Best Practices in
ENVIRONMENTAL EDUCATION

For more information about these and other programs on Groundwork Rhode Island properties, email info@groundworkri.org or call (401) 305–7174.

Compiled by the Rhode Island Environmental Education Association with support from the Environmental Protection Agency Region 1 Environmental Education grant.

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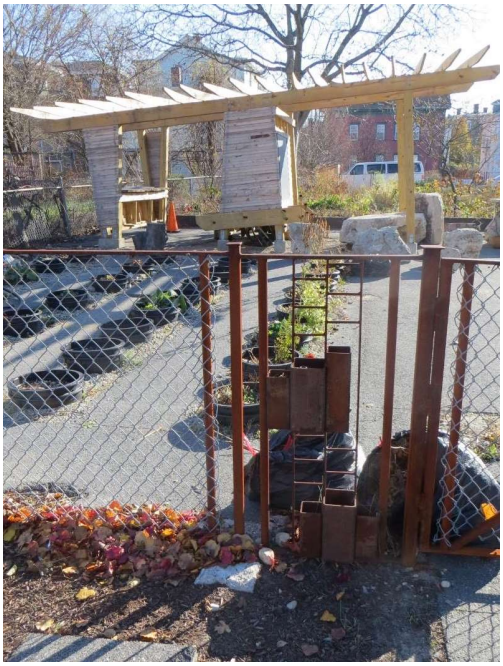
INTRODUCTION

During the 2017–2018 school year, organizational members of the Rhode Island Environmental Education Association (RIEEA) provided onsite programming for students and community members in Providence. Over 600 students ranging from pre-school through high school participated in one or more modules which were conducted at three properties owned and managed by Groundwork Rhode Island (GWRI).[1]

The Hope Tree Nursery, 59 Sprague Street, was constructed on a formerly polluted parcel in the West End of Providence. It provides a diverse stock of native species at-cost to Providence area residents and commercial properties located in neighborhoods with low tree canopy.

[1] "Farm-Based Food Rescue in RI and Beyond" and "Food Medicine" were not conducted on a GWRI property.



Located in a historic residential neighborhood, the Ring Street Community Garden was once a vacant, trash-filled parking lot. It now offers community members access to healthy growing spaces in nineteen raised vegetable beds as well as an outdoor teaching laboratory.

The Urban Farm and Greenhouse, located at 533 Prairie Avenue, hosts educational activities and events focused on urban agriculture. There is a pay-what-you-can farm stand as well as open hours for community members to learn, volunteer, and receive vegetables to take home.

The modules that were conducted at these three properties are excellent examples of environmental education that educators can use to strengthen students' environmental literacy and promote best practices among formal and informal educators. Each module includes basic information such as the audience, time required, and materials, and is aligned with the North American Association for Environmental Education's (NAAEE) *K-12 Environmental Education: Guidelines for Excellence* as well as the Common Core State Standards and Next Generation Science Standards.

FORESTRY IN YOUR BACKYARD

Northern Rhode Island Conservation District

Contact Information
Molly Allard
Environmental Education and Outreach Coordinator
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Location
Hope Tree Nursery, 59 Sprague Street, Providence

Audience
Middle School

Time Required
3 sessions of 60 minutes each

Overview

Forestry in Your Backyard introduces students to the process and benefits of urban tree selection and care while supplementing the middle school science curriculum and helping to increase canopy cover in the participating students' neighborhood. Over the course of three visits, middle school students learn basic tree identification skills, tree care skills, and tree planting.

Standards Connections

Common Core State Standards (ELA/Literacy)

- RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics
- RST.6-8.7: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table)
- RI.7.4: Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone
- SL.7.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly
- SL.7.1.B: Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed

Next Generation Science Standards

- MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem
- MS-LS2-2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems
- MS-LS2-5: Evaluate competing design solutions for maintaining biodiversity and ecosystem services

NAAEE K-12 Environmental Education: Guidelines for Excellence (8th Grade)

- 1.G: Learners synthesize their environmental observations and findings into coherent explanations.
- 2.3.A: Learners describe human-caused changes that affect the immediate environment as well as other places, other people, and future times.
- 3.1.D: Learners demonstrate active listening, tolerance, adaptability, and openness as they work with others to gather a range of perspectives and information.

Materials

- *Tree Finder* by May Theilgaard Watts (1 per 1–2 students)
- Small garden shears (1 pair)
- Tree branches with leaves, a variety of species (1 per 1–2 students)
- Clipart of white oak leaf to be projected
- Plastic garden tags with permanent marker (1 package)
- Tree flagging tape (1 roll)
- Clipboards (1 per 4 students)
- Shovels (3–4)
- 1–3 trees in 10 gallon or smaller pots
- Tree and shrub soil (1 bag per tree)
- Mulch, hardwood if possible, undyed if possible (1 bag per 2 trees)
- Gardening gloves (1 pair per student)
- Optional-shoe cover boots (1 pair per student)
- *Team 1 – Tree Identification* (several copies)
- *Team 2 – Tree Selection* (1 per group)
- *Team 3 – Tree Health Assessment* (several copies)
- *Team 4 – Tree Nursery Map and Inventory* (several copies)

Session #1: Trees in Your City

By the end of this session students will be able to:

- Identify the unique challenges that trees growing in a city face in obtaining the resources they need to thrive.
- Name the ecosystem services provided by urban trees.
- Use a dichotomous key to identify tree species common to their area.

Before Students Arrive:

- Collect tree branches with leaves from a variety of tree species; label each branch with a letter using masking tape. Identify each tree species, if necessary. Please speak with the landowner of the property you collect from to receive permission before trimming any branches.

Once Students Arrive:

1. Begin by asking students to brainstorm some of the benefits of street trees in their city. Write down their answers on the white board or on a large note pad.
2. Discuss benefits that they may not have mentioned and add them to the list. The benefits of street trees include: reduced energy use, wildlife habitat, clean water,

lower incidence of car and pedestrian accidents, higher property values, shade, reduced crime, and more.

3. Discuss your city's policies that may be in place to encourage the planting of street trees. In Providence, RI, for example, the city's Trees 2020 plan has set a goal of 30% canopy cover.
4. Introduce the concept of next session's walking field trip. Discuss the organization or nursery you may be working with, and any forms the students will need to bring in to participate in the trip.
5. Let students know that at the tree nursery they will be working on tasks in four different teams, each representing part of the job of an urban forester:
   - Tree identification and labeling
   - Tree health
   - Tree inventory
   - Tree selection
6. Pass out branches and *Tree Finder* guides to the students. Introduce the concept of a dichotomous key, and "key out" a tree species together as a class working from a picture projected at the front of the room. White Oak is recommended as a good practice species since it is distinctive in photos and will require working through most of the guide.
7. Give students 5-10 minutes to key out their branch. Students may work alone or in teams depending on class size and number of branches available. Students who finish quickly may trade branches with another student. Circulate to assist students with using the *Tree Finder*.
8. Review answers as a class; you may choose to project pictures of each branch using a projector or Smart Board.
9. Ask students to examine their branch closely and look for any signs that may indicate the tree it was from is not healthy. Record answers, which may include insect damage, fungus, or wilted leaves. Remind student to consider the season and how long ago the branches were collected. Discuss how students will be inventorying trees at the nursery for similar signs of health, and how not all signs of ill health indicate that a tree is actually unhealthy (for example, holes in leaves could be an indication of normal insect consumption and not an indication of irreparable harm to the plant).
10. Ask students what threats the tree growing at their school is likely to face. Answers may include traffic incidents, salt, pollution, vandalism, predation by insects and wildlife. Record their answers and discuss how urban foresters select trees that will likely be resilient to the specific challenges of trees that live in the city.
11. Discuss other considerations from the following list that must be taken into account to select the "right tree for the right spot."

- How much sunlight is available for the tree? How much shade will the spot receive?
- How much space is available for the tree?
- How close to the road will the tree be? This impacts both the spread that the tree can safely have, and the pollution tolerance that the tree requires.
- Who will care for the tree? Some trees require more frequent watering and trimming than others.
- Will the tree look nice in the spot? Is it consistent with any existing landscaping on the school grounds?

Session #2: Tree Nursery Work Day

By the end of this session students will be able to:

- Perform tree care tasks in an urban tree nursery with minimal assistance.
- Explain the various ways that trees benefit their neighborhood.
- Identify trees that are a good fit for planting at their school.

Before Students Arrive:

- Arrange forms on clipboards and other materials for each of the four groups.

Once Students Arrive:

1. Transport students and chaperone(s) to the tree nursery by walking or driving. (10 minutes)
2. Hand out garden gloves, pens or pencils, and shoe-coverings (optional) to each student. (5 minutes)
3. Divide students into four groups. (5 minutes)
    - Tree Identification and Labeling: receives clipboard with *Team 1–Tree Identification* handout (several copies), garden tags, permanent markers
    - Tree Selection: receives clipboard with *Team 2–Tree Selection* handout, flagging tape
    - Tree Health: receives clipboard with *Team 3–Tree Health Assessment* handout (several copies), one roll of flagging tape
    - Tree Inventory: receives clipboard with *Team 4–Tree Nursery Map and Inventory* handout (several copies)
4. Student Activity (30 minutes)
    - You may briefly introduce each activity, but the forms are designed so that they can be completed independently by middle school students. Circulate around the tree nursery to ensure that students remain on-task and offer help as needed.
5. Conclusion (10 minutes)
    - Collect equipment and walk back to school.

Session #3: Tree Planting Day

By the end of this session students will be able to:

- Implement a tree planting project on the school grounds.

Before Students Arrive:

- Speak with school administration about locating a place where a tree or trees can be planted on school grounds.
- Call Dig Safe or your area's equivalent service to ensure there are no underground gas or power lines at the planting site. This step is required even for hand digging holes to plant small trees, and in most states must be completed at least 3 business days before planting is scheduled.
- Arrange transport of tree(s) and planting materials to the planting site.
- Locate water access near the planting location and come up with a plan to water the tree weekly until the ground freezes during Year 1, and weekly during the growing season during Year 2. Soil should be watered underneath the tree's drip line so that it is moist to a depth of two inches. Watering bags may be used for spring plantings but are not recommended for fall plantings because of the risk of damaging the tree trunk.
- Familiarize yourself with proper tree planting techniques. A helpful how-to video from UMass Cooperative Extension can be found online at https://vimeo.com/198139268.
- Do a little digging at the site to ensure that the soil is loose enough to be easily moved by students. If it is not, a small excavator can be used in advance of student arrival or an alternate site can be selected.

Once Students Arrive:

1. Brief students on appropriate planting techniques. In particular, emphasize the importance of checking for roots encircling the trunk, loosening the root ball, and burying the root ball only up the root flare. (10 minutes)
2. Assign student jobs in the manner that makes the most sense for the class size. For each tree, jobs can include digging the hole, loosening the roots, bringing water to the site, stabilizing the tree, evaluating tree placement, holding the tree upright in the hole, finding the root flare, refilling the hole, adding soil (if necessary), mulching, and watering. Students not engaged directly in tree planting can work on writing a press release or school announcement about the event. (40 minutes)
3. Discuss what will need to be done to take care of the tree, and how the class or another school group will steward the tree moving forward. (10 minutes)

FORESTRY IN YOUR BACKYARD

Supplemental Handouts

Team 1 – Tree Identification

Some of the trees at the Groundwork Rhode Island tree nursery are no longer labelled. Your group's job will be to identify and label these trees using the Tree Finder books we practiced with in class. You can also use trees that ARE labelled as hints for nearby trees that look similar. Once you identify a tree, write the species down on a tag and attach the tag to one of the tree's branches. Ask Ms. Allard for help if you need to! You may work as a group, individually, or in pairs-it is up to you! Keep a record of the trees you identify on this page.

1.
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Team 2 – Tree Selection

Your team will be selecting the tree that we will plant in front of your school on Tuesday.

Remember to consider:

- How much space?
- How close to the road?
- Who will care for the tree?
- OVERALL DESIGN
- In general, **smaller** trees will have an easier time becoming established, or getting used to their new spot after planting.

Here is a photo of the planting site; the tree that used to occupy the spot has an “X” over it.

When you have chosen a tree that you would like to plant, use the plant health worksheet on this clipboard to make sure that it is healthy (one yes answer does not necessarily mean the tree is not healthy—check with us!) Then, mark it by tying a piece of flagging to one of its branches and let Ms. Allard know which tree you have chosen. Please also chose a second-choice tree in case there are any problems with your first choice.

