



Bare Rock to White Pine

A Look at Forest Succession



Photo by Glenda Clayton

Description of Lesson

The rocky shoreline of the eastern Georgian Bay is an excellent location to see primary succession in action: first to grow on the bare rocks are the lichens, then mosses, small plants, small shrubs like junipers and blueberries, and then finally climax species - our towering white pines. In this lesson, students will discuss, investigate changes throughout history and hypothesize about future changes to our landscape.

Connect with the Georgian Bay Biosphere Reserve

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This lesson plan and included media/
materials are the property of GBBR unless
otherwise stated.

At a Glance

Grade Level: 7

Learning Environment:

Outdoor classroom

Rock outcrop close to school

Prep Time: 10 minutes

Length of Lesson: 1 hour

Key Vocabulary: Succession,
Pioneer Species, Climax Species,
Primary Succession, Secondary
Succession

Staffing: 1 educator/ 5 students

Materials:

Primary Succession Observation
Sheets

Clipboards and Pencils

Field Guides: Forest Plants of
Central Ontario by Lone Pine
Publishing

Kit available from the NNDSB
Resource Centre

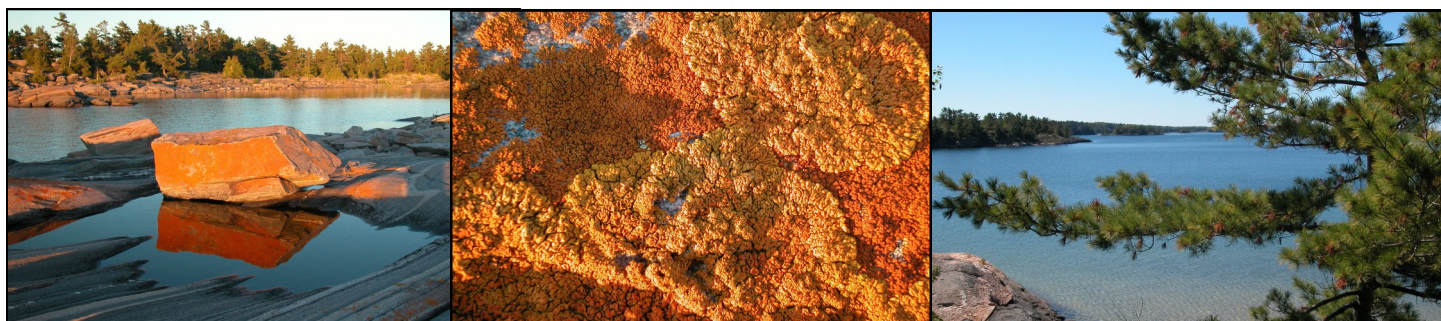
Groupings: Whole class, and Small
groups of 2 or 3

Teaching/Learning Strategies:

Discussion, Field Trip, Photo
Montage

Lesson Outline

Time	Activity	Location	Materials
20-30 min.	Field Trip	Outdoors Rock Out-crop	"Primary Succession" observation sheets (1/student) Clipboards and pencils (1/student) Field Guides: Forest Plants of Central Ontario by Lone Pine Publishing
10 min.	Debrief	Indoor Class-room	
25 min.	Photo montage	Indoor	Computer or iPads OR Glue, printed photos, construction paper, markers, pencils.



Curriculum Expectations Grade 7 Science and Technology

Understanding Life Systems: Interactions in the Environment

Overall Expectations

3. *demonstrate an understanding of interactions between and among biotic and abiotic elements in the environment.*

Developing Investigation and Communication Skills

2.1 follow established safety procedures for investigating ecosystems (e.g., stay with a partner, wash hands after investigating an ecosystem);

2.4 use appropriate science and technology vocabulary, including sustainability, biotic, ecosystem, community, population, and producer, in oral and written communication;

Understanding Basic Concepts Understanding Basic Concepts

3.6 distinguish between primary succession (e.g. the growth of native grasses on a sand dune) and secondary succession (e.g., the growth of grasses and shrubs in a ploughed field) within an ecosystem

Background

Imagine yourself standing in the exact location that you are in right now 15,000 years ago. What do you think that your surroundings would be like? The same as they are now, or very different?

