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FIFTH GRADE

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* ICON INDICATES TWO-PART LESSON



Nature Journaling

FIFTH GRADE

The first time students enter the garden is the best time to set expectations and also take some time to explore. Students will be involved in the rule-making process, then find a quiet place in the garden to compose a nature journal entry.

SUBJECT

EXPLORE

TIME

30 - 45 MIN

MATERIALS

A leaf or other easily sourced natural material for each student

Lined paper, 1 sheet per student

Pencils, 1 per student

Clipboards, 1 per student

Access to a whiteboard in the garden, or make a poster with the following phrases:

I notice ...

I wonder ...

It reminds me of ...

DIRECTIONS

- If your school garden does not have an outdoor classroom with a whiteboard, begin the lesson inside the classroom to make the garden rules.
- By fifth grade, many students are already familiar with the school garden and garden rules. Ask students to draw on their past experience to remind everyone of the garden rules and record them on the whiteboard. Basic garden rules may include: be respectful to others and your surroundings, only pick flowers, plants, or vegetables with permission from an adult, handle plants and animals gently, only touch animals when an adult says it's okay (never touch spiders or bees), use tools safely, and walk at all times..
- Head out to the garden and gather in the outdoor classroom. Hand out the leaf (or other object) to each student. Write the following phrases on the whiteboard (or show the poster if you made one): "I notice ...", "I wonder ...", "It reminds me of ...".
- Model the exercise by asking students if anyone can finish the prompt "I notice" while observing their leaf. If no one volunteers, model the exercise yourself. Emphasize that you notice what you see at the time, these are observations and not opinions. Things you might notice about a leaf include the color, that it has veins and a stem, etc. Then allow students to pair up and say everything they notice about their leaf to a partner. After a minute, have a few students share out.
- Repeat the activity for the phrases "I wonder" and "It reminds me of". Stress that all ideas are welcome - students should not feel like there is a "right" answer.
- Distribute the paper, pencils, and clipboards. Have students fold the paper in thirds short-wise (as if folding a letter to fit into an envelope). Have students write the prompt "I notice" at the top of the first third, "I wonder" at the top of the middle third, and "It reminds me of" at the top of the bottom third.
- Ask students to take a walk around the garden and explore for a few minutes. Task them to settle into one area and select one object to write a journal entry about using the prompts. Encourage them to use words and draw pictures.
- Return to the outdoor classroom and have a few students share their journal entries. Ask if they learned or noticed anything new that they hadn't thought about before.

SOURCE

Adapted from:

- John Muir Laws | [I Notice, I Wonder, It Reminds Me Of](#)



Seasonal Planting

FOURTH AND FIFTH GRADE

Everybody loves to plant in the garden! Due to the seasonal nature of growing a garden and the logistics of sharing garden space, just a little bit of advance planning will ensure a successful class crop. In this activity, students will plant seeds in a garden bed, make a nature journal entry, and pitch in to do some garden care tasks. Have fun!

SUBJECT

EXPLORE

TIME

1 HR

MATERIALS

Empty garden bed (filled with soil but not plants) or empty spaces in the garden beds

Seeds or seedlings to plant

Comprehensive Planting Chart for Zones 9 and 10

Trowels

Watering cans

Finished compost to sift (if applicable)

Black nursery trays

Buckets

Wheelbarrow (if available)

Blank paper, 1 per student

Pencils, 8-10

Clipboards, 8-10

DIRECTIONS

- A few main tasks will be important to work out as you plan this activity.
- You will need to:
 - Identify a garden bed to plant in. The assignment of garden beds varies from school to school, so it's best to get in touch with your school's garden coordinator for guidance. If your school doesn't have one, reach out to the district's garden liaison, Barbara Larson of BCK Programs (barbara@bckprograms.com).
 - Identify what you are going to plant. If you are in touch with Barbara, she may be able to get seedlings for your class to plant. If you want to go with seeds, refer to the laminated planting guide titled "Comprehensive Planting Chart for Zones 9 and 10" from the San Diego Seed Company. Locate the month and then look for the O symbol to identify the "Crop Family" varieties that can be planted from seed in that month. Then check to see which of those varieties you have in the Seed Library.
 - From the seeds you selected, read the back of the seed packet and note the planting information so you can plan out the garden bed and direct students on how to plant their seeds (generally, students can use their finger to poke a hole for their seed). You can place trowels or popsicle sticks in the places where students should plant - look for spaces near the emitter in the irrigation tube so they are planted close to water. Use the Crop Planting Worksheet to record the information from the seed packet, if desired. Plan for students to water the bed after they plant their seeds.
 - Refer to the Garden To Do List and survey the garden to predetermine the tasks that you will assign to students.
 - Schedule one or two volunteers for the day of the activity to help supervise the rotations.
 - Plan to divide students into three groups to rotate through the following stations: Planting, Garden Care, and Nature Journaling.
- On planting day, gather students in the outdoor classroom and introduce each of the three stations.
 - Station 1 Planting: Share with students the types of crops they will be planting and any information about why these were selected. Explain that they will be given specific instructions on how to plant their seeds when it's their turn to plant in the garden bed.
 - Station 2 Garden Care: Identify the tasks that students will complete and any tools they will be using. Talk about how to use

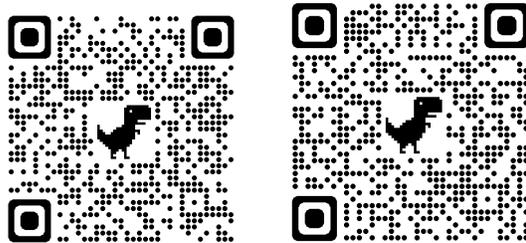


tools safely and other garden rules (walk at all times, keep tools below the waste, etc.).

- Station 3 Nature Journaling: Students will do an activity called “To Each Its Own” where they will draw and describe a leaf using as much detail as they can and then play a matching game to see if they can match up the actual leaves to the journal entries.
- In this rotation, each student will choose a leaf from the selection previously picked (see Materials List). Instruct students to use words, pictures, and numbers to draw a diagram of their leaf and describe the leaf as precisely as possible.
- Ask students what type of information would be useful to include to identify their leaf? They could describe the colors, record number of things like leaf tips, holes, or bite marks.
- When rotations begin, you will give students 7-8 minutes to make their journal entries, then lay the leaves next to each other and place their journals around the leaves to form a circle.
- Have students inspect each other's journals and the actual leaves, and when they think they found a match, place it next to the journal entry. Did they match them all?
- Assign students to their groups and spend 10 minutes at each rotation. Spend the final 5 minutes enlisting students' help to put away tools and tidy up the garden.

SOURCE

- BCK Programs | Seasonal Planting
- San Diego Seed Company | [Planting Chart](#)
- John Muir Laws | [To Each Its Own](#)



Crop Planting Worksheet

Refer to the planting instructions on the seed packet and record the information in the table below.

