

Grade 10: KEEP THE CHAIN CONNECTED

Students develop food chain models to explore biodiversity in ecosystems and troubleshoot challenges to ecosystems from the perspective of related environmental practitioners.

CURRICULUM CONNECTIONS

Related Outcomes

This lesson will contribute to the student's ability to

- work as a member of a team in assessing and addressing problems;
- consider further studies and careers in science- and technology-related fields;
- explain how the biodiversity of an ecosystem contributes to its sustainability;
- analyze the effect of external factors on an ecosystem.

Related Coursework

This lesson works well in classes studying

- food-chain relationships among organisms within an ecosystem;
- the impact of natural and human interference on the balance of the ecosystem;
- interaction between biotic and abiotic factors;
- problem-solving and decision-making skills.

PREPARATION

Learning Objectives

During this lesson, students will

- illustrate relationships between organisms in ecosystems by creating food chain and web models;
- identify diverse factors affecting the food-chain system by developing action plans to counter assigned environmental threats;
- explore related environmental occupations by incorporating practitioner perspectives into their action plans, using the Aboriginal EnviroCareers provided;
- integrate traditional ecological knowledge into action plans.

Total Time 65 minutes

Material Required

- Pencil (one per student)
- Flip chart markers and paper (one per group)
- Set of food chain cards with strings, each identifying one of the five food chain components (one per student)
- Set of Aboriginal Enviro Careers profiles for: forester, botanist, tree planter, conservation biologist, conservation officer, wildlife technician, and forest fire fighter (one per student)
- Overhead transparencies of each environmental challenge (See: 2.6-2.14)
- Overhead projector

DELIVERY



TIME

10 minutes



PROCESS

1. **Introduction: Understanding Ecosystem Hierarchies**
(*Didactic Questions and Explicit Teaching*)
 - 1.1 Ask students to name different types of plants and animals from their communities. Record answers on board.
 - 1.2 Ask leading questions about the feeding style of each animal to introduce the terms herbivores, carnivores, consumers, and decomposers.
 - 1.3 Explain differences among producers, consumers (primary, secondary, and final), and decomposers.



TEACHER'S NOTES

- 1.2 Introduce food chain terms, e.g., primary consumers, based on your students' related prior knowledge.
 - Prior to the lesson, prepare overhead transparencies of the instructions for the activity and for each of the environmental challenges selected.

15 minutes

1.4 Draw a model on the board or overhead and explain the concept of food chain and web models.

2. **Main Activity: Exploring Ecosystem Relationships**
(*Experiential Learning and Group Work*)

Building food chain and web models

2.1 Divide the class into groups of four to five students, by assigning a reporter for each group, and provide flip chart paper to each.

2.2 Explain: "Each group will build as many food chain and web models as possible, by connecting the producers, consumers, and decomposers you and your classmates generate."

2.3 Distribute the labelled cards to each student in this order: producer, primary consumer, secondary consumer, final consumer, and decomposer.

2.4 Provide directions

- "Write the name of a plant on the producer card and the name of an animal of your choice on each corresponding consumer card. Add aquatic organisms when possible."
- "Include a decomposer, like fungi or bacteria."
- "When you have finished writing the names, go around the room to find as many cards as possible from your classmates, listing organisms your plant or animal can eat or be eaten by directly."
- "When you find a connection, record your findings on the back of the appropriate card."
- "You'll get about five minutes to complete the cards before you begin your search."

2.5 After 10 more minutes, reconvene students into their initial groups, reminding them to complete the following

- Connect their finds to create as many food chains as possible within their group.
- Include a producer, primary through final consumers, and possible decomposers in each food chain.
- Record group answers on the flip chart.

Tackling environmental threats

2.6 Explain: "Develop an action plan for dealing with each environmental problem threatening your food chain. Use the expertise of the environmental practitioners, as described in the EnviroCareers profiles, to help create your action plans. Your group reporter will present your action plan to the class as one of your group's environmental experts, e.g., a forester."

15 minutes

2.4 Example of direct interactions: grasshopper (primary consumer) can eat grass (producer), and can be eaten by a frog (secondary consumer).

2.5 Encourage students to interconnect their food chains by forming a food web, to strengthen the feeding relationship.

2.6 During directions, inform the students that a member of the group should portray an Elder.

2.10 The problems posed can vary to teacher's discretion.

2.13 Insert the name of a predator appropriate for your region.

Evaluation Considerations

Use a standard teamwork and/or problem-solving rubric to evaluate each group. As well, be sure to evaluate the students' abilities to

- identify examples of, and link components of, the food chain;
- incorporate the skills and expertise of their assigned practitioners to each environmental challenge accurately.



- 2.7 Introduce the related occupations: “Several environment-related jobs study, monitor, and manage the relationships within an ecosystem.” Briefly describe each occupation.
- 2.8 Distribute EnviroCareers profiles for conservation biologist, wildlife technician, forester, and botanist to each group.
- 2.9 Instruct students: “Review the profiles and use at least one practitioner’s expertise to address the following problems. Remember to incorporate any Traditional Ecological Knowledge you may have.”
- 2.10 Reveal the first environmental problem on the overhead projector: A forest fire has destroyed most of your community’s fragile plants.
- 2.11 Instruct students
 - a. “Determine the impact of the forest fire on plants and animals in your food chains and webs, then decide on an action plan to minimize the effect of the fire.”
 - b. Discuss how each practitioner’s perspective on the problem and action plan might differ, as well as how an Elder’s perspective may also differ.”
- 2.12 When discussion closes, direct each group reporter to present the group’s action plan in the role of one of the environmental experts.
- 2.13 Once all groups have presented, reveal the next problem:
A new predator is introduced into the region.
- 2.14 Repeat the activity as before, but instruct students to choose another practitioner’s expertise to incorporate into their action plan.

10 minutes

3. **Closure and Evaluation: Debriefing the Activity** (*Discussion*)

- 3.1 Reconvene the students. Debrief by discussing questions such as
 - a. “What obstacles did you face in deciding on the action plan for the forest fire (the problem)?”
 - b. “Were the practitioners unanimous in their opinions when assessing the problem?”
 - c. “How could the forest fire have been prevented or minimized by simple observation?”
 - d. “Do you think that Traditional Ecological Knowledge and the knowledge of the practitioners complemented each other? Explain your answer.”
 - e. “How can your group, as a community, devise a plan for disaster prevention, which combines traditional knowledge and specialized occupations?”



SUGGESTIONS FOR ADAPTATION

- This lesson plan can be adapted to Grade 12 students by introducing a debate session between the groups.
- The problems posed by the teacher can also increase or decrease the difficulty of the lesson.