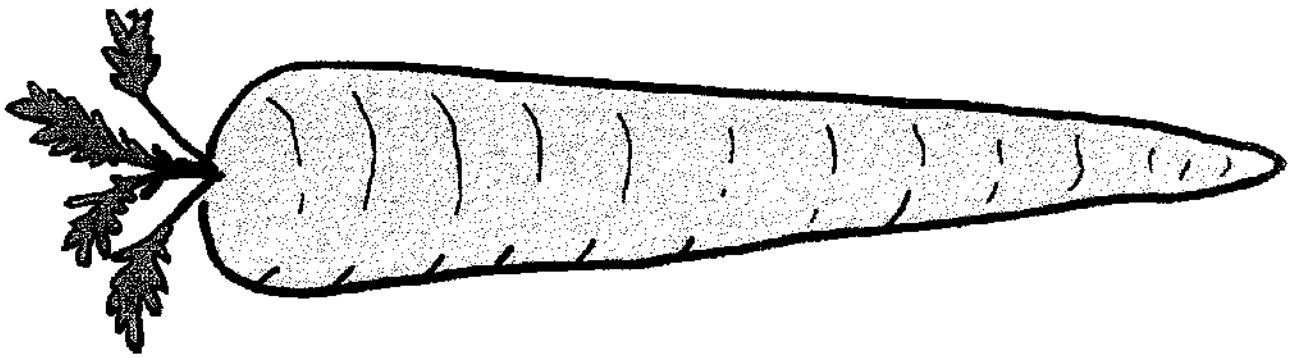
YES!	NO!

