

Huron County Nature Center Wilderness Arboretum

Land Succession in Michigan

Lesson Plan

Level: 5th – 7th Grade

Developed by Bob Tallman with funding support, in part, from the Huron County Nature Center.

Program Description: Students (who understand food webs in different environments) will visit several habitats at the Huron County Nature Center Wilderness Arboretum. Students will observe plants and animals and do an increment boring. They will discuss the organisms in each habitat and the ways in which they interact. The emphasis is on the change in the food webs over time. Students will create a timeline for food web succession.

MEAP Benchmarks:

SCIII.1.E.4: Develop an awareness of and sensitivity to the natural world.

SCII.III.5.MS.1: Describe common patterns of relationships among populations.

SCI.III.5.MS.2: Describe how all organisms acquire energy directly or indirectly from the sunlight.

SCI.III.5.MS.3: Predict the effects of changes in one population in a food web on other populations.

SCI.III.5.MS.4: Describe the likely succession of a given ecosystem over time.

Pre-visit Suggestions:

1. Be sure that every student is dressed for the weather conditions. Layers work best. Tell them to wear shoes that can get muddy.
2. Each student should have paper and pencil on which to record the organisms observed. A clipboard or 5 X 7 steno notebook work well.
3. Bring a camera to record each habitat.

Visit:

1. Do Role Play in order to define the succession vocabulary: succession, resident, remnant, invader.
2. Develop timeline concept for succession of food web communities. Use numbers showing the years each food web community takes to develop and physically move the group to the new food web community. (Bare ground at 0 years, grassland at 15 years, mixed herbaceous at 30 years, etc.)
3. Observe plants and animals recording examples of remnants, residents, and invaders in each Community on the worksheet. Make observations in seven food web communities. Continue using the numbers to emphasize the timeline (succession) concept.
4. Do an increment boring of a larger tree that is a remnant from the intolerant tree community that is growing in a tolerant tree community or climax community. The growth rings should be getting smaller closer to the cambium layer. Take the increment boring back to the classroom.

Post-visit Suggestions:

1. Create a timeline for the succession of communities in Michigan using a computer program like Timeliner by Tom Snyder Productions or by drawing the community as a series of pictures. Then compare the time period to a historical period familiar to the students.
2. Discuss the worksheet to compare the remnants, residents, and invaders.

Succession Role Play

1. Define 2 social groups within a class (Use two groups of students who usually are seen together.) Present the role play as a scene in the cafeteria.
2. On the first day one group sits in the center of a large space, pretending they are at a cafeteria table. These are the residents. (There are two extra “chairs”). Second group makes a ring around them. All others watch.
3. Two individuals from the outer group invade the center group (sit at the table because there are 2 extra chairs).
4. The next day, three more from the second group come in first. (The new group arrives first and takes the chairs.)
5. Three of the center (resident) group don't sit down because there aren't any chairs.
6. More of the second group invade, and residents leave.
7. The invading group have now become the residents (it's their table) and those who were in the center originally are now the remnants.

Discuss the concepts of residents, remnants, and invader species and the fact that with food webs this happens over years.

Field Procedure:

Taking an Increment Boring

1. Select a spot on the trunk which is shoulder height for the students and which is not obvious to the casual visitor to the woods.
2. Remove the borer from the handle and lock it into the center of the handle. Insert the extractor into the backside of the borer.
3. Place the borer tip and put pressure on the handle toward the tree. Keep the borer from wobbling. Turn the handle slowly clockwise while maintaining pressure.
4. Insert the borer, approximately 3". Then turn the handle counter-clockwise one quarter turn. Then turn back to the original stop point.
5. Now turn counter-clockwise until the borer is removed. Keep the extractor in the borer until it is removed from the trunk of the tree.
6. Use the rod to push backwards on the sample until it starts moving. Then the extractor will remove the sample from the borer tube. Do not let the sample flick or break.
7. Place the core in a small box (pen box, check box, wooden match box) before examining.
8. Fill the hole in the trunk as soon as possible with black bathtub caulk.
9. After each use, clean the borer parts with a cleaning agent like gun cleaning fluid and swab with oil. If needed, use a conical sharpening stone to sharpen the tip of the borer.
10. Examine the sample looking at the width of the rings. Fast green may be used to stain the sample. If the sample separates at the growth rings, use Elmers glue or wood glue to realign the sections.

Field Procedures:

Screening a Soil Sample for Organisms

Materials: shovel or hand trowel

Zip lock baggie

Centrifuge

Sieve

1. Dig a sample of soil from a 10 cm area and place it in a quart zip lock bag.
2. Soil is shaken through the screen.
3. Roots and animals are observed and counted.
4. Soil is then placed back in plastic bag with the root.
5. Take the soil sample back to the classroom. Place it in a container and water it. Observe and record any seeds that sprout.

Soil Composition

After returning to the classroom, use a centrifuge, if available, to examine the composition of the sample.

1. Place 2 cm of soil in a centrifuge tube.
2. Add 3 cm of water for a total of 5 cm of material in the tube of different materials.
3. Place the thumb over the opening and shake.

Place the tube in the centrifuge and spin.

5. The side profile of the soil will show the layers of different materials in the soil.