Plant Name	
Planting Depth	
Plant Spacing	
Plant Height	
Other Planting Tips	

Plant Name	
Planting Depth	
Plant Spacing	
Plant Height	
Other Planting Tips	

Plant Name	
Planting Depth	
Plant Spacing	
Plant Height	
Other Planting Tips	

Plant Name	
Planting Depth	
Plant Spacing	
Plant Height	
Other Planting Tips	



Garden To Do List

- 1. WEED.** Check for weeds inside and around the outside of garden beds, in the pathways, and around the perimeter of the garden. Use a trowel to pull weeds out from the roots. Collect weeds in one pile, and make sure it's out of the pathway. This will be the debris pile for the garden and will be collected by the grounds crew within a couple weeks.
- 2. WATER.** Fill up a watering can and check for thirsty plants. If there are rain tanks in your garden, use that water for any ornamental plants but not in the garden beds. Signs to look for are plants that are droopy, have yellow or brown leaves, or have leaves that are falling off. Water the soil around each plant for about 5-10 seconds, just enough to saturate the ground around them. If your garden has any potted plants, they will surely need a drink. Water potted plants for 5-10 seconds each, let the water seep in, and water for another 5-10 seconds.
- 3. RAKE UP LEAVES.** Check for areas in the garden where trees have dropped their leaves. Rake the leaves and place them in a pile next to the compost bins. The leaves will be combined with food scraps to make compost. You will be doing the composters a favor by collecting the leaves as they are essential for composting.
- 4. COLLECT SEEDS FROM SPENT PLANTS.** Check the garden beds and perimeter of the garden for plants with spent flowers. Spent flowers are flowers that have finished flowering and are dying off. The dead part of the flower usually contains seeds. Provide seed envelopes from the garden activities supplies. Have students label the seed packet with the name of the plant (if known) and any other information you can find. Place one seed packet of each type in the Seed Library and send home any extra packets. Place the remainder of the dead plants in the debris pile, or make a new pile out of the pathway.
- 5. SIFT COMPOST.** Check the active stack compost pile (this is different from the worm bin, and should have a sign next to it). If the pile looks dark brown, does not have any visible food pieces in it, and no or very few noticeable leaves and twigs, it is ready to sift. Grab a black nursery tray and place a scoop of compost in the tray. Grab a bucket or wheelbarrow and sift the compost over it. Discard any trash pieces in the trash and return the larger objects and any insects (like worms) to the compost pile. Feed the plants with your sifted compost by spreading a handful around each plant in a garden bed. **NOTE:** Please do not sift all the compost to share this activity with other classes.
- 6. HARVEST WORM COMPOST.** Worm castings are the digested dark matter in the worm bin that does not have visible signs of food- the "Black Gold"). To separate castings, grab 3 small paper trays for each small group of students (these should be located inside the worm bin). Place a small scoop (1-2 cups) of the digested compost in one tray (this will be from the side of the pile that has no visible signs of food and is a dark brown/black). Bring the trays to the tables and pick out the worms placing them in tray 2 and pick out any trash and placing it in tray 3. Place the worms back in the worm bin, throw away the trash and sprinkle the castings around the base of the plants in the garden beds. Use a watering can to water over the applied castings.
- 7. CLEAR AND ORGANIZE CLUTTER.** Sometimes things get left in the garden and need to be organized from time to time. Collect all buckets and stack them in one spot, do the same with nursery pots, organize the potting supplies and put away tools and gloves.
- 8. PICK UP LITTER AND EMPTY TRASH.** Grab a bucket and take a walk around the garden and pick up any litter you find. Be sure to check the perimeter next to fences, where litter tends to collect. Collect all the litter into one bucket and discard it in the nearest trash can. Return the bucket to the garden.
- 9. EXTRA TASKS:** Make a list of extra tasks that need to be done in the garden, like trimming trees, more weeding, etc. and give the list to your teacher so they can give it to the garden coordinator.



Harvesting Kindness

ALL GRADES

Gardening programs offer many opportunities to show kindness to each other, to the community, and to our planet. This lesson is designed specifically for when there is an abundance of produce to harvest, more than just one class could use, to inspire students to think of others. Students will harvest their crops, conduct a taste test, and then decide how to donate the excess of their harvest.

SUBJECT

EXPLORE/KINDNESS

TIME

OPEN-ENDED

MATERIALS

Read aloud book from the Garden Library (optional)

Buckets (or containers to collect harvest)

Scissors

Trowels

Colanders

Sink or hose

Paper towels

Food-grade bowls (if available)

Taste Test Evaluation, 1 sheet per student

Pencils, 1 per student

Clipboards, 1 per student

DIRECTIONS

- The garden is a great place for teaching empathy for others and modeling kindness. Often the school garden operates in “boom or bust” cycles, meaning there are times when plants are germinating and very little appears to be happening to the naked eye, or conversely an entire garden bed of lettuce must be harvested before it goes to seed. This lesson is designed to get students thinking about what to do when we have abundant resources and to model compassionate behaviors.
- If your class notices that some garden beds are bursting with crops ready to be harvested, but you didn't plant the crops, check with your school's garden coordinator before harvesting to ensure the crops are not already spoken for.
- Gather students in the garden around a garden bed with a successful crop that you plan to harvest. For younger students read *If You Plant a Seed* by Kadir Nelson or *Katie's Cabbage* by Katie Stagliano and ask questions about sharing and how it makes them feel when their friends share with them in class or when their siblings share with them at home.
- As a group, discuss how you might conduct an act of kindness with the food growing in the garden bed. Below are some examples of successful sharing outcomes from EUSD schools.
- **K-2 Salad Party:** Students harvest an entire garden bed of lettuce and celebrate with a huge salad for their class **AND** a salad for all of the teachers. Students write thank you notes for teachers and school staff and place the salad in the Teachers' Lounge.
- **3rd-4th Taste Test Sharing:** Students harvest a crop, like snap peas, peaches, cherry tomatoes, figs, passion fruit, grapes... and hold a taste test first for the class **AND** set up a “taste-test” table during their lunch to share the harvest with fellow classmates.
- **4th-6th: Food Pantry:** Students harvest a crop and prepare it to be delivered to a local food pantry. Often food pantries do not receive fresh fruit and vegetables. There are several food pantries nearby EUSD schools. Contact the district's garden liaison, Barbara Larson of BCK Programs (barbara@bckprograms.com) to arrange for the crop to be delivered.
- Harvesting vegetables that students grew can be a thrilling experience, but can also get chaotic with an entire class gathered around one garden bed. Some tips to help manage the large group are to:



- Set up several different stations so students can eventually spread out. Older students can manage the stations, while younger students will need assistance (additional help from another adult is ideal).
 - Set out colanders at the sink or hose and assign students to the **Washing Station** where they will rinse all the soil off the vegetables and then take them to the Drying Station.
 - Set up a clean table with paper towels and bowls (if you have them) and assign students to a **Drying Station** where they will dry the vegetables using paper towels.
 - After all the plants have been harvested, assign students to the **Clearing Station** where they will pull out the remaining plants and place them in a pile. Have students wash their hands after this task.
 - After the vegetables are washed and dried, gather in the outdoor classroom and conduct a taste test. How do students rate their crops? Distribute the Taste Test Evaluation to students.
 - Pack up the remaining crops to share with others.
- **NOTE:** Whichever manner your students choose to use to share the crops, make sure the produce is thoroughly washed.

SOURCE

- BCK Programs



Taste Test Evaluation

Food Tasted: _____

	Rate one to five stars (draw) ★★★★★	Description
Look		
Smell		
Texture		
Taste		
Overall Rating		



It's Alive!

FIFTH GRADE

Students probably know that their lunchtime food scraps get composted in the school garden, but they may not know **how** composting works, and they probably haven't seen the process in action. In this activity, students will explore one of the school's compost bins and see how worms and other critters turn their lunch scraps into a valuable natural fertilizer called compost.

