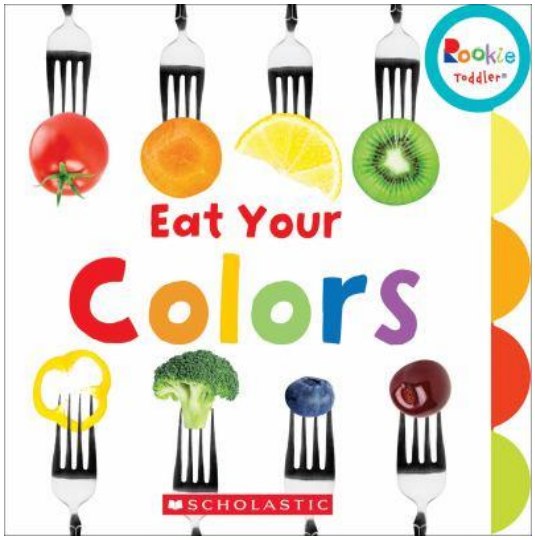
KITCHEN SCRAP GARDENING

Summary: Students will regenerate new plants from food scraps, investigating how plants grow through fruits and vegetables they are familiar with.

Standards Covered:
2.LS.2: All organisms alive today result from their ancestors, some of which may be extinct. Not all kinds of organisms that lived in the past are represented by living organisms today.



Time Frame: 30 minutes (growth time will vary)
Ages: K-4th Grade
Season: Any
Materials:

- Vegetable and fruit scraps (oranges, lemons, limes, sweet potatoes, avocados, carrots, beets, onions, celery and ginger work well)
- Growing container
- Potting soil

Suggested read-aloud:
Begin or end the lesson with a children's book exploring the different types of fruits and vegetables. We recommend: Eat Your Colors by Amanda Miller

Procedure:

1. Help students gather and prep the scraps of fruits or vegetables, keeping in mind that full growth may not be realistic in your climate/timeframe. The goal is to sprout these scraps as a classroom experiment, so make sure the students know that their new plants will most likely not actually bear fruit!
2. Have students assist with the planting of scraps in potting soil or by immersing in water. The best method for encouraging new growth will depend on the plant and plant part represented.
    - **For citrus fruit seeds** like oranges, lemons, grapefruit, and limes, fill a 4-inch-diameter pot with moistened potting soil. Remove whole seeds from the fruit and plant three to four of them one inch deep in the pot. The seeds should sprout in two to four weeks. Keep the seedlings well watered for about six weeks and then transplant individual trees into bigger pots. It will be quite a while before you see citrus flowers (let alone fruit -- these trees won't bear for many years, and most eating-quality fruits are borne on grafted, not seed-grown trees.) But you can enjoy the leaves. The leaves smell like whatever type of citrus you're growing, so be sure the students do some "rub and sniff" tests.

- **For Tropical fruits** such as avocado, let the pit dry out for a day or two, then plant it in a 6-inch-diameter plastic pot filled with moistened potting soil. Leave the tip of the pit exposed to air. Another fun and easy way to sprout an avocado is to suspend the pit over a glass of water. To do this, poke three toothpicks around the middle of a pit and rest the toothpicks on the rim of the glass. Add water until it just touches the bottom of the pit. Students can watch the roots and sprout emerge. Keep adding water as necessary. Students will need to be patient as it can take a month or two for roots to appear. If using the water-sprouting method, plant the pit in potting soil once roots and a sprout emerge.

- For tuberous roots and rhizomes such as **sweet potatoes**, begin with a chunk of sweet potato and prop it over a water-filled glass by poking three toothpicks in a circle into the middle of the tuber and resting the toothpicks on the rim of the glass so that the narrower, pointed half of the tuber is submerged in the water. Place the glass in a sunny window. Soon roots will begin to sprout from the portion in the water, and usually within a few weeks, stems and leaves will begin to grow from the top of the tuber. To keep your sweet potato as a houseplant, carefully transplant it into a container of potting soil once a good root system has developed.The same method works with **ginger**: suspend a chunk of ginger with toothpicks over a glass of water or place it in a container of moistened potting soil. If using the water method, transfer the new plant to a container of potting soil once roots appear.