Team 3 – Tree Health Assessment

Your team is in charge of investigating trees in the nursery for signs of damage or poor health. Start examining trees for the signs listed on this form. If you write "yes" in one or more spots for a given tree, tie a piece of flagging to one of the branches and write the number corresponding with the number from the form on that flag. Groundwork Rhode Island's forester can examine the trees that you flag and determine if they will be safe to plant. If you write "no" in each spot for a tree, you do not need to add a piece of flagging.

Tree Number	1	2	3	4	5	6
Dead or broken branches?						
Damage to the trunk?						
Bark peeling off the trunk?						
Is the tree wilting?						
Are there signs of insect damage?						
Are there signs of fungus or other diseases (such as brown or white spots)						
Are roots growing around the base of the tree's trunk?						
Are there signs that people have damaged the tree?						
Are there shoots, or small branches, growing out from the base of the tree?						
Anything else you would like to note about the health of this tree?						

Team 4 – Tree Nursery Map and Inventory

Your group will create a map of the Groundwork Rhode Island tree nursery. The map should show:

- How many rows of trees there are
- The number of trees in each row
- The relative sizes of the trees (using a symbol such as a circle)
- The location of Sprague Street and neighboring buildings relative to the tree nursery

Once you have created the map, you may shadow the tree ID group and begin to label the species of the trees on the map. Some trees may already be labelled.

SCHOOLYARD SAFARI

Norman Bird Sanctuary

Contact Information
Rachel Holbert
Director of Education
rholbert@normanbirdsanctuary.org, (401) 846–2577 ext. 33

Location
Urban Farm and Greenhouse, 433 Prairie Avenue, Providence

Audience
Grades 2–3

Time Required
90 minutes

Overview

Schoolyard Safari introduces students to the five items that all living things need to stay alive (food, water, air, shelter, space) as well as the concepts of habitat and ecosystem. Students go on a scavenger hunt for signs of wildlife habitat and then have an animal encounter and learn what it specifically needs from its environment.

Standards Connections

Common Core State Standards (ELA/Literacy)

W.2.8: Recall information from experiences or gather information from provided sources to answer a question.

SL.3.4: Report on a topic, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

Next Generation Science Standards

2-LS2.1: Plants depend on water and light to grow.

2-LS2-2: Plants depend on animals for pollination or to move their seeds around.

2-LS4-1: Make observations of plants and animals to compare the diversity of life in different habitats.

3-LS1-1: Develop models to describe that organisms have unique and diverse life cycles, but all have in common birth, growth, reproduction, and death.

3-LS4-2: Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

NAAEE K-12 Environmental Education: Guidelines for Excellence (4th Grade)

1.A: Learners develop questions that help them conduct simple investigations and learn about the environment.

2.1.B: Learners identify basic similarities and differences among a wide variety of living organisms. They explain ways that living organisms, including humans, affect the environment they live in, and how their environment affects them.

Materials

- Map of Rhode Island
- Bug boxes
- Magnifying lenses
- Clipboards
- Education animal: snake or amphibian
- Writing utensils
- *Wildlife Habitat Scavenger Hunt* (1 per student)

Full Session

By the end of this session students will be able to:

- Name 5 things that living things need to survive (food, water, oxygen/air, space, and shelter).
- Define habitat, ecosystem, producer, consumer, and decomposer.
- Explain how the urban ecosystem is impacted by non-living things and human interaction.

Before Students Arrive:

- Arrange for gate to Urban Farm and Greenhouse to be unlocked.
- Place 1 copy of *Wildlife Habitat Scavenger Hunt* on each clipboard.

Once Students Arrive:

1. Who are we and why are we here? (25 minutes)
    - Use the map of Rhode Island to show students where their school is located and where your organization is located. Give them an introduction to your organization.
    - Explain that nature is not just in parks and sanctuaries—nature is everywhere! Today we are going to make observations in our own community to see what we can discover about the living things around us.
    - Gather students and walk to the Urban Farm and Greenhouse.
2. Things Needed for Life (10 minutes)
    - Ask the class what living things need to stay alive (food, water, air, shelter, space).
    - Explain to the class that all living things need these things to live. A place where living things find food, water, air, space, and shelter is a habitat. We are going to think about what kinds of living things and non-living things are found in our local community.
    - Explain that an ecosystem is kind of like a neighborhood where all of the different habitats interact and work together. We can think of our own neighborhood as an ecosystem, and each of our houses as a habitat.
3. Green Space Exploration (20 min)
    - Set expectations for using the garden and greenhouse.
    - Distribute *Wildlife Habitat Scavenger Hunt* worksheets, bug boxes, magnifying glasses.
    - Let students work alone or in pairs or small groups with the purpose of discovering food, water, and shelter sources, as well as living things, facilitating when necessary.

4. Producers, Consumers, Decomposers & Review (15 minutes):
    - Explain to students what producers, consumers, and decomposers are. Ask the students to give you examples they found in the green space.
    - Review the things living organisms need to survive—did we find any examples of food, water or shelter? What about space—which animals live around humans in the city that might need a bigger space? (coyote, raccoon, opossum)
    - Did anyone find something man-made? Thing that humans leave in nature, like trash, are not good for the animals and plants living there—or us! Why not? What are some good choices we can make to keep our community clean?
    - Review producers, consumers, and decomposers one more time.
    - Walk back to school.
5. Animal Presentation (20 minutes)
    - During animal presentation, emphasize what this animal would need from its environment and its niche.
    - Conclude by reminding the students that nature is all around us, even close to humans in our communities.

SCHOOLYARD SAFARI

Supplemental Handouts

Wildlife Habitat Scavenger Hunt

Name _____ Today's Date: _____

Is there AIR? **YES** **NO**

What SHELTER can you find?

Ex. ant hill, squirrel nest

Is there WATER? **YES** **NO**

What FOOD can you find?

Ex. berries, leaves with holes in them

Is there enough SPACE? **YES** **NO**

Did you see any animals in the habitat?

AMAZING ARTHROPODS

Audubon Society of Rhode Island

Contact Information

Lauren Parmelee
Senior Director of Education
lparmelee@asri.org, (401) 949–5454 ext. 3111

Location

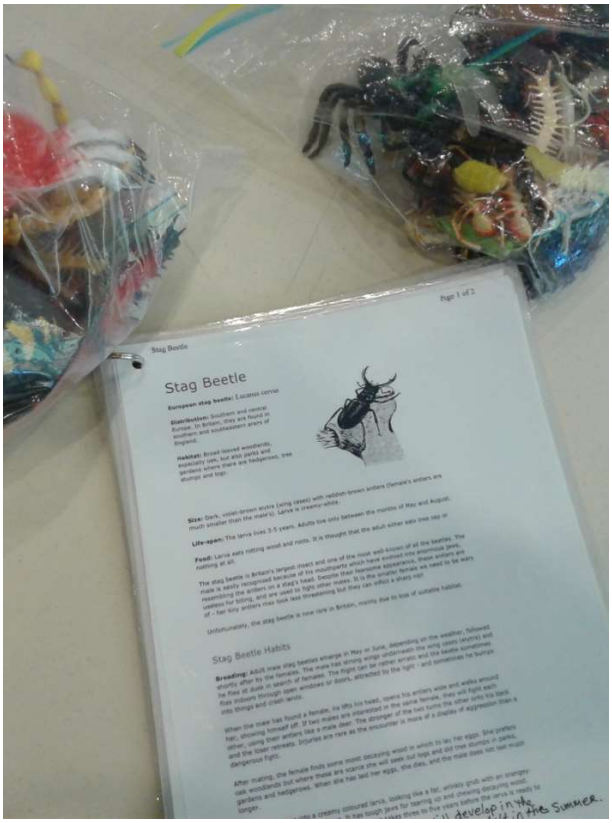
Urban Farm and Greenhouse, 433 Prairie Avenue, Providence

Audience

Grades K-2

Time Required

90 minutes



Overview

In this hands-on program, students will learn about the five major classes of Arthropods, their crucial importance to our ecosystem, and some of the amazing adaptations this diverse phylum of animals use to survive. Students will then visit with a live arthropod.

Standards Connections

Common Core State Standards (ELA/Literacy)

W.2.8: Recall information from experiences or gather information from provided sources to answer a question.

SL.2.1: Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.

SL.2.3: Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.

Next Generation Science Standards

1-LS1-1: Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

2-LS4-1: Make observations of plants and animals to compare the diversity of life in different habitats.

NAAEE K-12 Environmental Education: Guidelines for Excellence (4th Grade)

1.A: Learners develop questions that help them conduct simple investigations and learn about the environment.

2.1.B: Learners identify basic similarities and differences among a wide variety of living organisms. They explain ways that living organisms, including humans, affect the environment they live in, and how their environment affects them.

2.3.A: Learners identify ways that people depend on, change, and are affected by the environment.

Materials

- Posters of arthropods
- Models and examples of arthropods
- Bug boxes
- Magnifying lenses
- Metal spoons
- *Scavenger Hunt* (1 per student)

Full Session

By the end of this session students will be able to:

- Name the characteristics and classes of arthropods.
- Identify a species and determine if it is an arthropod.
- Discuss why arthropods are important to life on earth.

Before Students Arrive:

- Arrange to have the Greenhouse gate opened before your arrival.
- Familiarize yourself with the basic characteristics of Arthropods:
    - The word "*Arthropoda*" is Latin for "jointed feet."
    - Arthropods are "cold-blooded" (i.e. having a body temperature varying with that of the environment; poikilothermic) animals with segmented body parts, jointed legs, and an exoskeleton.
    - There are five major classes of Arthropoda: Insecta, Crustacea, Arachnida, Chilipoda (centipedes), and Diplopoda (millipedes).
    - Insects are the largest class of arthropods; about 80% of all arthropods are insects.

Once Students Arrive:

1. Introduction (10 minutes)
    - Gather students at end of walking school bus path, across the street from the Greenhouse, and give them an introduction to your organization.
    - Explain the rules for learning in nature: Do no harm; Leave no trace; Take no prisoners; Stay together!
2. What is an arthropod? Use models and examples of arthropods. (30 minutes)
    - "*Arthro*" means jointed and "*pod*" means foot. Arthropods have many jointed feet or legs. They are invertebrates. There are five different classes of arthropods.
    - Break students into three groups and have them sit in a circle with models or examples of Arthropods in the middle. Describe one species and have the students point to the one that matches the description. If time allows, have some students give descriptions.
    - In same small groups, students can sort the examples into groups based on common characteristics. Ask for examples of why they sorted the arthropods the way they did.
3. Outdoor Exploration (20 minutes)
    - Split the students into groups of 3 or 4 and give each group at least 1 magnifying lens, bug box, spoon, and *Scavenger Hunt* handout. Ask the students to explore the area for arthropods and other animals.
    - As groups find specimens, ask if it is an arthropod, what kind, and why? Take the opportunity to explain how birds and other animals need arthropods to survive.

4. Greenhouse Exploration (20 minutes)
    - Before entering the area, explain the rules for exploring the Greenhouse and that it is very important not to harm any plants.
    - Have the groups explore the Greenhouse area as they did above. As groups find specimens, ask if it is an arthropod, what kind, and why? Take the opportunity to explain how arthropods need plants to survive.
5. Conclusion (10 minutes)
    - Ask how humans might benefit from arthropods. Use posters of arthropods to discuss their roles in the food chain, as pest management, for science, medicine, and other products used by humans.
    - Collect equipment and return to school.

