Design an Urban Schoolyard Forest

Standards Addressed

Environmental Education Standards:

A. Questioning and Analysis: A.4.1, A.4.2, A.4.3, and A.4.4.
B. Knowledge of Environmental Processes and Systems: B.4.4, B.4.5, and B.4.8.
C. Environmental Issues and Investigation Skills: C.4.3, C.4.4, and C.4.5.
D. Decision and Action Skills: D.4.2 and D.4.3.
E. Personal and Civic Responsibility: E.4.1 and E.4.2.

Key Concepts/ Content

- To understand the term soil.
- To know the role of trees in the earth's ecosystems in our urban environment.
- To know how to develop a learning laboratory for forest and ecosystem study in an urban environment.

Teacher Background

All forests have layers; the uppermost is the canopy where most of the photosynthesis occurs. The understory is the shrub layer, made up of smaller and younger trees. The forest floor provides nourishment for the forest as the decomposers create humus among the ferns, small plants, mosses, etc., that grow in the low light regions.

A forest is established in stages through a process called succession. Open meadows allow shrubs and small trees to start growing. As these trees grow, a young forest is formed. Mature forests support many diverse plants and animals. Old forests contain dead trees as well, supporting the species adapted to this niche.

The contribution of the forest to earth's cycles is important. The amount of carbon dioxide removed from circulation by the forest is roughly proportional to the volume of wood in the trees. The roots of the forest hold the soil, preventing erosion and water pollution by sedimentation.

There are many kinds of forests. In northern Wisconsin we have *boreal forest* (containing mostly conifers like balsam, spruce, fir, and other needle leafed trees that have adapted to a short growing season and cold winters). South of the boreal forests grow the *temperate deciduous forests* (containing some conifers and many deciduous trees).

The type of urban schoolyard forest you create depends on many factors including the soil conditions and type of plants already growng there. Although it may not be an old growth forest your urban schoolyard forest can still be a stimulating environment to learn about what makes up a forest, succession, and the benefits forests provide to the water and air cycles.

Getting Ready

- Visit the National Wildlife Federation's website and review *Why Create a Schoolyard Habitats Site?* www.nwf.org/habitats/schoolyard
  Another good site to visit is: www.newforestsproject.com.
  Go to>Tree Education and then to >Ecology & Trees.

- Walk and roughly map the school campus. If no trees exist, determine a possible place to create a green space with the layers of the forest. Enlist the support of school staff and administration prior to classroom presentation. Visit the Minnesota Arbor month website for an activity called "Loggin In: A Closer Look at your School Grounds" which outlines a procedure for assessing and improving your school grounds as an outdoor classroom. The website can be found at: www.startribune.com
  Go to > for teachers then to > classroom activities then to > Arbor Day is Every Day.

- Parents and volunteers help with supervision and the work. This activity will make a community project.

Safety Issues

- Use the safety contract in the appendix or one you have developed.
- Be aware of traffic patterns when choosing the site. Instruct parent volunteers in safety and school policies.

Materials Needed

- Journals, for recording the process.
- Pencil, paper, markers, etc., for students' mapping of the school grounds.
- Shovels, tools for removing paving, and hand tools for planting
- Plants. Suggested species for attracting birds and wildlife include basswood, beech, birch, burning bush, bitter-sweet vine, blueberry, dogwood, elder, grape vine, hawthorne, juniper, linden, maple, mountain ash, oak, poplar, plum, redbud, rosa rugosa, raspberry, sand cherry, serviceberry (shadbush), strawberry, viburnum, virginia creeper, white ash, white spruce.
- Water source

Procedures

Option 1

1. Read aloud *A Tree in a Forest* (or other books creating interest in forest ecosystem.)
2. Brainstorm plant and animal species you would find in a forest. (Reference: *Eastern Forests*, National Audubon Society)
3. Discuss the terms interrelationships and ecosystem.
4. Have students do research on "What is a forest."
5. If possible, visit a park or a forest and while there create a photo collage or drawing.
6. Share forest writings and drawings with each other, another class, or community members.

Option 2

1. Ask groups of students to do research on possible uses for the school's green space, including how could we use this green space to simulate a forested area? Ask the students to consider inviting a forester or naturalist, or a parent to the class to discuss possible uses for the green space.

2. Ask other groups to conduct research on what will be needed to prepare the area for planting.

3. Have each student complete a yearlong journal about the project. In pairs or other small groups, map the school's green space.