SUBJECT

SCIENCE

TIME

30 - 45 MIN

MATERIALS

Compost from the worm bin

Magnifying lens, 1 per student (optional)

Small trays, 3 per group (located inside the worm bin)

Newspaper, 1 sheet per student

Compost Insect Information Sheet, several to share

Pencils, 1 per student

DIRECTIONS

- Prior to visiting the garden, have students read the Compost Critter Information Sheet to become familiar with the different roles the bugs play in the ecosystem of a worm bin. Bring sheets out to the garden.
- Explain to students that our school enlists the help of worms to turn food scraps into rich compost. Show students where the worm bin is located and ask if they have ever visited the bin before. Point out that worms are not the only critters in the bin that feed off of decaying fruits and vegetables. Most but not all of the critters in the bin are helping to create healthy soil.
- Seat students in groups of 5-6 around a flat surface (table or ground). Ask them which of the critters they think they will find in the school's compost? Where do the critters get their food? (from students' leftover fruit and veggie scraps) How do the food scraps turn into compost? (the food begins to rot, and the worms ingest the bacteria/microbes that form on the decomposing food)
- Go to the worm bin and locate the side that looks like dark soil. This is compost that is finished. Avoid taking compost from areas that have visible food pieces; the critters are still working on this part. Place 1 to 2 cups of the dark finished compost in a tray for every group. Also, retrieve 2 empty trays per group from the worm bin.
- Place a sheet of newspaper in front of each student and put a portion of compost on each newspaper.
- Instruct the students to observe the sample and try to find the critters on the information sheet. Use hand lenses if you have them.
- Separate the worms from the compost and place them in one of the trays. Separate the inorganic items from the pile that did not biodegrade, such as plastic bits, and place those in another tray. Throw those bits away.
- When the observation activity has ended:
 - Return the worms and empty trays to the worm bin.
 - Ask students to use the sorted compost to "feed the soil" by sprinkling it along the base of the plants in the garden beds.
 - Throw away any trash.
 - Cover the piles in the worm bin with burlap or cardboard and close the hard lid.
 - Wash hands.

SOURCE

- BCK Programs



Compost Insect Info Sheet

Name	Picture	What are they doing?
Pill Bug (Roly Poly)		They eat decaying bits of fruit and vegetables.
Grub		Grubs are beetle larvae. They eat the tough part of plant materials, making it easier for smaller critters to finish the job.
Centipede		Centipedes actually eat other insects and worms. Uh oh 😬.
Millipede		Help eat decaying vegetation and make holes in the compost that air and other microbes can travel through.
Slug		Great at eating decaying fruit and vegetables in the compost bin, but if they make it into the garden bed, they will also eat your plants.
Spider		They eat other insects, and some are dangerous. If you see one try to avoid it.
Ant		They like to eat sweet food in the compost bin. They will help out by shredding larger bits of food. If you have too many ants, that means your compost is too dry.
Mite		These tiny guys eat decaying organic matter but they can also be harmful to our wiggly friends if there are too many of them.



Anytime Garden Care

ALL GRADES

A gardener's work is never done! To keep your school garden healthy and inviting there are a few basic chores that always need attention. Follow this garden care activity anytime you want to spend time outdoors and keep students tuned in to the garden.

SUBJECT

EXPLORE/
COMMUNITY BUILDING

TIME

OPEN ENDED

MATERIALS

Trowels

Watering cans

Rakes

Seed envelopes (if
applicable)

Finished compost to
sift (if applicable)

Black nursery trays

Buckets

Wheelbarrow (if
available)

Garden To Do List

DIRECTIONS

- Prior to the activity, refer to the Garden To Do List and survey the garden to predetermine the tasks that you will assign to students, then plan to split the class into groups. When a whole class works in the garden, it is a good practice to split up into smaller groups and rotate through tasks to avoid overcrowding.
- Gather students in the garden and ask them to share their favorite parts of the garden. Then ask if they know who takes care of the garden to make sure they can do all of their favorite things? Explain that caring for a school garden is a huge task and today they will be showing kindness to their fellow students and to the garden's caregivers by spending time keeping the school garden in good shape. Caring for the garden will also give students a sense of ownership and community.
- Divide students into groups and explain the tasks to be accomplished, referring to the instructions in the Garden To Do List. Assign each group to one task (i.e., Group 1 - weed, Group 2 - water, Group 3 - sift compost, etc.). Some of the tasks may need to be modeled for younger students.
- Give students 5-10 minutes at the first task and then rotate so students can participate in all tasks.
- After all tasks are complete (or you run out of time) gather students and ask how they feel after pitching in to maintain the garden? Are there any tasks that they need extra help with (such as trimming fruit trees, too many weeds to clear, etc.). Make a list of extra tasks and provide it to your school's garden coordinator.

SOURCE

- BCK Programs



Garden To Do List

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- 2. WATER.** Fill up a watering can and check for thirsty plants. If there are rain tanks in your garden, use that water for any ornamental plants but not in the garden beds. Signs to look for are plants that are droopy, have yellow or brown leaves, or have leaves that are falling off. Water the soil around each plant for about 5-10 seconds, just enough to saturate the ground around them. If your garden has any potted plants, they will surely need a drink. Water potted plants for 5-10 seconds each, let the water seep in, and water for another 5-10 seconds.
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- 8. PICK UP LITTER AND EMPTY TRASH.** Grab a bucket and take a walk around the garden and pick up any litter you find. Be sure to check the perimeter next to fences, where litter tends to collect. Collect all the litter into one bucket and discard it in the nearest trash can. Return the bucket to the garden.
- 9. EXTRA TASKS:** Make a list of extra tasks that need to be done in the garden, like trimming trees, more weeding, etc. and give the list to your teacher so they can give it to the garden coordinator.



Finding Fibonacci

FIFTH GRADE

The Fibonacci Sequence is a pattern of numbers that are often found in nature. The sequence is created by starting with 1 and adding the previous number together, for example, $0+1=1$, $1+1=2$, $1+2=3$, $2+3=5$, $3+5=8$ and so on. Chances are students will be able to identify Fibonacci numbers in your school garden as they can be found in the number of petals on a flower, points on a leaf, number of spirals in a sunflower or pinecone, spiral pattern of growth in a succulent or leaves growing on a stem.

SUBJECT

SOCIAL SCIENCE/MATH

TIME

30 - 45 MIN

MATERIALS

A few pinecones or sunflowers to use as props

Blank lined paper, 1 sheet per student

Pencils, 1 per student

Clipboards, 1 per student



DIRECTIONS

- Start this activity in the classroom and show the two-minute trailer for the book *Blockhead* by Joseph D'Agnese (<https://youtu.be/XItCNf5Bjew>) for a quick introduction to Fibonacci. Write the numbers 1, 1, 2, 3, 5, 8, 13, 21, 34, and ask students to try to find the pattern.
- Begin to reveal the pattern if students do not figure it out. The pattern is created by starting with 1 and adding the previous number together. Write the pattern on the board $0+1=1$, $1+1=2$, $1+2=3$, $2+3=5$, $3+5=8$. Ask what comes next? Continue to write more of the sequence asking them to add the numbers as you display them on the board.
- The sequence was discovered as early as 200 BC in India by an ancient scholar named Pingala, but it was made famous centuries later by Leonardo of Pisa, known as Fibonacci.
- Explain that the Fibonacci sequence is found in nature, and use the pine cone or a sunflower as an example. Count the number of spirals at the top of the pine cone. Is it a Fibonacci number? Chances are it is (although there can be anomalies from time to time). Pass a few pine cones around so students can count the number of spirals themselves.
- Task students to explore the garden looking for Fibonacci numbers.
 - Look for spirals, such as inside the head of a sunflower – how many spirals did you count?
 - Count the number of petals on flowers, the number of tips on leaves, the number of leaves on a stem, etc. – are they Fibonacci numbers?
 - Look at plants from a birds eye view to identify how the leaves are arranged in a spiral and do not overlap. This is Fibonacci too!
- Record observations on the blank paper and include a description of what they found, how it is related to the Fibonacci sequence (is it a spiral, or number?), and draw a picture of the item.
- Extension: If students want to know more about the Fibonacci sequence after this activity, consider showing this 5-minute video: *Doodling in Math: Spirals, Fibonacci, and Being a Plant* (<https://youtu.be/ahXIMUkSXX0>), getting the book *Blockhead: The Life of Fibonacci* by Joseph D'Agnese, or play the full read aloud from YouTube (<https://youtu.be/sc1CjKc1NGc>).

SOURCE

Adapted from:

- Schoolyard | [Fibonacci Sequence 101](#)



Serenity Scenes

FIFTH GRADE

Creating patterned art from natural elements in the garden can be a calming and centering activity that connects students with the outdoors. This activity will help students reduce stress by having them clear their minds and focus only on creating a pattern in their artwork.

