NUMI FOUNDATION
Celebrating People, Planet & Possibility

NUMI Foundation Organic Gardening Program Curriculum: Mixed Age Afterschool Program

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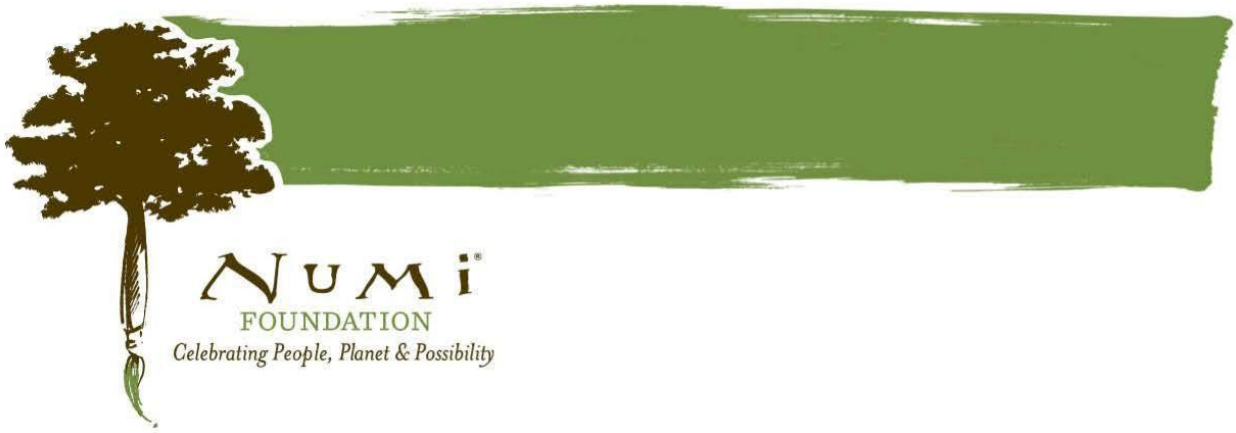

Introduction

What follows are lesson plans that are designed and intended to be intergenerational and across different classes as an after-school program.

Designed in partnership with professional curriculum developers and Numi Organic Tea's founders, the NUMI Curriculum brings nature, artistic expression, and social awareness to children in grades K-6.

To date our organic garden curriculum has reached over 20,000 students at Title 1 (50%+ free/reduced lunch) elementary schools. The gardening program includes free access to our curricula and lesson plans, plus potential funding for field trips to local organic farms, and stipends for instructors and garden stewards. Please contact us via www.NumiFoundation.org with any questions.

All three curricular focus areas meet common core standards for California Public Schools. They were created with flexibility in mind. Use lesson plans individually to enhance your thematic units or engage in the entire curriculum with two lesson plans a week for 30 weeks.

They were developed based on the following principles:

- Children learn to respect and appreciate their family, community, cultural heritage, and environment when they actively participate in a wide range of creative, multicultural, and educational experiences.
- By nurturing creativity and imagination, children develop self-awareness, self-confidence, and the ability to visualize new possibilities.
- When children are equipped with a bigger toolbox of creative skills combined with cultural and environmental understanding, they are more likely to grow into socially conscientious individuals who value and appreciate nature and their community.
- A community that is served by socially conscious individuals will benefit and thrive in a healthy way that benefits both the community, and the world at large.

These source books are offered in partnership with the Numi Foundation education team to support educators with training, professional development, field trips, consultations and more.

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Welcome to the Garden

STANDARDS
K.SL.6

OBJECTIVES
- Students are introduced to the garden
- Students learn about what takes place in a garden
- Students create their rules for the year

MATERIALS
- Large poster board
- Markers

Preparation:
Students are going to develop their own agreements for how to use the garden. While they should establish their class agreements of how to respect the garden and each other, there are some safety rules that need to be decided and explained beforehand. (For example: always walk, always ask permission to use tools, always ask before harvesting, etc.). Also, decide if you want to allow students to touch bugs or not, and be prepared to stand by your decision. Think about what rules you want to establish and be ready to explain and practice them.

Background Information:
It is important to establish that the garden is a special place and emphasize that it is a classroom even though it is outside. Procedures for staying safe in the garden must be established on day one!

Procedure:

- Students come into the garden for the first time and sit in a circle.
- Students are asked to describe what they see.
- “What is a garden? What happens in a garden? Who and what lives in a garden? How can we take care of the garden?”
- “What rules can we agree on to make sure we take care of the garden and each other?” List student responses on the poster board.
- Students sign the poster board (Review these garden rules before entering the garden in following weeks).
- Students explore the garden, practicing the rules they just learned.

Wrap up:

Teacher shows students where to line up at the end of class.

Notes/Feedback:

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Scavenger Hunt

STANDARDS
2.SL.1

Preparation:

Send students on a scavenger hunt. Know beforehand what kinds of things you'll ask them to find. For example: Something orange, a bug, aphids, a healthy plant, a shady spot, something soft, something spiky, a plant you have never seen.

Procedure:

- Students enter the garden and explore.
- Gather students. "I am going to send you on a scavenger hunt. I want to see that you are able to explore the garden while practicing our garden rules."
- Begin the scavenger hunt; have students find each item and gather all students before you announce the next item to find.
- If there is time, let students help suggest items to find in the garden.

Notes/Feedback:

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Plant Part Review

STANDARDS
2.SL.1, 2.SL.3, W.2.8

OBJECTIVES

- Students recall plant parts and their functions
- Students can identify different plant parts in the garden
- Students build their own plant

Preparation:

Know which plants you will bring students to as you discuss each plant part and their function.

Background Information:

Plant Parts and Their Jobs

Roots—Keep plants stable (rooted!) in the ground and absorb water and nutrients from the soil.
Stem—To hold the plant upright, and to bring water and nutrients from the roots up to the rest of the plant. (The stem also brings sugars down from the leaves to the roots, but for second grade purposes it's ok to teach that the stem pulls water and nutrients up)
Leaves—Make food from the sun.
Flowers—Reproduction; to make new seeds.
Fruit—To protect seeds, to attract animals who spread the seeds.