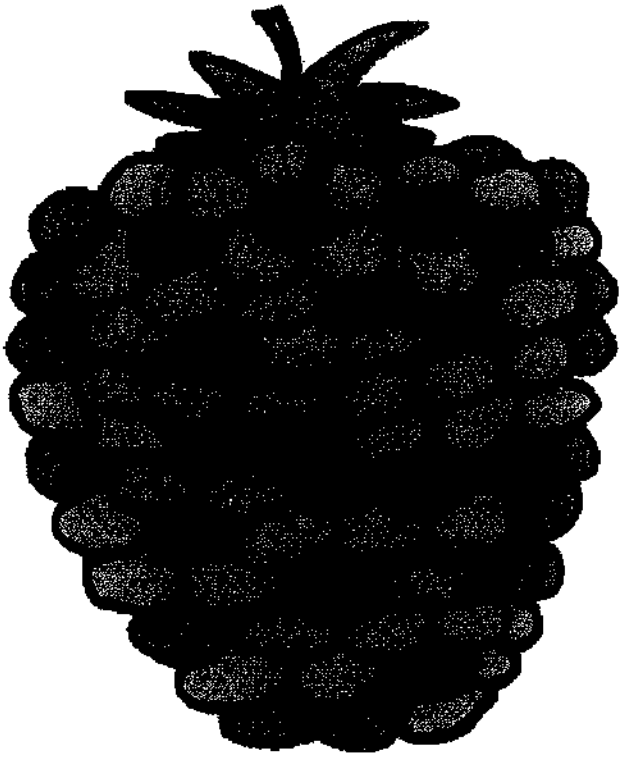


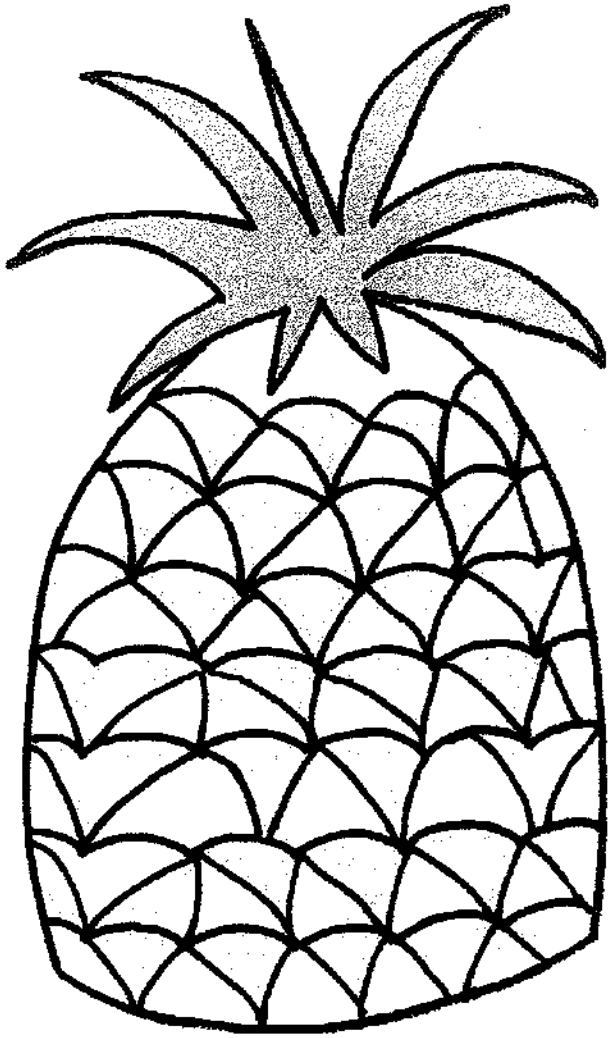


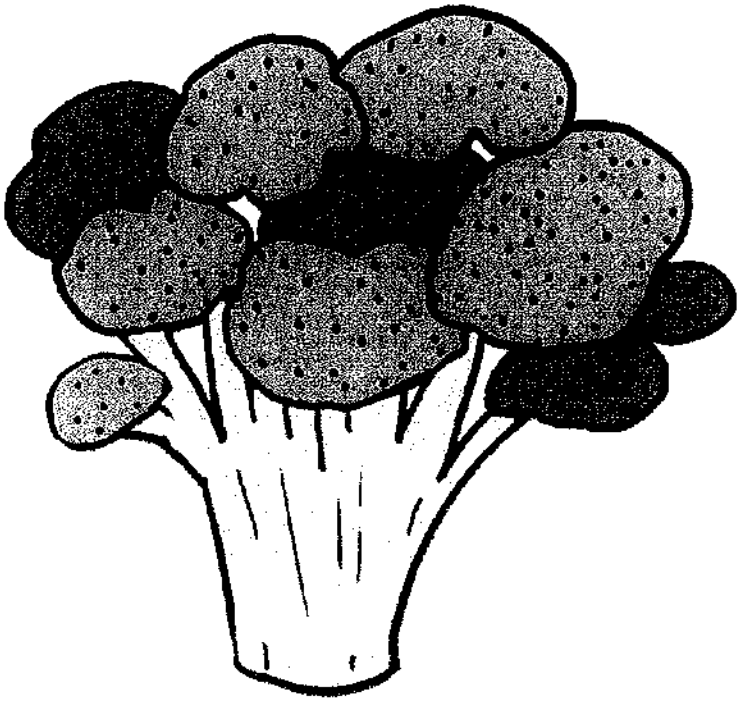


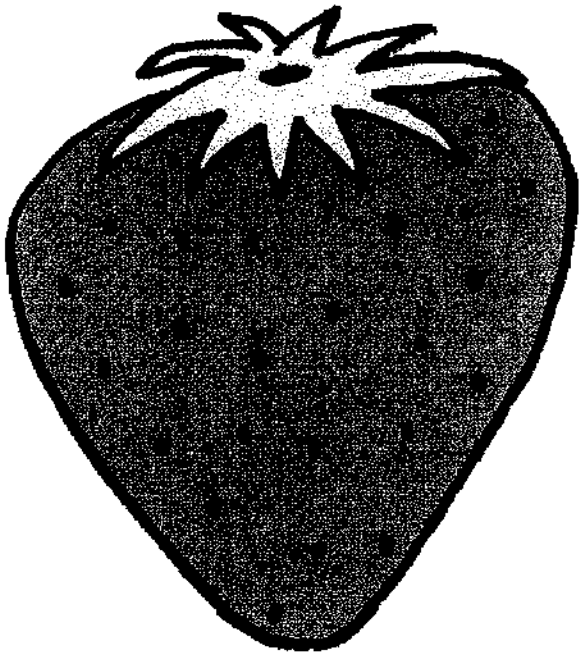


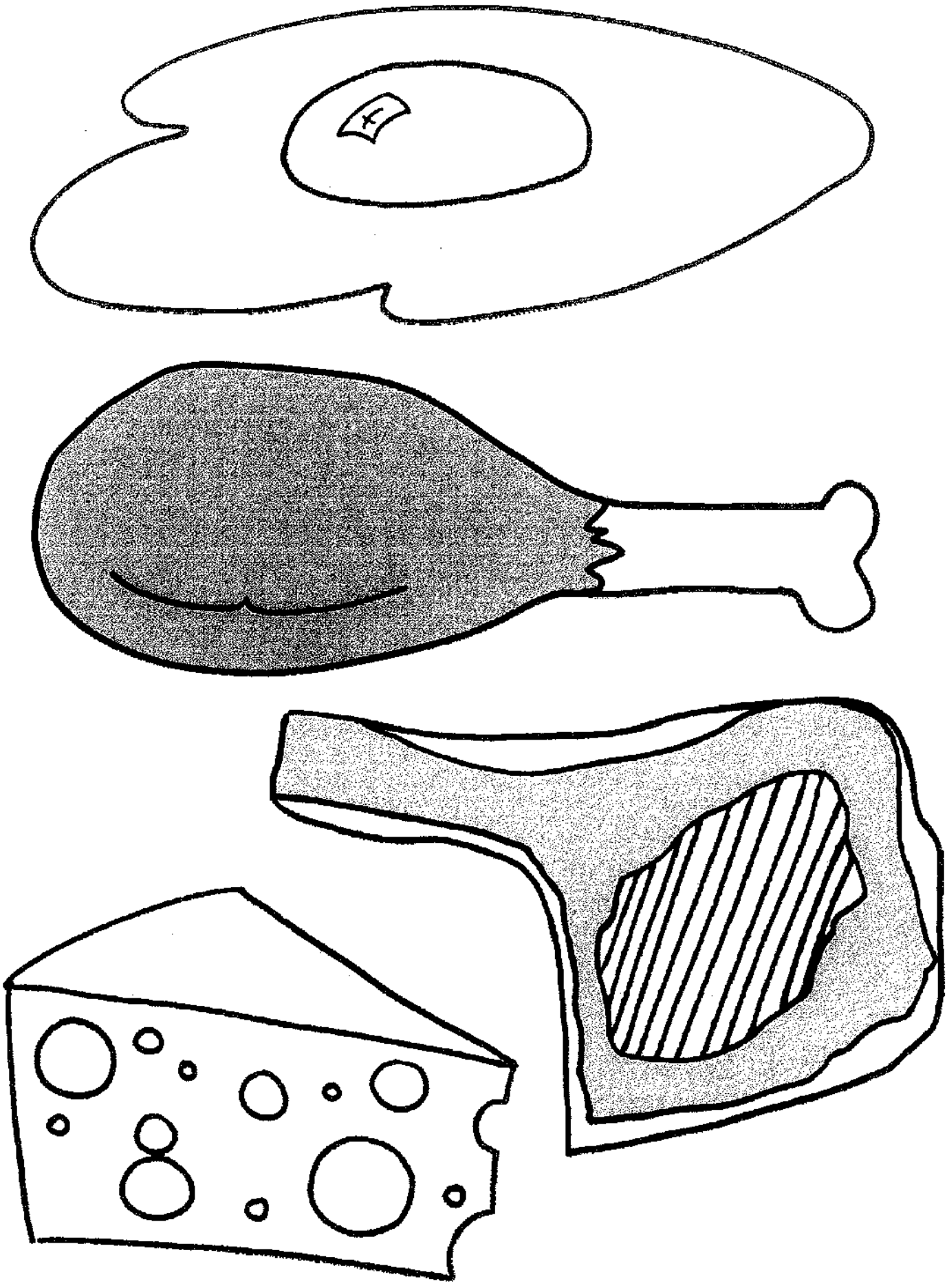










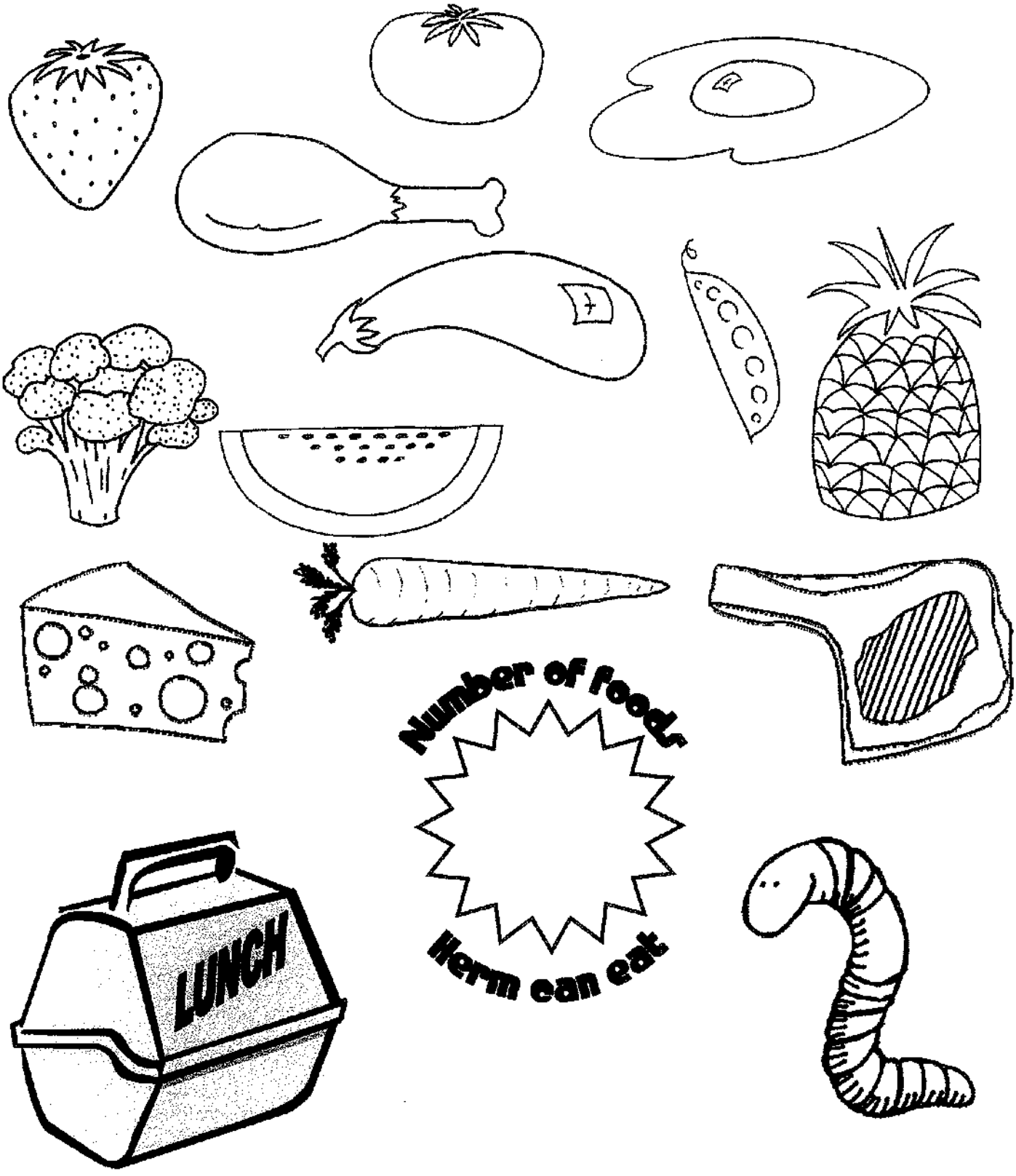


Worm Diner Take-Out Menu

SF Environment

Name_____ Date_____

Herm the Worm is hungry! Help him choose food by coloring ONLY the foods that come from plants. Then count the number of plant-based foods Herm the Worm can eat. Write this number in the star below.



First Grade Fall Garden—Plant Part Salad

Objective:

Students will learn (1) that they eat different parts of plants when they eat vegetables and (2) the primary parts of a mature flowering plant and their function.

California State Content Standards:

1) *Science Standard 2b:* Students know both plants and animals need water, animals need food, and plants need light.
2) *Science Standard 2c:* Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.
3) *Science Standard 2e:* Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.

Lesson Outline:

A. Lesson
   a. People eat plants—fruits, vegetables, grains
   b. Draw basic plant
   c. Label the plant parts and the vegetables we will plant
   d. Review what plants need to grow—soil, water, sun
B. Garden Rules
C. Planting Plan
D. Plant

Materials:

Seeds:

Carrots—Thumbelina, Nante or Babette
Radishes—Easter Egg or Cherry Belle
Swiss Chard—Bright Lights
Lettuce—Two varieties, one green and one red leafed
Broccoli--DiCiccio
Sugar Snap or Snow Peas—be sure they are pole, not bush, if you plan to have a climbing vine

Transplants (optional):