AMAZING ARTHROPODS

Supplemental Handouts

Animals Found Under Logs

Name_____

Ground Beetle

Beetle larva

Cricket

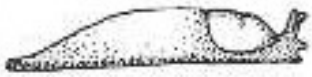
Centipede

Termite

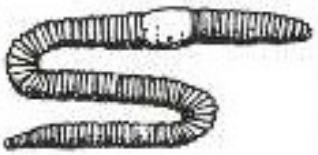
Ant

Sowbug

Millipede

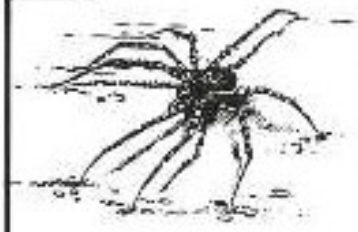


Slug

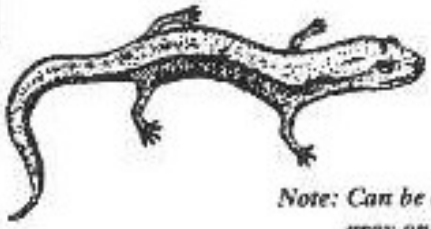


Earthworm

Snail



Spider



Note: Can be either red gray on back

Redback salamander

Spotted salamander

FREE PLAY AFTERNOONS

Roger Williams Park Zoo & Providence Parks Urban Wildlife Refuge Partnership

Contact Information

Samantha Polon
Manager of Hasbro's Our Big Backyard
spolon@rwpzoo.org, (401) 785–3510 ext. 353

April Alix
Conservation and Education Coordinator
aalix@providenceri.gov, (401) 864–4807

Location

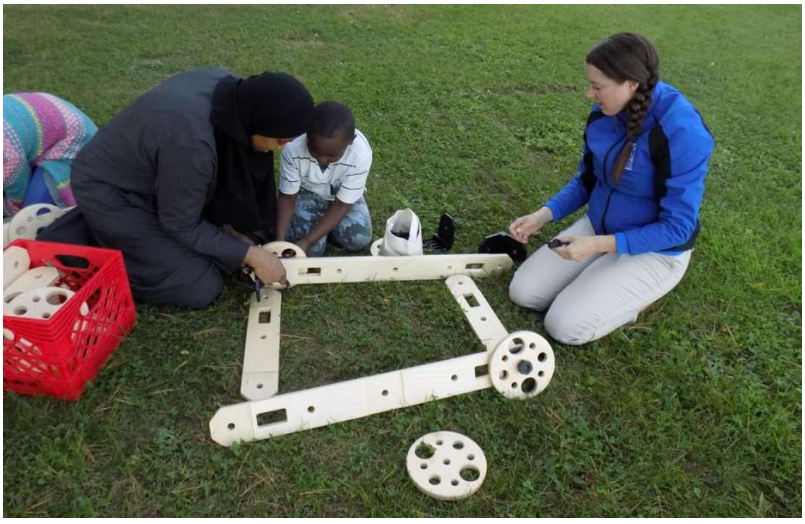
Urban Farm and Greenhouse, 433 Prairie Avenue, Providence (Session 1)
Hope Tree Nursery, 59 Sprague Street, Providence (Session 2)
Community Garden, Ring Street, Providence (Session 3)

Audience

Elementary School and their families

Time Required

3 sessions of 120 minutes each



Overview

These informal, after school programs engage children in unstructured outdoor play and learning about the urban natural landscape while parents, guardians, and caregivers gain valuable skills as partners in that experience. Students identify and observe animals and their shelters, learn about underground habitats and the role of decomposers, and use simple materials to design and build models of animal shelters and natural structures.

Standards Connections

Common Core State Standards (Math)

MP2: Reason abstractly and quantitatively.

MP5: Use appropriate tools strategically.

MP7: Look for and make use of structure.

Next Generation Science Standards

K-ESS3-1: Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

2-LS2-2: Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

NAAEE K-12 Environmental Education: Guidelines for Excellence (4th Grade)

1.F: Learners use models to represent environmental relationships, patterns, and processes.

2.1.B: Learners identify basic similarities and differences among a wide variety of living organisms. They explain ways that living organisms, including humans, affect the environment they live in, and how their environment affects them.

Materials

- Imagination Playground
- Banner
- Pictures of commonly found species (gray squirrel, American robin, little black ants, red tailed hawk, New England cottontail rabbit, wasp)
- Pictures of corresponding animal shelters (squirrel drey, robin nest, ant hill, hawk nest, rabbit hole, wasp nest)
- Yarn
- Clay
- Loose natural items found on property (e.g. sticks, leaves, acorns, etc.)

- Pictures of city birds (house sparrow, pigeon, American robin, European starling, blue jay, northern cardinal)
- Binoculars
- Bird shapes
- Metal spoons
- Trowels
- Bug boxes
- Magnifying lenses

Session #1: Urban Habitats

By the end of this session students will be able to:

- Name six animals that live in a city.
- Identify six shelters that animals that live within a city build or use.
- Utilize engineering skills to construct natural shelters.
- Build a model of an animal shelter.

Before Students Arrive:

- Hang banner.
- Gather natural materials from property.
- Unpack and set up Imagination Playground.

Once Students Arrive:

1. Use photographs to introduce students to six animals that survive and thrive in an urban setting.
2. Show the photographs of the shelters used by these animals one at a time, asking the students to guess who lives there. Ask them to pay special attention to the materials the animals use to create their shelters.
3. Let the students use the natural materials found in the area to create their own animal shelters. Encourage caregivers and family members to participate and ask questions.
4. Students and families can also use Imagination Playground to create animal shelters, or simply allow children to use the equipment creatively.
5. If there is time and/or interest, give a tour of the Greenhouse and explain the Little Free Library.

Session #2: Urban Birding

By the end of this session students will be able to:

- Name four birds that live in a city.
- Use binoculars to observe birds.
- Find food, water, shelter, space, and air that birds need to survive in a city.

Before Students Arrive:

- Hang banner.
- Place the bird shapes in different trees around the Tree Nursery.
- Unpack and set up Imagination Playground.

Once Students Arrive:

1. Use photographs to introduce students to some birds that survive and thrive in an urban setting. Discuss what urban birds eat and drink, and where they take up shelter.
2. Explain how to use binoculars and let the students take turns trying them, first by looking at a bird shape close up and far away and then by trying to spot living birds in the area. Encourage care givers to help their children.
3. Ask the students to explore the Tree Nursery and try to identify items that birds might use to survive.
4. Students and families can use Imagination Playground to create birds or bird nests, or simply allow children to use the equipment creatively.
5. If there is time and/or interest, give a tour of the Tree Nursery and promote the Little Free Libraries in the local public parks.

Session #3: Decomposers

By the end of this session students will be able to:

- Discuss the role of decomposers in an ecosystem.
- Identify three types of decomposers.
- Define “adaptation” and give an example of an adaptation of a plant or animal in the park.

Before Students Arrive:

- Hang banner.
- Unpack and set up Imagination Playground.

Once Students Arrive:

1. Explain what a decomposer is and why they are important in an ecosystem.

2. Invite the students and their caregivers to flip logs and/or use the trowels and spoons to dig in the dirt and try to discover some decomposers in the garden. Encourage students to use the magnifying lenses and collect items in bug boxes to show one another.
3. Students and families can use Imagination Playground to create underground habitats, or simply allow children to use the equipment creatively.
4. If there is time and/or interest, give a tour of the Garden and promote the Little Free Libraries in the local public parks.

TREES AND CLIMATE

The Empowerment Factory

Contact Information
Gail Ahlers
President
gail@empowermentfactory.org, (401) 365–1010

Location
Hope Tree Nursery, 59 Sprague Street, Providence

Audience
Middle School

Time Required
3 sessions of 90 minutes each

Overview

Students work individually and in teams to increase knowledge about trees and climate and learn how they can make a difference in their neighborhood. Creative arts projects are incorporated to help students visualize and better understand the environmental science concepts. This three-day program can be easily adapted for Grades 1–8.

Standards Connections

Common Core State Standards (ELA/Literacy)

RI.6.1: Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

RI.6.2: Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.

RI.6.3: Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).

RI.6.7: Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

W.6.1: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

SL.6.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

SL.6.2: Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.

Next Generation Science Standards

LS2 (5-8) SAE–6: Given a scenario trace the flow of energy through an ecosystem, beginning with the sun, through organisms in the food web, and into the environment (includes photosynthesis and respiration).

LS2 (5-6) –6: Students demonstrate understanding of energy flow in an ecosystem.

LS2 (7-8) –6: Students demonstrate understanding of food webs in an ecosystem.

LS2 (5-8) SAE–7: Given an ecosystem, trace how matter cycles among and between organisms and the physical environment (includes water, oxygen, food web, decomposition, recycling but not carbon cycle or nitrogen cycle).

LS2 (5-6) –7: Students demonstrate understanding of recycling in an ecosystem.

LS2 (7-8) –7: Students demonstrate understanding of recycling in an ecosystem.

NAAEE K-12 Environmental Education: Guidelines for Excellence (8th Grade)

1.A: Learners develop, refine, and explain questions that help them conduct environmental investigations and learn about the environment.

1.F: Learners use models to analyze information that support their environmental investigations. They explain the purposes and limitations of these models.

2.1.B: Learners describe how living things, including humans, are dependent on their environment and are adapted to live in particular ecosystems, under particular environmental conditions. They describe major interactions among organisms and populations of organisms and explain the importance of biodiversity to ecosystem health. They describe how humans affect and are affected by the ecosphere.

2.3.A: Learners describe human-caused changes that affect the immediate environment as well as other places, other people, and future times.

2.3.C: Learners describe the meaning of "place" both close to home and around the world.

3.1.A: Learners use primary and secondary sources of information and apply growing research and analytical skills to investigate environmental issues, beginning in their own community and region.

Materials

- Leaf stencil
- Card stock
- Colored pencils
- Hole puncher
- String
- Markers
- Construction paper
- Play-dough
- Toothpicks
- Diagram of a chlorophyll molecule
- Newspaper
- Stack of books or heavy objects
- *Living Sunlight: How Plants Bring the Earth to Life* by Molly Bang and Penny Chisholm
- *Leaf Man* by Lois Ehlert
- *Air Quiz* (1 per student)
- *Environmental Tree-Via Quiz* (1 per group of 3-4)
- *Gypsy Moths Bring More Bad news to Region* (1 per student)

Session #1: Photosynthesis

By the end of this session students will be able to:

- Identify the molecules involved in photosynthesis.
- Explain how the molecules are reorganized during the photosynthetic process.

Once Students Arrive:

1. Greet the students and let them introduce themselves. Make leaf shaped name tags using the stencils, card stock, colored pencils, hole puncher, and string. (10 minutes)
2. Read from the book, *Living Sunlight: How Plants Bring the Earth to Life.* (20 minutes)
3. Have the students work individually to create 6 molecules of water and 6 molecules of carbon dioxide using play-dough and toothpicks. (20 minutes)
4. Separate the students into teams and have them "do the work" of chlorophyll and reorganize the molecules to create a sugar molecule and oxygen molecules. Teams can show their molecules and discuss the photosynthetic process of making sugar. (20 minutes)
5. Show the diagram of a chlorophyll molecule and discuss. (10 minutes)
6. Have the students take the *Air Quiz* to assess what they know about the composition of air and how nitrogen gets absorbed into plants. (10 minutes)

Session #2: Neighborhood Walk

By the end of this session students will be able to:

- Discuss the trees in the neighborhood of the Hope Tree Nursery.
- Press leaves for use in art projects.

Before Students Arrive:

- Talk a walk in the area of the Tree Nursery and orient yourself.

Once Students Arrive:

1. Have the students share what they thought about yesterday's lesson. What did they learn that they did not know before? (5 minutes)
2. Distribute the *Environmental Tree-Via Quiz* and let the students work together in teams to complete it. Have teams exchange papers and mark them as the entire group discusses the correct answers. (15 minutes)
3. Lead the students on a walk through the immediate neighborhood of the Hope Tree Nursery and examine and discuss the placement of trees around various properties. Ask the students for specific recommendations about the planting of trees to improve

the neighborhood and explain their reasoning. Ask students to gather leaf samples to press and use in an art project at the next class. (60 minutes)

4. Direct the students to place their leaf specimens between sheets of newspaper and press under the weight of books. Distribute copies of *Gypsy Moths Bring More Bad news to Region* and ask the students to read it before the next time we meet. (10 minutes)

Session #3: Leaves

By the end of this session students will be able to:

- Identify that leaves are shaped differently.
- Define defoliation and explain at least one environmental problem caused by defoliation.

Before Students Arrive:

- Set up three stations with necessary materials.