Procedure:

- Students enter the garden and explore.
- Gather students, check in about the season and weather.
- Ask students, “Can you touch your head? Your ears? Your stomach? Your knees? Etc.”
- You have many body parts. Your body parts work together to make your body go, and each part has a special job. Can someone tell what your eyes are responsible for? Your knees? Your feet? If you wanted to eat an apple, would you bring it to your ear or to your mouth?”
- “Just like you, plants have body parts too. Before we go any further into the year, we are going to review all the important plant parts and their functions. I am going to put you to the test today. First, what are the six main plant plants?”
- As students answer, list on the board: Roots, Stems, Leaves, Flowers, Seed, Fruit.
- Do you know any other plant parts? (Bulbs, tendrils, tubers—all modified stems).
- Return to the original six plant parts. “We are going to find all of the plant parts in the garden and review their jobs.”
- Bring students to a tree. Ask one student, or maybe two to try to push it over. “Why can’t they push it over? What part of the plant is keeping the plant strong and stable in the ground?”
- “Right, the roots. What other job do the roots have?” (To absorb/drink water and nutrients from the soil.)
- “Remember when I asked if you wanted to eat an apple, would you bring it to your ear or mouth? If I water a plant and pour the water on its leaves, it’s kind of like sticking an apple in my ear…I can’t eat it through my ear! It’s important to always remember that the roots drink, and to water the soil when watering.”
- Continue looking for plant parts in the garden, and discussing each purpose.
- Once you have finished your tour, test students: “Go find three stems. Find two flowers. Find evidence of roots. Find five different shaped leaves.”
- Gather students. “Find pieces of plants on the ground and leaves that have fallen. ‘Build’ your own plant. You can use any material you find, but be sure to show roots, stems, leaves, and a flower.”
- When students have finished, let them show each other their “plants”.
- Is there anything ready to harvest? Harvest with your kids and ask which plant part they are eating.

Wrap up:

Wash hands.

Notes/Feedback:

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Planting Day!

STANDARDS
2.ESS2.1, W.2.8, 2.SL.1

OBJECTIVES
- Students review the concepts of nutrient cycling and erosion prevention
- Students prepare a bed for planting, and plant

MATERIALS
- Fava beans
- Buckets to collect weeds
- Compost
- Full watering cans
- Craft stick and permanent marker
- Row cloth, if necessary

Preparation:
Know where you are planting! Have all the materials you need (buckets to collect weeds, compost, hand rakes, full watering cans, etc.) ready at the planting site. Fava beans should be planted about 1.5 inches deep, and 4 inches apart (or the width of a child's palm). Roughly estimate how many fava beans you'll need to plant your bed, divide that by the number of students, and then you'll know how many seeds to give each student.

Background Information:

You will be cutting the fava bean plants down before they produce bean pods, but the leaves are edible (and delicious). There is a rare genetic condition, Favism, that causes certain people to get sick from eating fresh fava beans. It tends to affect people from the southern Mediterranean region. Row cloth can be purchased from any gardening store. It is a thin cloth that slows evaporation while still letting light through. You can water right through it and remove it once plants are a few inches high. It will need to be weighed down.

Procedure:

- Students enter the garden and explore.
- Gather students, check in about the season and weather.
- "Today is planting day! Who can tell me the type of bean we are planting today? Knowing that we are in the fall and moving towards winter, what kind of weather did you think fava beans prefer?" (Favas are a cool season crop).
- "Who can tell me two ways that the fava bean plant helps take care of the soil?"
- Review the concepts that certain plants can add nutrients back into the soil, and that plant roots hold onto soil and prevent erosion by wind and rain.
- "Normally in a garden, we plant plants that we want to eat, like potatoes or lettuce or strawberries. Some gardeners plant fava beans to eat, but many plant it for the same reason that we are, to take care of the soil. When you plant a plant not because you want to eat it, but because you want to take care of the soil, the plant is called a cover crop"
- "We are going to plant these fava beans and take care of them until they are big and tall. Once they make flowers, we are going to cut the plants down and let the stems and leaves turn into soil. After the plants have decomposed, we will be able to plant new plants on top, and the soil will be rested, healthy and strong!"
- Bring students to the planting site. Pull weeds, if necessary. Add a little bit of compost. "Why do we add compost to the soil?" and make the area smooth with hand rakes. Students can crush big clumps of soil if there are any and pull stones if there are big ones.
- Distribute seeds to your students. Allow them a minute to explore these big seeds.
- Show students how to lay one seed down at a time, placing a flat hand down as a spacer before laying down the next. There should be about one hand's width in between all seeds. Be careful not to compact the soil while putting hands on the bed. Instruct students that everyone should lay their seeds down first, otherwise students may accidentally plant on top of each other's seeds.
- Once all seeds have been laid down, ask "If we push small seeds in only a little bit, how far do we push big seeds?"

- “Fava beans need to be pushed down about an inch and a half, which is about the height of your thumb.” Show students how to push seeds down with your thumb, pushing until your thumb is all the way in the soil.
- Students push the seeds down.
- “How do we wake up our seeds?”
- Water the soil.
- Label a craft stick “Fava Beans”, and the date, and place in the soil.
- If it is very sunny, or has been very sunny, cover the soil with row cloth to keep the soil moist. You can remove the row cloth when plants are 3-4 inches tall.

Notes/Feedback:

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Garden Journals

MATERIALS

- Journals, pencils

Preparation:

Review garden rules before going outside.

Think about the procedures you would like to establish around journal-writing.

Procedure:

- Students enter and explore.
- Gather students. Distribute journals, “These are your garden journals. We will be using them to draw, and to write. Take good care of them. Now take 2 minutes to find something you want to draw.”
- Discuss procedures around journaling—where students can sit, what they can do when they are done, and so forth.
- Students should find something that interests them and draw it.
- Share and discuss drawings.

Wrap up:

Return journals.

Notes/Feedback:

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Garden Map

STANDARDS
2.ESS2.2

OBJECTIVES
- Students experience working with a map
- Students make thorough observations of the garden

MATERIALS
- Map outline, clipboard and pencil; one per student
- An example garden map
- A plan from a landscape architect, several copies.

Preparation:
Draw a basic outline of the garden for your students to fill in, and make a copy for each student. Fill in a garden map yourself to show as an example. Find and print a drawing/plan from a professional landscape architect, which can easily be found online.

Procedure:
- Students enter the garden and explore.
- Gather students, check in about the season, the weather and the favas.
- "Today we are going to continue our conversation about the garden ecosystem. Can someone remind the class what 'ecosystem' means?"
- "We are going to draw a map of the garden, and label everything we can. I want you to pretend that you are going to give the map to someone who has never been in a garden before, so you need to provide plenty of detail. You will draw and label what you see inside every garden bed (or garden row), all the paths, all the animals and all the trees."

- “This is a lot of work! We are going to spend two class times on this project, so take your time. We are going to go together from bed to bed to work on this.”
- Start at the entrance to the garden. Have students mark the entrance on their map, and draw the plants in their immediate vicinity, and any insects or bugs that they see.
- Move to the next area, which may be the first bed, or row. “What plants are here? Draw what you see, and label.”
- Move with the students from bed to bed. Ideally, after being guided through the first few areas, the students get in a rhythm and can work independently.
- Hopefully students are noticing animals and insects, and can describe their relationships to the plants that they are eating or living in.
- When class time is almost over, gather students and collect the maps.
- Show students the drawing that a landscape architect drew. “What you were just working on is drawing the map of our garden. A landscape architect has a similar job. He or she also draws outdoor spaces, and helps design what they look can look like. Look at all the detail in the drawing, all the buildings, trees, paths, and other plants.”
- Pass out the copies of the drawings for students to look at.