SUBJECT

ART/SOCIAL EMOTIONAL

TIME

30 - 45 MIN

MATERIALS

Collected natural objects

Small paper bags, 1 per student

Optional:

Construction paper or cardstock, 1 sheet per student

Tacky glue

DIRECTIONS

- Go for a walk in the garden or school grounds to collect natural materials. Encourage students to gather multiples of the objects they find so they can create patterns - about 10 of each object. Some materials to look for are: leaves, twigs, flowers, petals, bark, stones, pine needles, stems, and especially objects with a pop of color. Use paper bags to hold items.
- Settle in the garden or another area on campus to assemble the natural art piece. Each student should find a flat spot with a couple square feet of area to work in. Find a spot that contrasts with the materials. For example, if the materials include green leaves, a spot on the grass would not be an ideal location.
- Ask students to clear their minds and picture what they imagine their pattern will look like. Will it be a circle? A square? What elements will they repeat?
- To assemble the art, place the most interesting object in the center. Use the collection of found objects to create a pattern around that object. Try playing with different patterns by placing objects in different directions. Creating repetitive shapes and color combinations is a great way to add interest.
- After students have completed their projects, have them wander around to appreciate each other's art. Because this activity is for clearing the mind of stress, students can return the objects used in their art piece back to nature.
- Optional: If you would like an art piece to display and take home, the students can glue down their found objects on a sheet of construction paper or cardstock.

SOURCE

- BCK Programs



Example Serenity Scene



Herb Therapy

FIFTH GRADE

Herbs are known to have calming properties due to their distinct and strong smells. Students will dabble in aromatherapy by making scent packets. Students will collect herbs in this activity, give them a week to dry out, then return to make their packets. They can put them under their pillows, carry them during stressful times, bring them to an exam or give them away as a gift.

SUBJECT

ART

TIME

30 MIN
+
30 MIN one week later

MATERIALS

Fresh herbs from the garden: lavender, chamomile, rose petals, rosemary, mint, thyme.

Scissors, 1 pair per student

Twine

Paperclips

8" fabric square, 1 per student

DIRECTIONS

- Go for a walk in the garden to harvest herbs for the project. Point out to students the herbs they will harvest and instruct them to cut about a 6-inch length of each branch. Students should collect approximately enough herbs to fill a handful.
- Have students close their eyes and focus on the smell of each item they pick. Ask why they think certain plants smell so strong. (for some, it is to attract pollinators, for others, it's a defense mechanism). Next, ask if they know what herbs might be used for besides adding flavor to food? Did students get any particular feeling when they smelled the various herbs? Some people think that keeping mint or rosemary inside the classroom can help stimulate thinking and thus may be helpful when it's time to take tests. Ask whether certain smells remind them of people, places, or experiences they've had.
- Explain to students that they will be making aromatherapy packets. In order to do this, the herbs must be dried prior to packaging. The best way to dry herbs is to make a bundle and then tie the stems together at the bottom with a piece of twine. Unbend a paperclip and hook one end on the twine and use the other end to hang the bundles upside down in a dry location, away from direct sunlight. Let the herbs dry for about one week.
- To make the aromatherapy packets, have students place their dried herbs in the center of a fabric square. Gather up the four corners of the fabric and tie tightly with twine.

SOURCE

Adapted from:

- The Spruce | [How to Make Sachets](#)



Soil Nutrient Testing

PART 1 OF 2

FIFTH GRADE

Like people, plants require a balanced diet to thrive. Take a look at any bag of plant fertilizer, and you'll see three key nutrients highlighted at varying levels. How do we know how much of each nutrient creates the perfect growing environment? In this two-part activity, students will take on the work of organic farmers and perform key research in a dedicated garden bed to understand how to improve the soil naturally.

SUBJECT

SCIENCE

TIME

45 MIN - 1 HR
+
30 - 45 MIN follow up a few months later

MATERIALS

Empty garden bed ready to plant

Soil test kits

Pipettes, 1 per student

Pitcher or bowl to mix soil sample

Small bowls (or containers), 4

Plant Nutrient Availability Graph, 1 per group

Element sheets, 1 per group

Plant pH Preference List

Comprehensive Planting Chart for Zones 9 and 10 (laminated)

Bags of sulfur and lime to adjust pH

DIRECTIONS

- Note: Read the directions on the element and pH sheets in advance, and mix soil the sample 30 minutes prior to the activity. When collecting the sample, be sure to dig down at least 4".
- Gather students in groups of four, one group for each test (pH, Nitrogen, Potash, Phosphorous). Ask the students what plants need to grow. What about nutrients? How can you tell if soil has the nutrients plants need to thrive?
- Ask the students to study the Plant Nutrient Availability graph and ask what the data means. Explain the pH of the soil conditions the roots to uptake specific nutrients. Nitrogen, Phosphorus and Potassium being the most important.
- Explain that they are going to test the soil in a garden bed to make sure it has the nutrients it needs to grow crops. By testing your soil, you determine its exact condition so that you can add nutrients as needed to help plants grow strong. Farmers and gardeners do this as a regular practice to make sure they grow the most abundant and healthy crops.
- Hand out the appropriate element/pH sheet per group, a colorator, a small bowl or cup of soil sample and 1 pipet per student.
- Tell the groups to carefully read through the entire sheet before beginning. After a few minutes, have a class discussion so each group can share how their element helps plants grow.
- Once they have filled the comparator boxes with soil sample, hand out the reagent capsules to carefully open and add powder to the small compartment of the box.
- Set a timer for 10 minutes and direct students to one of the following activity options during processing time:
 - Find peas or beans growing in the garden and explain that planting legumes is an organic way to add nitrogen to the soil. (Optional - do further research on the symbiotic relationship of the bean plant and the rhizobia
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Bags of langbeinite (Potash) and bone meal (Phosphorus)

Snap peas (fall) or bean seeds (spring)

Cover crop seeds (fall)

A hose or watering cans

bacteria in the soil which “fix” nitrogen to deepen the discussion.)