4. Create plans for planting trees in varying heights to model the layers of a forest on the school grounds.

5. Enrich soil with compost, peat moss, shredded leaves, etc., to provide humus. Follow instructions for planting a tree (see Activity Sheet for Planting a Tree).

6. Plant trees, shrubs, vines, and ground covers to model the forest.

7. Continue to water and enrich the soil with fallen leaves and compost.

8. Install birdfeeders for year-round feeding to attract bird species.

9. Mulch for winter protection.

Evidence of Student Understanding

Ask the students to periodically evaluate their own personal journal using criteria that you have established with each student. One such criterion might be neatness of handwriting or use of complete sentences, or even keeping a list of the knowledge gained from the project.

References/ Resources

- 🕮 *Once There Was a Tree*, by Natalia Romanova, Dial Books, 1985.
- 🕮 *A Tree in a Forest*, by Jan Thornhill, Simon & Schuster, 1992.
- 🕮 *Eastern Forests*, Knopf, National Audubon Society, 1987.
- 🕮 *Trees in the School Grounds: Learning Through Landscapes*, by Rosemary Clark and Peter Walters, Southgate.

Activity Sheet

Planting a Tree

Planting a Tree

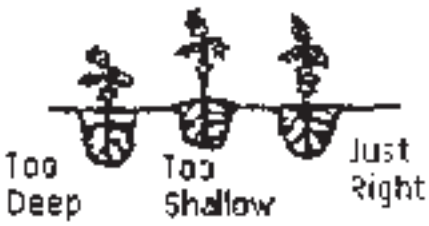
1. Choose a good spot for your tree. Dont forget its ADULT size.

2. Keep your roots moist all the time. Dry roots die.

3. Dig a hole large enough to spread the roots apart. Check for underground utility lines first!

4. Plant the tree at the right depth. (See "How Deep?") Gently add loose soil.

How Deep?



5. Add more soil and firm with foot.

6. Mulch with wood chips.

7. Water regularly. Wait for shade!

Robin Warmup Exercise

One of the best examples of wildlife to observe throughout Wisconsin is the American robin, Turdus migratorius. Did you know that the robin is the state bird of Wisconsin? School children actually picked the robin in 1926 during Arbor and Bird Day. Every county in the state voted for the robin, except Sheboygan County which voted for the eastern bluebird. Wow, kid power in action!

Use the robin activity sheet as an example of observing a natural community and interdependence. Try to get your students to observe from the sky to below the ground. Remember the robin is dependent on many things that you might only see by digging in the ground or looking through a microscope.

All living things need:
1. Food
2. Water
3. Shelter
4. Space

Fun questions about robins:
A robin walks on the ground in a very distinct way. Have your students demonstrate the robin walk.

Robins eat a lot of worms. Observe robins on a lawn and notice how the robins tilt their heads to the side. Are they looking for worms or listening for worms?
Answer: Listening mostly but when the worms rise to the surface after a rain, eyesight probably takes over as the more important sense.

What other food do robins eat besides worms?
Answer: Insects, fruits and berries

Name some predators of robins.
Answer: Sharp-shined and Cooper's hawks, raccoons, and cats. Predators can prey on unhatched eggs, young robins in the nest, or mature robins on the ground.

How does a robin find a mate?
Answer: Singing and showing off

Do robins have territories?
Answer: Yes and they announce their territory by singing.

Do robins migrate?
Answer: Most robins migrate to the southern United States and Central America. Some robins will remain in Wisconsin if their needs for food, water, shelter, and space can be satisfied. You will see winter robins feeding on insects and berries along lowland areas.

How can I tell the difference between male and female robins?
Answer: Males have a black head and females have a grey head but both have that famous red breast.

Other fun bird ideas:
Visit the Audobon society, participate in the Christmas bird count, set up a bird feeder, or visit a cool website at The Raptor Center at the University of Minnesota http://www.raptor.cvm.umn.edu

Activity Sheet

Design an Urban Schoolyard Forest

The robin uses the top of the tree and sky for singing and general showing off "

Hiding from predators

Sleeping

How does the ecosystem supply your needs ??

Nesting

Gathering seeds from tree

Leaf litter reveals a tasty bug "

Oops! Wrong time to take a peek !

SKY

CROWN CANOPY

FOLIAGE

TRUNK

TURF