Wrap up:

Collect all materials.

Notes/Feedback:

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Fall

STANDARDS
W.2.8, 2.PS1.1

OBJECTIVES

- Students recall what they know about the season of fall
- Students learn that there are predictable weather patterns and changes associated with the seasons
- Students make observations related to the season

MATERIALS

- A large poster board, prepared as explained below.
- Enough index cards for all your students
- Pencils, crayons
- Permanent marker

Preparation:

On the poster, write FALL in large letters at the top. Also have sections that say: Weather, We Harvest, We Plant, Garden Jobs, Special Fall Changes. Each section should be big enough to fit at least 5 index cards. Students will be drawing on their index cards, and you will assemble them on the poster board and glue them down. Find a spot in your classroom to hang your Fall poster. Outside, have the cards, pencils, and crayons ready so that the first students can begin drawing as you distribute cards.

Background Information:

[You may need to help your students with this activity. It will be easier when you make the Winter poster and the Spring poster later in the year.]

For your information:

Fall Weather: Sunny, Partly Cloudy, Rainy, Windy
Food we harvest: Pumpkins, Apples, Pears, Corn, Winter Squash, Potatoes, Figs, Grapes (There are more, of course. You can also use examples from your own garden)
Foods we plant: Greens, lettuce, radish, carrot, beets, fava beans, peas, wheat (Again, there are more examples, and you can use examples from your garden)
Garden jobs: Planting, weeding, watering (when it is not raining), mulching, planting cover crops, preparing the garden for winter (And any others you can think of)
Special Changes: Animals migrate, leaves change color and fall, days get shorter, first rains.

Procedure:

- Start class by taking students on a walk through your campus, looking for signs of fall. Before even going outside, ask students what kinds of things they may be looking for.
- After your exploration, come into the garden and explore, also looking for signs of fall.
- Gather students, check in about the season and weather.
- "What signs of fall did you see around school? What did you see in the garden?"
- "Though we think of fall as a pretty chilly time of year, sometimes in Oakland the beginning of fall can be quite warm. We have a temperate climate which means that it does not usually get extremely hot or extremely cold. We have to look harder for signs of seasons here, but we can see them if we pay attention. Another change from summer to fall is that we have less and less hours of daylight. Many animals know that when the days start getting shorter, it is time for them to start migrating. Can anyone think of an animal that migrates? What are insects that we see less of in the fall, and many of in the spring?"
- "We are going to make a fall poster together, which will list the season, the weather, the foods that we harvest, the foods we plant, the fall garden jobs, and special fall changes. We are going to go category by category, and when you have an idea, raise your hand and I'll call on you. I'll write it in marker on the bottom of this card, and you will draw a detailed picture. For example, if I ask 'What is the weather like in the fall?' If I call on someone who says 'Sunny', I'll write 'Sunny' on the bottom of this card and hand it to them, and they will draw a picture of a sunny day and then color it in. Of course, there is more than kind of weather in the fall, so multiple students can answer."
- Go through the sections, handing out cards. Students who already have cards should be able to work independently. If students finish early, they can do multiple cards, if there are enough.
- Assemble the poster and glue cards down, allowing students to admire their work.

Wrap up:

Collect and return materials.

Notes/Feedback:

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Wildflowers

STANDARDS
2.LS4.1, 2.SL.6, 2.LS2.2

OBJECTIVES
- Students learn that to attract pollinators, one must provide food
- Students understand that pollinators play an important role in the garden
- Students understand that a fall sowing of seeds ensures a spring blooming

MATERIALS
- Wildflower Seeds
- Soil to mix with the seeds

Preparation:
One risk of sprinkling wildflower seeds throughout the garden is that they can be confused for weeds, and may be pulled. You can choose to designate a section solely for the pollinator garden, or you can disperse such a copious amount of seed that even if a few plants get pulled here and there, there will still be plenty of plants blooming in the spring.

Background Information:
Most garden stores sell wildflower seed mixes. You may want to choose a mix with flowers native to your area that are adapted to your climate. There usually are further specifications on seed mixes, such as seeds for a sunny garden or a shady garden.

Procedure:

- Students enter the garden and explore.
- Gather students, check in about the season and weather.
- “Can someone tell me what pollen is? Where is pollen found? What does pollination mean? Which insects are pollinators?”
- “Two of the most common pollinators in a garden are bees and butterflies. Why is it so important to have pollinators in our garden?”
- “Can you name 10 things that we eat that depend on insect pollination?” (Fruit, some nuts, “vegetables” that are really fruits like cucumbers, tomatoes, and pumpkins).
- “Well, if we want bees and butterflies to visit our garden, we need to invite them!”
- Look at the sky and shout, “Bees!!! Butterflies!! Please come to our garden!!” Look around theatrically, trying to see if any have come.
- “Do you think that will work? If we want to invite, or attract, pollinators, how should we do it?” (Planting flowers—which provide food).
- “We are going to plant wildflowers! Do most flowers bloom in the fall and winter, or spring and summer?”
- Draw this as you explain, “Fall is an excellent time to plant wildflower seed. What happens is that we sprinkle them into the soil now, and we let the rain water them—just like in nature. They spend all of fall and winter developing strong roots. As winter ends and the world warms up again, the plants are all ready to start blooming. We will have many pollinating visitors as our flowers begin to bloom.”
- Pass out a pinch of wildflower mix to each student. Let them look at the different sizes, shapes and textures of the seeds. Have them cup their hand with the seeds in it, and add a small handful of soil. Have them mix the seeds and soil together. Show them how to sprinkle this soil/seed mix into the garden. Great places are next to established plants, in corners, around the edge of the garden, near the garden entrance, or wherever inspires your class.
- Allow students to plant; encourage them to take their time.
- Discuss.
- Are there any pollinators in the garden at the moment? If so, have students observe them. Challenge students to notice as the number of bees or butterflies decrease as winter approaches.

Wrap up:

Wash hands, if necessary.

Notes/Feedback:

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Insects

STANDARDS
W.2.8, 2.SL.1, 2.PS1.1

MATERIALS

- Journals, pencils, crayons
- Watering cans, full

Preparation:

Fill the watering cans.

Procedure:

- Students enter the garden and explore.
- Water the favas, if necessary. Have they sprouted?
- Go on another insect hunt. Challenge students to move silently through the garden.
- Distribute journals and pencils. Have students find and draw one insect, and one non-insect (like a snail or spider).