Edible Flowers—Pansies and/or Violas

Lesson:

**THIS LESSON IS BEST DONE USING A WHITEBOARD OR CHALKBOARD TO DRAW THE PLANT PARTS AS YOU TALK. ALSO DO A Q/A TO GET THEM TO GUESS WHICH VEGETABLE THEY EAT IS A ROOT v. LEAF, ETC.

Today we are planting a special salad garden that will teach about the different parts of plants that we are eating when we eat a salad. 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!

When we fruits, vegetables and grains (wheat in bread, rice, pasta), we eat are many different parts of the plant. We will plant vegetables today that represent each of the five major parts of a plant—the roots, stem, leaves, flowers and seed. Here are the vegetables we are planting (this is when you draw the picture—start by drawing a horizontal line for the ground and draw picture from the roots up or you may just use a pre-drawn, labeled drawing):

Roots—Carrots and Radishes—roots bring water up from the ground to the plant.
Stems—Swiss Chard—rainbow colored stems—stems support the plant.
Leaf—lettuces and swiss chard—make food for the plant from sunlight using "photosynthesis."
Flower—Broccoli—the green balls are unopened flower buds. If not eaten, the buds grow into a big bouquet of yellow flowers. If you are doing transplants, pansies and violas are also edible flowers for in the salad—flowers attract pollinators like bees and butterflies to help the plant produce seeds that will grow another plant.
Seed—Peas—individual peas are the seed for the pea plant—you can show them that the peas from the seed package look just like dried out peas they would eat (remind them not to eat seeds because dirty—seeds grow a new plant.