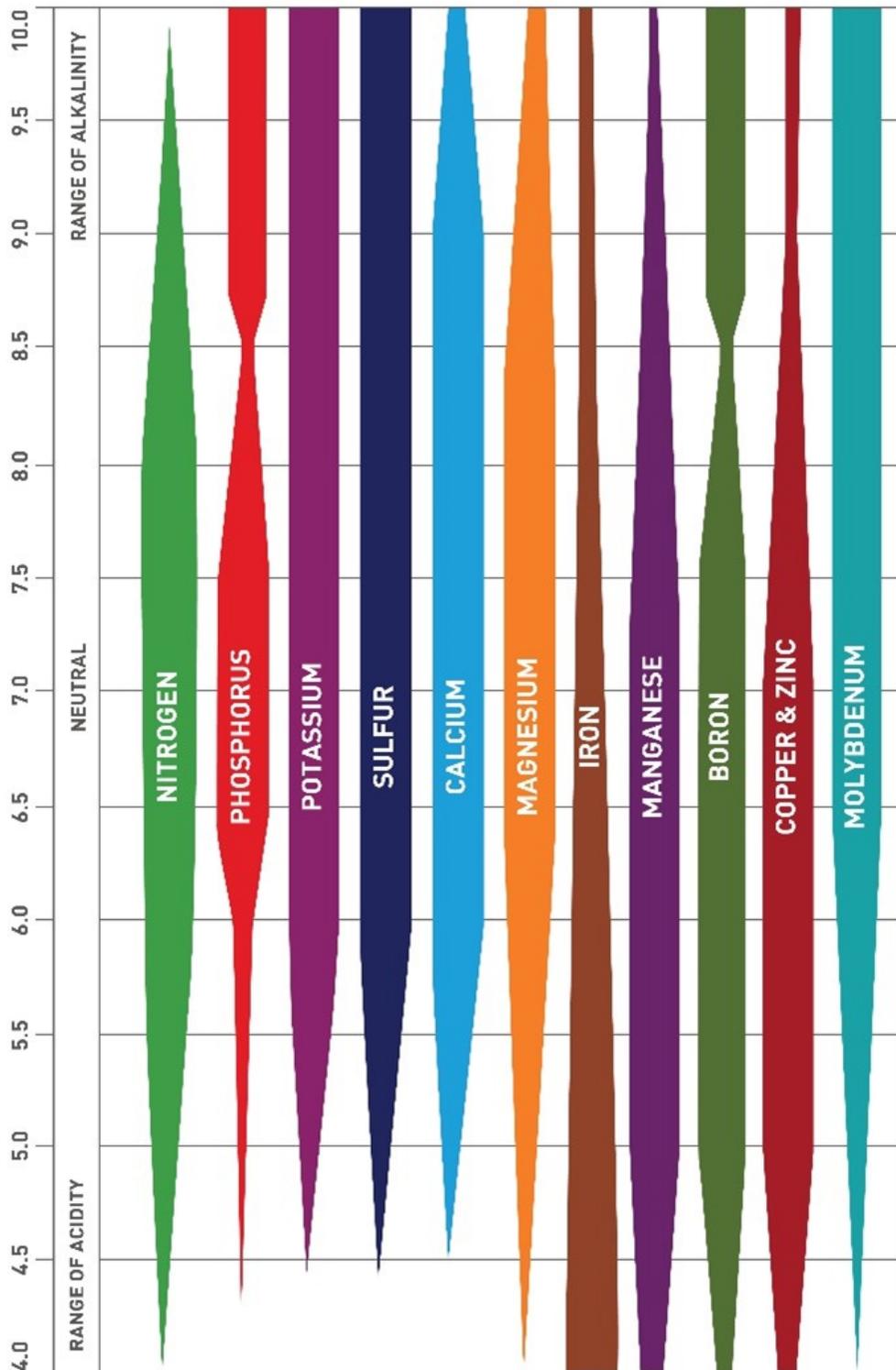
- Ask students to observe the garden and look for signs of their group's element deficiencies in the plants.
- Give the students free time to explore the garden.
- After 10 minutes bring the students back to the tables to review and report out their results.
- Add appropriate amendment to the garden beds following the directions on the element sheets.
- Next, plant a class crop of either bean seeds or snap peas (depending on season) to harvest and eat in Part 2 of this activity. Plant the beans/peas even if the soil is not Nitrogen deficient. If it is deficient, plant the cover crop seeds too to get full coverage of the garden bed.

SOURCE

- BCK Programs



Plant Nutrient Availability



Source: Gold Harvest Seeds



Element Sheet - Nitrogen (N) Group

Nitrogen is synonymous with plant nutrition. It is directly responsible for producing leaf growth and green leaves. A deficiency causes yellow leaves and stunted growth. Too much nitrogen causes over-abundant foliage with delayed flowering; the plant becomes subject to disease and its fruit is of poor quality.

Test your garden soil's Nitrogen level:

1. Remove the cap of the comparator. Make sure the color chart (film) is in place. Do not interchange color charts between comparators.
2. Using the pipets provided, fill the test and reference chambers to the fill mark on the chart with solution from your soil sample. Avoid disturbing the sediment. Transfer only liquid.
3. With one person holding the comparator box, another person will carefully separate the two halves of the reagent capsule and pour the powder into the **smaller test chamber**.
4. Fit the cap on the comparator, making sure it is seated properly and caps tightly. Assign a different person to shake the sample thoroughly.
5. Allow color to develop for 10 minutes. Do not allow the color to develop for more than 10 minutes.
6. Compare the color of the solution in the test chamber to the color chart.
7. For best results, allow daylight (not direct sunlight) to illuminate the solution in both the test and reference chambers.
8. What reading did you get? Do you need to amend the soil? Read on to learn how.

Bean, peas and other legumes are special plants that have a symbiotic relationship with a nitrogen fixing bacteria found in soil called Rhizobia. Rhizobia bacteria live in plant roots and use energy from the plant to convert nitrogen into a usable form for the plant. If your soil is Nitrogen deficient, plant a cover crop of peas (Fall) or beans (Spring). Once grown, cut up the remaining foliage and bury it in the bed. You could also plant a variety of nitrogen-rich plants, this special mix is called a cover crop.

Should you plant legumes or a cover crop mix to fix nitrogen in the soil?



Element Sheet - Phosphorous (P) Group

Growing plants need phosphorus. It is the major component of plant genetics and seed development. A deficiency causes stunted growth and seed sterility. Phosphorus aids plant maturity, increases the seed yield, increases fruit development, increases vitamin content and aids the plant's resistance to disease and winterkill.

Test the soil's phosphorus content:

1. Remove the cap of the comparator. Make sure the color chart (film) is in place. Do not interchange color charts between comparators.
2. Using the pipets provided, fill the test and reference chambers to the fill mark on the chart with solution from your soil sample. Avoid disturbing the sediment. Transfer only liquid.
3. With one person holding the comparator box, another person will carefully separate the two halves of the reagent capsule and pour the powder into the smaller test chamber.
4. Fit the cap on the comparator, making sure it is seated properly and caps tightly. Assign a different person to shake the sample thoroughly.
5. Allow color to develop for 10 minutes. Do not allow the color to develop for more than 10 minutes.
6. Compare the color of the solution in the test chamber to the color chart.
7. For best results, allow daylight (not direct sunlight) to illuminate the solution in both the test and reference chambers.
8. What reading did you get? Do you need to amend the soil? Read on to learn how.

If your bed is phosphorus deficient, Bone Meal can be used to bring up the phosphorus content. Add 1 cup per 10 square foot.

Calculate the square footage by multiplying length times width. Most garden beds are 3' x 8' or 3' x 6'.

How many cups do you need to add to your bed? Water in the amendment.



Element Sheet - K Potash (Potassium) Group

Potassium strengthens the plant. It helps form carbohydrates and promotes protein synthesis. It will improve the color and flavor of fruit. It further aids early growth, stem strength and cold hardiness. Plants deficient in potash are usually stunted and have poorly developed root systems. Leaves are spotted, curled and appear dried out at the edges. Yields for potash deficiency are low.

Test the soil for Potassium content:

1. Remove the cap of the comparator. Make sure the color chart (film) is in place. Do not interchange color charts between comparators.
2. Using the pipets provided, fill the test and reference chambers to the fill mark on the chart with solution from your soil sample. Avoid disturbing the sediment. Transfer only liquid.
3. With one person holding the comparator box, another person will carefully separate the two halves of the reagent capsule and pour the powder into the smaller test chamber.
4. Fit the cap on the comparator, making sure it is seated properly and caps tightly. Assign a different person to shake the sample thoroughly.
5. Allow color to develop for 10 minutes. Do not allow the color to develop for more than 10 minutes.
6. Compare the color of the solution in the test chamber to the color chart.
7. For best results, allow daylight (not direct sunlight) to illuminate the solution in both the test and reference chambers.
8. What reading did you get? Do you need to amend the soil?
9. Read on to learn how.

To bring up the Potassium (K) content in soil, add $\frac{1}{4}$ cup of Langbeinite per 24 sq feet.

Calculate the square footage by multiplying length times width. Most garden beds are 3' x 8' or 3' x 6'.

How many cups do you need to add to your bed? Water in the amendment.



pH Group

Plants also need the correct pH (acidity / alkalinity) level, which controls how well plants utilize the nutrients available in the soil. All plants have a pH preference, so it is important to know the pH level of your soil. You can then choose plants with the same pH preference, avoid those that will not do well in your soil or know how to go about supplying their special growing needs.