Once Students Arrive:

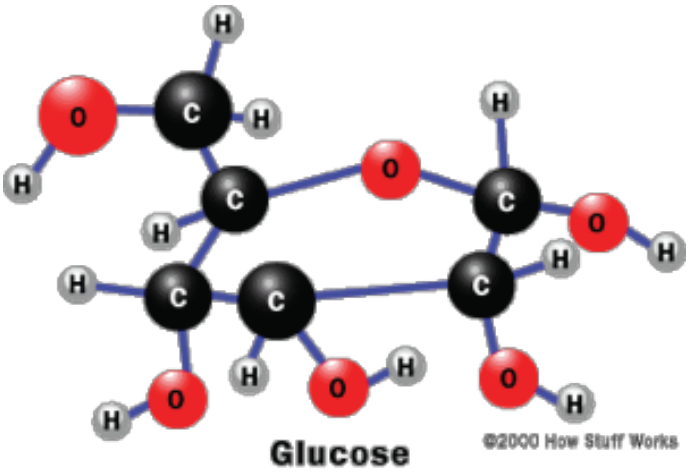
1. Have the students share what they thought about yesterday's lesson. What did they learn that they did not know before? (5 minutes)
2. Review the Gypsy Moth article that the students were given to read. Ask the students if they had any questions or want to share comments about it. Then, direct the students in creating a list of environmental problems caused by defoliation. Be sure to discuss chlorophyll, why leaves change color and then fall from the trees. (15 minutes)
3. Group the students into three teams and ask them to rotate through three different creative learning stations. (20 minutes at each station for a total of 60 minutes)
    - Station 1: Examine the whimsical book *Leaf Man*.
    - Station 2: Trace leaf shapes onto construction paper and color to create pictures.
    - Station 3: Write nature journal entries about what they've learned over the three days.
4. Ask for student volunteers to share their artwork and/or journal entries. If possible, take photographs and share with teachers. (10 minutes)

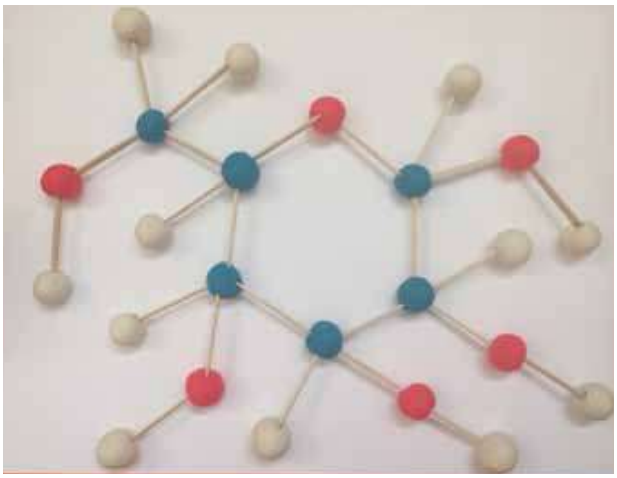
TREES AND CLIMATE

Supplemental Handouts

Plant Chemistry

color code for picture
Oxygen = red balls - form 2 bonds
Carbon = black balls - forms 4 bonds
Hydrogen = gray balls - form1 bond

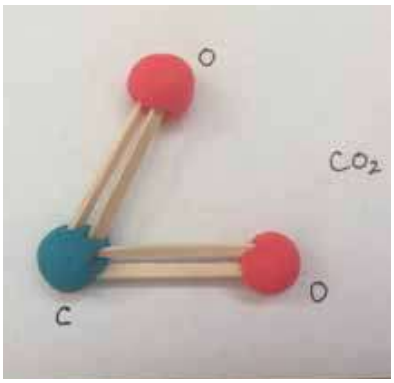




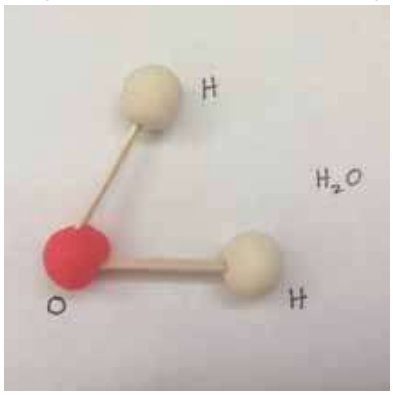
O_2 = Oxygen Molecule = 2 Oxygen Atoms
CO_2 = Carbon Dioxide Molecule = 2 Oxygen Atoms + 1 Carbon Atom
H_2O = Hydrogen Oxide Molecule (water) = 2 Hydrogen Atoms + 1 Oxygen Atom
$C_6H_{12}O_6$ = Glucose Molecule = 6 Carbon + 12 Hydrogen + 6 Oxygen Atoms

Each Team will make: 6 CO_2 and 6 H_2O Molecules

CO_2 = Carbon Dioxide Molecules



H_2O = Hydrogen Oxide Molecules (water)



Reassemble the atoms from those molecules to make one glucose molecule .
$C_6H_{12}O_6$ - Glucose Molecule = 6 Carbon Atoms + 12 Hydrogen Atoms + 6 Oxygen Atoms

Ok so now you have made a glucose molecule, the food that plants need to grow.
What do you have left over?
You should have 12 oxygen atoms. Pair them up to create 6 oxygen molecules.
Oxygen atoms will always form two bonds.

The plant releases the oxygen molecules into the air for humans and animals to breathe.

Air is made up mostly from four gases. Draw a line between the gas and the percent of air it represents.

Oxygen	.93 percent	(parts per hundred)
Argon	20.95 percent	(parts per hundred)
Nitrogen	78.09 percent	(parts per hundred)
Carbon Dioxide	0.04 percent	(parts per hundred)

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ENVIRONMENTAL TREE-VIA QUIZ

1) How much carbon dioxide can a mature tree absorb in a year?

a) 10 pounds
b) 25 pounds
c) 48 pounds

2) How much carbon dioxide can a tree sequester by the time it reaches 40 years of age? (Sequester means to take in and hold.)

a) 500 pounds
b) 1,000 pounds
c) 2,000 pounds (1 ton)

3) One large tree can supply enough oxygen to support how many people?

a) 1
b) 2
c) 8

4) Trees cools the earth by providing shade. The net cooling effect of a young health tree is equivalent to how many room-size air conditioners operating 20 hours per day?

a) 1 air conditioner
b) 5 air conditioners
c) 10 air conditioners

5) How much water can a tree lift out of the ground and transpire into the air in one day? Transpire means to give off moisture through the pores in leaves and other parts of a plant, much like humans sweat. 1 gallon = 16 cups = 8 pounds

a) 5 gallons (80 cups or 40 pounds)
b) 50 gallons (800 cups or 400 pounds)
c) 100 gallons (1,600 cups or 800 pounds)

6) Trees help to reduce storm water runoff, which carries pollutants into streams and rivers. For every five percent of tree cover added to a community, storm water runoff is reduced by what percent? Percent means number of parts out of 100 parts.

a) 2 percent
b) 5 percent
c) 10 percent

ENVIRONMENTAL TREE-VIA QUIZ ANSWERS

1) How much carbon dioxide can a mature tree absorb in a year?

a) 10 pounds
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c) 48 pounds

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Gypsy Moths Bring More Bad News to Region

https://www.ecori.org/natural-resources/2017/5/3/gypsy-moths-bring-more-bad-news-to-region
May 03, 2017

By TODD McLEISH/ecoRI News contributor

It's almost gypsy moth caterpillar season again, a time of tree defoliation, a variety of other environmental impacts, and caterpillar droppings raining down upon us. And now comes the news that last year's infestation may have also affected water quality in the region and will likely do so again.

Gypsy moth caterpillars — along with winter moth caterpillars and forest tent caterpillars, but mostly gypsy moths — defoliated about 230,000 acres in Rhode Island last year, according to University of Rhode Island entomologist Heather Faubert, making it the worst defoliation since at least the early 1980s. More than half of the state's 400,000 forested acres were impacted.

The defoliation also allowed sunlight into areas usually shaded by forest canopy, which local ecologists said allowed sun-loving invasive plants to spread into the forest, denied native birds and small mammals protection from predators, and made it difficult for frogs and salamanders living on the forest floor to remain cool and moist.

Coupled with last year's drought, it also resulted in what botanist Keith Killingbeck called "a muted display" of fall foliage.

The water-quality implications from the caterpillars, reported last month by URI researcher Kelly Addy at a research conference at Brown University, were a coincidental result of a comparative study of how rainstorms affect stream-water quality in forested, urban and agricultural watersheds. Addy said sensors in Cork Brook in North Scituate picked up a "signature" of gypsy moths that lasted for many months.

“When you lose canopy cover, you have more sunlight hitting the streams, which warms up the water, and warm water cannot hold as much oxygen, so dissolved oxygen levels go down,” she said.

Addy also noted that dissolved oxygen levels were further suppressed when large quantities of additional carbon — from caterpillar excrement, the caterpillars themselves and leaf fragments — dropped into the water from above.

“All that carbon fuels the organisms living in the water, causing them to flourish,” she said. “Suddenly, you have more biomass of life in the streams, which sounds good, but they are then consuming more oxygen, and dissolved oxygen levels decline even more.”

In Cork Brook, dissolved oxygen was measured at 8 milligrams per liter in summer 2014 and 2015, but just 5 milligrams per liter last summer.

“At that level, you can start getting oxygen distress in sensitive species,” Addy said.

The low levels of dissolved oxygen in Cork Brook remained through at least last fall, when the sensors were removed.

“If gypsy moths are not a big issue this spring, then the water will likely recover,” she said. “But if it happens repeatedly, then the streams won’t bounce back as easily, and each spring it may remain low.”

Unfortunately, gypsy moths are poised for another big year, with one caveat. “How bad it will be will depend somewhat on the weather,” Faubert said.

In years when it’s rainy in May, the moisture abets several fungal diseases that get passed back and forth between gypsy moth caterpillars, causing the population to crash.

“But even if almost all of our gypsy moth caterpillars die off from the diseases, they don’t die until they’re already large caterpillars, so they will have already eaten a lot of leaves,” she said. “So we’re in for a lot of gypsy moth damage, regardless of the weather.”

That means the likelihood of many more dead trees, since the botany rule of thumb suggests that three consecutive years of defoliation will usually kill most trees. And even one year of defoliation of spruce or hemlock trees can kill them, Faubert said.

The only good news is that Faubert found fewer winter moth eggs this spring than in the past two years, so winter moth caterpillars, which typically hatch in early to mid-April and feed on leaves and tree blossoms for about a month, may have a lesser impact on local trees this year than previously expected.

The Rhode Island Department of Environmental Management (DEM) has reported that moderate to high concentrations of gypsy moth caterpillars are expected this spring across the state. While a nuisance, the caterpillars don't pose a public-health threat and will eventually die off naturally, according to the state agency.

As a result of the anticipated large numbers of caterpillars, widespread defoliation of trees and shrubs is expected. However, these effects will be temporary and most of the state's impacted tree canopy is expected to recover, according to a May 5 press release from DEM.

The state, at this time, doesn't plan to apply pesticide to control caterpillar populations, DEM said. Homeowners interested in learning more about treatment options for infested landscape should contact a licensed arborist.

"A significant caterpillar infestation is anticipated in 2017, putting much of the trees in our state's forests, parks and urban green spaces at risk of experiencing some level of defoliation," said Paul Ricard, forest health program manager for DEM's Division of Forest Environment. "We should also remember that this is not the first gypsy moth infestation that the majority of our trees have experienced. This is a testament to their resiliency, and we are confident that the vast majority of trees will recover from this infestation as well."

Rhode Island resident and author Todd McLeish runs a wildlife blog.

WEB OF LIFE

The Empowerment Factory

Contact Information
Gail Ahlers
President
gail@empowermentfactory.org, (401) 365–1010

Location
Urban Farm and Greenhouse, 433 Prairie Avenue, Providence

Audience
Elementary School

Time Required
3 sessions of 45–90 minutes each

Overview

Students learn the important connections between plants, insects, birds, other animals, and human beings through garden explorations and art.

Standards Connections

Common Core State Standards (ELA/Literacy)

RI.3.1: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

RI.3.2: Determine the main idea of a text; recount the key details and explain how they support the main idea.

RI.3.3: Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

RI.3.7: Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

RL.3.3: Describe characters in a story (e.g., their traits, motivations, or feelings) and explain how their actions contribute to the sequence of events.

RL.3.7: Explain how specific aspects of a text's illustrations contribute to what is conveyed by the words in a story (e.g., create mood, emphasize aspects of a characters or setting).

RF.3.4: Read with sufficient accuracy and fluency to support comprehension.

SL.3.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

SL.3.2: Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

SL.3.3: Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.

Next Generation Science Standards

LS2 (K-4) SAE –6: Describe ways plants and animals depend on each other (e.g., shelter, nesting, food).

LS2 (K-2)–6: Students demonstrate an understanding of food webs in an ecosystem.

LS2 (3-4)–6: Students demonstrate an understanding of food webs in an ecosystem.

LS3 (3-4) –7: Students demonstrate an understanding of equilibrium in an ecosystem.