Garden Rules:

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

•Children must NEVER eat a plant or flower they find growing anywhere at school, home or in their neighborhood unless their 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 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, like no running, yelling, climbing, apply in the garden as well.

3) **Listen to instructions** and plant as you are told our 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:

- Students will each get to plant one type of seed to plant
- We will assign each student the type of seed or plant they get to plant
- It doesn't matter what you plant today—the entire class will share the whole salad. You will get to taste everything planted today, and you will not have to eat anything you do not want to eat at the harvest party.

For all seeds: Make rows a 6 inches apart and $\frac{1}{4}$ 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 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 and patting down dirt around it.

First Grade Fall Planting

This week your 1st graders will participate in the GrowingGreat Garden program. The students will work with our garden coordinator and volunteers to learn about the fall plantings and sow seeds in a garden box (that your class shares with another 1st grade class). All activities through the GrowingGreat Garden program support California State Standards in science, language arts, or social studies.

Here are the details for your fall planting:

Plant Part Salad Garden

When we eat vegetables, we are eating many different parts of plants. This garden features the many roots, stems, leaves, flowers, and seeds of plants that we eat. Your students will be planting radishes and carrots (roots), swiss chard (stems), lettuce and chard (leaves), edible flowers and broccoli (flowers), and peas (seeds).

This garden supports the following California State Science Standards:

1) *California State Science Standard 2b:* Students know both plants and animals need water, animals need food, and plants need light.
2) *California State Science Standard 2c:* Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.
3) *California State Science Standard 2e:* Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.

Please visit the garden throughout the fall and winter to see how your plants are doing. We recommend bringing your class to the garden weekly to observe which plant parts your students can identify. We will plan a harvest party in late winter.

1st Grade Learning Garden Lessons: Student Pre- and Post-Test

Date: _____ Name: _____ School: _____

Circle one: PRE or POST

George Washington Carver

Draw a food Dr. Carver found many ways to use:

Where does a sweet potato grow? _____

Plant Parts Salad

Draw a plant and label all the parts you can name:

What is the name of the plant-part that has seeds? _____

Square Foot Fall Garden

What four things do plants need to stay alive? _____

_____ _____ _____

Healthy Eating

What is a healthy thing 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: Plant Parts Salad

CAPTAIN PLANET'S LEARNING GARDENS

Grade
1

Standards
S1L1c HE1.1 a

Time
(1) 45 minute period

Supplies
- Salad spinner or strainer
- Fall veggies/greens harvested from garden representing different parts of plants (plus additional if necessary for whole class to taste)
- Salad dressing (can have students make a basic vinaigrette if desired)
- Tasting materials (small cups and forks)
- Nutrient chart
- Book: *"Eat Healthy, Feel Great"* by William Sears

Overview
Students will harvest their fall vegetables, taste a variety of plants and learn about their nutritional value. Students learn parts of a plant through making a 'plant parts salad.'

Guiding Question
What can I do in the garden? What do I need to know?

Engaging Students
Show students a variety of fruits and vegetables and ask them to name which part of the plant they are. For example:
Fruit: Zucchini, tomato, cucumber (anything with seeds inside)
Seed: Corn, peas
Flower: Broccoli, cauliflower
Leaf: Lettuce, spinach, collards, kale
Stem: Celery (this is really a modified leaf), Asparagus
Root: Carrot, beet, radish

Exploration
Go to school garden and harvest veggies for a salad.

Explanation
Plants have different parts; each part has a special function.
Vegetables are part of a healthy diet, contribute vitamins, minerals, fiber, carbohydrates.

Environmental Stewardship
Compost leftover salad; take steps to care for garden from which vegetables were harvested.

Evaluation
Students can name parts of the plant.
Draw examples of vegetables representing all the parts of a plant.

CONTEXT FOR LESSON ACTIVITIES
Standards
GPS Science
S1L1. Students will investigate the characteristics and basic needs of plants and animals.
c. Identify the parts of a plant—root, stem, leaf, and flower.

GPS Health

HE1.1: Students will comprehend concepts related to health promotion and disease prevention to enhance health. Students will acquire basic personal health concepts that help maintain healthy behaviors and prevent disease. First grade students will understand how healthy behaviors impact personal health and disease prevention.

a. Tell how healthy behaviors impact personal health and wellness.

Next Generation Science Standards

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

• Helpful chart on parts of plant we eat:
http://gardenabcs.com/uploads/plantparty-4.pdf
• Suggestions for plant part salad:
http://www.hhmi.org/coolscience/forkids/vegquiz/partlist.html
• Video on parts of plant:
http://www.brainpopjr.com/science/plants/partsofaplant/preview.weml
• Attached: Eating the Rainbow, parts of the plant my plate charts

PROCEDURES FOR LESSON ACTIVITIES

1. Walk the students outside to the school garden and harvest any vegetables that are ready
2. Explain the nutritional value of these vegetables and how they promote good health. Refer to the Nutrient Chart. They are a good source of:
   - Carbohydrates
   - Calcium
   - Fiber
   - Protein
   - Iron
   - Vitamins and minerals
3. Read the story, Eat Healthy, Feel Great. Talk about the importance of trying new foods and making good, healthy choices.
4. Wash the vegetables before serving. Add a small amount of salad dressing and ENJOY!
5. Conclude the lesson by having each student get out their journals. They are to draw a picture of the vegetables they tasted, identify which parts of the plant is edible for each one (lettuce is a leaf, radish is a root, etc), and write why they are important to their body.

Vegetables

Nutrition Facts

Raw, edible weight portion.
Percent Daily Values (%DV) are based on a 2,000 calorie diet.

