In this lesson students will harvest from the Learning Garden

- Safe harvesting and food handling practices should be used.
- Plants from our Learning Garden have different nutritional properties.
- Getting a variety of nutrients from fruits and vegetables keeps me healthy.

**Common Core – English Language Arts**

- SL.9-10.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively
- SL.9-10.6: Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate
- SL.11-12.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.
- SL.11-12.6: Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate.

**Materials & Preparation**

- Review harvesting documents, see Teacher Background
- Prepare for harvest and collect harvesting supplies
- Nutrient Design Challenge, 1 per group
- Online access to: [http://www.fruitsandveggiesmorematters.org/fruit-vegetable-nutrition-database](http://www.fruitsandveggiesmorematters.org/fruit-vegetable-nutrition-database) (or preprint information for harvestable Learning Garden crops)
- Review lesson and familiarize yourself with your Learning Garden
- Optional: supplies for additional Learning Garden activities

**Teacher Background**

Review your regional local school district safe handling guidelines and ask your TKC Garden Educator for more information or safe harvesting practices. At a minimum you should review TKC’s harvesting documents, which include:

- Harvest Basics, A Plant-Centric Harvest Guide
- Planning your Learning Garden Harvest
- Five Steps to Food-Safe School Gardening
- Creating Your Harvest Kit

These resources can be found online, at [www.thekitchencommunity.org](http://www.thekitchencommunity.org), by navigating to Teaching in your Garden > Garden Skills and Lessons > Harvesting.

Connect this lesson to nutrition and health. Students ages 14-18 need on average 1.5 cups of fruit ([https://www.choosemyplate.gov/fruit](https://www.choosemyplate.gov/fruit)) and 3 cups of vegetables ([https://www.choosemyplate.gov/vegetables](https://www.choosemyplate.gov/vegetables)) every day.

In addition, we love the following sites to learn more about each specific crop: [http://www.fruitsandveggiesmorematters.org/fruit-vegetable-nutrition-database](http://www.fruitsandveggiesmorematters.org/fruit-vegetable-nutrition-database)
Most vegetables are naturally low in fat and calories. None have cholesterol. (Sauces or seasonings may add fat, calories, and/or cholesterol). Vegetables are important sources of many nutrients, including potassium, dietary fiber, folate (folic acid), vitamin A, and vitamin C.

Most fruits are naturally low in fat, sodium, and calories. None have cholesterol. Fruits are sources of many essential nutrients that are under consumed, including potassium, dietary fiber, vitamin C, and folate (folic acid).

- Diets rich in potassium may help to maintain healthy blood pressure. Vegetable sources of potassium include sweet potatoes, white potatoes, white beans, tomato products (paste, sauce, and juice), beet greens, soybeans, lima beans, spinach, lentils, and kidney beans. Fruit sources of potassium include bananas, prunes and prune juice, dried peaches and apricots, cantaloupe, honeydew melon, and orange juice.
- Dietary fiber from fruits and vegetables, as part of an overall healthy diet, helps reduce blood cholesterol levels and may lower risk of heart disease. Fiber is important for proper bowel function. It helps reduce constipation and diverticulosis. Fiber-containing foods help provide a feeling of fullness with fewer calories.
- Folate (folic acid) helps the body form red blood cells. Women of childbearing age who may become pregnant should consume adequate folate from foods, and in addition 400 mcg of synthetic folic acid from fortified foods or supplements. This reduces the risk of neural tube defects, spina bifida, and anencephaly during fetal development.
- Vitamin A keeps eyes and skin healthy and helps to protect against infections.
- Vitamin C helps heal cuts and wounds and keeps teeth and gums healthy. Vitamin C aids in iron absorption.

Spend time discussing the following introductory questions:
- Do plants have a nutritional information?
- How many fruits and vegetables should we be eating every day?
- Why is it important to eat fruits and vegetables?

Welcome your students to the Learning Garden and line students up along one side of the Learning Garden. Stand on the opposite side of the Learning Garden so you can address the entire group.

Ask students if they know what they will be doing in the Learning Garden for the day’s lesson. Let them know they will be practicing their harvesting skills.

1. Ask students if they know what is currently growing in the Learning Garden. Encourage responses.
2. Introduce the crop(s) to be harvested and review the plant part that will be eaten. Review with students how we know this vegetable is ready to harvest and choose appropriate harvest opportunity: student harvest or teacher harvest.

