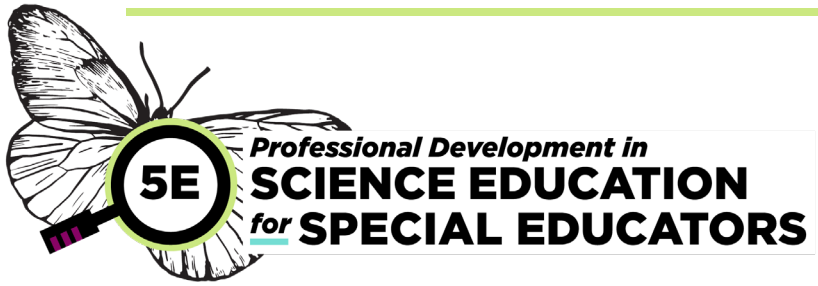
1. Essential Element

Activity/Lesson Title: Movement of Matter Through Food Chains

EE.5.LS2-1: Create a model that shows the movement of matter (e.g., plant growth, eating, composting) through living things.

Teacher: Patrick **Grade Level:** Elementary (Grades 3-5)



2. Science and Engineering Practice

SEP 2: Developing and Using Models

- Supports students in using models to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural world.

3. Disciplinary Core Idea

Cycles of Matter and Energy Transfer in Ecosystems

- The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.

4. Crosscutting Concept

Systems and System Models

- Students in grades 3-5 come to understand that a system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. They can also describe a system in terms of its components and their interactions.

5. Linkage Level Descriptors

Initial

- Identify common human foods

Precursor

- Identify a model that shows the movement of matter from plants to animals (e.g., food chain or food web)

Target

- Create a model that shows the movement of matter (e.g., plant growth, eating, composting) through living things

6. Student's Typical Accessibility Supports

- Enlarged picture cards
- Graphic organizers
- Textured diagrams
- Models/manipulatives

7. Student Prior Experiences, Prior Knowledge

- The student enjoys going to the park.
- The student has an aquarium at home.
- The student loves animals, particularly those that live in the ocean.
- The student has prior knowledge of the movement of matter and simple models.

8. Phenomenon to Explore

Question to investigate or design problem to solve

- How does matter move through an Arctic food web?

9. Possible Alternative Conceptions

- Thinking that matter passes through ecosystems in a straight line instead of cyclically
- Thinking that the direction of arrows in visual models of food webs indicate "what eats what" instead of indicating the flow of matter/energy
- Thinking that insects break up materials after the material rots on its own first
- Thinking that dead plants and animals just "disappear" instead of cycling nutrients through a food web

10. UDL Options and Solutions to Potential Barriers

- Use synonyms to support complex vocabulary
- Use a variety of formats and materials (e.g., enlarged picture cards, textured diagrams, models, manipulatives)
- Use appropriately leveled texts
- Use a graphic organizer (e.g., T-chart) to collect information

11. Engage

Think

- How to access student prior learning?
- How to use the CCC to connect everyday language with scientific language of the phenomenon?
- How to support student participation by scaffolding the SEP?

Teacher Will

- Create picture response cards containing organisms in an Arctic food web (animals and ocean plants); draw arrows on separate cards so that they can be placed between organism cards (use the organisms depicted in the Tarheel Reader text called "An Arctic Food Chain")
- Ask and then help students identify their favorite foods and discuss with students where the identified foods fall within a food chain (example: student says they like to eat burgers and fries... where are cows and potatoes located in a food web?) as well as this food provides the nutrients that our bodies need to grow and stay healthy.
- Ask students to think about where animals in the ocean get their food
- Ask students to consider how they can use picture cards to represent how animals get the nutrients they need from their food

Students Will

- Identify their favorite food(s) to organize in a food chain
- Use picture cards (organisms and arrows) to predict the order of the ocean food chain

12. Explore

Think

- What is invisible or inaccessible about the phenomenon and how can the Explore phase make it more visible?
- How can students collect data in a way that reveals patterns in data?
- How to emphasize careful observation and ask good questions vs. looking for only the "right answer"?

Teacher Will

- Engage in shared reading session using the Tarheel Reader text called "An Arctic Food Chain"
- Provide picture response cards that reflect the organisms in the story
- Assist the student with placement of picture cards and arrows
  - » Teacher will assure that arrows depict the direction that nutrients from food are moving (e.g., from prey to predator) vs showing "what eats what"
- Encourage the student to ask questions and find evidence together (e.g., using books and results from solid sources found in online searches)

Students Will

- While listening to the story, students will organize the picture cards as organisms are introduced
- Place the arrow cards to represent how nutrients move through the food chain
- Search for evidence to inform the placement of the cards

13. Explain

Think

- How can students connect science topic, phenomena, data, and everyday experiences? How can students connect everyday language and scientific language? What reasoning helps students see or explain the invisible

Teacher Will

- Ask students to describe what is occurring in the food chain as matter (or nutrients) is passed between organisms

Students Will

- Complete a CER statement
  - i. Example: Claim: Arctic animals get their food from plants and animals in an Arctic food web.
  - ii. Evidence: I know from my own diet that I have to eat food to get nutrients. Books and a good internet source reported that Arctic animals have to eat plants and other animals to get their nutrients or food.
  - iii. The photos represent organisms in a food web I read about; the arrows show how food/nutrients move through the food web. This process is like how I eat food that comes from plants and animals to stay healthy.

14. Elaborate

Think

- How can I enrich or extend student ideas? Are there related science concepts or processes that would support student learning?

Teacher Will

- Extend the lesson to explore the movement of matter in a forest ecosystem
- Engage in shared reading of a new text with the student
- Provide picture cards for the student

Students Will

- Arrange the picture cards to create a food chain for the forest organisms
- Complete a CER statement

15. Evaluate

Think

What information do I need to collect to inform my teaching throughout the lesson? What do I need to see or hear from my students that assures that they have learned the science content?

Teacher will

Monitor students' responses to questions during the lesson and review students' data represented in their food web diagrams.

Students will

Respond to questions posed by teacher, complete their food webs using picture cards and arrows, and complete their CER statement.