Plants on Our Plates

Science Instructional Materials Lesson Upgrade

This lesson upgrade was developed as part of an Office of Superintendent of Public Instruction (OSPI) and Washington State Leadership and Assistance for Science Education Reform (LASER) project funded through an EPA Region 10 grant. The purpose of the lesson upgrades is to incorporate environmental and sustainability concepts into high use science instructional materials and also address the cultural relevancy of the lessons by incorporating Native American stories.

http://www.wastatelaser.org/_support/ESEL/new_plants/index.asp

Grade: 1-2

This lesson replaces Investigation 4 from the FOSS© "New Plants" instructional materials kit.

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Lesson Summary

The upgrade for Investigation 4, "Plants on Our Plates," explores how plants provide food for us. The investigation focuses on plant parts as related to common foods, how we obtain our food, and how our food choices relate to sustainability. Washington State Science and Environmental Sustainability standards are addressed through experience-based activities to bring relevance to the students' lives.

Lesson Objectives

Students will:

- Investigate plant parts in the context of commonly eaten foods.
- Explore ways humans obtain food.
- Observe that seeds are living and grow into new plants and that some of these plants produce food for humans.
- Understand sustainability in the context of food choices.

Student Friendly Learning Targets

- I know how parts of a plant are related to the entire plant.
- I can explain how plants are related to the food we eat.
- I can make good choices about my food.

Essential Questions

- What plant parts do we eat?
- How do humans obtain food?
- What are sustainable food choices?

Content Standards Connections

- Environmental and Sustainability Standards: ESE 1, ESE 3
- WA Science Standards: K-1 SYSA, K-1 INQC, 2-3 SYSE, K-1 LS1B, K-1 LS1E, 2-3 LS2A
- A Framework for K12 Science Education (and NGSS Placeholder): CCC: Structure and Function; LS1A,B
- ELA Common Core Standards: Informational Text (7) Integration of knowledge and Ideas
- Social Studies Standards: EALR 2.1.1 – Economics (needs and wants)

Key Vocabulary

- Roots
- Stem
- Leaves
- Flower
- Fruit
- Seed
- Sustainability
- Organic

Materials

For each student:

- Plant Parts We Eat, Worksheet B, "Match the plant to the part we eat." http://oklahoma4h.okstate.edu/aitc/lessons/primary/parts.pdf
- Garden journal.

For the class:

- Part 1: Variety of vegetables and fruits for use in identifying plant parts.
- Part 2: Garden bed or container, seeds (radish, spinach, peas).
- Gardening tools (trowels, watering cans, craft sticks, string).

- Soil amendments (lime, peat moss, sand).

For the teacher:

- Soil test kit.
- ESE 1 PowerPoint.

Getting Ready

1. Time to do the lesson: 30-45 minutes for each part, garden ongoing (not included is the time needed to care for and observe plants over time).
2. Site Preparation: Find suitable small garden area, preferably near classroom for easy access. Use existing planting beds, or install raised beds, buckets, or pots in a sunny protected area, near a water source.
3. For Part 2, take students outside anytime during *New Plants* to prepare bed and plant seeds.
4. Safety Considerations: Check for and be aware of any harmful plants or hazardous items in investigation area.
5. Tips for Success: Avoid giving students the idea that the seeds they plant are theirs. They will be very disappointed if their seeds don't come up. Instead, focus on the class garden.
6. Sustainability/Conservation: Rethink, Reduce, Reuse, and Recycle materials as much as possible.
7. Teacher background knowledge:

   From the Oklahoma Ag in the Classroom program of the Oklahoma Cooperative extension Service, Oklahoma Department of Agriculture, Food and Forestry and the Oklahoma State Department of Education. Which parts of the plant do we usually eat? The seed? The fruit? When we eat spinach or lettuce we are eating the plant's leaves. We eat the fruit of squash, cucumber and tomato plants. When we eat corn or peas we are eating seeds, and when we eat radish or carrot, we are eating roots. Cauliflower and broccoli plants produce flowers we like to eat.

   With some plants we eat more than one part. The root of the beet plant is what most people like to eat, but the leaves are also good to eat—in salads, when the leaves are young and tender, and cooked when they get bigger. We eat the root of the onion plant but can also eat the stems, for a milder flavor. Some of the plants we eat are poisonous—if we eat the wrong part. The leaves of tomato plants are poisonous. For many years people would not even eat tomatoes, because they thought the entire plant was poisonous. Now we know that the fruit of the tomato plant has vitamins that are very good for us. They are also delicious—sliced or chopped fresh into salads, cooked into spaghetti

sauce or processed into ketchup. From Plant Parts We Eat: http://oklahoma4h.okstate.edu/aitc/lessons/primary/parts.pdf www.agclassroom.org/ok

Guiding the Investigation

Part 1: Eating Plant Parts

1. Tell students they will be learning about what parts of plants we eat.
   Elicit student responses to assess prior knowledge.
   Ask: *What foods do we eat that are roots? Leaves? Seeds?*
2. Have students work on Plant Parts We Eat, Worksheet B matching worksheet to sort out which foods are which plant parts. Tell them they will be sharing with whole class and will be asked to justify their thinking.
3. Wrap-up: Discuss as a class each food example and have students come to agreement on which plant part it is. Ask them how they know. Show more examples (real food or photos) and classify as a class.

Guiding the Investigation

Part 2: How do humans obtain food?

1. Ask: *How do we get our food?* Elicit several responses and discuss. Be sure to include stores, gardens, and farmers' markets.
2. Tell students they will be growing their own food. Students will keep a garden journal, observing and recording each step of the garden as well as changes.
3. Do **Plant Radish-Seed Gardens** Lesson from, "Science in the Schoolyard Guide: FOSS *New Plants*", http://www.fossweb.com/modulesK-2/pdfs/NewPlants/New_Plants_Science_Outdoors.pdf page 4-5.

NOTE: You can also do this investigation indoors if you have a sunny location in your classroom. Students can grow radishes in cups or in flats indoors.

Guiding the Investigation

Part 3: Sustainable Foods

1. Tell students they will be learning about how their daily food choices can affect their health, the environment, and future generations.
2. Ask students: *What does sustainability mean?*
   Explain that sustainability means doing things in a way that is thoughtful about the future. It might be not using more than we need, to save for tomorrow. It might be doing things in a way that help rather than hurt our environment. You could ask: *Is it healthy for me? Is it healthy for the earth? Could you do it a long time without messing up/damaging/harming the planet? Could you do it a long time without running out/using it up?*

Teacher background, from WA State K-12 Integrated Environmental and Sustainability Education Learning Standards:

- "meeting the needs of the present without compromising the ability of future generations to meet their own needs" *Brundtland Report,* 1989 United Nations commission on development
- "What impact will this decision have on the seventh generation?" from Iroquois and other Tribal traditions.

3. Tell students you will be discussing different things to think about that are all connected to sustainability.
4. Tell students they will compare two apples: one organic grown in New Zealand and one conventional grown in Washington. (You may substitute the apples for other similar items such as farm-raised versus wild salmon, bottled versus tap water, store-bought versus home-grown carrots.)
    a. Show two apples and ask, "Which apple is more sustainable, the organic one or the conventionally produced one? What do you want to know to help you decide?" Take several responses and questions.
    b. Share, one at a time, the following information about the apples and after each ask "Which one is more sustainable?"
        i. The organic apple is grown in New Zealand and the conventional one is grown in Washington.
        ii. To grow the conventional apple the farmer used pesticides. No pesticides were used to grow the organic apple.
        iii. The organic apple costs $1 and the conventional one costs 50 cents.
        iv. The organic apple farmer received more for his apple than the conventional farmer received.
        v. The soil quality on the conventional apple farm is poor while the soil quality of the organic apple farm is good.
5. Discuss—what kinds of food choices could you make that are affordable, good for you, the earth, and the future?

Extension: Students create posters to display in school cafeteria, promoting healthy and sustainable food choices.

Assessment

- Formative: Monitoring student participation and garden journals
- Pre and Post Assessment: New Plants Assessment

Teacher Reflection

After teaching the lesson spend some time reflecting on how the lesson went, whether students, met the objectives, and what adjustments you would do if and when you (or your colleagues) teach the lesson again.

Credits

- Lesson upgrade developed by Susan Milan, Teacher South Whidbey School District and Wendy Whitmer, Northeast LASER Alliance Director and NEWESD Regional Science Coordinator.
- What plant parts do we eat?:
  http://oklahoma4h.okstate.edu/aitc/lessons/primary/parts.pdf
  http://urbanext.illinois.edu/gpe/case1/c1f.html
  http://www.teachersdomain.org/asset/lsps07_int_plantparts/
- Plant a Garden:
  Adapted from Science in the Schoolyard Guide: FOSS New Plants, Boston Schoolyard Initiative, www.schoolyards.org
- Eating Sustainable Foods:
  http://www.ecoliteracy.org/downloads/getting-started
  K-12 Integrated Environment and Sustainability Education Standards Implementation Tool Kit Version 1, 2/2011
- Lesson "Is it Sustainable" from www.facingthefuture.org

Accessing Lesson Online

http://www.wastatelaser.org/_support/ESEL/new_plants/index.asp