Wrap up:

Share, in partners.

Notes/Feedback:

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The Parts We Eat

STANDARDS
1.ESS1.2, LS1.A, W.1.8, 1.L5.C

OBJECTIVES
- Students begin to identify the plant parts of the foods they eat
- Students taste different plants

MATERIALS
- Fruits and vegetables to eat, one per plant group. For example: Nuts (seeds), carrots (roots), celery (stem), lettuce (leaf), orange (fruit), broccoli (flower)
- Soap to wash hands
- Printed pictures of foods you choose, in their whole form. For example: An almond tree, a carrot growing with leaves and stems, a picture of a whole celery plant, an orange tree, a whole lettuce plant, and a whole broccoli plant.
- Compost bin
- Tools for garden work

Preparation:
Know of any allergies in your class. Prepare foods so that each student can have a bite of each.

Procedure:
- Students enter the garden and explore.
- Students explore the light spots, and the wheat.
- Gather class, and check in about the season, weather, and explorations.

- “We just spent nearly two months learning about the different parts of the plant. We studied each in depth, we talked about how they work together, and we even built a new plant. Today we are going to taste each plant part! Every time you eat a plant, you are eating one of the plant parts. I want you to start thinking about that when you eat.”
- Put students into six groups, and give each group a printed picture. They need to figure out what the plant is, and which part they eat. (For example: We have an orange tree, we eat the fruit). You may need to go from group to group and assist them.
- Wash hands.
- Share out one at a time. After each group, taste that fruit or vegetable. Encourage students to describe the tastes. (If a student does not like something, teach them to say “It’s not for me” instead of “This is gross!” Acknowledge them for trying something new, and direct them to the compost bin.)
- After all groups have shared out, vote on favorites.
- Have students help clean up, and wash hands.
- Do garden work.

Wrap up:

Return tools, and wash hands again, if necessary.

Notes/Feedback:

This is the end of the fall semester sequence!

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Garden Work

MATERIALS

- Watering cans
- Tools necessary for garden work.

Preparation:

What garden work needs to be done? Prepare a garden work project.

Procedure:

- Students enter the garden and explore.
- Check on the favas, water them. Pull weeds if necessary.
- Bring students to the area you prepared for garden work.
- What can be harvested in the garden? Have a tasty snack.

Wrap up:

Return materials, wash hands.

Notes/Feedback:

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The Garden FBI

STANDARDS
4.SL.1, 4.ESS2.1

OBJECTIVES

- Students learn about the garden FBI
- Students can name an example of Fungus, Bacteria and Invertebrates
- Students understand the importance of decomposition

MATERIALS

- Hand lenses, class set
- Watering can

Background Information:

The FBI (Fungus, Bacteria, Invertebrates) are decomposers; they are responsible for breaking down organic matter. Fungus includes mold and mushrooms. Bacteria already lives on organic matter, but does not start to break down organic matter right away. Invertebrates that decompose include worms, roly polys (pill bugs) and slugs

Procedure:

- Students enter the garden and explore.
- Gather students; check in about the season and weather.
- "What is decomposition? Name 5 things that can decompose. Why is decomposition important?" Discuss.
- "Close your eyes. Imagine a forest. Leaves fall, trees fall, and animals die. Imagine that none of these things decomposed. Imagine, after 100 years, how messy the forest would be! Imagine after thousands of years…"
- "Now imagine that trees and plants are pulling nutrients out of the soil, but that no nutrients are going back to the soil. Eventually there will be no nutrients left for the

roots to find. Then what?"

- "Again, why is decomposition important?"
- "Decomposition is the basis for the nutrient cycle –that is the recycling of nutrients back into the earth. Plants pull nutrients from the earth and contain these nutrients (which animals eat!). When plants die, they decompose and the nutrients go back into the soil for the next plants to use. It's a cycle that has always existed. The nutrients that exist now are the same nutrients that have always been on the planet, just in different forms!"
- "But the question remains—what turns dead plants into soil? What breaks it down?"
- "There are three main categories, and we lovingly call them the garden FBI." On your board, write Fungus, Bacteria, Invertebrates.
- "Before we start. Have you ever left food out too long in your house? What does it start to look like as it gets older and older?" (Mushy, moldy, slimy.)
- "Many of you mentioned mold! Mold is a type of fungus. Mushrooms are also fungus. If you have ever seen a tree that has fallen down, you probably have seen mushrooms growing on it. The mushrooms are decomposing the tree." (Write mushrooms and mold under Fungus).
- "B stands for Bacteria. What do you know about bacteria?" Discuss.
- "Bacteria cannot be seen without a microscope. Bacteria are all over our bodies, and inside our bodies. Most bacteria help our bodies, only some kinds make us sick. Bacteria is in the soil, and on our plants. When a plant dies, only then do bacteria start to decompose."
- "I stands for invertebrate. Vertebrate means with a spine. Invertebrate means without. Are you a vertebrate or an invertebrate? Can you think of which invertebrates in the garden eat dead plants?" (Slugs, worms, roly polys).
- "When a plant dies, the garden FBI shows up and takes care of business. Are they interested in an apple growing on a tree? What about when the apple falls?"
- Distribute hand lenses; students explore the garden, looking for the FBI, or evidence of the FBI. Look under trees, in woodchips, under logs, and for fallen fruit. Remind students that if they find mushrooms, be sure to not touch them!
- Water greens, if necessary.

Wrap up:

Return materials.

Notes/Feedback:

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ASSESSMENT: Building a Compost Pile

STANDARDS
4.ESS2.1

OBJECTIVES

- Students learn about different types of compost piles
- Students learn about components of a compost pile
- Students build a compost pile

MATERIALS

- Brown, carbonaceous materials
- Green, nitrogenous materials
- Hose, or full watering cans
- Compost bin, if using one

Preparation:

Do your research about building compost piles.

Gather all materials needed at the compost building site. This is an assessment in that you are encouraging your students to use their knowledge of decomposition to help build the pile.

Background Information:

Refer to Teacher Supplement for additional information.

Procedure:

- Students enter the garden and explore.
- Gather students, check in about the season and weather.
- "Today we are going to build a compost pile! Before we get started, can someone remind us what soil is made of?" Discuss.
- "Yes, part of soil is made from decomposed plants. What does decomposition mean? Whose job is it to break down all the dead organic matter on earth? Why is this important?"
- "When farmers and gardeners build compost piles, we are copying nature. We are looking at how she recycles her nutrients. In nature, nothing is wasted. Did you know that in the United States, landfills are full of food scraps and food waste? All of that food can be recycled back into the earth if given the chance to decompose. Let's recycle our plant waste into something we can use to feed the new plants we grow: compost."
- Build the compost pile, teaching students as you go. You may want to have a student or two just in charge of keeping the pile wet.
- Stand back and admire your work. Ask, "Who do you think is going to show up to take care of this pile? How do you think the pile will change over time?"
- Water the greens, if necessary.