Here in the Eastern Georgian Bay area, we would be under 1 kilometre of ice. That last glacier swept through the area, removing all of the vegetation, soil and loose rocks, transporting and dumping it to the south. After the glacier melted away, we would be standing here on barren rock. Some of that rock is still evident along the shoreline of Georgian Bay, but as you head inland, more and more plant life has covered over the rock.

How did those first plants take root on the bare rock? The first to arrive were lichens -a pioneer species. Lichen are actually a relationship between two organisms - a fungus and an alga - living together as one. The fungus acts as a house or umbrella for the alga – protecting it from the weather. The alga acts as the cook - it can create its own food and nourish the fungus as well. This relationship is known as symbiotic - a mutually beneficial arrangement.

An easy way to remember this relationship is the “Veggie Romance” tale: Alice Alga and Freddy Fungus took a lichen’ to each other and started a relationship, but it’s been on the rocks ever since.

The fungus also produces acidic enzymes that help to break down the rock. The decaying of the lichen and the broken down rock particles create soil which the mosses use to establish themselves, further creating soil as they decompose.

From there, some species of ferns and grasses are able to slowly take root. The build-up of decomposed materials from plants and animals causes soil to form so that larger plants like shrubs can take hold. Finally, there is enough soil that trees are able to grow. This is known as primary succession.



In the eastern Georgian Bay area, primary succession generally follows this pattern of species:

- Pioneer species: lichens, mosses
- Intermediate species: ferns, grasses, shrubs (e.g. juniper and sumac)
- First trees: aspen poplar, white birch
- Climax species: white pine, sugar maple

A hundred years ago, this area was radically changed once again - this time by the lumber companies that cleared this area first of white pine and then of other tree species. The re-growth that occurred in these clear-cut areas is known as secondary succession.

Succession is an ongoing, dynamic process. A forest ecosystem goes through a cycle of birth, growth, maturity, stability, and death. What we see today is not what will be here in the future.

Teaching and Learning

Part A. Field Trip

Take students to a location that shows the different stages of primary succession (along the Georgian Bay shoreline is excellent).

Discuss: What would it have been like if we were in this exact location 100 years ago? 1,000 years ago? 15,000 years ago? How would it be different from now? What would you see?

Handout Primary Succession Observation Worksheet. Explain to students that starting from the rocky shoreline up to the forested area, they are to draw the plant species that they see, not worrying so much about names as accurate drawings/descriptions.

Part B. Debrief

Discuss their drawings: What plants did you notice on the rocky outcrops? What about a little farther from the shore? And farther past that? And in the forest? What did you notice about the soil depth as you went further from the shore? How does the forest change?

Extension discussion: What do you expect that this area will be like 1,000 years from now? How might climate change impact what we see around us?

Part C. Photo Montage (Opportunity to use this product as an assessment)

In small groups, students create a photo montage of primary succession in our area. Photos should be labelled as to the different types of plants from pioneer to climax species.

Extension Activities

Species at Risk (SAR) Extension

Using a large, flat rock boulder, create a plasticine model of SAR that live/use rock barren habitat, including the: five-lined skink, eastern hognose snake, eastern foxsnake, eastern Massasauga rattlesnake, eastern milksnake, and common nighthawk. Label various uses of the rock barrens, including: gestation (birthing) sites, basking sites, cover/retreat rocks, egg laying etc.

For information on each of the SAR, refer to the Georgian Bay Biosphere Reserve's website: www.gbbr.ca.

Primary Succession Observation Worksheet

Date: _____ Location: _____ Name: _____

Example Species	PIONEER SPECIES	GRASS/WEED STAGE	SHRUB/BUSH STAGE	FIRST TREES	MATURE FOREST
Sketch/Description					