NAAEE K-12 Environmental Education: Guidelines for Excellence (4th Grade)

1.C: Learners locate and collect information about the environment and environmental topics.

2.1.B: Learners identify basic similarities and differences among a wide variety of living organisms. They explain ways that living organisms, including humans, affect the environment they live in, and how their environment affects them.

2.3.A: Learners identify ways that people depend on, change, and are affected by the environment.

3.2.A: Learners examine and express their own views on environmental issues.

3.2.D: Learners identify environmental, social, and economic consequences of design solutions and civic actions, including their own actions.

4.A: Learners describe their basic rights and responsibilities as members of a community and the importance of these rights and responsibilities in promoting environmental quality and community well-being.

Materials

- *Rachel Carson and Her Book That Changed the World* by Laurie Lawlor
- Animal puppets
- *Web of Life puppet play script* (1 per student)
- Antique hand cranked rivet machine
- Metal petals pre-cut from soda cans
- Gemstones
- Hot glue
- *Secrets of the Garden: Food Chains and the Food Web in Our Backyard* by Kathleen Weidner Zoehfeld and Priscilla Lamont
- Garden trowels and/or metal spoons
- *WiggleWorms* at Work by Wendy Pfeffer
- *An Earthworm's Life* by John Himmelmen
- *What If There Were No Bees?* by Suzanne Slade
- Diagram of flower
- Canvas shopping bags
- Permanent markers
- Construction paper
- Scissors
- Hole puncher
- Pencils (1 per student)
- *Scavenger Hunt* (1 per student)

Session #1: It's All Connected!

By the end of this session students will be able to:

- Explain that farmers can use insects such as ladybugs and praying mantids instead of chemical sprays to prevent pests from consuming their crops.
- Create metal flower broaches.
- List 3 edible fruits or vegetables that can be grown in an urban garden.

Before Students Arrive:

- Prepare all materials needed for the recycling craft.

Once Students Arrive:

1. Welcome everyone and ask the students to sit in front of you. Read *Rachel Carson and Her Book That Changed the World* and ask for some volunteers to share what they thought about the book. (15 minutes)
2. Hand each student a puppet and script and ask them to practice reading their lines first by themselves, and then with a partner or teacher. Then, perform the play for one another. (45 minutes)
3. Divide the students into two groups. Half of the students can explore the garden and sample fruits and vegetables such as ground cherries (also known as husk tomatoes), cherry tomatoes, green beans, jalapeno peppers, sorrel, or summer squash. Guide the other students in how to use a to do the rivet machine to make metal flower broaches using layers of metal petals pre-cut from soda cans. Let each student finish their jewelry piece by gluing gems in the center. After 15 minutes or so, switch so each student has a chance to make a piece of recycled jewelry and taste some food. (30 minutes)

Session #2: Scavenger Hunt

By the end of this session students will be able to:

- Explain how every living thing relies on other living things for food or for protection.
- Identify 2-3 organisms that live in the farm and/or greenhouse.

Once Students Arrive:

1. Welcome everyone and ask the students to sit in front of you. Read *Secrets of the Garden: Food Chains and the Food Web in Our Backyard* and ask for some volunteers to share what they thought about the book. (15 minutes)
2. Divide the students into two groups. Half can dig in the garden soil, look for worms, and look at the two picture books about worms. The other half can go on a scavenger hunt to search for a variety of leaves that represent the diversity of plants

growing in the garden. After 15 minutes or so, switch so each student has a chance to do the activities. (30 minutes)

Session #3: Bees

By the end of this session students will be able to:

- Define “keystone species” and identify bees as an example.
- Define “extinct” and give an example of a species that is extinct.
- Name one part of a flower and how it is used in pollination.

Before Students Arrive:

- Draw and cut out bees on different colored construction paper and punch 2 holes in center.

Once Students Arrive:

1. Welcome everyone and ask the students to sit in front of you. Read *What If There Were No Bees?* and ask for some volunteers to share what they thought about the book. (15 minutes)
2. Define the term keystone species: a plant or animal species that is so important that without it many other species could become extinct (no longer in existence). Then show the diagram of a flower and describe pollination, explaining that bees help pollinate many of the crops we like to eat such as apples, broccoli, blueberries, almonds, and onions. (15 minutes)
3. Ask the students to create art with messages about bees, flowers, and why bees are important. In between the three art projects, the students can look for bees and other pollinators in the garden. (60 minutes)
    - Bags: students use markers to decorate.
    - Posters: students make signs for their school to help educate others about bees.
    - Pencil puppets: students draw, color, and cut out bees and attach them to pencils.

TREES AND CLIMATE

Supplemental Handouts

WEB OF LIFE

a play written by Wendy Fachon

ACT 1: INSECTS

Narrator: One morning some insects came to visit the farmer's children.

Bee: I wish the farmers would stop spraying those crazy chemicals on the corn.

Butterfly #1: Yes, the spray kills the weeds and wildflowers.

Butterfly #2: We need the wildflower nectar to survive.

Butterfly #3: And the spray kills the milkweed, which is the only plant my picky children will eat.

Worms: Cough! Cough! The chemical spray washes down into the soil and make us sick.

Little Girl: I'm sorry. I did not know that spraying was a problem.

Ladybug: See those pesky aphids eating the tomato leaves? I can help the farmer. I love to eat aphids.

Praying Mantis: I can help, too. I will eat the beetles that are eating the bean and squash plants.

Little Boy: I didn't know you could help protect our crops. Thank you for helping.

ACT 2: BIRDS

Narrator: In the afternoon birds came to visit the children.

Crow: I wish the farmer would stop spraying those crazy chemicals all over the tomatoes. It makes me sick when I chomp on the tomatoes.

Little Girl: You shouldn't be eating our tomatoes.

Chicken: You shouldn't either, Little Girl. They have been sprayed bad stuff.

Papa Cardinal: I wish the farmer would spray the fruit trees with something safer.

Mama Cardinal: Yes, that icky stuff is making our babies sick.

Blue Jay: I wish the farmer would stop spraying the oak trees. I love to eat acorns but do not want to get sick from eating them.

Turkey: The spray is killing the grasshoppers and the weeds I like to eat.

Little Boy: Gosh, how can we get rid of weeds without spraying?

Wise Old Owl #1: Some weeds are delicious and nutritious.

Wise Old Owl #2: You can pull them out of the ground and eat them, IF they are chemical-free.

Little Girl: Really? Cool! I want to learn more.

ACT 3: OTHER ANIMALS

Narrator: In the evening, more animals came to visit the farmer's children.

Beaver: I wish the farmer would stop spraying those crazy chemicals, because the rain washes the chemicals into the river, which kills the fish.

Possum: The chemicals also kill the snails and frogs I like to eat.

Squirrel: All this spraying is upsetting our food chain.

Chipmunk: Yes, it is hurting us.

Fox: If farmers were as clever as I am, they would learn how to grow food using organic methods.

Little Boy: I have an idea. Let's talk to our parents about this.

Little Girl: That's a great idea!

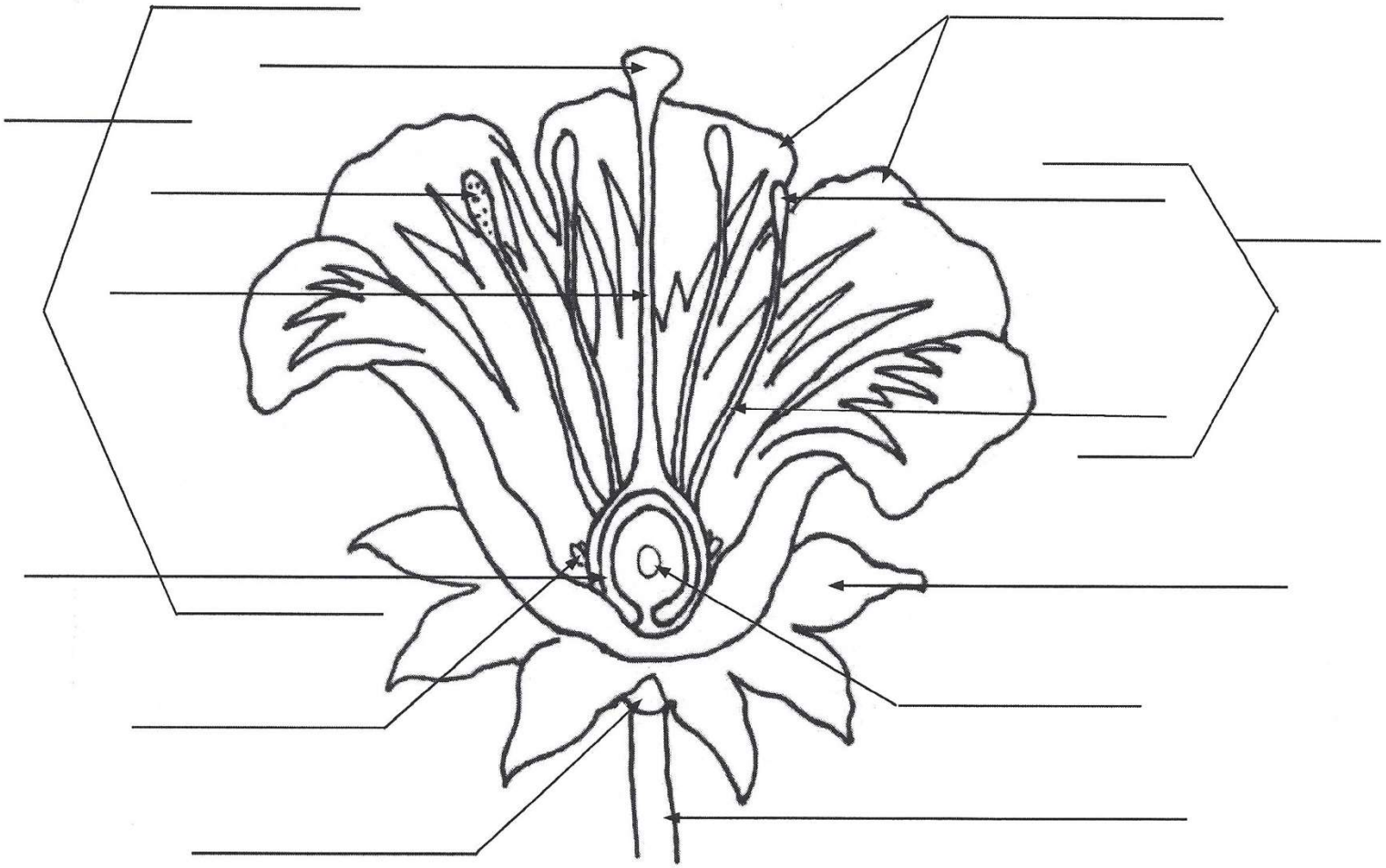
Little Boy: Together we will come up with some solutions that are healthier for all of us.