Wrap up:

Return materials, wash hands.

Notes/Feedback:

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Mulching for Warmth

STANDARDS
4.ESS2.1

OBJECTIVES

- Students learn several reasons why mulching is important
- Students understand that mulching is a form of biomimicry
- Students mulch the greens

MATERIALS

- Bags to collect leaves
- Full watering cans

Preparation:

Are there many fallen leaves in the garden? If so, great! If not, find a place on campus where you and your students can collect fallen leaves.

Background Information:

Mulching is simply putting something under a plant, covering the soil under the leaves and above the roots. Common mulches are woodchips, leaves, straw or even compost. Mulching is done for a variety of reasons: to slow evaporation and thereby save water, to prevent weed growth, and to keep a plant warm. Mulching can often prevent soil from freezing. Most greens are frost tolerant, but still appreciate the extra warmth.

Procedure:

- Students enter the garden and explore.
- Gather students, check in about the season and weather.
- “What do animals do to prepare for the winter? What do plants do?” Discuss.
- “Many trees drop their leaves to prepare for the winter. With less sun, the trees essentially ‘hibernate’ and focus what little energy they have on their roots underground. The fallen leaves help the tree in several ways. Can anyone think of how?”
- “For one, the leaves keep the soil under the tree warm. It is like a little blanket at the base of the tree. Secondly, the leaves eventually decompose, and all those nutrients from the leaves end up back in the soil for the tree to use in the spring. What will change the leaves into soil?” (The FBI!).
- “Gardeners and farmers have been copying nature for a long time. Just like we copy the forest when we make a compost bin, we copy the leaves that fall when we mulch. This is called bio-mimicry—copying the earth.”
- Discuss mulching—materials you can use and benefits of each.
- Either in the garden or out, collect leaves. Be sure to leave some leaves for the tree!
- Back in the garden, bring students and leaves to the greens.
- Show students how to mulch. Crush up some leaves and cover the area under the plants. Make a thick layer.
- Water the greens.

Wrap up:

Wash hands, return materials.

Notes/Feedback:

NUMI FOUNDATION
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Ecosystems

STANDARDS
4.LS1.1, 4.LS1.2, 4.ESS2.1, 4.SL.1

OBJECTIVES

- Students can define ecosystem to mean an environment composed of living and nonliving things
- Students know that ecosystems can vary greatly, but are consistent in being comprised of living/nonliving
- Students investigate the ecosystem within the compost pile

MATERIALS

- Materials for garden work

Preparation:

Identify the area in the garden that students will be weeding, thinning or watering after the lesson. If the weather has been dry and the garden needs water, you can ask students about the rainfall trend in your ecosystem. If you are going to be weeding, you can ask students about competition for resources in an ecosystem. Any garden project you do can be related back to this lesson, just be sure to identify some areas to work beforehand. Also, write ECOSYSTEM on the top of your whiteboard.

Background Information:

An ecosystem is a community of living and non-living things that work together. Ecosystems have no particular size. An ecosystem can be as large as a forest or as small as a tree. This lesson is meant as a review. In past grades, ecosystems are defined relatively simply. Here the idea is to reinforce that all elements in a system work together. This lesson will serve as a foundation for following lessons in attracting pollinators, discussing the roles pollinators have within a system, food webs, and even donating produce—what role do we have in our community?

Procedure:

- Students enter the garden and explore
- Gather students, check in about the season and weather.
- “Let’s look around our garden. Can you name what you see?”
- Teacher lists student responses on whiteboard. Teacher should list responses into two columns, one with living organisms and one with nonliving, but should not tell students why he/she is organizing it that way. If students aren’t listing nonliving things, some prompting may be necessary. Nonliving things should include soil, water, air and heat/sunlight.
- After all responses have been taken… “I have listed your answers into two columns. Can anyone see the pattern? Why did I separate your responses? How are the things in column A different from column B?
- Facilitate a class discussion.
- “You just described our garden ecosystem here in Oakland. You figured out that it is made from living and nonliving elements. The living things depend on the nonliving, and the nonliving can be affected by the living. They work together. The point here is consistent with what we have been discussing for the past weeks. Though each plant part has its job, its greater job is to work with the other parts to help the plant grow and reproduce. Same goes the compost pile, the FBI works together to decompose plant material.”
- “A forest ecosystem is also compromised of living and nonliving components. You can imagine that there are different living things in a forest, or in the desert. Again, everything in the system works together.”
- Teacher asks: “You listed soil as a nonliving element in an ecosystem. But soil is alive, and each handful contains billions of microorganisms. But it’s made up of nonliving things like rocks, and sand and decomposed plant matter. Would you consider soil living, or nonliving?”
- Discuss.
- Bring students to the compost pile. Pull out a chunk, and let students dig through it. “What are you finding? How are the FBI working together in here?” (One example is that the bugs generally break the bigger pieces apart, and the fungus and bacteria work on the smaller pieces. In general, the FBI works together, not one part can decompose by itself.)
- When all have finished, return the plant material back to the compost pile. Gather students and do the garden work that you have prepared.

Wrap up:

Return materials, wash hands.

Notes/Feedback:

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Food Webs

STANDARDS
4.LS1.1, 4.LS1.2, 4.SL.1

OBJECTIVES
- Students learn that the ecosystem is a web, not chain
- Students learn surprising connections among elements in a web
- Students discuss consequences of altering the web

MATERIALS
- Blank stickers (i.e. name tags)
- Permanent marker
- A ball of yarn or string

Preparation:
For this web to work properly, students must represent decomposers, plants, animals, as well as the sun, soil, and water. Remember that decomposers can "eat" anything (and return it to the soil), plants can "eat" sun, soil, water and get eaten by animals. Animals eat plants or other animals, and get "eaten" by decomposers.

Procedure:
- Students enter the garden and explore.
- Gather students, check in about the season and weather.
- "Last week we talked about food chains, can somebody name one?"
- "Like we have been talking about all year, nature actually works in a system, in a community, where all parts work together. I will show you how. First, as a class, name everything you see in the garden."
- If a student says "Greens", give him/her a sticker that says "Greens" on it. Continue

until all students are labeled. Push students towards naming the less obvious (sun, soil, water) and decomposers (fungus, bacteria, invertebrates). Once all students are labeled, gather everyone in a standing circle.

