

Ecosystems

There are approximately **4 hours** of programming during each day of this week, for a **total of 20 hours of core programming**. About **5 additional hours** of programming are available in the Additional Activities section of the Educator Guide.

| Course Overview

Day 1	Day 2	Day 3	Day 4	Day 5
Welcome (25 min) Students are welcome to the course, and the stage is set for the week’s various types of activities.	Welcome (15 min) Students review what they learned the day before and preview what they will learn today.	Welcome (15 min) Students review what they learned the day before and preview what they will learn today.	Welcome (30 min) Students review what they learned the day before and preview what they will learn today. They also form initial hypotheses about what is happening in Loon Lake.	Welcome (15 min) Students review the conclusions they reached, as well as the evidence they will use to defend their conclusion.
Engineering Challenge Warm Up (1 hr 15 min) Students are given the challenge of designing a fishing net that eliminates bycatch.	Dams and the Ecosystem (45 min) Students learn about what dams can do to a freshwater ecosystem and work on adding eco-friendly designs to their dams.	Loon Lake Long Ago (45 min) Students use newspapers and photos from the past to hypothesize about previous animal populations in Loon Lake and compare this information to current animal populations.	Engineer a Filter Feeder (1 hr) Students learn about filter feeders and design their own “filter feeder.”	Catching ONLY Zebra Mussels (1 hr) Students work on their zebra-mussel-catching device, modifying it to eliminate bycatch.
What’s Happening at Loon Lake? (45 min) Students are presented with the week’s problem scenario (an ecosystem change in the fictional town of Loon Lake) and draft an initial list of inquiry questions.	Who Lives in Loon Lake? (45 min) Students learn how biologists estimate populations in ecosystems and use what they learn to determine current and past animal populations at Loon Lake.	Biomagnification (1 hr) Students participate in a simulation to help them understand how biomagnification can affect animals in a food web.	Refining Ecosystem Pyramids (30 min) Students use their understanding of filter feeders to add numbers to their ecological pyramids.	Showcase Preparation (1 hr 15 min) Students prepare to communicate about the problem solving they’ve done this week and finish their campaigns.
Introduction to Dams (1 hr 15 min) Students learn about abiotic pieces of ecosystems, and the structure and function of dams. They do an initial build of their dam.	Ecosystem Mapping (45 min) Students begin to map the energy flow in the Loon Lake ecosystem using the information gathered from the animal populations of Loon Lake.	Public Service Campaign (1 hr) Students will learn the characteristics of effective public service campaigns and begin planning their public service campaigns to share with the town.	Case Study Analysis (30 min) Students read case studies of ecosystems similar to Loon Lake for comparison and research.	Showcase (1 hr) Students present the results of their inquiry and problem solving to visitors.
Reflect (20 min) Students reflect on what they have learned today and add to their question list.	Water Quality Testing (1 hr) Students analyze water samples for multiple characteristics: pH, temperature, dissolved oxygen, turbidity, and chemical contamination. Reflect (30 min) Students reflect on what they have learned today and add to their question list.	Reflect (45 min) Students reflect on what they have learned so far and use their understanding of biomagnification to create one type of ecosystem pyramid that exists in Loon Lake.	Catching the Zebra Mussels (45 mins) Students begin engineering a device to collect zebra mussels from Loon Lake. Reflect (45 min) Students share their public service campaigns with each other to get feedback.	Reflect (30 min) Students participate in a protocol designed to help them reflect on the science, engineering, technology, and math they’ve experienced this week.