LESSON B:

Name:_____ Date:_____

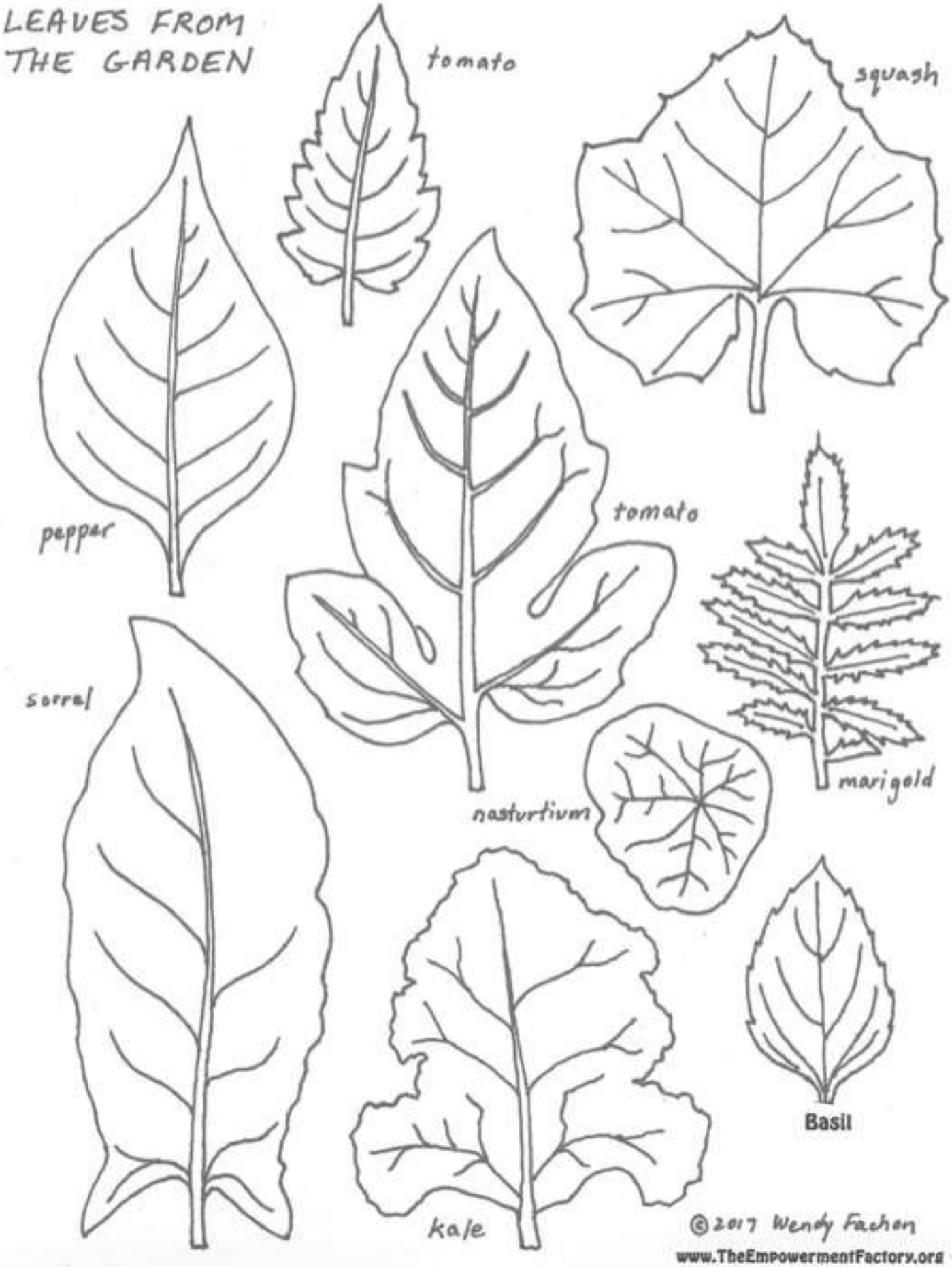
THE POWER OF A FLOWER!

Not only do they look pretty and smell good; but flowers also serve a very important purpose. Flowers are actually what enable a plant to reproduce. Below is a cross section of a flower. Use the word bank provided below to label the flowers different parts.



Word Box

ovule	petals	stem
anthers	pollen grains	stigma
filament	sepal	style
ovary	receptacle	stamen
nectary	pistil	


LEAVES FROM THE GARDEN
tomato
squash
pepper
tomato
marigold
sorrel
nasturtium
Basil
kale
©2017 Wendy Fachon
www.TheEmpowermentFactory.org

YOUTH LOCAL NUTRITIONAL EDUCATION

Feeding the Streets USA

Contact Information
Patrick Straus
Founder
patrickfreshconn@gmail.com, (631) 327–8649

Location
Community Garden, Ring Street, Providence

Audience
Middle School
High School

Time Required
60 minutes

FEED the STREETS USA™
COMMUNITY REACHING OUT TO THE HEARTS IN DOUBT ©

Overview

Youth Local Nutritional Education was founded by a group of young innovators alongside Feed the Streets USA to empower, encourage and inform young people on the necessity behind local food, nutrition, and product identification. This lesson focuses on local food knowledge, intuitive thinking, and discussion. With the use of local food as an application to knowledge learned, the students use their five senses to decide for themselves if and why they should eat local foods.

Standards Connections

Common Core Standards (ELA/Literacy)

SL.6.1.C: Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.

SL.9-10.1.C: Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.

NAAEE K-12 Environmental Education: Guidelines for Excellence (8th Grade)

2.3.B: Learners explain that uneven geographic distribution of natural resources influences their use and perceived value.

4.A: Learners explain the rights and responsibilities of community membership and their role in promoting environmental, social, and economic sustainability.

Materials

- Ingredients to make salsa
- Chips
- Plates

Full Session

By the end of this session students will be able to:

- Explain how healthy food benefits the body and why eating different colored foods is important.
- Identify local food sources.
- Prepare a local food that is in season.

Before Students Arrive:

- Prepare the ingredients for the salsa.

Once Students Arrive:

1. Ask the students what “being healthy” means to them. Be sure to include the following in the discussion (10 minutes):
    - eating a balanced diet, getting an hour of activity each day
    - this has mental and physical effects (e.g. ability to retain information, activity level through the day; quality of life)
2. Introduce the concept of “Eating the Rainbow” (10 minutes):
    - Red and orange foods contain large amounts of beta-carotene (which the body converts into vitamin A), fiber, vitamin C, and antioxidants.
    - Yellow foods help produce carotenoids (which help protect against diseases such as cancer) and can improve skin complexion and health.
    - Green, blue, white, and brown foods are filled with iron, calcium, and other nutrients to build the immune system, lower blood sugar, and decrease cardiovascular disease.
3. Explain why eating natural, local produce is better than eating packaged, processed foods and why water and fat-free milk are better than Gatorade and soda. (30 minutes)
    - Prepare garden salsa using local ingredients, discussing each ingredient and where it was sourced.
    - Let students taste the salsa.
4. Discuss the main components of local, healthy eating (10 minutes):
    - Who? Farmers and artisans create healthy foods.
    - What? You are what you eat and what it eats.
    - When? Eat foods that are in season.
    - Where? Products grown locally are best.
    - Why? Local, healthy foods help you, your community, and the economy.

Farm-Based Food Rescue in RI and Beyond

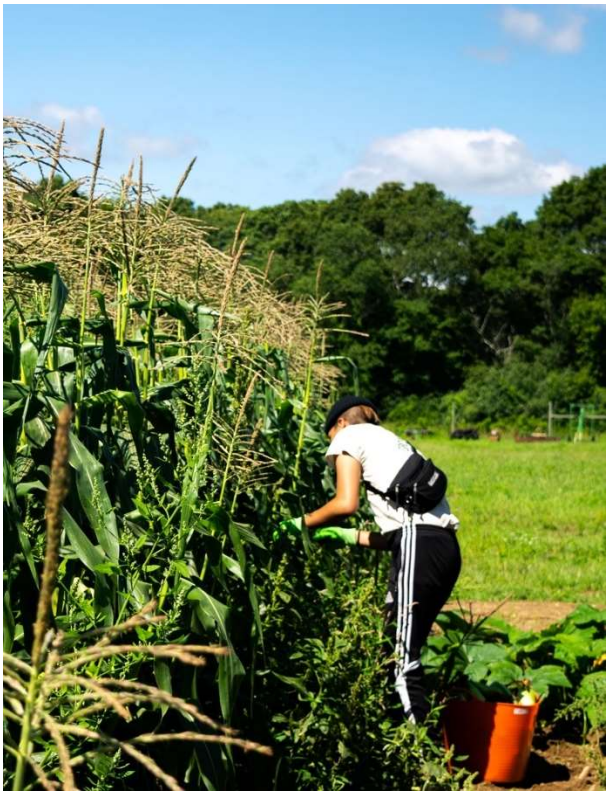
Hope's Harvest RI

Contact Information
Eva Agudelo
Director
eva@hopesharvest.org, (401) 680–0281

Location
URI Agronomy Farm, 370 Plains Road, West Kingston

Audience
High School

Time Required
1 session of 180 minutes



Overview

This workshop starts with a lecture and discussion of the larger context, history, and current status of food waste/surplus issues nationally, regionally, and locally, and strategies to address these issues. Then, participants learn what gleaning is and rescue corn for delivery to hunger relief agencies statewide.

Standards Connections

Common Core Standards (ELA/Literacy)

SL.9-10.1.C: Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.

NAAEE K-12 Environmental Education: Guidelines for Excellence (12th Grade)

2.1.B: Learners describe basic population dynamics, genetic mechanisms behind biological evolution, and the importance of diversity in living systems. They explain how changes in the hydrosphere, atmosphere, lithosphere, and anthrosphere affect the ecosphere. They describe how human sustainability is dependent on the ecosphere.

2.2.A: Learners observe and describe ways that individual and group action affects the environment, and how each can work to promote the common good. They analyze differing beliefs and values that exist within the same community and the larger society and explain how sustainable solutions rely on reconciling diverse perspectives.

2.2.D: Learners analyze how economic systems and economic decision-making affect environmental quality and long-term sustainability at local, tribal, national, and global levels.

2.3.A: Learners analyze ways that humans interact with their environment and how these interactions change with technological developments. Learners determine costs and benefits to different groups in society as well as unintended consequences.

2.3.B: Learners analyze ways that the perceived value and use of natural resources change over time and vary under different economic, political, social, and technological systems.

3.2.D: Learners evaluate the intended and unintended consequences of design solutions, their own civic actions and actions taken by other individuals and groups, including implications for long-term environmental, social, and economic sustainability.

4.B: Learners exhibit personal agency by working independently and making choices to bring about change in their community that addresses environmental, social, and economic sustainability.

Materials

- *Gleaning Background and Basics*
- (All gleaning equipment is located at URI Agronomy Farm.)

Full Session

By the end of this session students will be able to:

- Recognize food waste as an issue of significant importance.
- Explain how and why food waste happens on farms.
- Relate food waste to the issues of hunger and food insecurity, resilience of local food systems, and the environment.
- Define and demonstrate “gleaning” and how it addresses the issues above.
- Describe how Hope’s Harvest RI is working locally to rescue surplus food from farms.

Before Students Arrive:

- Read *Gleaning Background and Basics* handout.
- Coordinate corn gleaning with URI Agronomy Farm staff including vehicles, harvest equipment, and delivery locations.

Once Students Arrive:

1. Meet URI Agronomy Farm Staff and have everyone introduce themselves. (30 minutes)
2. Lead discussion based on *Gleaning Background and Basics* and include the following questions: (45 minutes)
    - Where do you see wasted food in your lives?
    - Why does food get wasted at the (production, retail, home) level?
    - What is the impact of food waste on farmers? food-insecure families? our local food systems?
    - What are some strategies for addressing wasted food?
3. Define “gleaning” and explain how it can be used to reduce food waste, help food-insecure families, support local farmers, and reduce the environmental impacts of the food system. Give an overview of the URI Extension Farm and explain the personal and food safety considerations they must keep in mind. (15 minutes)
4. Demonstrate how they will harvest and pack the corn. Students participate in gleaning. Answer questions as they arise. (75 minutes)
5. Pack up product and supplies. (15 minutes)

FARM-BASED FOOD RESCUE IN RI AND BEYOND

Supplemental Handouts

GLEANING BACKGROUND AND BASICS

According to Feeding America, every year approximately 20 billion pounds of surplus fruits and vegetables that could otherwise feed hungry families are left in the fields of America's farms. This amounts to 16 percent of the total amount food wasted along the supply chain, while 20 percent of fruits and vegetables are lost in the production stage. In Rhode Island, this adds up to roughly $3.3 million in unearned revenue for farmers and 2 million pounds of healthy, local fruits and vegetables going uneaten (though data is incomplete). The Rhode Island Food Strategy developed by the state's Director of Food Strategy in 2018 prioritizes the reduction of food waste as one of its "Integrated Focus Areas" in recognition of the environmental, social, and economic importance of minimizing food losses in our state.

At the same time, the Rhode Island Community Food Bank estimates that 12% of Rhode Island residents are food insecure (51,000 households) and the RI Food Strategy has called for comprehensive efforts to ensure food security for all Rhode Islanders. Children, seniors, and working families struggling to make ends meet make up the majority of people in our state who utilize a network of over 200 emergency food pantries and meal sites from Westerly to Woonsocket.

Gleaning, the act of mobilizing volunteers to collect unharvested produce and deliver it to needy populations, is a necessary and elegant solution to the twin challenges of food waste and hungry people that also addresses the environmental impacts of feeding underserved populations with commodity food shipped from thousands of miles away instead of food that is readily available in our own backyard.

The National Gleaning Project, hosted at the Vermont Law School, lists **over 250 gleaning projects across the country** (100 farm-based) and offers legal fact sheets, toolkits, and a plethora of additional information about how gleaning in our communities can be an integral piece of transforming our local food systems into sustainable and equitable mechanisms for bringing about a better world.