- Give one student the string to start. Instruct him/her to hold on to one end. "Pass the rest of the string to someone that you eat, or get eaten by." The next person holds onto the string, and passes the ball of string to someone they eat or get eaten by. Continue until everyone is in the web.
- (This could look something like: Greens → soil → Lettuce → Caterpillar → Bird → Fig tree → Fungus → Ladybug → Aphids → Wheat… etc.).
- "This is not a chain, this is a web! We are all connected to each other. This is a system, an ecosystem. When we looked at animals at the 'top of the food chain' last week, the animals that don't get eaten, we can see now they do get eaten, by the decomposers. The decomposers return everything to the soil, where new plants grow from. It is all connected in an intricate web of life."
- Ask the 'fungus' to pull on his/her part of the string. Ask "Who else feels the tug? Who is connected to the fungus?" Ask the 'ladybug' to pull the string. Continue, finding interesting connections between unexpected members of the ecosystem.
- "What would happen if I sprayed a chemical that killed all the ladybugs? Would that affect the rest of the ecosystem?" Discuss.
- I am going to ask the 'ladybug' to drop his/her part of the string. If you feel your string move when his/her drops, then you can drop yours as well, and so on. Ask the 'ladybug' to drop his/her part of the string.
- The whole web should collapse very quickly.
- Gather students. "What did you learn from that activity?"
- Discuss.
- Probe, "What connections surprised you? What did you learn from the part when the whole web collapsed? If someone came to you and said they wanted to kill all the aphids on their farm, what might you say to them?"
- "Some animals on our planet are going extinct. How does that affect the habitat in which it lives?"
- Continue exploring the garden.

Notes/Feedback:

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Getting Ready for Spring

STANDARDS
1.ESS1.2, LS1.A

OBJECTIVES
- Students learn how to plant seeds in pots
- Students understand some advantages to planting in pots
- Students recognize that planting again means the onset of spring

MATERIALS
- Pea Seeds
- Potting Soil, in a plastic tub
- 6-pack planting containers
- Craft sticks, permanent marker
- Watering cans, full of water

Preparation:
There are many varieties of pea seeds available, and most will do fine. You can do a mix and see which variety does better in your area, just be sure to keep track of where you planted each variety. You can soak the pea seeds for a few hours before you plant.

Background Information:
There are several advantages to starting seeds and then transplanting them later. You can protect them from extreme weather and pests. You can monitor moisture as well.
When potting plants, you moisten the soil first, then put the moistened soil in the potting plants. Only then do you plant. The seed packet will tell you how deep to plant, but as a rule of thumb, the depth you plant is double the height of the seed. Students should spray the pots with water every day, unless it rains or otherwise the soil is still moist. Over the weekend, the plants will do fine if you place the pots in a shallow tray with water.

Procedure:

- Students enter the garden and explore.
- Students check on the light spots, the wheat, and feed the worms.
- Gather students, and check in about the season, and the weather. Spend time discussing the signs of spring, and the changes in temperature.
- "As gardeners, we always keep track of the season and weather patterns. One big job in the spring is to start planting again. There is more daylight, and the soil has warmed. We are going to plant peas today. We are not planting them directly into the soil, but rather in these little pots? Anyone have any ideas why?"
- "Yes, we can protect our little plants as they germinate and grow a little. We can make sure they have enough water and warmth, and we can protect them from animals like slugs, snails and birds that love to eat little plants. Once we plant them in the garden in a few weeks, they will be bigger and strong. Also, the soil will have warmed up a little more."
- "Does anyone know what kind of weather peas prefer?" (Warm, but not hot. Cool, but not freezing). "In the Bay Area, this means that we can grow peas in the fall and spring. We are starting them now, before the hot summer days."
- Bring students to the area in which you'll plant. Pour water onto the soil and have them help mix. It should be wet, but not sopping. If you squeeze a handful of soil and water is escaping, it's probably too wet. Add soil. In small groups, give students a 6-pack cell. Have them fill the cells to the top, but do not squish the soil down. Demonstrate how deep to poke a hole. Ask what would happen if they pushed the seed too far down or left it sitting on top of the soil.
- Distribute seeds and have students plant one seed per cell. Place the pots in a sunny, protected place. Write the date and variety on a craft stick (one per pot) and place them in the pots.
- Ask students if the seeds have water to sprout. Ask if the little sprouted plants have food (yes, in the soil), air (also in the soil), and sun (yes, the plants are in a sunny place).
- Have students wash hands.
- Do "Seed Bodies". Have students pretend to be pea seeds that are being planted in little pots, and eventually transplanted into a big garden. Go through the life cycle of the pea plant.

Wrap up:

Return tools, wash hands.

Notes/Feedback:

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Nitrogen Fixation

STANDARDS
4.ESS2.1, 4.LS1.1

OBJECTIVES
- Students learn about nitrogen fixation
- Students understand the mutually beneficial relationship between a special bacterium and the fava bean
- Students understand that cover crops are planted to improve soil quality

MATERIALS
- Watering cans
- Tools for garden work
- Labeled index cards
- Masking tape

Preparation:
If there are already fava beans (or any other legumes—peas, or other beans) growing in the garden, try to pull one out before class. You should be able to see the nitrogen nodules on the roots. Label twelve index cards with the following -- Label one 'fava bean', label one 'bacteria' and label five cards 'sugars', and another five 'nitrogen'.
Prepare garden work.

Background Information:
Nitrogen fixation is the process by which certain legumes "fix", or put, atmospheric nitrogen into the soil. Nitrogen is an extremely important plant nutrient. Certain legumes, including fava beans, have a relationship with bacteria from the genus Rhizobium, which cause the formation of root nodules. The bacteria live in the nodules and create food (nitrogen) for the plant, and the plant supplies food in return.

Procedure:

- Students enter the garden and explore.
- Gather students; check in about the season and weather.
- Take one volunteer; bring her to the front of the class. Tape the card that says 'fava bean' on her. Hand her the five cards that say 'sugar'.
- "This is our fava bean, a full-grown plant. Last week we talked about how cover crops protect the soil from wind and rain, and how plants in the legume family add nitrogen to the soil. What do you remember about nitrogen from our soil testing day?"
- "I am going to show you how this plant brings nitrogen into the soil. It's a special plant, it gives more to the soil than it takes." Take a volunteer and bring them up to the fava bean. Tape the card that says 'bacteria' to them, and have the bacteria sit next to the fava bean's roots. Hand them the five cards that say 'nitrogen'.
- "This is a special bacterium, called Rhizobia. You don't need to remember its name, just know that it is a bacterium. The fava bean and the bacteria have a special deal." (Have the fava bean and bacteria shake hands.)
- "The bacteria live on the bean's roots. The plant is making sugar from the sun and bringing it to its roots. The plant is letting the bacteria eat some of the sugar." (Fava bean hands the bacteria a 'sugar' card."
- "In exchange, the bacteria take nitrogen out of the air in the soil, make it solid, and put it on the bean's roots for the bean to use." (The bacteria hand the bean a 'nitrogen' card.)
- "And so on and so forth, they get along quite nicely." (Bacteria and bean continue exchanging cards.)
- "The bacteria get sugar to eat, and the bean gets nitrogen to grow. This process is called 'nitrogen fixation'."
- If you have a sample fava bean or pea plant, pass it around, showing students the solid nitrogen nodules on the roots. They can break them apart and open them, they should be pink on the inside. Volunteers can sit down.
- "This is an amazing plant to put in your garden. We can cut the fava beans down before they use up all their nitrogen to make bean pods. The favas will decompose into the soil, adding nutrients. Also, the nitrogen on the roots will stay in the soil and be available for the next plant to use."
- Discuss, take questions.
- Do garden work, including watering the fava beans.