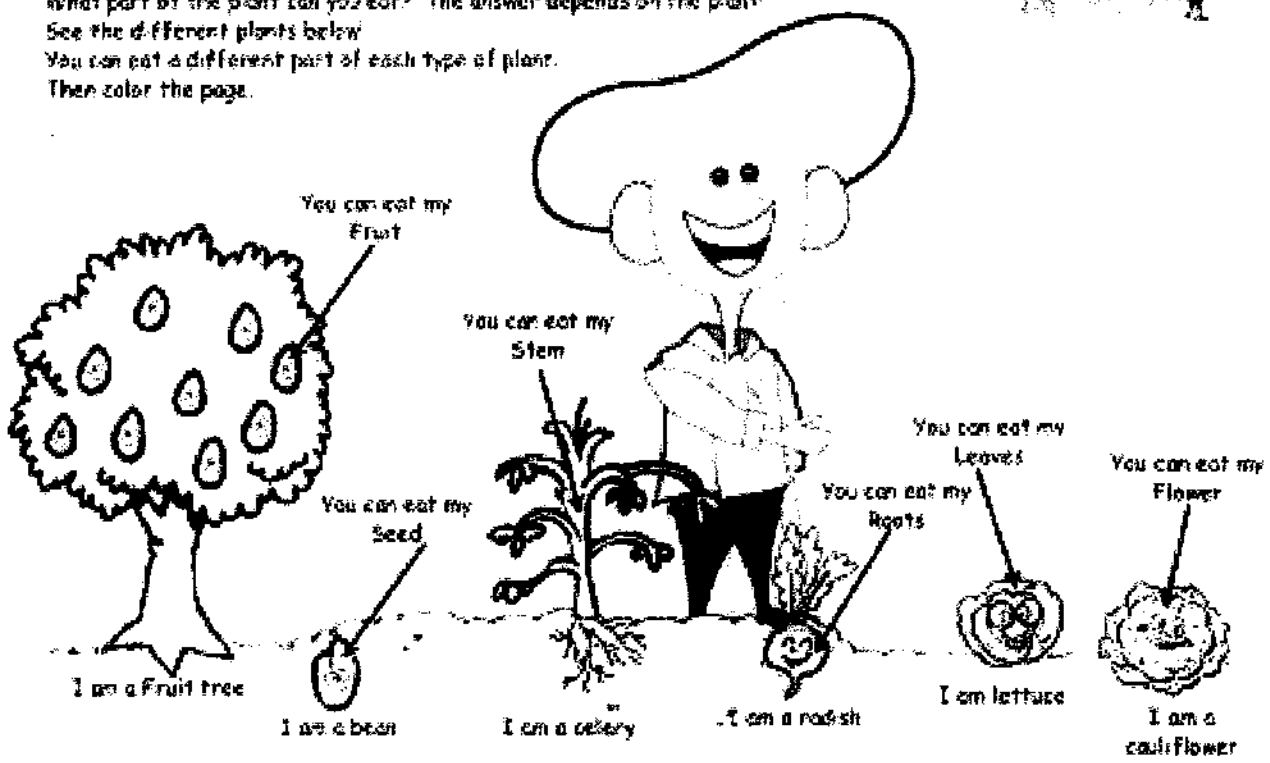
Vegetables Serving Size (gram weight/ounce weight)	Calories	Calories from Fat	Total Fat g %DV	Sodium mg %DV	Potassium mg %DV	Total Carbohydrate g %DV	Dietary Fiber g %DV	Sugars g	Protein g	Vitamin A %DV	Vitamin C %DV	Calcium %DV	Iron %DV
Asparagus 5 spears (93 g/3.3 oz)	20	0	0 0	0 0	230 7	4 1	2 8	2g	2g	10%	15%	2%	2%
Bell Pepper 1 medium (146 g/5.3 oz)	25	0	0 0	40 2	220 6	6 2	2 8	4g	1g	4%	190%	2%	4%
Broccoli 1 medium stalk (148 g/5.3 oz)	45	0	0.5 1	80 3	460 13	8 3	3 12	2g	4g	6%	220%	6%	6%
Carrot 1 carrot, 7" long, 1 1/4" diameter (78 g/2.8 oz)	30	0	0 0	60 3	250 7	7 2	2 8	5g	1g	110%	10%	2%	2%
Cauliflower 1/6 medium head (99 g/3.5 oz)	25	0	0 0	30 1	270 8	5 2	2 8	2g	2g	0%	100%	2%	2%
Celery 2 medium stalks (110 g/3.9 oz)	15	0	0 0	115 5	260 7	4 1	2 8	2g	0g	10%	15%	4%	2%
Cucumber 1/3 medium (99 g/3.5 oz)	10	0	0 0	0 0	140 4	2 1	1 4	1g	1g	4%	10%	2%	2%
Green (Snap) Beans 3/4 cup cut (83 g/3.0 oz)	20	0	0 0	0 0	200 6	5 2	3 12	2g	1g	4%	10%	4%	2%
Green Cabbage 1/12 medium head (84 g/3.0 oz)	25	0	0 0	20 1	190 5	5 2	2 8	3g	1g	0%	70%	4%	2%
Green Onion 1/4 cup chopped (25 g/0.9 oz)	10	0	0 0	10 0	70 2	2 1	1 4	1g	0g	2%	8%	2%	2%
Iceberg Lettuce 1/6 medium head (89 g/3.2 oz)	10	0	0 0	10 0	125 4	2 1	1 4	2g	1g	6%	6%	2%	2%
Leaf Lettuce 1 1/2 cups shredded (85 g/3.0 oz)	15	0	0 0	35 1	170 5	2 1	1 4	1g	1g	130%	6%	2%	4%
Mushrooms 5 medium (84 g/3.0 oz)	20	0	0 0	15 0	300 9	3 1	1 4	0g	3g	0%	2%	0%	2%
Onion 1 medium (148 g/5.3 oz)	45	0	0 0	5 0	190 5	11 4	3 12	9g	1g	0%	20%	4%	4%
Potato 1 medium (148 g/5.3 oz)	110	0	0 0	0 0	620 18	26 9	2 8	1g	3g	0%	45%	2%	6%
Radishes 7 radishes (85 g/3.0 oz)	10	0	0 0	55 2	190 5	3 1	1 4	2g	0g	0%	30%	2%	2%
Summer Squash 1/2 medium (98 g/3.5 oz)	20	0	0 0	0 0	260 7	4 1	2 8	2g	1g	6%	30%	2%	2%
Sweet Corn kernels from 1 medium ear (90 g/3.2 oz)	90	20	2.5 4	0 0	250 7	18 6	2 8	5g	4g	2%	10%	0%	2%
Sweet Potato 1 medium, 5" long, 2"diameter (130 g/4.6 oz)	100	0	0 0	70 3	440 13	23 8	4 16	7g	2g	120%	30%	4%	4%
Tomato 1 medium (148 g/5.3 oz)	25	0	0 0	20 1	340 10	5 2	1 4	3g	1g	20%	40%	2%	4%

Most vegetables provide negligible amounts of saturated fat, *trans* fat, and cholesterol.