- You can force many **root crops** (**beets, parsnips, and carrots**) as well as **celery,** to sprout new top growth by “beheading” them. Have students slice off the top end and 1-2 inches of the root and place it in a saucer filled with pebbles for support and water. In a week or so new greens should begin to appear from the top. To continue growth, transplant into an appropriate-sized pot.

- This beheading technique also works well with **pineapples**. Cut off the top inch of the fruit and scoop out most of the yellow flesh inside the crown, leaving the core. Let the top dry for a day or two, then place it in a tray filled with pebbles for support and water. Roots will appear and new shoots will sprout from the top in about two weeks, and soon you'll have a fantastic tropical plant. To continue growing the new pineapple, transplant it into a pot, covering the crown and roots with soil.

- Plant old cloves of **garlic** or bulbs of **onions** just below the surface in containers filled with moistened potting soil. Within a few weeks you'll see sprouts. Place in a sunny window and watch them grow!

DECOMPOSITION BAGS

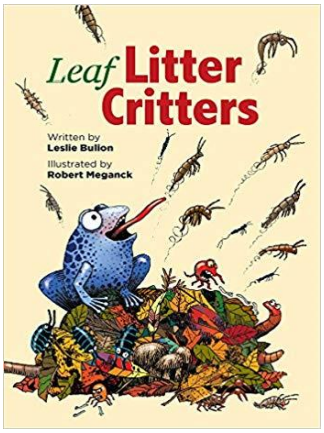
Summary: Students examine the process of decomposition and consider how living and once-living materials decompose to become part of soil.

Standards Covered: 2.LS.1: Living things cause changes on Earth. Living things function and interact with their physical environments. Living things cause changes in the environments where they live; the changes can be very noticeable or slightly noticeable, fast or slow.

Time Frame: 2+ weeks of observation

Ages: 2nd-4th Grade

Season: Any



Materials:

- Clear gallon-size plastic bags
- Plant debris
- Pieces of old fruit, vegetables, and bread
- Soil

Suggested read-aloud: Begin or end the lesson with a children's book about decomposition. We recommend:

Leaf Litter Critters by Leslie Bulion

Procedure:

1. Begin by explaining how decomposers are the final links in the food chain. Discuss how these organisms use dead plants and animals as food, ultimately releasing locked up nutrients to be used again by plants. Among the decomposers are fungi, which include molds, mildews, mushrooms, rusts, and smuts. Because they lack chlorophyll and can't carry out photosynthesis, fungi feed on once-living materials or act as parasites on living organisms. Some fungi can be seen by the unaided eye, but other decomposers, such as bacteria, are so small that a mere teaspoon of soil may contain billions of them.
2. Discuss what the students think would happen if we left plant debris and/or old food sitting out, would it still be the same in one week? Two weeks? Three weeks? What types of food might "disappear" faster than others and why?
3. Place pieces of plant debris, old fruit, vegetables, and moist bread in clear gallon plastic bags (separately or in different combinations). Hang the bags on a bulletin board with a sign reading: "What do you think is happening in this bag?" Take time to regularly observe any changes in the plant debris and food scraps in the bags. After a week or two, depending on the foods chosen, students should notice the objects showing signs of mold and other fungal growth.
4. Ask students: How did the observed changes compare with your predictions? Have you noticed this kind of change before? What do you think is causing this change?

5. Ask them to brainstorm places where they have seen examples of once-living things changing and decomposing in the environment, such as rotting logs, leaves on the forest floor, or compost piles. Ask them to imagine what our planet would look like if living things did not decompose after they died.