Wrap up:

Return materials, wash hands.

Notes/Feedback:

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Spring has Begun!

STANDARDS
W.2.8, 2.PS1.1

OBJECTIVES

- Students recall what they know about the season of spring
- Students learn that there are predictable weather patterns and changes associated with the seasons
- Students make observations related to the season

MATERIALS

- A large poster board prepared as explained below.
- Enough index cards for all your students
- Pencils, crayons
- Permanent marker
- "And Then It's Spring" by Julie Fogliano (or something similar)

Preparation:

On the poster, write Spring in large letters at the top. Also have sections that say: Weather, We Harvest, We Plant, Garden Jobs, Special Spring Changes. Each section should be big enough to fit at least 5 index cards. Students will be drawing on their index cards, and you will assemble them on the poster board and glue them down. Find a spot in your classroom to hang your Spring poster. Outside, have the cards, pencils, and crayons ready so that the first students can begin drawing as you finish distributing cards to the rest.

Background Information:

[For your information, some basics are listed below. Add or edit based on the specifics of your garden.]

Spring Weather: Sunny and warm, Sunny and chilly, Rain showers.
Food we harvest: Lettuce, radish, fava leaves, peas (There are more, of course. You can also use examples from your own garden).
Foods we plant: Greens, lettuce, radish, carrot, peas, and warm weather crops such as tomatoes, sunflowers, cucumbers, melons and so forth. (You may or may not plant warm weather crops in your school garden, just be sure to explain to your students that spring is the time when you can begin to plant heat-loving plants).
Garden jobs: Weeding, watering (when it is not raining), planting a spring garden, pulling old plants, protect plants from heat.
Special Changes: Flowers bloom, bulbs sprouts, leaves grow back on trees, days become longer and warmer, insects return, birds return from migration, and so forth.

Procedure:

- Start class by taking students on a walk through your campus, looking for signs of spring. Before you even go outside, ask students what kinds of things they may be looking for.
- After your exploration, come into the garden and explore, also looking for signs of spring.
- After students have explored the garden, but before you gather in your outdoor classroom, bring students to a place with exposed soil. Have students sink their hands in the soil. “Remember how cold the soil was in the winter? How does it feel now?”
- Gather students, check in about the season and weather and the radishes—have they sprouted?
- “What signs of spring did you see around school? What did you see in the garden?”
- “Often spring seems short in Oakland. All at once, days seem warmer and longer, trees are blossoming, flowers are blooming, and before we know it, it is hot and summery. We will have to pay attention to the kind of spring we have this year.”
- “Compared to the winter, does the spring have more or less daylight? (Are days longer or shorter?) Do you think plants grow faster or slower?”
- Read “And Then It’s Spring” and discuss. Compare spring in Oakland with the spring depicted in the book.
- “Just like we did in the fall and winter, we are going to make a spring poster together, which will list the season, the weather, the foods that we harvest, the foods we plant, the spring garden jobs, and special spring changes. We are going to go category by category, and when you have an idea, raise your hand and I’ll call on you. I’ll write it in marker on the bottom of this card, and you will draw a detailed picture. For example, if I ask ‘What is the weather like in the spring?’ If I call on someone who says ‘Some days are sunny and warm, I’ll write ‘Sunny and warm’ on the bottom of this card and hand it to them, would will draw a picture of a warm, sunny day and then

color it in. Of course, there is more than kind of weather in the spring, so multiple students can answer."

- Go through the sections, handing out cards. Students who already have cards should be able to work independently. If students finish early, they can do multiple cards, if there are enough.
- Do the radishes need watering? Send students to water the rest are finishing.
- Assemble the poster and glue cards down, allowing students to admire their work. Replace the winter poster with the spring poster.

Wrap up:

Return materials.

Notes/Feedback:

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Spring and Sunflowers

STANDARDS
3.ESS2.1, 3.ESS2.2, 3.LS3.2

OBJECTIVES
- Students discuss signs of spring
- Students discuss the spring climate
- Students plant sunflowers

MATERIALS
- "And Then It's Spring" by Julie Fogliano
- Sunflower seeds
- Compost
- Row cloth
- Watering cans, full
- Craft sticks, permanent marker
- Hand trowels, or something similar (optional)

Preparation:
Know where you will be planting sunflower seeds. An ideal bed will have plenty of hours of sunshine each day. Avoid planting sunflowers where they can shade other low growing plants. Bring all the tools and materials that you will need to the planting area.

Procedure:

- Students enter the garden and explore. Some students are recording weather data.
- Gather students; check in about the season, the weather and the leaf cage.
- Weather collectors share data.
- "It is spring! What changes do you notice? What changes do you expect that you will begin to notice? Before we begin collecting data, how would you describe the Oakland spring climate? How is it similar, or different to the winter climate?"
- Read "And Then It's Spring" and discuss.
- Compare and contrast Oakland's winter and spring climate to the climate depicted in the book.
- "What plants prefer cool weather? Which prefer warm weather?"
- "Spring is a special time in the garden. With the promise of longer, warmer days, gardeners have a lot of work to do! What kinds of jobs does a gardener do as the winter ends and spring begins?" (Prepares beds for a big planting).
- "Today we are going to plant sunflowers. Sunflowers require plenty of heat and sunshine to grow. They are also 'heavy feeders', meaning they also require soil with plenty of nutrients. What is something we can add to the soil to make sure it has plenty of nutrients?" (Compost)
- Bring students to the area where you are going to plant sunflowers.
- "We are going to do an experiment. We have been learning about decomposition this year, and the importance of the nutrient cycle—that is, knowing that plants absorb nutrients from the soil, but that decomposed plants that also add nutrients back in. We are going to add compost to half of the bed and plant the other half without compost. We will measure the height of the sunflowers for the rest of the school year. What do you suspect will happen?"
- Add compost to half of the bed, and dig it in.
- Encourage students to be quiet and mindful during planting. Following the spacing directions on the seed packet, plant the sunflower seeds. Label the bed with the sunflower type, and date.
- Water the seeds, cover with row cloth.