U.S. Food and Drug Administration
(January 1, 2008)

What Parts of the Plants Can We Eat?

What part of the plant can you eat? The answer depends on the plant!
See the different plants below
You can eat a different part of each type of plant.
Then color the page.



Assessment for Plant Parts Salad

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

:bject Mastered → / Benchmark or Performance Measure	 5 pts	 4 pts	 3 pts	 n/a	TOTAL POINTS
Students can identify the following plant parts: roots, stems, leaves, flowers and fruit					
Students recognize that vegetables are an important part of the diet because they provide a variety of nutrients, vitamins and minerals					

CAPTAIN PLANET'S LEARNING GARDENS

Garden

Grade
1

Standards
S1L1.a MCC1.G.3

Time
(1) 45 minute period

Supplies
- Garden space made of geometric shapes (eg, rectangular, square, triangular beds) that is prepared for planting
- Watering cans (or any container) full of water
- String, thumbtacks and scissors or • Bamboo stake
- Square foot gardening guide sheet
- Fall vegetable seeds (greens, radish, carrot, beet, turnip, etc) Vegetable planting calendar

Overview
Students learn the basic needs of plants as they identify geometric shapes through planting a fall garden. Students research health impact of eating vegetables from the garden.

Guiding Question
Where is the garden? What is in it? How can I participate?
What vegetables grow best in the fall? What healthy snacks can I grow in the garden.

Engaging Students
Role play:
Ask for 4 or 5 volunteers to do a roleplay about how much space plants need to grow:
- First, have students squish together, squat down, then pretend to grow and bloom. There should be lots of hands in people's faces, discomfort.
- Then, ask students to stand arm's length from each other, squat down, and pretend to grow and bloom.
- Ask volunteers which way was more comfortable
- Share that plants need space for their roots and leaves to stretch out and meet their basic needs.
- Ask class what do plants need to survive?
  - Air, Water, Light, and Nutrients.
  - How do we know?

Exploration
Students choose what seeds they want to plant.

Explanation
Students can describe why plants need to be planted a certain distance from one another.

Extension
Set up an experiment to test that air, water, light and nutrients are basic needs: set up plots and allow class to come up with ways to control variables (cover with a shade cloth, don't water, etc).

Environmental Stewardship
Set up a class roster to care for the garden's basic needs.

Evaluation

Name the basic needs of plants.
Correctly divide seeds in the square foot garden template.

CONTEXT FOR LESSON ACTIVITIES

Standards

GPS Science
S1L1. Students will investigate the characteristics and basic needs of plants and animals.
a. Identify the basic needs of a plant.
1. Air
2. Water
3. Light
4. Nutrients

Math Common Core GPS: MCC1.G Understanding Shapes and Fractions
MCC1.G.3 Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

Next Generation Science Standards
Core Idea LS1 From Molecules to Organisms: Structures and Processes
LS1.B Growth and Development of Organisms

Background Information

- Georgia Organics planting calendar:
ttp://georgiaorga.web707.discountasp.net/plantingcalendar.pdf
- Square foot gardening resources:
http://www.squarefootgardening.com/
http://en.wikipedia.org/wiki/Square_foot_gardening
http://www.backyardplanter.com/squarefoot.html
- Attached square foot gardening examples for teachers as well as worksheet for students
- Recommended books: *Water, Weed and Wait* by Edith Hope Fine & Angela Demos Halpin
The Dandelion Seed by Joseph Anthony: http://www.amazon.com/The-Dandelion-Seed-Joseph-Anthony/dp/188322067X
In a Nutshell by Joseph Anthony

Teacher Preparation

Optional: allow class to choose seeds to plant previous to planting activity.

PROCEDURES FOR LESSON ACTIVITIES

In the classroom:
- Ask class what vegetables they would like to grow in the garden.
- Refer to planting calendar to decide which ones are appropriate to plant for the fall season.
- From those, select a few kinds to plant based on the seeds you have available (or do this part in advance and then acquire the appropriate seeds).
- Ask for 4 or 5 volunteers to do a roleplay about how much space plants need to grow:
  - First, have students squish together, squat down, then pretend to grow and bloom. There should be lots of hands in people's faces, discomfort.
  - Then, ask students to stand arm's length from each other, squat down, and pretend to grow and bloom.
  - Ask volunteers which way was more comfortable.
  - Share that plants need space for their roots and leaves to stretch out and meet their basic needs.
- Ask class what do plants need to survive?
  - Air, Water, Light, and Nutrients.
  - How do we know?

- Refer to Square Food Gardening hand out to find out how many seeds of each vegetable to plant per square foot.
- Organize students into 3 or 4 groups and have each one choose a vegetable to plant from the available seeds. Have each group draw how many seeds to plant per square on the Square Foot Gardening Worksheet.

