

Lesson: Out of Balance—Food Web Hike

Environmental Literacy Question: How have humans affected the Chesapeake Bay and its watershed?



Topic/Essential Question: What is the human impact on the interactions of organisms in Maryland habitats?

Unit/Lesson Sequence: One of two lessons in the “Out of Balance” 4th grade module based at Arlington Echo Outdoor Education Center.

Content Standards:

- **Environmental Literacy**

- 4.A.1.b. Explain and demonstrate that the earth can be described as one single global food web, and food webs can be described for a particular environment.

- 5.A.1. Analyze the effects on human activities on earth’s natural processes.

- 5.A.2.d. Evaluate the effects of an alien species on the Chesapeake Bay ecosystem.

- 8.F.1.b. Identify actions that can be taken as individuals and those that require the involvement of other people, organizations and government.

- **Science**

- 4.F.1.a. Identify and describe the interactions of organisms in an environment.

- **Common Core State Standards for English Language Arts**

- CCSS.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.

Length of Lesson: 35 minutes

Student Outcome: Students will demonstrate an understanding of food web connections in the Chesapeake Bay Watershed, and describe how human activity can have negative and positive effects on the food web.

Knowledge of the Learner:

- Prerequisite knowledge, skills, and processes: Students must have a basic understanding of the roles within food chains and webs (producers and consumers). Students need to have an understanding of the interactions of organisms in a Chesapeake Bay watershed food web.
- Students’ needs, interests, and previous learning will be determined during the pre-assessment.
- Differentiated: This lesson will appeal to different types of learners. Kinesthetic learners should do well with the physical act of navigating the canoe or hiking. Interpersonal learners will benefit from the team dynamic required to steer a canoe.

Knowledge of Content:

- **Vocabulary:**

algae bloom

bacteria

erosion

fertilization

food chain

food web

habitats
nutrients
predator

interact
producer
scavenger

nonnative species
consumers
decomposer

● **Resources:**

Artificial animal scat
Magnetic pictures of organisms, ecosystems,
and human effects to be put on the backdrop

Magnetic board with waterfront/land backdrop
Erasable marker for drawing arrows in food
web
Poster on hiking in the wilderness

● **Supplements:**

A-1: Food Web
A-2: Food Web Out of Balance
B: Causes of Food Web Imbalance
C: Facts
D: Vocabulary

Lesson Setup:

Set up the magnetic pictures that will be placed on the board near the tables at the overhang; the lesson will start and end here. In the event of inclement weather the lesson will start and end in the lower Resource Lab.

Set up artificial scat along the trail. The trails are marked by color as labeled on the map. Artificial evidence of wildlife (scat, prints, logs) will be placed in the area where a ribbon of the same trail color is placed. Ribbons are labeled with corresponding numbers and scat for each station, and a flip book with main points and evidence of wildlife is available in addition to the information chart (**see Supplement C**). Meet the first group of students after the Out of Balance Module introduction.

Instructional Delivery

Pre-Assessment:

- Welcome the students to the activity and introduce yourself.
- Ask students if they know what a food chain and food web are.

Motivation/Warm-up:

1. Engage the students by explaining that they will be going on a food web scavenger hunt as Scatologists. Tell them they are going to explore the cove at Arlington Echo by foot searching for signs of wildlife, plants and habitats (show board with habitat backdrop).
2. Ask students what kinds of animals and plants they think they might see.
3. Hold up some of the pictures of animals, plants, and habitat that can be found at Arlington Echo.
4. Review the words producer, consumer, predator, scavenger, decomposer, and examples of each (**Supplement D**).
5. With the students' input, set up a food chain (**see Supplement A-1**).
6. Keeping the same pictures and arrows on the board, demonstrate what happens when a food web is out of balance.
7. Tell the out of balance story (**Supplement A-2**). As you tell the story, take down the trees, then the

house and grass. As you get to the appropriate part in the story; add fertilizer, algae across the top, and bacteria that eat the algae (in that order). Then remove the O². Finally, put an X on all other plants and animals to indicate that they would die.

8. Ask students:
 - a. What caused the food web to go out of balance?
 - b. What could be done differently to keep the food web in balance?
 - c. What else could cause a food web to go out of balance? **(See Supplement B).**

Hiking Procedure:

1. Go over the rules for hiking in the wilderness:
 - a. Walk quietly
 - b. Leave no trace. Leave anything that is found on the hike where it is.
Never pick up anything that is living.
 - c. Do not touch scat!
 - d. Walk carefully and observantly. Use your senses when on the hike. Listen carefully to the sounds of the woods, look for signs of animals, feel the bark of the trees, smell the air.
2. Start at Station 1 behind the resource lab, guide the students down the path that runs along the cove. As you come across real or artificial signs of wildlife at each station, ask questions and generate discussion (use facts on **Supplement C** and/or the flip book). You will be taking the same path back so leave some of the discussion for the return trip. Also, point out ways in which humans have impacted the food web **(see Supplement B)**.
3. Leave enough time at the end of the hike to get back to the starting location and complete journal pages.



Assessment:

- Upon returning to the starting point, ask the students what they saw on their scavenger hunt. After they've recalled a few things, guide them to discuss the food web and the effects of climate change.
- Using some of the animals discovered on the hike, make a new food chain. Connect this food chain with the one made before the scavenger hunt at the appropriate locations. Tell students that a food web is made up of many interconnected food chains.
- Have them turn to the food web page in their journals and complete a food chain.
- Discuss the question at the bottom of the page and have students answer in their journals **(see Supplement B)**.

Notes for Clean up

Please clean, organize and return the lesson materials to their proper locations at the end of each day of instruction. Magnetic pictures are labeled 1, 2, or 3; please return pictures into correct envelopes. If canoeing, return canoes and any other paddles and PFDs to their proper locations. If hiking, please gather planted evidence of wildlife and place them with the rest of the lesson materials. Remember to inform the Arlington Echo staff if you need assistance, or if any materials are damaged or missing.

Notes for Inclement Weather:

Arlington Echo encourages keeping our outdoor activities outdoors—even in the rain—but in the case

of severe weather (thunder, extreme cold, etc.), the rain location for this activity will be determined at the time of your school's arrival (Upper Resource Lab or Dining Hall). Except for extreme conditions; this decision is made by Arlington Echo Staff and they will direct you appropriately. Student safety is our first concern.