*If every student has the opportunity to harvest:* Demonstrate how to harvest the crop safely, focusing on exactly what part of the plant to harvest, how to harvest it, and ways you could harvest incorrectly. Review the steps and ask students if they have any questions. Instruct students to place their crop in a harvest container for that specific crop.

*If not every student has the opportunity to harvest:* Harvest within sight of all students and place harvested crops into a harvest container for that specific crop.

3. After you have finished harvesting with your students return inside with your produce. Weigh and track your harvest. Store crops appropriately.

4. Let your students know that they will now be completing a Nutrient Design Challenge in groups. Divide students into groups and distribute the Nutrient Design Challenge worksheet, review with students.

5. Students will be using the following website: [http://www.fruitsandveggiesmorematters.org/fruit-vegetable-nutrition-database](http://www.fruitsandveggiesmorematters.org/fruit-vegetable-nutrition-database) to complete the background information section of their worksheet.

6. After students have finished the background information students should transition to creating their group’s school lunch that is not only nutrient dense but also something they would like to eat!

7. Give students 15 to 20 minutes to complete the assignment.

8. Have students prepare a short peer to peer, or if time allows – a classroom presentation, that details the nutritional benefits of their crop.

9. Consider the creative ways your students can display your students work.

CONCLUSION

Have students share key parts of the day’s activity and review the Lesson Outcomes. Students should clean-up the Learning Garden as needed.

**Additional Learning Garden Activities**

Extend your Learning Garden experience and have your students participate in any of the following Learning Garden activities as appropriate. A tasting activity is a great follow up activity to the harvesting lesson. Choose a recipe for your class that is simple and requires little to no cooking, like a salad or a sandwich! Other follow up activities can include: planting, watering and weeding.
**BACKGROUND INFORMATION:**
Eating fruits and vegetables provides health benefits — people who eat more fruits and vegetables as part of an overall healthy diet are likely to have a reduced risk of some chronic diseases. Fruits and vegetables provide nutrients vital for health and maintenance of your body.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Health Benefits</th>
<th>Fruit &amp; Vegetable Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium</td>
<td>• helps to maintain healthy blood pressure</td>
<td></td>
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<tr>
<td>Fiber</td>
<td>• reduces blood cholesterol levels and may lower risk of heart disease.</td>
<td></td>
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<tr>
<td></td>
<td>• improves bowel function and helps reduce constipation</td>
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<tr>
<td></td>
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<td></td>
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</tbody>
</table>
DESIGN CHALLENGE:

Your team will need to design a school lunch that features all five nutrients that you research on the reverse page. Your school lunch will also need to be a lunch that you and your team would be excited to eat!

Use the space below to brainstorm and detail your school lunch.
Getting to know your plants will help you harvest most effectively. While harvesting, you will find that we often eat only one part of a plant we grow. Knowing the edible parts of the plant can help you plan for harvest, preparation, and potential storage of the yield. Here is a quick guide of how to harvest various edible plant parts:

**ROOTS**

*Example crops:* Carrots, radishes, beets, turnips

*Harvest methods and tools:* Pull from the ground by hand. You may need a shovel to loosen soil around roots.

*Preparation and eating basics:* Wash roots clean. Slice roots with a knife and cutting board to share.

*Will these veggies keep well after harvest?* Roots will stay crisp if they are washed and refrigerated. They soften in sun and heat.

**STEMS OR SHOOTS**

*Example crops:* Celery, kohlrabi, pea shoots, chard stem

*Harvest methods and tools:* If tender, harvest by hand. Sturdy stems will require a knife or scissors.

*Preparation and eating basics:* Wash stems if dirty. Slice stems with a knife and cutting board to share if needed.

*Will these veggies keep well after harvest?* Vegetable stems or shoots will stay crisp if they are washed and refrigerated. They may become rubbery and soft if left in the sun and heat.

**LEAVES**

*Example crops:* Lettuce, kale, spinach, chard leaf

*Harvest methods and tools:* Harvest larger leaves by hand. Cut leaves from young plants.

*Preparation and eating basics:* Wash salad greens with a salad spinner. Dressing can add flavor.

*Will these veggies keep well after harvest?* Leaves will stay crisp if they are washed and refrigerated. They wilt quickly in the sun and heat.

**FLOWER**

*Example crops:* Broccoli, nasturtium, cauliflower

*Harvest methods and tools:* Pinch flower stem with hand, or cut with a knife.
**Preparation and eating basics:** Check flowers for bugs as they provide many hiding places. Wash sturdy flowers such as broccoli.