Test the soil for the pH level :

1. Remove the cap of the comparator. Make sure the color chart (film) is in place. Do not interchange color charts between comparators.
2. Using the pipets provided, fill the test and reference chambers to the fill mark on the chart with solution from your soil sample. Avoid disturbing the sediment. Transfer only liquid.
3. With one person holding the comparator box, another person will carefully separate the two halves of the reagent capsule and pour the powder into the smaller test chamber.
4. Fit the cap on the comparator, making sure it is seated properly and caps tightly. Assign a different person to shake the sample thoroughly.
5. Allow color to develop for 10 minutes. Do not allow the color to develop for more than 10 minutes.
6. Compare the color of the solution in the test chamber to the color chart.
7. For best results, allow daylight (not direct sunlight) to illuminate the solution in both the test and reference chambers.
8. What reading did you get?
9. If your class is planting:
 - Find your crop in the pH Preference List
 - What pH does the plant grow well at?
 - Refer to the information that follows for adjusting soil pH, if required.

If your soil has a low pH and you need to make it higher or more alkaline, and add Lime. Add $\frac{1}{4}$ cup per 24 square feet.

If your soil has a high pH, you will need to add Sulfur to bring it down. Add $\frac{1}{4}$ cup of Sulfur per 24 sq feet.

Calculate the square footage by multiplying length times width. Most garden beds are 3' x 8' or 3' x 6'.

How many cups do you need to add to your bed? Water in the amendment.