6. Repeat your experiment by investigating the impact different types of conditions have on your decomposition bags, such as amount of moisture, temperature, and the addition of soil. Which seem to promote the most rapid decomposition? Further explore by adding items you don't think will decompose and see what happens to them.

Decomposers

- Food chains always end with decomposers
- They release stored energy and allow nutrients from dead organisms to be cycled back into the system.

Dig Deeper

Explore ways humans prevent food from decomposing such as refrigeration, drying, smoking, canning, and salting. Ask students to brainstorm a list of materials that decomposers do not break down. What happens to them? Investigate compost bins and the benefits of using compost in your garden. If possible, plan a field trip to a composting facility or find a special guest speaker to find out more about composting efforts in your area.

SEASONAL GARDENING

Summary: Students will study what produce can be grown during the four seasons of the year in their region and why eating seasonally is better for the environment, the wallet, and much more delicious. Students will create an “Eating Through the Four Seasons” poster and play a matching game to review what they have learned about seasonal planting.

Standards Covered:

1. 2.LS.1: Living things cause changes on Earth. Living things function and interact with their physical environments.
2. 2.ESS.3: Long- and short-term weather changes occur due to changes in energy.

Procedure:

1. It’s important to know what your growing region is and to research what can be grown at different times of the year in your area. Visit the USDA website to find out helpful tips to help you know when to plant as well as your hardiness zone: http://planthardiness.ars.usda.gov/PHZMWeb/ Also find there and print your area’s season gardening chart (Ohio chart included below).
2. Ask the class what they know about the seasons of the year. How is the weather during each season in your region? Are there certain foods they associate with certain seasons?
3. Discuss with students how the changing seasons of the year offer different opportunities to grow produce in different parts of the country. Some regions can grow in the soil year round, while others need to grow indoors or in green houses for the winter. Explain that the four seasons of the year affect our everyday lives, from the clothes we wear to the food we eat. Because some fruits and vegetables can only be grown during certain seasons of the year, crops are grown in different places since the four seasons are different across the world. It’s important to know what fruits and vegetables are in season because they taste better when they’re in season and often are more affordable.

Time Frame: 1hr
Ages: 2nd-3rd Grade
Season: Any

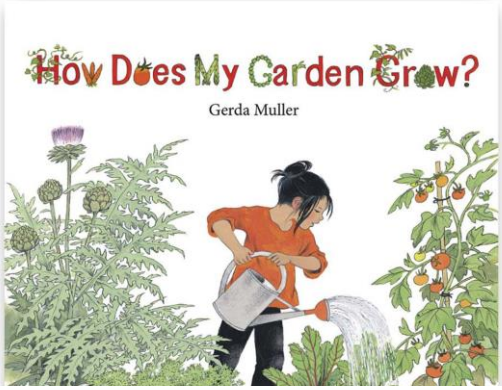
Materials Needed:

• Seasonal Gardening chart
• Large butcher paper divided into 4 sections, labeled with each of the 4 seasons
•Construction paper
• Scissors
• Glue or tape
• Produce matching game cards (see below for instructions on how to make these)

Suggested read-aloud:

Begin or end the lesson with a children’s book about growing vegetables at home. We recommend:

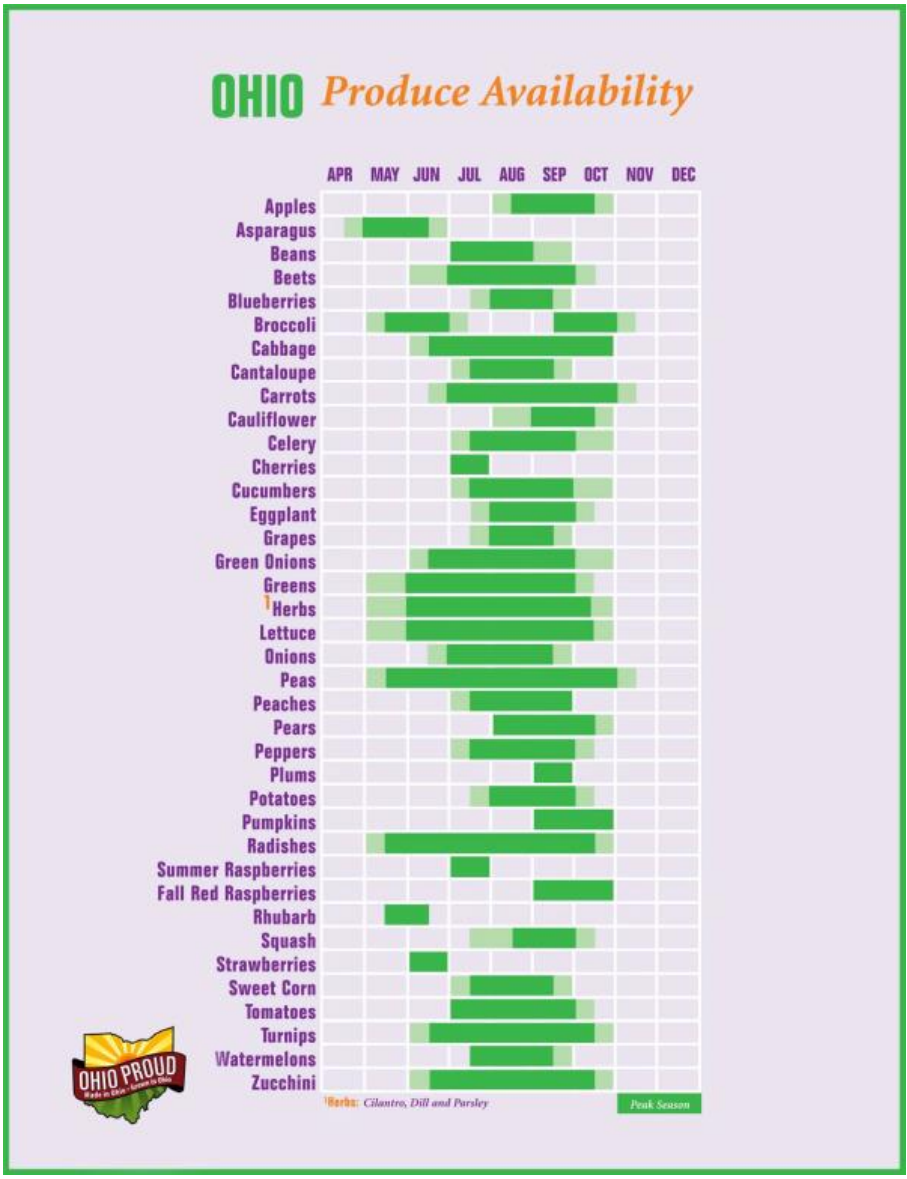
How Does My Garden Grow? by Gerda Muller



4.Discuss how farmers can plan what they'll plant according to the season, so they can have a good harvest.

5.Divide students into groups and pass out the Seasonal Gardening Chart specific to your location. Discuss what can be grown at different times of the year and allow students to share some of their favorite fruits and vegetables for each season. Have students draw a fruit or vegetable from each season that they will share on the class poster "Eating through the Four Seasons." Display the poster in the classroom or in the hallway.

6.Have students play a matching game using produce pictures. (These can easily be printed and laminated using clip art photos). Students will match the picture of the produce to its name and can also can also separate the matched cards by season as well as whether or not it is grown in your region.



Dig Deeper

Bring in examples of fruits and vegetables that are fresh, canned, frozen and dried. Have students sample a taste from each. Ask students to decide which they like the best by writing their name on a sticky note and placing it on the board under the columns fresh, canned, frozen or dried. Create a class graph from the responses. Explain why food is packaged in different ways and that foods cost more when they aren't in season.