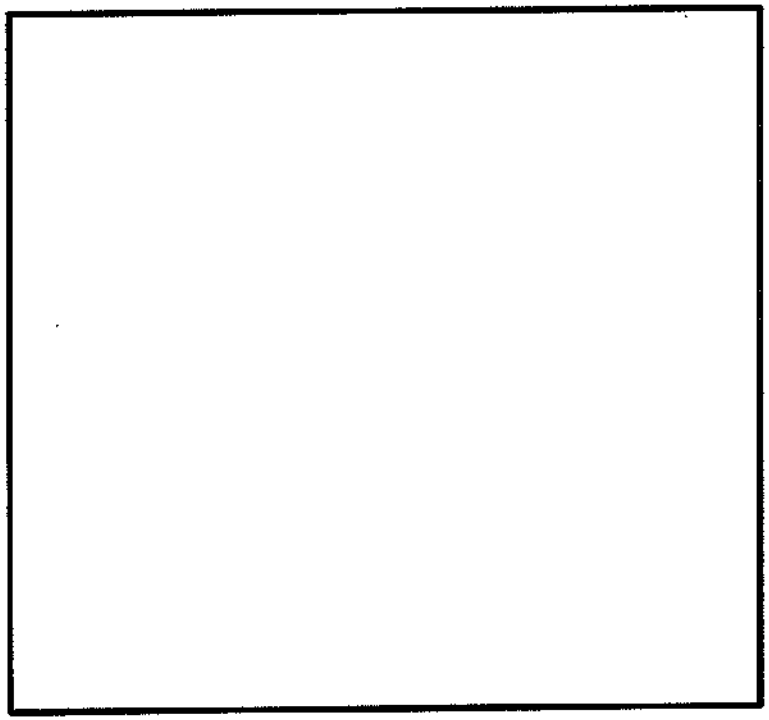
In the garden:

- Create a grid using string and thumbtacks over a raised bed. Or, if there is no raised bed, just lay string in a grid on the ground over soil prepared for planting. Bamboo stakes laid out on the ground are another easy way to make a grid.
- Assign each group one square on the grid, and allow each student to plant a seed (groups can have more than one square if necessary to accomplish this).
- Ask class to identify if these seeds have all their basic needs to survive.
  - Someone will probably recognize that they need water; have watering cans on hand and allow students to water.
- Ask class to identify their own basic needs.
- Ask class how the vegetables they planted will help them meet their own basic needs for health.

My Square Foot Garden

Name:_____

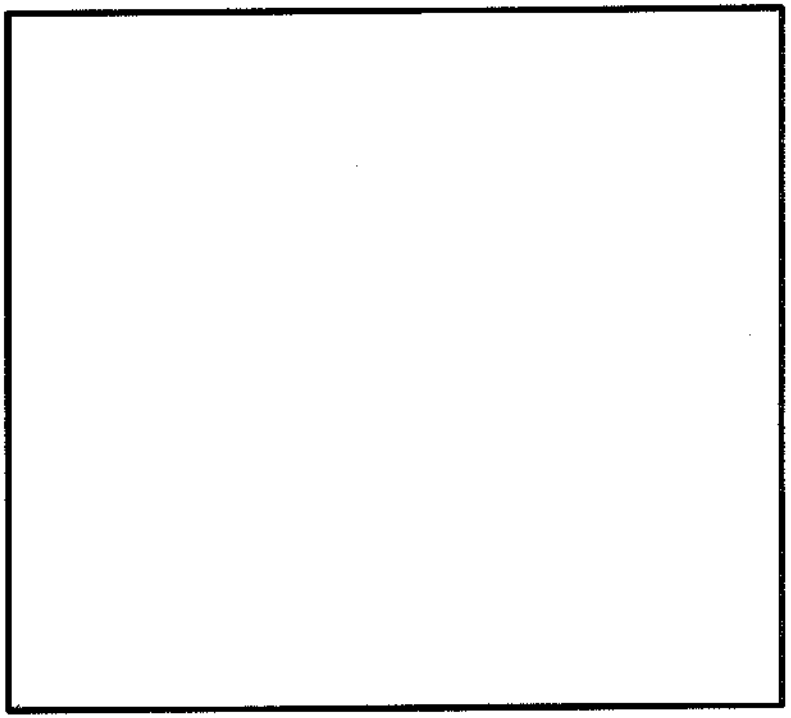
Draw what plants you will put in your square foot garden:



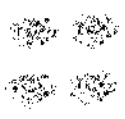
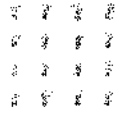
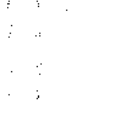
My Square Foot Garden

Name:_____

Draw what plants you will put in your square foot garden:



Square Foot Planting Guidelines

 Garlic. (4)	 Okra. (1)	 Carrots. (16)	 Hot peppers. (1)	 Kale. (2)	 Kohlrabi. (4)	 Head Lettuce. (4)	 Leaf Lettuce. (16)	 Peas. (8)	 Peppers. (1)	 Potatoes. (3)	 Melons. (1)
 Dill. (9)	 Fennel. (2)	 Beans. (4)	 Beets. (9)	 Bok Choi. (1)	 Brussels Sprouts. (1)	 Cabbage. (1)	 Cauliflower. (1)	 Chives. (1)	 Corn. (3)	 Cucumbers. (2)	 Eggplants. (1)
 Oregano. (1)	 Parsley. (2)	 Parsnips. (9)	 Cilantro. (9)	 Rutabagas. (4)	 Radishes. (16)	 Rosemary. (1)	 Pumpkins. (1)	 Peppers. (1)	 Sage. (1)	 Basil. (2)	 Arugula (16)
 Spinach. (9)	 Summer Squash. (1)	 Sweet Potatoes. (1)	 Swiss Chard. (2)	 Thyme. (2)	 onions. (9)	 Turnips. (9)	 Winter Squash. (1)	 Swiss Chard. (2)	 Leeks. (6)	 Celery. (2)	 Calendula. (2)

Assessment for Square Foot Fall Garden

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

ıbject Mastered → / Benchmark or Performance Measure ↓	 5 pts	 4 pts	 3 pts	 n/a	TOTAL POINTS
Students know the basic needs of plants					
Students can divide squares into smaller squares in order to determine correct seed spacing					
TOTAL in LAST BOX →					_ /25 pts

CAPTAIN PLANET'S LEARNING GARDENS

Lesson 3: George Washington Carver and the Sweet Potato

Grade
1

Standards
SS1H1

Time
(2) 45 minute periods

Supplies
Day 1:
- 4-5 whole organic sweet potatoes (conventional sweet potatoes may have been treated with an anti-sprouting chemical)
- Knife
- Jars or clear plastic cups
- Toothpicks
- Biography of GW Carver such as *In the Garden with Dr. Carver* by Susan Grigsby (Teaching guide available here: http://www.alber twhitman.com/resources/BookResources/1/9/documents/aw510.05_carver_tg_r13.pdf)

Day 2:
- Prepared garden space
- Whole organic sweet potatoes
- Sweet potato nutrition facts
- Sweet potatoes and GWC handout
  Whole sweet potatoes

Overview
Students plant sweet potatoes in May to be harvested by the following class in September and learn about George Washington Carver's contributions to agriculture.