Plant pH Preference List

NAME	pH	NAME	pH	NAME	pH	NAME	pH	NAME	pH
FRUIT		VEGETABLES & HERBS		HOUSE & GREENHOUSE PLANTS		FLOWERS, TREES & SHRUBS		FLOWERS, TREES & SHRUBS	
APPLE	5.0 - 6.5	SAGE	5.5 - 6.5	GENISTA	6.5 - 7.5	ASPERULA	6.0 - 8.0	LAUREL	6.5 - 7.5
APRICOT	6.0 - 7.0	SHALLOT	5.5 - 7.0	GERANIUM	6.0 - 8.0	ASPHODOLINE	6.0 - 8.0	LAVENDER	6.5 - 7.5
AVOCADO	6.0 - 7.5	SORGHUM	5.5 - 7.5	GLOXINIA	5.5 - 6.5	ASTER	5.5 - 7.5	LIATRIS	5.5 - 7.5
BANANA	5.0 - 7.0	SOYBEAN	5.5 - 6.5	GRAPE IVY	5.0 - 6.5	AUBRITA	6.0 - 7.5	LIGUSTRUM	5.0 - 7.5
BLACKBERRY	5.0 - 6.0	SPEARMINT	5.5 - 7.5	GRAPE HYACINTH	6.0 - 7.5	AZALEA	4.5 - 6.0	LILAC	6.0 - 7.5
BLUEBERRY	4.0 - 6.0	SPINACH	6.0 - 7.5	GREVILLEA	5.5 - 6.5	BALLOON FLOWER	6.0 - 6.5	LILY OF THE VALLEY	4.5 - 6.0
CANTALOUPE	6.5 - 7.5	SWEDE	5.0 - 7.0	GYNURA	5.5 - 6.5	BAYBERRY	4.0 - 6.0	LITHOSPERMUM	5.0 - 6.5
CHERRY	6.0 - 7.5	THYME	5.5 - 7.0	HEDERA (IVY)	6.0 - 8.0	BERGENIA	6.0 - 7.5	LOBELIA	6.5 - 7.5
CRANBERRY	5.5 - 6.5	TOMATO	5.5 - 7.5	HELIOTROPISM	5.0 - 6.0	BLEEDING HEART	6.0 - 7.5	LUPINUS	5.5 - 7.0
CURRENT: Black	6.0 - 8.0	TURNIP	5.5 - 7.0	HENS AND CHICKENS	6.0 - 7.0	BLUEBELL	6.0 - 7.6	MAGNOLIA	5.0 - 6.0
Red	5.5 - 7.0	WATER CRESS	6.0 - 8.0	HERRINGBONE PLANT	6.0 - 6.0	BROOM	5.0 - 6.0	MAHONIA	6.0 - 7.0
White	6.0 - 8.0	HOUSE & GREENHOUSE PLANTS		HIBISCUS PLANT	6.0 - 8.0	BUDDLEIA	6.0 - 7.0	MARIGOLD	5.5 - 7.0
DAMSON	6.0 - 7.5	ABUTILON	5.5 - 6.5	HOYA	5.0 - 6.5	BUPHTHALUM	6.0 - 8.0	MOLINIA	4.0 - 5.0
GOOSEBERRY	5.0 - 6.5	ACORUS	5.0 - 6.5	IMPATIENS	5.5 - 6.5	BUTTERFLY BUSH	4.0 - 6.0	MORAEA	5.5 - 6.5
GRAPEVINE	6.0 - 7.0	AECHMEA	5.0 - 5.5	IVY TREE	6.0 - 7.0	CALENDULA	5.5 - 7.0	MORNING GLORY	6.0 - 7.5
GRAPEFRUIT	6.0 - 7.5	AFRICAN VIOLET	6.0 - 7.0	JACARANDA	6.0 - 7.5	CAMASSIA	6.0 - 8.0	MOSS	6.0 - 8.0
HAZELNUT	6.0 - 7.0	AGLAONEMA	5.0 - 6.0	JAPANESE SEDGE	6.0 - 8.0	CANDYTUFT	6.0 - 7.5	MOSS, SPHAGNUM	3.5 - 5.0
HOP	6.0 - 7.5	AMARYLLIS	5.5 - 6.5	JASMINUM	5.5 - 7.0	CANNA	6.0 - 8.0	MYOSOTIS	6.0 - 7.0
HUCKLEBERRY	4.0 - 6.0	ANTHURIUM	5.0 - 6.0	JERUSALEM CHERRY	5.5 - 6.5	CANTERBURY BELLS	7.0 - 7.5	NARCISSUS	6.0 - 8.5
LEMON	6.0 - 7.0	APHELANDRA	5.0 - 6.0	JESSAMONE	5.0 - 6.0	CARDINAL FLOWER	4.0 - 6.0	NASTURTIUM	5.5 - 7.5
LYCHEE	6.0 - 7.0	ARAUCARIA	5.0 - 6.0	KALANCHOE	6.0 - 7.5	CARNATION	6.0 - 7.5	NICOTIANA	5.5 - 6.5
MANGO	5.0 - 6.0	ASPARAGUS FERN	6.0 - 8.0	KANGAROO THORN	6.0 - 8.0	CATALPA	6.0 - 8.0	PACHYSANDRA	5.0 - 8.0
MELON	5.5 - 6.5	ASPIDISTRA	4.0 - 5.5	KANGAROO VINE	5.0 - 6.5	CENOSIA	6.0 - 7.0	PAEONIA	6.0 - 7.5
MULBERRY	6.0 - 7.5	AZALEA	4.5 - 6.0	LANTANA	5.5 - 7.0	CENTAUREA	5.0 - 6.5	PANSY	5.5 - 7.0
NECTARINE	6.0 - 7.5	BABY'S BREATH	6.0 - 7.5	LAURUS (BAY TREE)	5.0 - 6.0	CERASTIUM	6.0 - 7.0	PASSION FLOWER	6.0 - 8.0
PEACH	6.0 - 7.5	BABY'S TEARS	5.0 - 6.0	LEMON PLANT	6.0 - 7.5	CHRYSANTHEMUM	6.0 - 7.0	PASQUE FLOWER	5.0 - 6.0
PEAR	6.0 - 7.5	BEGONIA	5.5 - 7.0	MIMOSA	5.0 - 7.0	CISSUS	6.0 - 7.5	PAULOWNIA	6.0 - 8.0
PINEAPPLE	5.0 - 6.0	BIRD OF PARADISE	6.0 - 6.5	MIND YOUR OWN BUSINESS	5.0 - 5.5	CISTUS	6.0 - 7.5	PENSTEMON	5.5 - 7.0
PLUM	6.0 - 7.5	BISHOP'S CAP	5.0 - 6.0	MONSTERA	5.0 - 6.0	CLARKIA	6.0 - 6.5	PERIWINKLE	6.0 - 7.5
POMEGRANATE	5.5 - 6.5	BLACK-EYED SUSAN	5.5 - 7.5	MYRTLE	6.0 - 8.0	CLIANTHUS	6.0 - 7.5	PETUNIA	6.0 - 7.5
QUINCE	6.0 - 7.5	BLOOD LEAF	5.5 - 6.5	NEVER NEVER PLANT	5.0 - 6.0	CLEMATIS	5.5 - 7.0	PINKS	6.0 - 7.5
RASPBERRY	5.0 - 7.5	BOTTLEBRUSH	6.0 - 7.5	NICOTEMIA (INDOOR OAK)	6.0 - 8.0	COLCHICUM	5.5 - 6.5	POLYGONUM	6.0 - 7.5
RHUBARB	5.5 - 7.0	BOUGAINVILLEA	5.5 - 7.5	NORFOLK ISLAND PINE	5.0 - 6.0	COLUMBINE	6.0 - 7.0	POLYANTHUS	6.0 - 7.5
STRAWBERRY	5.0 - 7.5	BOXWOOD	6.0 - 7.5	OPLENDAER	6.0 - 7.5	CONVOLVULUS	6.0 - 8.0	POPPY	6.0 - 7.5
WATERMELON	5.5 - 6.5	BROMELIADS	5.0 - 7.5	ORPHEMENTUS	5.0 - 6.0	COREOPSIS	5.0 - 6.0	PORTULACA	5.5 - 7.5
VEGETABLES & HERBS		BUTTERFLY FLOWER	6.0 - 7.5	ORCHID	4.5 - 5.5	CORONILLA	6.5 - 7.5	PRIMROSE	5.5 - 6.5
ARTICHOKE	6.5 - 7.5	CACTI	4.5 - 6.0	OXALIS	6.0 - 8.0	CORYDALIS	6.0 - 8.0	PRIMULA	6.0 - 7.5
ASPARAGUS	6.0 - 8.0	CALCAOLARIA	6.0 - 7.0	PALMS	6.0 - 7.5	COSMOS	5.0 - 8.0	PRIVET	5.0 - 7.5
BASIL	5.5 - 6.5	CALADIUM	5.0 - 6.0	PANDANUS	5.0 - 6.0	COTTONEASTER	6.0 - 8.0	PRUNELLA	6.0 - 7.5
BEAN	6.0 - 7.5	CALLA LILY	6.0 - 7.0	PEACOCK PLANT	5.0 - 6.0	CRAB APPLE	6.0 - 7.5	PRUNUS	6.5 - 7.5
(Runner, Broad, French)		CAMELIA	4.5 - 5.5	PELLIONIA	5.0 - 6.0	CROCUS	6.0 - 8.0	PYRETHRUM	6.0 - 7.5
BEETROOT	6.0 - 7.5	CAMPANULA	5.5 - 6.5	PEPEROMIA	5.0 - 6.0	CYNOGLOSSUM	6.0 - 7.5	RED HOT POKER	6.0 - 7.5
BROCCOLI	6.0 - 7.0	CAPSIUM	5.0 - 6.5	PHILODENDRON	5.0 - 6.0	DAFFODIL	6.0 - 6.5	RHODODENDREN	4.5 - 6.0
BRUSSELS SPROUTS	6.0 - 7.5	CARDINAL FLOWER	5.0 - 6.0	PILEA	6.0 - 8.0	DAHLIA	6.0 - 7.5	ROSES	
CABBAGE	6.0 - 7.5	CASTOR OIL PLANT	5.5 - 6.5	PLUMBAGO	5.5 - 6.5	DAY LILY	6.0 - 8.0	HYBRID TEA	5.5 - 7.0
CALABRESE	6.5 - 7.5	CANTURY PLANT	5.0 - 6.5	PODACARPUS	5.0 - 6.5	DELPHINIUM	6.0 - 7.5	CLIMBING	6.0 - 7.0
CARROT	5.5 - 7.0	CHINESE EVERGREEN	5.0 - 6.0	POINTSETTIA	6.0 - 7.5	DEUTZIA	6.0 - 7.5	RAMBLING	5.5 - 7.0
CAULIFLOWER	5.5 - 7.5	CHINESE PRIMROSE	6.0 - 7.5	POLYTHASIAS	6.0 - 7.5	DIANTHUS	6.0 - 7.5	SALVIA	6.0 - 7.5
CELERY	6.0 - 7.0	CHRISTMAS CACTUS	5.0 - 6.5	POTHOS	5.0 - 6.0	DOGWOOD	5.0 - 7.0	SCABIOSA	5.0 - 7.5
CHICORY	5.0 - 6.5	CINERARIA	5.5 - 7.0	PRAYER PLANT	5.0 - 6.0	EDELWEISS	6.5 - 7.5	SEDUM	6.0 - 7.5
CHINESE CABBAGE	6.0 - 7.5	CLERODENDRUM	5.0 - 6.0	PUNICA	5.5 - 6.5	ELAEAGNUS	5.0 - 7.5	SNAPDRAGON	5.5 - 7.0
CHIVES	6.0 - 7.0	CLIVIA	5.5 - 6.5	SANSERIERIA	4.5 - 7.0	ENKIANTHUS	5.0 - 6.0	SNOWDROP	6.0 - 8.0
CORN - SWEET	5.5 - 7.0	COCKSCOMB	6.0 - 7.0	SAXIFRAGA	6.0 - 8.0	ERICA	4.5 - 6.0	SOAPWORT	6.0 - 7.5
CRESS	6.0 - 7.0	COFFEE PLANT	5.0 - 6.0	SCINDAPUS	5.0 - 6.0	EUPHORBIA	6.0 - 7.0	SPEEDWELL	5.5 - 6.5
COURGETTES	5.5 - 7.0	COLEUS	6.0 - 7.0	SHRIMP PLANT	6.0 - 7.0	EVERLASTINGS	5.0 - 6.0	SPIRAEA	6.0 - 7.5
CUCUMBER	5.5 - 7.5	COLUMNNEA	4.5 - 5.5	SPANISH BAYONET	6.0 - 7.5	FIRETHORN	6.0 - 8.0	SPRUCE	4.0 - 5.0
FENNEL	5.0 - 6.0	CORAL BERRY	5.5 - 7.5	SPIDER PLANT	6.0 - 7.5	FORGET-ME-NOTS	6.0 - 7.0	STOCK	6.0 - 7.5
GARLIC	5.5 - 7.5	CRASSULA	5.0 - 6.0	SUCCULENTS	5.0 - 6.5	FORSYTHIA	6.0 - 8.0	STONECROP	6.5 - 7.5
GINGER	6.0 - 8.0	CREeping FIG	5.0 - 6.0	SYNOGONIUM	5.0 - 6.0	FOXGLOVE	6.0 - 7.5	SUMACK	5.0 - 6.5
HORSERADISH	6.0 - 7.0	CROTON	5.0 - 6.0	TOLMIEA	5.0 - 6.0	FRITILLARIA	6.0 - 7.5	SUNFLOWER	5.0 - 7.0
KALE	6.0 - 7.5	CROWN OF THORNS	6.0 - 7.5	TRDESCANTIA	5.0 - 6.0	FUCHSIA	5.5 - 7.5	SWEET PEA	6.0 - 7.5
KOHLRABI	6.0 - 7.5	CUPHEA	6.0 - 7.5	UMBRELLA TREE	5.0 - 7.5	GAILLARDIA	6.0 - 7.5	SWEET WILLIAM	6.0 - 7.5
LEEK	6.0 - 8.0	CYCLAMEN	6.0 - 7.0	VENUS FLYTRAP	4.0 - 5.0	GAZANIA	5.5 - 7.0	TAMARIX	6.5 - 8.0
LENTIL	5.5 - 7.0	CYPERUS	5.0 - 7.5	WEEPING FIG	5.0 - 6.0	GENTIANA	5.0 - 7.5	TRILLIUM	5.0 - 6.5
LETTUCE	6.0 - 7.0	DIEFFENBACHIA	5.0 - 6.0	YUCCA	6.0 - 7.5	GEUM	6.0 - 7.5	TULIP	6.0 - 7.0
MARJORAM	6.0 - 8.0	DIPLODENIA	6.0 - 7.5	ZEBRINA	5.0 - 6.0	GLADIOLI	6.0 - 7.0	VIBERNUM	5.0 - 7.5
MARROW	6.0 - 7.5	DIZGOTHECA	6.0 - 7.5	FLOWERS, TREES & SHRUBS		LOBULARIA	5.5 - 7.0	VIOLA	5.5 - 6.5
MILLET	6.0 - 6.5	DRACAENA	5.0 - 6.0	ABELIA	6.0 - 8.0	GODETIA	6.0 - 7.5	VIRGINIA CREEPER	5.0 - 7.5
MINT	7.0 - 8.0	EASTER LILY	6.0 - 7.0	ACACIA	6.0 - 8.0	GOLDEN ROD	5.0 - 7.0	WALLFLOWER	5.5 - 7.5
MUSHROOM	6.5 - 7.5	ELEPHANT'S EAR	5.0 - 6.0	ACANTHUS	6.0 - 7.0	GYPHOPHILIA	6.0 - 7.5	WATER LILY	5.5 - 6.5
MUSTARD	6.0 - 7.5	EUPISCIA	6.0 - 7.0	ACONITUM	5.0 - 6.0	HAWTHORN	6.0 - 7.0	WEIGELIA	6.0 - 7.5
OLIVE	5.5 - 6.5	EUONYMOUS	6.0 - 8.0	ADONIS	6.0 - 8.0	HEATHER	4.0 - 6.0	WISTARIA	6.0 - 8.0
ONION	6.0 - 7.0	FERNS:		AGERATUM	6.0 - 8.0	HELIANTHUS	5.0 - 7.0	ZINNIA	5.5 - 7.5
PAPRIKA	7.0 - 8.5	BIRD'S NEST	5.0 - 5.5	AILANTHUS	6.0 - 7.5	HELLEBORUS	6.0 - 7.5	TURF & ORNAMENTAL GRASSES	
PARSLEY	5.0 - 7.0	BOSTON	5.5 - 6.5	AJUGA	4.0 - 6.0	HOLLY	5.0 - 6.5	BAHAI	8.5 - 7.5
PARSNIP	5.5 - 7.5	BUTTON	6.0 - 8.0	ALTHEA	6.0 - 7.5	HOLLYHOCK	6.0 - 7.5	BENT	5.5 - 6.5
PEA	6.0 - 7.5	CHRISTMAS	6.0 - 7.5	ALYSSUM	6.0 - 7.5	HONEYSUCKLE	6.0 - 7.5	BERMUDA	6.0 - 7.0
PEANUT	5.0 - 6.5	CLOAK	6.0 - 7.5	AMARANTHUS	6.0 - 6.5	HYACINTH	6.5 - 7.5	CANADA BLUE	4.5 - 6.4
PECAN	4.0 - 6.0	FEATHER	5.5 - 6.5	ANCHUSA	6.0 - 7.5	HYDRANGEA (Blue)	4.0 - 5.0	CLOVER	6.0 - 7.0
PEPPER	5.5 - 7.0	HART'S TONGUE	7.0 - 8.0	ANDROSACE	5.0 - 6.0	HYDRANGEA (Pink)	6.0 - 7.0	KENTUCKY BLUE	6.0 - 7.5
PEPPERMINT	6.0 - 7.5	HOLLY	4.5 - 6.0	ANEMONE	6.0 - 7.5	HYDRANGEA (White)	6.5 - 8.0	MEADOW	6.0 - 7.5
PISTACHIO	5.0 - 6.0	MAIDENHAIR	6.0 - 8.0	ANTHYLLIS	5.0 - 6.0	HYPERICUM	5.5 - 7.0	PAMPAS	6.0 - 8.0
POTATO	4.5 - 6.0	RABBITS FOOT	6.0 - 7.5	ARBUTUS	4.0 - 6.0	IRIS	5.0 - 6.5	RED TOP	6.0 - 6.5
POTATO - SWEET	5.5 - 6.0	SPLEENWORT	6.0 - 7.5	ARENARIA	6.0 - 8.0	IVY	6.0 - 7.5	RYE	6.0 - 7.0
PUMPKIN	5.5 - 7.5	FIG	5.0 - 6.0	ARISTEA	6.0 - 7.5	JUNIPER	5.0 - 6.5	ST. AUGUSTINE	6.5 - 7.5
RADISH	6.0 - 7.0	FITTONIA	5.5 - 6.5	ARMERIA	6.0 - 7.5	KALMIA	4.5 - 5.0	TALL FESCUE	6.0 - 7.0
RICE	5.0 - 6.5	FREESIA	6.0 - 7.5	ARNICA	5.0 - 6.5	KERRIA	6.0 - 7.0	VELVET BENT	5.0 - 6.0
ROSEMARY	5.0 - 6.0	GARDENIA	5.0 - 6.0			LABURNUM	6.0 - 7.0	ZOYSIA	6.0 - 7.0