**Will these veggies keep well after harvest?** Delicate flowers should be eaten immediately. Sturdy flowers like broccoli will keep if washed and refrigerated.

**FRUIT**

**Example crops:** Tomato, squash, cucumber

**Harvest methods and tools:** Ideal harvest windows may be brief. Some fruits require a knife to harvest.

**Preparation and eating basics:** Fruits vary widely! Many are eaten raw. Some fruits require cooking.

**Will these veggies keep well after harvest?** Fruits may vary widely. Most keep well, but many are best eaten raw in the garden.

**SEED**

**Example crops:** Sunflower seeds, coriander seeds

**Harvest methods and tools:** Harvest easily by hand

**Preparation and eating basics:** Some seeds may need to be protected from scavengers. Many are eaten raw or roasted.

**Will these veggies keep well after harvest?** Seeds keep well if dried or if they have a shell.
Harvesting your garden

All of your work in the garden culminates at harvest time! Harvesting your garden requires only a small amount of gardening know-how to be successful—it mostly requires your creativity and personal experiences with preparing food. Reach out to your Garden Educators for guidance on safe harvesting, as well as ideas and recipes for eating your fresh produce with students.

When you are preparing to harvest, be sure to consider the following questions:

1. Who will harvest?
2. When will crops be ready to harvest?
3. What tools will you need?
4. Who will enjoy the harvest?
5. How will you prepare the harvest?
6. What supplies will you need?

Tips and Pointers

• Not everything in the garden will be ready to harvest at the same time. You may have multiple harvests - some big, some small.
• If you have garden or harvest specific questions, share photos of your plants with your TKC Garden Educators for the quickest response.
• Engage parents and others in your community to assist and enjoy in the harvest. They likely will have valuable experience and time to share to make your harvest extra special.
• You’ll be pleasantly surprised at what students will eat when they grow it themselves!
• Take notes after each harvest to track your bounty and help plan for next year.
Food Safety and Your School’s Garden Produce

Establishing and maintaining a garden in a school setting is a great learning project for students, staff and the surrounding community. All involved will certainly feel a sense of pride as the garden yields fruits and vegetables that were planted by their own hands. Teaching basic food safety practices is a great way to incorporate healthy habits that will last a lifetime.

Increasingly, foodborne illness outbreaks are being traced to lettuce, tomatoes, cantaloupe and other raw fruits and vegetables. These outbreaks are caused by pathogenic (disease causing) bacteria, viruses, molds and parasites found on raw produce. These microorganisms are a natural part of the environment and can be a problem whether you choose to use organic or conventional gardening methods.

You can reduce the levels of these microorganisms with good gardening and harvesting practices. Thorough washing and careful preparation will further reduce the level of the pathogens found on the outer surface of fresh fruits and vegetables.

It is also possible to get sick from contamination of produce with chemicals such as cleaning solutions, fertilizers, pesticides, and heavy metals (lead) and other chemicals that may be found in garden soil or well water.

Five Steps to Food Safe Gardening

Here are five simple steps school gardeners follow to reduce the risk of foodborne illness from eating the produce from your school garden.

Step One: Prepare the Garden for Planting
1. Be aware of your school’s rules and regulations and how they pertain to your garden project.
2. Test soil for contaminants, particularly lead, prior to planting.
3. Locate vegetable gardens away from manure piles, well caps, garbage cans, septic systems, run-off from any potential sources of contamination, and areas where wildlife, farm animals, or pets roam.
4. Use compost safely. Compost is the natural breakdown product of leaves, stems, manures and other organic materials—and also a source of pathogens. To be safe for gardening, your compost must reach a temperature of at least 130°F. Check the temperature with a compost thermometer. Do not use any animal waste, including pet waste, meat scraps or dairy product waste in your compost bin.
5. Work with the maintenance staff at the school to ensure safe practices on the school grounds near the garden.
Harvesting your garden

Step Two: Maintain the Garden

1. Schools must water their gardens with water from an approved public water system. You can be sure that water from a municipal or public water system is safe and potable (drinkable).
2. Surface water (lakes, ponds, rivers and streams) can be polluted by human sewage or animal waste, fertilizers and pesticides from lawns and farm fields, or chemicals from industry and should not be used.
3. Instead of using chemical herbicides, control weeds by using mulch or pulling them out.
4. During the gardening season, keep cats, dogs and other pets out of the garden, as animal waste can be a source of bacteria, parasites and viruses.
5. Curtail nesting and hiding places for rats and mice by minimizing vegetation at the edges of your fruit and vegetable garden.
6. Do not feed wild animals, even birds, near your garden. Fencing or noise deterrents may help discourage other wild animals.