Wrap up:

Return materials, wash hands if necessary.

Notes/Feedback:

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Planting Day!

STANDARDS
LS1.A

OBJECTIVES
- Students handle pea seedlings gently
- Students learn how to transplant seedlings

MATERIALS
- Pea seedlings
- Mulch (store bought, or woodchips)
- Watering cans
- Hand trowels

Preparation:
Mark spots for planting.

Procedure:
- Students enter the garden and explore. Check on the light spots, and the wheat.
- Gather students, check in about the season, the weather and other observations.
- "It is planting day! We are going to transplant our peas from their cozy little homes into the garden. I want you to imagine that you are the pea. All you have known is your tiny little home. It's safe and warm. Then someone pulls you out of your home and puts you into a huge space. You'd be a little frightened, yes? It's almost like your first day of school. All you've known is your house and your family, and then you go into a huge school with lots of people! Well, what we are about to do the peas is hard for them too. We can make it easier by being very, very careful with them." Gather students at the area that they chose last week.
- Show students how to dig a hole at each marked spot.

- Give each student a pea seedling; show them how to hold it very, very gently—without touching the roots. Have them identify the roots, stem, and leaves. Have the tendrils started to appear?
- Organize students into a line so that planters have space.
- Show students how to carefully lower the start into the hole. The hole should be slightly deeper than the height of the roots. Gently fill in the soil and make a shallow "moat" around each plant.
- When all the students have finished, let them gently water into their transplants. Remind them that only roots drink, and that they should only water inside the moats.
- Distribute a handful of mulch to each student and have them spread the mulch over the moat.
- Ask, "Why are we covering the soil?" (The mulch prevents evaporation).
- Stand back and appreciate your hard work!

Wrap up:

Return materials and wash hands.

Notes/Feedback:

Meal Planning

STANDARDS
4.SL.1

MATERIALS
- Full watering cans

Procedure:
- Students enter the garden and explore.
- Students find and identify 4-6 plants that are ready for harvest.
- In groups, plan “meals” that they could make from the produce in the garden.
- Gather class, have groups explain the meal that they would make from the garden.
- Water the fava beans, if necessary.

Wrap up:
Return materials.

Notes/Feedback:

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Tendrils need Trellises

STANDARDS
1.LS1.1, LS1.A

OBJECTIVES
- Students learn about the role and function of tendrils
- Students build a trellis

MATERIALS
- Pictures of different types of tendrils, if not available in your garden
- Bamboo poles
- Twine
- Scissors

Preparation:
Find examples of tendrils in your garden; vines have tendrils. If you can't find any, print pictures to show. (Pumpkins, cucumbers, grapes, and morning glories all have tendrils.)

Background Information:

Tendrils are specialized stems. They grow out from the stem, and curve around until they touch something, and when they do, they attach. Plants with tendrils use them for support and for climbing.

Procedure:
- Students enter the garden and explore. Check on the wheat and the light spots.
- Gather students, check in about the season, weather, and other observations.
- Bring the pea starts. Show the students, and have students describe what they see.
- "When we planted these peas in their pots, we discussed what type of weather

they prefer. Does anyone remember?"

- "Next week, we are going to take the peas out of their homes, and plant them in the garden. You said that peas like to be warm but not hot. Let's find a sunny place for the peas that gets some shade during the day."
- Look for a place to with your students to plant the peas next week. Look at the objects around the garden that will cause shade (fences, tall plants, trees).
- Once you have chosen a place, return students to your circle.
- Have students list the 6 plant parts they have studied this year, and list them on the board.
- "Today we are going to learn about a new plant part called a "tendril". It is a special part of the stem that only certain plants have. Plants called vines have tendrils. Does anyone know what makes a plant a vine? What do vines do?"
- "Vines grow up fences, or in nature, they grow up other plants. To help them climb up, they have tendrils. Tendrils grow out of the stem and are very curly. They twist and twist until they find something to grab onto."
- If you have vines with tendrils in your garden, show your students. If not, show pictures of different types.
- "Peas grow as a vine. They have tendrils and are much healthier when they grow up. We need to build them a structure to grow onto, and this structure is called a trellis."
- Bring students to the area that you will plant.
- Before you build your trellis, prepare the area for planting. Pull any weeds, break any big clumps of soil, and add compost. Rake the area smooth. Narrate the steps as you do them with your students. Ask questions along the way. "Why are we pulling weeds? Why are we adding compost? Why are we smoothing the soil?"
- Place your bamboo poles or stakes at either end of the row, and every 2-3 feet along the row. Tie a knot with the twine on the bottom of the first pole. Show students how to wrap the twin around each pole and pull the twine taut. (Keeping the twine taut is very important). Have students take turns. You will need to help, and you will probably need to finish the trellis as the students cannot reach any higher.
- When you have finished, tie off your trellis.
- Stand back and enjoy your work!
- Water the peas.
- Feed the worms.

Wrap up:

Return materials.

Notes/Feedback:

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Helping the Earth

STANDARDS
3.ESS2.1, 3.ESS2.2, 3.LS3.1, 3.LS3.2,

OBJECTIVES
- Students discuss spring weather data, and make claims about the spring climate
- Students discuss the results of the sunflower experiment
- Students engage in discussion about their agency to help the world

MATERIALS
- Clipboard, pencil, paper, rulers
- Tools for garden work.

Preparation:
Today you will be discussing your spring weather data and try to have the kids make a claim about the spring climate in Oakland. Get familiar with the record book before class, so you can synthesize the data to the students. Push them to make claims about the spring climate in Oakland based on what they observed.
Prepare garden work.

Procedure:
- Students enter the garden and explore. Some students are recording weather data.
- Gather students, check in about the season, the weather, and the leaf cage.
- Weather collectors share data.
- Synthesize the spring weather data.
- "How would you describe the spring climate in Oakland? What changes did you notice from the winter? What similarities?"
- "Are there signs of summer approaching? What is summer like in Oakland? What is summer in other places that you have been?"

- Go to the sunflowers. Measure and record sunflower heights.
- “We have learned so many new concepts this year in third grade gardening. Perhaps the most important is this idea of interdependence: we are all connected. We are connected to each other, and we are all connected to the earth.”
- “What are some ways that you, personally, can help the earth? They can be big or small.” (Write responses on the board)
- “This is a long list! There are hundreds of ways you can help, from talking to people about the importance of bees, to picking up trash on the street. Do not forget how much power you have!”
- Discuss.
- Do garden work.

Assessment:

Class discussion: What were the results of the experiment with the sunflower plants? What caused the height differences? Is every sunflower going to grow to the same height? Discuss.

Wrap up:

Return materials.

Notes/Feedback: