Lesson: Sustainable Table

Topic/Essential Questions: How have humans affected the Chesapeake Bay and its watershed?

Content Standards:

- **Science**
  3.4.E.1 Recognize food as the source of materials that all living things need to grow and survive.
  6.4.B.1. Recognize and describe that people in Maryland depend on, change, and are affected by the environment.
- **Environmental Literacy**
  5.A.1. Analyze the effects on human activities on earth's natural processes.
  1.A.5.f. Make recommendations supported by data to help address or resolve the issue.

Lesson Sequence: This lesson is one option as part of the "School Choice" module based at Arlington Echo Outdoor Education Center. The lesson's focus is on decreasing negative environmental impacts by becoming more sustainable.

Length of Lesson: 35 minutes

Student Learning Outcome: The student will follow a recipe to prepare local food, explain the environmental impact of food production and distribution, as well as discuss ways they can be sustainable at home and in their communities to minimize environmental impact.

Knowledge of the Learner:

- Prerequisite knowledge, skills and processes: Students will complete two lessons in school and conduct research on human impact.
- Student needs, interests, previous learning: Conduct pre-assessment to see level of prior knowledge and address any special needs of students that might need modification.
- Conceptual difficulties: relating production, packaging, and transportation to the cost of and ecological impact of food, and other practices to increase sustainability.
- Differentiation: Students are 4th graders, with a diversity of backgrounds and skill levels.

Knowledge of the Content: Students will be exploring the connection between buying locally grown produce and the impact of sustainability practices on the Chesapeake Bay. Since it involves making something they will eat, students will be engaged the whole time. By choosing local foods, students will be able to make wise choices that impact their health and the health of the bay.

Vocabulary:

Sustainable	Compost	Buffer Zone	Organic
Preservatives	Fossil Fuels	Habitat	Watershed

Materials:
Cooking supplies (Bowls, Utensils, Measuring cups, etc.) Recipe Ingredients Lorax Book

US produce Map Maryland Seasonal Produce Chart
Bowl of finished compost "Basic Kitchen Measurements at a Glance" mat

Supplements:

- A: True False Game
- B: Vocabulary

Lesson Setup
Setup varies with the recipe. Lay out recipes, "Basic Kitchen Measurements at a Glance" mats, ingredients and utensils on the table. Have the poster and maps on an easel. Have all students wash their hands when they arrive.

Instructional Delivery
Pre-Assessment
Ask "How many students have a garden?" "How many students have been to a farm or farm stand?" "What are students' favorite local fruits and vegetables?" "What is a natural resource?" "How can we preserve our natural resources?"

Motivation/Warm-up:

1. Upon entering the Resource Lab direct students to wash their hands and to sit at the table.
2. Introduce the concept of sustainability to students; tell them they will learn how to conserve resources. *(Being sustainable is a way of harvesting a resource so that it is not used up or permanently destroyed for future generations).*

Lesson:

Cooking:

1. Refer to US produce map; point out several examples of where our food comes from, show the labels of packaged food provided and have students generate ideas about what needs to be done in order to get that food to Maryland. *(Food must be treated with chemicals such as pesticides and preservatives, and require excessive packaging; it needs to be shipped by truck, train, boat or plane, requiring fossil fuels that release more pollution into the air and on the ground; from West Coast to East Coast is about 3,000 miles).*
2. Tell students they will be preparing food for a meal at Arlington Echo, or to try during the lesson (depending on recipe). They are going to be the chefs today.
3. Have the students look at the recipe and ingredients. If you need to multiply the recipe, have students do math to get the correct amounts (use measurement conversion charts). Have students be active participants in the process of measuring and making the food. They can measure, wash, chop, grate, slice, or mix the ingredients. Allow students to try ingredients when possible. When finished: if the food item will be cooked, set aside for

kitchen staff to bake, or refrigerate to be served at the next meal; if not, eat and enjoy.

4. Clean up the cooking prep before starting the discussion. If there is compost from peeling or chopping the ingredients, have the students put it that in a bucket. Show the students the finished compost. Explain that when we compost during the meal cleanup that Arlington Echo staff adds it to our compost facility and that we use it in the gardens when it is "finished".

Discussion:

1. Ask students where we can get food so that we don't have as much an impact on the environment? *(Buy food that is produced closer to home. **Local** food means it was grown close to you. The ingredient we used today was grown in _____).* Have students point out Maryland on the map and discuss the shorter travel distance, less pollution, and fresher food that was harvested recently. "What other produce is grown in Maryland?" Use the seasonal produce charts as guides. Discuss why things like bananas, oranges and lemons are not very sustainable.
2. Point out that *buying locally does not always mean it's sustainable; make sure the food was not only local, but also produced without using chemicals like fertilizers, pesticides, or preservatives.*
3. Ask students if they have read/seen "The Lorax". Read a few sections of the tabbed pages and discuss what is happening and whether or not it's sustainable *(it is <u>not</u> very sustainable; all the Truffula trees were cut down and destroyed even though only the tops of the trees were needed.* "How could they be more sustainable?" *(Only harvest the tops of the trees instead of cutting the whole tree down; plant more trees when others are cut down).*
4. Discuss the effects on the environment and habitats when we are not sustainable *(farming can harm the land- chemicals can contaminate soil; large clearings can be susceptible to erosion with no trees to hold soil in place; polluted runoff flows into water sources; without reducing/reusing/recycling more trash is generated and contaminates habitats).*
5. Prompt students to brainstorm some other ways we can be sustainable; guide them to think about small steps we can take to make a big difference *(compost food to produce rich soil, reduce food waste, plant a garden, cut down less trees, avoid chemicals, plant buffer zones (see vocab supplement), reduce transportation distances, buy organic when possible, reduce, reuse, recycle).*
   We know that it is not always possible to buy locally, due to factors including financial restrictions, convenience, seasonal availability, etc. It's ok that we can't always go to a farm stand to buy local food, but when possible buying or growing sustainable produce is much better for us and our environment. This is not the only way to be sustainable; every little step we take makes a big difference!

Assessment

- Ask students about the benefits of eating local foods. You may guide the discussion using the following questions.
  - When we buy foods that are imported across the country, how does that impact our environment? *(uses lots of gas, vehicles emit fumes, food is not as fresh due to long travel times so preservatives are added, extra packaging is required to travel farther distances, chemicals are used to make produce ripen).*

    - What options are there to buy produce? *(buy local produce from store, go to a farmer's market, grow your own).*
    - What can you do at home or at school to make wise food choices to protect the bay and have a "Sustainable Table"? *(Use reusable bags, buy products with less packaging, refuse a bag when not needed, reduce the amount of food waste, and teach others what you have learned).*
- Play the True or False game **(Supplement A).** Have the students stand up. Tell them one side of the table is true and the other false. Use the true/false statements and have the students move to the side of the table that they think is the correct answer. Discuss the answer.
- Between lessons, wash materials (if students ate from them) in Resource Lab sink.

Supplement A

True or False

The following are a few True/False statements about local food and sustainability. Feel free to add more questions as you think of them.

- Oranges, lemons, and bananas are some of the fruits grown locally in Maryland. (F)
- Local foods are always sustainable. (F)
- A typical dinner has traveled 1,500 miles from the source to your table. (T)
- One fourth of all meals consumed in the US are fast food. (T)
- Burning fossil fuels has minimal effects on climate change. (F)
- Food shipped long distances usually needs extra packaging to protect the food and keep it fresher. (T)
- Farming often uses chemicals that damage native habitats. (T)
- Buying locally means shopping at the closest supermarket. (F)
- Trees are important around farmlands and crops to control erosion and filter pollution. (T)
- Food shipped long distances are fortified with ingredients to help preserve and protect the food. (T)
- Crops grown with and without pesticides or preservatives have the same nutrient values. (F)
- Coal, oil and natural gas are fossil fuels. (T)
- Burning fossil fuels releases carbon dioxide into the air. (T)
- We have an unlimited supply of fossil fuels. (F)

- Money spent at farmers' markets does not go directly to the farmers. (F)
- Many supermarkets often sell local foods. (T)
- Recycling can reduce the amount of pollution and litter that goes into the environment. (T)
- A farmers' market usually has locally produced fruits and vegetables. (T)

Supplement B:

Vocabulary

Sustainable – A way of harvesting a resource so that it is not used up or permanently destroyed

Compost – The process of using organic food waste to produce nutrient-rich soil

Buffer Zone/Forest Buffer – Trees and plants surrounding an area, particularly around a water source, which help to hold soil in place and filter pollution before it gets into the water

Organic – Food produced without using any chemical fertilizers, pesticides, preservatives, or genetically modified organisms

Preservatives – Chemicals used to prolong the freshness of certain produce, especially when being transported over long distances

Fossil Fuels – Coal, oil, and natural gas produced from the remains of organic matter over millions of years

Habitat – A natural environment suited to specifically support life of the plants and animals living in that area; every habitat must have food, water, shelter, and sufficient space for its inhabitants

Watershed – An area of land where all water sources flow into a particular body of water