Step Three: Harvest Garden Produce

1. Do not work in the garden when suffering from vomiting and/or diarrhea.
2. Always wash your hands before and after harvesting fresh produce.
3. Use clean gloves or clean hands when picking produce.
4. Use clean, food-grade containers. Food-grade containers are made from materials designed specifically to safely hold food. Garbage bags, trash cans, and any containers that originally held chemicals such as household cleaners or pesticides are not food-grade.
5. All tools used in the garden must be used solely in the garden and cleaned regularly.
6. Do not eat fresh produce while harvesting.

Step Four: Store Garden Produce

1. If you choose to wash fruits and vegetables before storing, be sure to dry them thoroughly with a clean paper towel. (NEVER wash berries until you are ready to eat them).
2. If you choose to store without washing, shake, rub or brush off any garden dirt with a paper towel or soft brush while still outside. Store unwashed produce in plastic bags or containers. Be sure to label the container in a way that makes it clear to others that it must be washed prior to use.
3. Keep fruit and vegetable bins clean.
4. When washing produce fresh from the warm outdoors, the rinse water should not be more than 10 degrees colder than the produce. If you are washing refrigerated produce, use cold water.
5. Fresh fruits and vegetables needing refrigeration (melons, cut leafy greens, and cut tomatoes) can be stored at 45° F or less.
6. Fresh fruits and vegetables stored at room temperature (onions, potatoes, whole tomatoes) should be in a cool, dry, pest-free, well-ventilated area separate from household chemicals.
Step Five: Preparing and Serving Garden Produce

1. More often than not, we eat fresh fruit and vegetables raw, so we cannot rely on the heat of cooking to destroy pathogens that might be on our lettuce or tomatoes. It is important to prepare raw produce with food safety in mind.
2. Always wash your hands before and after handling fresh produce.
3. Rinse fresh fruits and vegetables under cool, running, potable, clean water even if you do not plan to eat the skin or rind.
4. Never use soap, detergent, or bleach solution to wash fresh fruits or vegetables. These solutions can affect flavor and may not be safe to ingest.
5. Avoid cross-contamination when preparing fruits and vegetables. Cross-contamination occurs when a clean work surface, such as a cutting board or utensil (paring knife) or uncontaminated food, is contaminated by dirty work surfaces, utensils, hands or food. Be sure to wash your hands (as well as the knife and cutting surface) before preparing any ready-to-eat foods such as salad, fresh fruit or a sandwich.
6. If you have leftover produce that has been cut, sliced, or cooked, store it in clean, airtight containers in the refrigerator at 45°F or less.

Thank you to our friends at the University of Connecticut for compiling this helpful guide!

Additional resources to be noted: FDA’s Guidance for Industry: Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables; Fresh, Healthy, and Safe Food: Best Practices for Using Produce from School Gardens by National Farm to School Network; Food Safety in the Garden from Univ. of Maryland Extension.
Create your Harvest Kit

Many vegetables in your Learning Garden can be harvested easily by hand, and some vegetables are more easily harvested with tools. All produce harvested should be rinsed and cleaned with potable water. Please be safe when harvesting produce and always consider what tools are appropriate for what age group. Consult your Garden Team and your Regional Harvest Guide for best recommendations around harvest as well as local guidance and regulations around serving and consuming food grown at school.

Cleaning and Transporting Tools

Two Food Safe Buckets – For cleaning and rinsing produce in potable water.

Harvest Container (Large Mixing Bowl) – Used to transport cleaned produce indoors or to the cafeteria.

Compostable Harvest Bags – Used to transport cleaned produce indoors or to the cafeteria.

Harvesting Tools

Large Shovel – Used by adults to loosen soil around Carrots and Potatoes.

Strong Scissors – Can be used by adults to harvest Baby Greens, Pea Shoots, Squashes, Cucumbers, Fresh Herbs, and Flowers.

Harvest Knife – Can be used by adults to harvest Baby Greens, Pea Shoots, Squashes, Cucumbers, Fresh Herbs, and Flowers.

Kid Safe Scissors – Can be used by students to harvest Baby Greens, Pea Shoots, Fresh Herbs, and Flowers.