Guiding Question
Who was George Washington Carver?
What are some of his inventions?
What can you invent from something in the garden?

Engaging Students
Ask students if they've ever invented anything.
Read story about GWC and sweet potatoes:
http://science.howstuffworks.com/innovation/famous-inventors/george-washington-carvers-inventions3.htm

Exploration
What experiments can students replicate/invent with sweet potatoes in the garden?

Explanation
GWC contributed many things to the development of agriculture in the United States.

Extension
Math: Chart growth and number of leaves of sweet potato slips.
Science: Design an invention.

Environmental Stewardship
Come up with an invention that is good for the environment.

Evaluation
Students can describe GWC's importance in history and agriculture.

CONTEXT FOR LESSON ACTIVITIES
Standards
(outcomes: plant sweet potatoes and learn about Dr. Carver's contributions to agriculture)
GPS Social Studies
SS1H1 The student will read about and describe the life of historical figures in American history.

a. Identify the contributions made by these figures: Benjamin Franklin (inventor/author/ statesman),Thomas Jefferson (Declaration of Independence), Meriwether Lewis and William Clark with Sacagawea (exploration), Harriet Tubman (Underground Railroad), Theodore Roosevelt (National Parks and the environment), George Washington Carver (science).
b. Describe how everyday life of these historical figures is similar to and different from everyday life in the present (food, clothing, homes, transportation, communication, recreation

Next Generation Science Standards
Core Idea LS1 From Molecules to Organisms: Structures and Processes
LS1.B Growth and Development of Organisms

Background Information

George Washington Carver is well known for his work with peanuts, and he also invented hundreds of applications for sweet potatoes. Due to peanut allergies, sweet potatoes are a better choice for school garden experiments. Also, they are easy to grow, and their greens are edible as well as the tubers. This lesson takes advantage of the fact that sweet potatoes can be planted in May and grow with little care over the summer for a fall harvest.

- Growing sweet potato slips: http://www.diynetwork.com/how-to/how-to-plant-and-grow-sweet-potatoes/index.html
- Handout about how to grow sweet potato slips:

http://www.teachervision.fen.com/tv/printables/Moutran_0876283024_166.pdf
http://www.ncsweetpotatoes.com/sweet-potatoes-101/how-to-grow-sweet-potatoes/
http://www.mofga.org/Publications/MaineOrganicFarmerGardener/Fall2003/SweetPotatoes/tabid/1452/Default.aspx

- Attached sweet potato background info

Teacher Preparation

- Choose a book from the many available about George Washington Carver's life to share with your class.

http://www.brainpopjr.com/science/plants/georgewashingtoncarver/grownups.weml
http://www.tuskegee.edu/about_us/legacy_of_fame/george_w_carver/carver_sweet_potato_products.aspx

- Recommended book: *In the Garden with Dr. Carver* by Susan Grigsby

Accompanying study guide (free download):
http://www.albertwhitman.com/resources/BookResources/1/9/documents/aw510.05_carver_tg_r13.pdf

PROCEDURES FOR LESSON ACTIVITIES

Day 1:
- Read about George Washington Carver
- Start sweet potato slips

Day 2 (1-2 months later):
- Read handout on GWC and sweet potatoes
- Plant sweet potato slips in garden
- Look around the garden and try to see it through George Washington Carver's eyes—come up with ideas/inventions using plants or other objects from the garden in ways that help people.

Extensions:
- Math: chart growth of sweet potato sprouts and/or leaves after lesson 1.
- Choose ideas/inventions from class brainstorm to actually try to carry out.

Sweet Potato Background Teaching Information

Nutrition: Sweet potatoes are a nutrient-rich food. They contain high levels of beta-carotene and vitamin E, as well as, potassium, iron and vitamin B6. Sweet potatoes are nearly fat free, cholesterol free and low in sodium. Sweet potatoes are also high in dietary fiber, which is important for a healthy digestive system. The way to get the best possible nutrition from a sweet potato is to eat the skin along with the flesh.

Colors of a sweet potato: Sweet potatoes grow in a variety of colors. Skins come in red, purple, copper, pink and flesh comes in orange, copper, cream, white and purple. The most common is the Covington sweet potato it is pink with orange flesh. The more orange the flesh the higher the nutritional content.

Using sweet potatoes: Sweet potatoes can be baked, boiled, steamed or microwaved. They are great mashed and roasted. Sweet potatoes can be used in baking (to make breads, pies, etc.) and in soups, stews and casseroles. The leaves can be harvested and cooked like spinach. The possibilities are endless!

Storing: Sweet potatoes can last for around 10 months if stored properly. They should be stored in a dry place at between 55-60ºF. Do not store in the refrigerator, refrigeration causes a hard flesh and undesirable taste.

Growing: Sweet potatoes grow best in hot places. Most of our sweet potatoes are grown in the south. They require a long period of time without frost (150 days). They are a fairly easy to plant and grow if you live in a place with the right conditions. Sweet potatoes should be harvested soon after the first frost.

Sweet Potato vs. Yam: In America we use the term "yam" and the term "sweet potato" interchangeably but in the U.S. we really mean "sweet potato". Yams and sweet potatoes are actually a lot different. Yams are an African/Caribbean grown tuber and sweet potatoes are a storage root closely related to morning glories. Yams grow larger in size and are rougher in texture. They are starchy with dry flesh. Sweet potatoes, on the other hand (what we are familiar with), are smooth, sweet, and much smaller in size with a moist flesh. You will most likely never see a true yam in the grocery store here although they may be labeled as one. They are actually sweet potatoes!

Assessment for George Washington Carver

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

oject Mastered → / Benchmark or Performance Measure	 5 pts	 4 pts	 3 pts	 n/a	TOTAL POINTS
Students can identify George Washington Carver's important contributions to history					
Students describe how George Washington Carver's everyday life compares to modern living					
Students know the life cycle of a sweet potato					
TOTAL in LAST BOX →					_ /15 pts