Although our neighbors in Massachusetts and Connecticut have multiple gleaning projects that have been in operation for over a decade, Hope's Harvest RI is Rhode Island's first organization to focus specifically on rescuing fruits and vegetables directly from the farm. Their goals in 2018 were to recruit and mobilize 100-200 volunteers to rescue 60,000 lbs. of food. As of September, they were on track to meet these goals.

A successful gleaning project involves three primary **stakeholder groups**:

- ***Farmers*** generally plant about 25% more of a crop than their target yield in order to account for disease and pest pressures. When circumstances align for a

bumper crop, farmers may not have the capacity (i.e. labor) to harvest or the market to sell excess produce, which is then either left in the fields or plowed under. A gleaning project can offer farmers tax write-offs for their donated product in addition to the less tangible benefits of engaging in charitable giving.

- ***Food pantries and their guests*** often do not have access to fresh fruits and vegetables on a consistent basis and families can struggle to put healthy food on the table when they are trying to stretch their dollars. Local food can be even more inaccessible and people who frequent food pantries may not be able to take advantage of farmers markets, even when subsidies are available. Gleaning can bring healthy food to communities most impacted by food insecurity while reducing the burden on under resourced organizations to purchase fresh fruits and vegetables with their limited budgets.
- ***Volunteers*** provide the missing piece of the equation, offering labor in exchange for a taste of farm life and an integral role in bringing about a more just and equitable food system that meets the needs of all the members of our community. In addition, a resurgence in citizen activism in the recent past has led to a desire for people to create tangible, real world change. Gleaning is as tangible as it gets and volunteers experience a great workout for the mind, body, and soul.

The major **functions of administering a gleaning project** include:

- Developing and managing robust and complex databases and online registration systems that track donations, volunteers, and products.
- Understanding and managing the needs of overworked farmers while providing them with a clear value add for their business.
- Recruiting, orienting, and overseeing volunteer groups for regular gleaning events.
- Utilizing a wide range of outreach and communications tools to engage multiple stakeholder groups and potential donors.
- Connecting effectively to hunger relief agencies while meeting their need to uphold rigorous food safety standards.
- Managing logistical challenges around the distribution of perishable food products including considerations re: cold storage, processing, and packaging.
- Generating multiple and diversified funding streams that include individual donors, foundation and government grants, sponsorships, and revenue generating events of various sizes and types.
- Understanding the larger context of how a gleaning project fits into Rhode Island's statewide goals for a more equitable and sustainable local food economy.

FOOD IS MEDICINE

Lifespan Community Health Institute

Contact Information
Marianne Stepanian
Cardiac Project Coordinator
mstepanian@lifespan.org, (401) 444–8063

Location
Lifespan Community Health Institute, 335R Prairie Avenue, Suite 2B, Providence

Audience
High School

Time Required
4 sessions of 60 minutes each

Overview

This program is based on “Raising the Bar on Nutrition” (RTB), which is a program started by Mary M. Flynn, PhD, RD, LDN and Andrew Schiff, PhD, CEO of the Rhode Island Community Food Bank (RICFB). The participants are introduced to recipes that are low-cost and delicious and are designed to improve risk factors for chronic diseases, such as hypertension, blood lipids and lipoproteins, blood glucose and insulin, inflammation, and body weight. Then, they observe how the recipes are made, sample the food, and go home with the recipes to try on their own. (Note: the recipes could vary per class/session depending on the season and audience.) Using fresh produce from the GWRI greenhouse, a local community garden, etc. can be a great additional experience for students to learn about where food comes from and how it is grown.

Standards Connections

Common Core Standards (ELA/Literacy)

SL.6.1.C: Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.
SL.9-10.1.C: Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.

Materials

- *Healthy Foods Recipes* handout (1 per student)
- Cooking equipment and ingredients for each recipe

Session #1: Extra Virgin Olive Oil

By the end of this session students will be able to:

- List 1-2 benefits of extra virgin olive oil.
- Explain that adding extra virgin olive oil to vegetables can improve their taste and benefits.
- Explain why extra virgin olive oil that is made in California is better than imported olive oil.
- Prepare vegetarian chili using extra virgin olive oil.

Before Students Arrive:

- Prepare the ingredients for the chili.

Once Students Arrive:

1. Ask the students if they have ever heard of extra virgin olive oil and if anyone knows what it is or why it is a healthy fat. Explain that extra virgin olive oil is the juice of the olive fruit so it is a plant product. People who use olive oil often have a lower risk of a number of chronic diseases, including diabetes.
2. Studies have shown that the daily use of extra virgin olive oil will:
    a. lower blood levels of glucose and insulin;
    b. decrease blood pressure;
    c. increase your HDL cholesterol and lower your LDL cholesterol;
    d. decrease your risk of heart disease; and
    e. decrease your risk of some cancers such as breast and prostate cancer.
3. Extra virgin olive oil also makes vegetables taste better, especially vegetables that are bitter in their raw form, like spinach, kale, and broccoli. Cooking vegetables in olive oil (about 1 tablespoon per cup of vegetables) also means that you will absorb the nutrients in vegetables that make them healthy. If you do not use fat when you eat vegetables, you do not get the maximum health benefit.
4. Explain that it is best to buy olive oil that is made in California. A lot of the olive oil that is imported into the United States that is labeled “extra virgin olive oil” is really vegetable oil that is flavored to taste like olive oil. It is currently hard to tell which olive oils are real and which are fake, so it is best to buy only ones from California until the US government better controls imported olive oil. Imported olive oil is often from Italy, Spain, Turkey, and other countries.
5. Demonstrate how to prepare vegetarian chili using extra virgin olive oil.

Session #2: Canned, Frozen, and Fresh Vegetables and Fruit

By the end of this session students will be able to:

- Identify phytochemicals (also known as phytonutrients) as the protective compounds in plant products that help prevent disease.
- Explain that vegetables and fruit are good sources of vitamins.
- Compare canned, frozen, fresh, and homegrown vegetables and fruit and list the benefits of each.
- Prepare corn, black bean, and tomato fried rice using canned and frozen vegetables.

Before Students Arrive:

- Prepare the ingredients for the fried rice.

Once Students Arrive:

1. Explain that vegetables and fruit are good sources of vitamins and contain compounds called “phytochemicals” or “phytonutrients”. These are protective compounds in plant products that help prevent diseases.
2. Ask the students if they eat canned, frozen, or fresh vegetables and fruit. Discuss the benefits of each. For example, canned and frozen vegetables and fruit have about as many vitamins as fresh vegetables and are usually much cheaper than fresh vegetables and fruit. However, vegetables and fruit that you grow yourself or buy at a local farmer’s market have slightly more vitamins (and usually taste better) than those you buy in a store. You can buy canned or frozen vegetables when they are on sale to stock up when they are on sale. This can be very helpful at the end of the month when your food money is low.
3. Ask the students if they know how many servings of vegetables and fruit comprise a healthy diet (5) and what the size of a serving of vegetables or fruit is (½ cup). Explain that most pieces of fruit (apples, bananas, pears, etc.) are two servings.
4. Demonstrate how to prepare corn, black bean, and tomato fried rice using canned and frozen vegetables.

Session #3: Whole Grains

By the end of this session students will be able to:

- Describe the difference between a whole grain and a white starch.
- Identify at least one way whole grains are healthier than white starches.
- Explain that true whole grain products have “whole wheat” or “whole grain” listed as their first ingredient.
- Prepare vegetable lo mein using whole grain spaghetti.

Before Students Arrive:

- Prepare the ingredients for the lo mein.

Once Students Arrive:

1. Ask the students if they know what a “whole grain” is (a carbohydrate/starch that has not been refined or is in its natural form) and why they are healthier than “white starches” (they have more phytonutrients and other nutrients).
2. Explain that people who eat whole grain products on a regular basis have a lower risk of diabetes. Whole grains are more slowly absorbed than refined starch so they keep blood glucose levels in a healthier range. In addition, whole grain foods are higher in fiber than refined grains which is healthy for both your intestinal tract and

your heart. People who eat whole grain products often have lower body weight and are less likely to gain weight, compared to people who always eat refined grain products.

3. Show the students the package of spaghetti and point out that “whole wheat” or “whole grain” is the first ingredient on the ingredient list. Explain that “multigrain” products are not usually whole grain products; you would need to read the ingredient label to see if the first ingredient is “whole wheat” to make sure it is a whole grain product.
4. Demonstrate how to prepare vegetable lo mein using whole grain spaghetti.

Session #4: Plant-based Meals

By the end of this session students will be able to:

- Identify at least one benefit of a plant-based diet.
- Explain that plant-based diets are less expensive than meat-based ones.
- Prepare vegetable and bean soup.

Before Students Arrive:

- Prepare the ingredients for the soup.

Once Students Arrive:

1. Ask the students if they know of any of the health benefits of a plant-based diet (i.e. a diet that emphasizes vegetables, grains, beans (legumes), and nuts). Plant-based foods are rich in fiber, which contributes to feeling full, and vegetarians maintain a healthier weight and have a lower risk of many diseases compared to people who eat animal products often.
2. Although it is not necessary to become a vegetarian, incorporating a few plant-based meals every week can improve health and reduce costs. The more plant-based meals you eat, the healthier you will be and the less you will spend on groceries.
3. Demonstrate how to prepare the vegetable and bean soup.

FOOD IS MEDICINE

Supplemental Handouts

Session 1: Vegetarian Chili

Makes about 4 servings (9 cups)

What you will need: Measuring cups, teaspoons, colander, bowls for drained vegetables, deep pan, knife, cutting board, bowls, utensils

Ingredients:

½ cup extra virgin olive oil
1 medium onion (red or white), chopped (about 2 cups)
2 cans corn, drained or 3 ½ cups of frozen, defrosted
28 ounce can crushed tomatoes
3 cans of beans: black, kidney, pinto, and/or cannellini, drained and rinsed

You can use all or some of these spices:
2 teaspoons ground cumin
1 tablespoon chili powder
2 teaspoons dry oregano

Directions:

1) Heat the olive oil on medium (4 to 5 on the dial) heat in a large pan on top of the stove or in a slow cooker. Add the onions, stir to combine with the oil; season with salt and pepper. Cook for about 10 minutes or until the onions are translucent.
2) Stir in the drained corn and cook for another 5 minutes. You should occasionally stir the vegetables.
3) Sprinkle the cooked vegetables with the spices. Stir to mix in evenly. Add the tomatoes and all the beans. Stir to combine. Reduce heat to medium low and simmer for about 20 minutes or longer, stirring occasionally. For making this at home, you can put it in a slow-cooker for 4 or more hours.
4) Serve over cooked rice (preferably brown rice) or in a baked potato.

Cost for total recipe:	$ 8.02
Cost per cup:	**$ 0.89**

Session 2: Corn, Black Beans, and Tomato Fried Rice

Makes 4 servings

What you will need: Measuring cups, teaspoons, colander, bowls for drained vegetables, large skillet (12 inches or more across), deep pan to cook rice, plates, utensils.

Ingredients:

6 tablespoons extra virgin olive oil
1 can corn, drained or 2 cups frozen, defrosted corn
1 can black beans, drained and rinsed
1 small can diced tomatoes
4 cups cooked brown rice (directions below)

Optional: dried oregano and/or basil; salt and pepper

Directions:

1) Heat the olive oil on medium (4 to 5 on the dial) in a frying pan about 12 inches wide. Add any herbs and stir to coat with the oil.
2) Stir in the corn; season with salt and pepper. Cook 3 to 5 minutes.
3) Add the black beans and cook 4 to 5 minutes longer.
4) Stir in the tomatoes and heat 3 to 5 minutes.
5) Stir in the cooked rice, stir to combine and heat through.

Cost for total recipe:	$4.55
Cost per serving:	**$1.14**

To cook brown rice: *this can be done before the class either at home and brought in or arrive early for the class.*

Put about 3 quarts of water in a large pan (about what you would use if you were cooking pasta). You can add 1 to 2 teaspoons of salt, if you like. Heat the water on high until it boils. Add the dry rice (1 to 2 cups), cover the pan and return to a boil. As soon as it boils again, reduce the heat to low and slow boil for about 35 minutes. Immediately drain the rice into a colander. One cup of dry rice makes at least 3 cups cooked rice.