Source: plantnatural.com



Soil Nutrient Outcomes

PART 2 OF 2

FIFTH GRADE

In Part 1 of this activity, students planted one or two cover crops to “fix” the soil. In Part 2, we return to the garden a few months later when the cover crops are grown. Students will harvest a little, do a taste test, till the remaining plants into the soil, and examine the nodules formed on the plant roots from the rhizobia bacteria.

SUBJECT

SCIENCE

TIME

30 - 45 MIN

MATERIALS

Fruiting snap peas or other legumes

Buckets or bins for harvesting, several

Sharp pruners, 1 pair per adult

Access to a sink or several colanders to rinse beans

Paper towels, 1 roll

Magnifying lenses, about 10-12

Blank paper, about 10-12 sheets

Gardening tools like shovels, rakes, and hoes, about 4-5

Taste Test Evaluation, 1 copy per student

Pencils, about 10-12

DIRECTIONS

- When a class works in the garden together, it is good to split up into smaller groups and rotate through tasks to avoid overcrowding. Students will accomplish several tasks in this activity:
 - Harvest pods (whole class)
 - Pull up plants and remove the roots for observation (whole class)
 - Wash and taste beans/peas (Station 1)
 - Observe and dissect roots (Station 2)
 - Till plants into the soil (Station 3)
- Gather in the outdoor classroom and lead a brief discussion to revisit the test results from Part 1. Do they remember why they planted cover crops? What are the benefits of this method? (provides natural organic matter to the soil, which improves soil health and is a natural practice that protects watersheds)
- As students walk into the garden, they can harvest pods and pull up the plants. An adult should cut the roots off the bottom of the plant and place them at the observation station. Place some blank sheets of paper at the station to dissect the roots over.
- Divide the class into three groups and rotate every 5-10 min.
 - Group one will start at the tasting station. First, they will rinse their bean pods in the sink or run a hose through a colander. Next, they will taste the beans and fill out the Taste Test Evaluation.
 - Group 2 will start at the dissection station. Have them break open some nodules and note their observations. What are the nodules for? What's inside them?
 - Group 3 will start at the garden bed. Work with an adult to break up the bean plants into smaller pieces and then till them into the soil. If you planted the cover crop mix, till those plants into the soil as well.

SOURCE

- BCK Programs



Taste Test Evaluation

Food Tasted: _____

	Rate one to five stars (draw) ★★★★★	Description
Look		
Smell		
Texture		
Taste		
Overall Rating		