Session 3: Vegetable Lo Mein

Makes 4 servings

What you will need for equipment: Measuring cups, teaspoons, colander, bowls for drained vegetables, large skillet (12 inches or more across), deep pan to cook pasta, plates, utensils

Ingredients:

6 tablespoons extra virgin olive oil
2 cups frozen, defrosted chopped broccoli
1 can sliced carrots (or 2 cups frozen, defrosted carrots)
1/3 cup soy sauce
4 teaspoons corn starch or flour
12-16 ounces (dry weight) whole wheat spaghetti noodles

Optional: sliced/crushed garlic, salt and pepper

Directions:

1) Heat a large pot of water for the spaghetti and cook as directed.
2) Heat the olive oil on medium (4 to 5 on the dial) in a frying pan about 12 inches wide. Add any optional ingredients (garlic, herbs) and stir to combine.
3) Add the broccoli; season with salt and pepper. Cook 5 to 8 minutes.
4) Cut the carrot slices into smaller pieces. You can either cut them in half or each half into 3 pieces. Add the carrots to the broccoli and cook 3 to 5 minutes
5) Combine the soy sauce and 2 tablespoons cold water in a small bowl. Add the corn starch and stir with a fork until there are no lumps. Pour into the pan with the hot vegetables and completely stir in. Heat until sauce is thick (about 3 minutes).
6) Serve over cooked spaghetti.

Cost for total recipe:	$ 4.16
Cost per serving:	**$ 1.04**

Variations: Instead of carrots and broccoli, try one of these substitutions:

1) 1 can of corn and 1 can of peas, both drained. Add the corn first and cook for 3 to 5 minutes. Then add the peas; just heat through as the peas will get mushy.
2) 2/3 cup frozen, defrosted spinach and 1 cup chopped red onion. Add the onion first and cook for about 10 minutes then add the spinach and cook 3 to 5 minutes.

Session 4: Vegetable and Bean Soup

Makes 4 servings

What you will need for equipment: Measuring cups, teaspoons, colander, bowls for drained vegetables, deep pan for soup, bowls, utensils

Ingredients:

6 tablespoons extra virgin olive oil
1 can corn, drained or 2 cups frozen, defrosted
1 can green beans, drained or 2 cups frozen, defrosted
1 can peas, drained or 2 cups frozen, defrosted
1 can white beans, rinsed and drained
28 ounce can diced tomatoes
6 to 8 cups of broth (vegetable, chicken, beef); you can use any broth

Directions:

1) Heat 2 tablespoons of the olive oil on medium (4 to 5 on the dial) in a large soup pan. Add the corn and cook for about 5 minutes.
2) Add the rest of the olive oil and the green beans and peas; season with salt and pepper. Cook for 3 to 5 minutes, stirring occasionally.
3) Stir in the can of drained, rinsed white beans and heat 3 to 5 minutes.
4) Add the crushed tomatoes and heat through. Let the vegetable mixture simmer.
5) When the vegetables are cooked, add the vegetable broth. Heat through.
6) The soup can be frozen in individual servings. You can add cooked pasta, rice or potatoes at the time of eating.

Cost for total recipe:	$ 6.26
Cost per serving:	**$ 1.57**

FOOD AND JUSTICE FOR ALL

The Greene School

Contact Information
Brendan Haggerty
Instructional Guide/Teacher
bhaggerty@thegreeneschool.org, (401) 397–8600

Location
Urban Farm and Greenhouse, 433 Prairie Avenue, Providence

Audience
Elementary School
High School (leaders)

Time Required
1 session of 90 minutes

Overview

In the Food and Justice for All lesson, students learn about gardening, food justice, culinary arts, and healthy eating. Elementary students move through six stations, each taught by a team of high school students from The Greene School.

Standards Connections

Common Core State Standards (ELA/Literacy or Math)

SL.4.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.

RI.3.7: Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

Next Generation Science Standards

2-LS4-1: Make observations of plants to compare the diversity of life in different habitats.

NAAEE K-12 Environmental Education: Guidelines for Excellence (4th Grade)

1.A: Learners develop questions that help them conduct simple investigations and learn about the environment.

2.1.A: Learners describe characteristics of Earth's physical systems, including air, water, and land. They explain how these systems interact with one another and identify changes in the physical environment over time. They provide examples of how physical systems affect living organisms, including humans.

2.3.B: Learners describe ways people harvest, re-distribute, and use natural resources.

3.1.B: Learners use their knowledge of how ecological and human systems are interconnected to describe the environmental, social, and economic consequences of local environmental issues.

Materials

- For signs: poster boards, markers (red, yellow, green, blue, purple, brown), duct tape, and dowels
- Tables (1 per station)
- Station #1: newspaper, boxes, tape, compost, seeds, and trays for pots
- Station #2: seedling starters, seeds, gloves, garden tools
- Station #3: oil, vinegar, onion powder, salt, pepper, mixing bowls, salad tongs, lettuce, cups

- Station #4: soil profile layer stick, two clear plastic soda bottles filled with different soil, water, meter sticks, shovel
- Station #5: *Food Access* handout (1 per student), pencils, clipboards
- Station #6: a variety of fruits and vegetables

Full Session

By the end of this session students will be able to:

- List what a seed needs to germinate.
- Plant seeds in both small pots and large garden beds.
- Prepare a simple salad dressing.
- List 2–3 different components of soil and explain why compost can increase food production.
- Explain the difference between food justice and food injustice, and correctly identify their own neighborhood as one or the other.
- Identify a variety of fruits and vegetables and describe how and where one fruit or vegetable grows.

Before Students Arrive:

- High school students work in groups to make color-coded signs for their stations using poster board, markers, duct tape, and dowels. Include name and number of the station and use the following colors:
    - #1 Grow your own plant with upcycled materials – blue
    - #2 Planting the community gardens – green
    - #3 Culinary arts – yellow
    - #4 Soil science – brown
    - #5 Food access and equity – red
    - #6 Food identification – purple
- Arrange which seeds will be planted in garden beds and where.
- Ask classroom teacher(s) to split elementary students into 6 even groups and give each group one of the colors above which will indicate the station that they start at.
- Set up 6 stations with all materials and place signs prominently.

Once Students Arrive:

- High school and elementary students meet and introduce themselves. (5 minutes)
- Explain that today they will move through 6 stations to learn about healthy food – how it is grown, how to prepare it, and why it is important. (5 minutes)
- Direct student groups to their respective start stations and begin rotation. Groups will spend 10 minutes at each station, with 1-2 minutes to rotate to next station. Explain

how the groups will rotate: go to the next higher number, and restart at #1 after #6. (70 minutes)
- At the end, bring everyone together and ask for a few comments, questions, or ideas from what they learned at the stations. Say goodbye. (10 minutes)

Station #1: Grow your own plant with upcycled materials

1. Ask the students what seeds need to start to grow into a plant (germinate). Make sure to mention water, oxygen, warmth (correct temperature) and a good location (such as in soil).
2. Demonstrate how to create an upcycled seedling pot using newspaper and tape. Fill with compost and plant seeds. Make the connection between what a seed needs and how that related to the process of planting.
3. Allow students to transplant their own seeds to take home. Remind them to keep the soil damp but not soaking and place in a sunny area.

Station #2: Planting the community gardens

1. Ask the students what seeds need to start to grow into a plant (germinate). Make sure to mention water, oxygen, warmth (correct temperature) and a good location (such as in soil).
2. Using gloves and garden tools, demonstrate how to plant a variety of seeds as well as started seedlings in garden beds.
3. Allow students to plant seeds and seedlings.

Station #3: Culinary Arts

1. Show the students how to their own delicious salad dressing from cheap and simple ingredients.
2. Allow students to sample the salad with the dressing.

Station #4: Soil science

1. Ask the students what they know about the importance of soil as it relates to food production and what they know about the different ingredients that go into a healthy soil.
2. Show the two soda bottles filled with different soils to illustrate how the ingredients of different samples of soil can be very different.
3. Then show the students a soil pit that was dug to try to identify the different types of layers in a soil profile. After identifying each layer, students can rub a small sample

of each layer between their thumb and forefinger and try to estimate how much organic matter vs. sand each layer contains.
4. Explain that compost can be used to add organic matter to soil increasing the soil's ability to grow more food over time.

Station #5: Food access and equity

1. Walk students through the *Food Access* handout to learn about food justice and food injustice in their own neighborhoods.
2. Facilitate a discussion about the results.

Station #6: Food identification

1. Show the students different a variety of fruits and vegetables and ask them to identify them.
2. Explain where and how these fruits and vegetables are grown and describe what type of plant each comes from.

FOOD AND JUSTICE FOR ALL

Supplemental Handouts

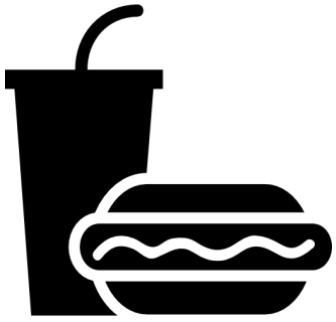
Food Access Form

Step 1: Read definitions together (2min)

Definitions
Food Justice: Neighborhoods that have healthy food stores, shops, and carts
Food Injustice: Neighborhoods that do not have healthy food stores, shops, and carts

Step 2: Fill out questions by yourself (5min)

Food Justice Questions	
 **Question 1:** How many grocery stores do you have near your home?	#
Question 2: How many farmers markets, community gardens, and vegetable stands do you have near your home?	#
Question 3: How many healthy restaurants or food carts do you have near your home?	#
Add up all of the numbers in this table and write the sum in the following box:	*Sum*

Food Injustice Questions	
 **Question 1:** How many fast-food restaurants do you have near your home?	#
Question 2: How many corner or convenience stores do you have near your home?	#
Question 3: How many unhealthy restaurants or food carts do you have near your home?	#
Add up all of the numbers in this table and write the sum in the following box:	*Sum*

Step 3: Equation (1min)

Subtract the Food Justice Factors ***Sum*** (from the first table) from the Food Injustice ***Sum*** (from the second table) to come up with the ***difference*** of these two numbers.

Food Justice Factors Sum		Food Injustice Factors Sum		Difference
	-		=	

Difference of -5 to 0 = *possible food injustice*	Difference of 1 to 5 = *possible food justice*

Step 4: Discussion questions (2min)
Discuss the following questions as a group:

What things help a neighborhood to have food justice?

What things cause a neighborhood to have food injustice?

Who has food justice in their neighborhood? Who does not have food justice? Why?

How can we work together to bring food justice to all neighborhoods in Rhode Island?

WASTE SOLUTIONS SUMMIT

The Greene School

Contact Information
Brendan Haggerty
Instructional Guide/Teacher
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Location
Urban Farm and Greenhouse, 433 Prairie Avenue, Providence

Audience
Elementary School
High School (leaders)

Time Required
1 session of 90 minutes

Overview

The goal of this hands-on educational program is to educate youth about issues related to waste and promote solutions to Rhode Island's growing waste disposal problems. Small groups rotate through six interactive activities led by high school students, that focus on promoting basic understanding of the lifecycles of the various wastes our communities produce.

Standards Connections

Common Core State Standards (ELA/Literacy)

SL.4.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.

RI.3.7: Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

Next Generation Science Standards

4-ESS3-2: Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

NAAEE K-12 Environmental Education: Guidelines for Excellence (4th Grade)

1.A: Learners develop questions that help them conduct simple investigations and learn about the environment.

2.2.A: Learners generate examples of how people act, as individuals, as members of a group, and as members of society, toward the environment. They articulate their own beliefs and the beliefs of family and community members about the environment and environmental issues.

Materials

- T-Shirts for elementary students
- Prizes
- Materials for presentations and interactive stations
- Materials for tri-fold poster creation

Full Session

By the end of this session students will be able to:

- List at least 3 different ways waste is disposed of in Rhode Island.
- Explain the difference between recycling, composting, and incinerating.

Before Students Arrive:

- High school students work in teams to develop a written, visual, and oral presentations for small groups of elementary school students for their particular station related to waste, composting, recycling, incineration, landfill, or lead paint.

Once Students Arrive:

- High school and elementary students meet and introduce themselves. (5 minutes)
- Explain that today they will move through 6 stations to learn about waste in Rhode Island – how it is disposed of and why it is important. (5 minutes)
- Direct student groups to their respective start stations and begin rotation. Groups will spend 10 minutes at each station, with 1-2 minutes to rotate to next station. Explain how the groups will rotate: go to the next higher number, and restart at #1 after #6. (70 minutes)
- At the end, bring everyone together and ask for a few comments, questions, or ideas from what they learned at the stations. Say goodbye. (10 minutes)