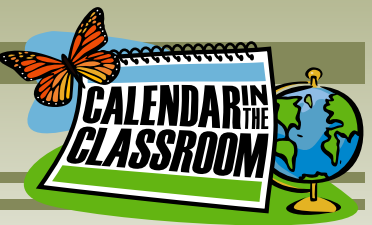




Water is Life



Overview

Students discover that Minnesota, and even their own schoolyard, provides habitat – food, water, shelter and space for many animals with interesting characteristics and behaviors.

Background

Water is life. Without it plants and animals would not survive – and Minnesota is blessed with an abundance of freshwater resources with our many lakes and streams as well as the headwaters of the Mississippi River.

The *Minnesota Weatherguide Environment™ Calendar* contains many eye-catching photographs of animals in their aquatic environment. The term “environment” includes all the surrounding, living and non-living (abiotic) things that make up an area. This includes non-living things such as rocks, water, air, sunlight, weather and climate conditions. Living (biotic) things include all the plants and animals and those organisms that have died and are being naturally recycled. In an area or environment there may be several different kinds of habitats.

The place where an animal or plant lives is called its habitat – in other words, its home. Rivers, marshes, lakes and ponds are all aquatic habitats with many similarities and many differences. As a comparison, rivers are cool flowing waters that contain many animals that hide in deep water, live under rocks or swim fast to avoid predators or catch food; while a marsh or pond is shallow, warmer and contains many plants for animals to feed upon and to use to conceal themselves from predators.

The term, field scientist, is a generic term applied to many different kinds of scientists. It identifies someone who spends a portion of their time studying and conducting research in an outdoor environment rather than spending most of their time in an indoor laboratory. Examples: geologists studying rock layers and fossils, forest ecologist studying the health of a woodland area, aquatic biologist studying life in a river system, an entomologist collecting insect specimens.

When the class goes outside to look for animals in the schoolyard, the task is easier if you have a nature area or birdfeeder and water to lure creatures. If this is not available, placing a potted plant that you keep watered or a dog's water bowl in an out of the way place will provide moisture to lure soil creatures such as centipedes, worms or pill bugs to a concentrated area.

Life cycles are easy to study in spring. A jar of pond water with a few tadpoles adds classroom excitement while reinforcing the reliance of living things on water. Materials and specimens for raising butterflies in the classroom can be ordered from science education catalogs and the insects can be released in a lovely spring ceremony.

In winter, mealworms can be obtained from stores with sporting goods or bird-feeding supplies. They offer an easy way to observe life cycles.

Time:

Day 1: 30 min.

Day 2: 30 min.

Day 3: 1 hr.

Skills:

Observing
Describing
Comparing
Sorting
Communicating
Critical Thinking

Vocabulary:

environment
habitat
aquatic habitat
forest
rain forest
desert tundra
life cycle
field scientist

Materials Needed:

- *Minnesota Weatherguide Environment™ Calendar*
- Student Journal
- Crayons
- Chart Paper
- Collection Jars (optional)
- Magnifiers

In fall, your habitat hunt on the schoolyard may yield caterpillars or cocoons that can be observed in the classroom and over-wintered in a protected place outdoors. Wouldn't it be fun to capture a "bear" for its winter hibernation? A woolly bear, that is. See the Extensions section of this lesson for ideas.

The Activity

Day 1 Warm Up

Peruse the *Minnesota Weatherguide Environment™ Calendar* for a large photograph of an animal in its aquatic habitat. (Beaver, dragonfly, waterfowl, wading bird, frog, etc.)

Ask: Where does this animal live? (Marsh, river, pond, lake, depending on the animal selected. They all contain water but each of these is a different habitat with different conditions.)

1. Introduce the term, habitat – an animal's home. Children live in a home too.
2. Ask: What do you children need in order to stay alive? (food, water, shelter, space to mate and raise a family, and air)
3. Guide the class to create two lists to compare the students' home with the animal's home. What/where is the food, shelter, water and space for themselves and for this creature? (With your guidance they should recognize that we are all living animals. We share basic needs.)
4. Now show students a photograph of a woodland or prairie creature (deer, wolf, robin, butterfly). Discuss this habitat and how it differs from, and is similar to the aquatic habitat. (They all must contain food water, shelter, space, air.)

Day 2

1. Review student learning from Day 1 before starting a list of common animals that students recognize. In addition to Minnesota animals, urge them to include creatures from all over the world.
2. Once you have a sizable list, have students begin sorting the animals into groups that all live in the same kind of habitat. (water habitats or land habitats including: forest, rain forest, desert and tundra)
3. After the animals are sorted ask each child to select one animal to draw and describe the physical characteristics and behaviors. A fun extension is a charade-like activity where students "act out" the characteristics of their animal for class members to guess the identity of their creature.
4. The class will be going outside tomorrow on a "Habitat Hunt." Tell them to come prepared to be field scientists and dress appropriately for the outdoors.

Day 3 The Schoolyard is a habitat!

1. Ask: What animals live on our schoolyard? (It's easy if you have a natural area at your school, but even urban surroundings will yield "wild" animals. The students just have to be very observant – and that's part of the fun!)
2. Getting Ready: Have students prepare a recording page in their journals. Establish expectations for behavior. Define the area where students will be searching and establish boundaries. They must be within your sight at all times. If there are animals on the grounds remind them of quiet and slow-moving behavior so that the animals can be observed. Show students the proper way to use the magnifier. Discuss the ethics of studying wildlife. Nothing is to be harmed. If samples are collected in jars for observation, they are to be returned to their habitat unharmed.
3. Students are to search for animals and then observe how they are living in the schoolyard habitat. The animals leave clues everywhere. It is your field scientists' job to find the evidence.
Where is the animal's shelter or hiding place? How and what do they eat? Where do they get their water? They may not find pools of water, but they should find damp areas. Sometimes no animals will be seen but students will find evidence that something lives there. (Look for squirrel nests made of bundles of leaves, bird nests of twigs and grass, hollows in trees, tunnels and holes in the ground, tracks in mud or snow, evidence of chewing on leaves, trails, bones, feces, listen for sounds, etc.)
4. Even in what appears to be a barren schoolyard there will be spider webs and many insects in crevices. Look for micro-habitats along the edge of the building foundation, along the curb by the sidewalk. These are areas where the moisture collects. Part the grass from the concrete to reveal pill bugs and worms in this damp environment. Search the bark of any trees and bushes. Look under flowerpots and in the flower garden – being careful not to trample plants. Gently stir the mulch that helps hold water around a tree or flowerbed to see small soil critters. Dump some soil and leaves on a piece of white butcher paper and wait a few seconds to watch for movement of worms, etc. Perhaps, use a spade to dig a bit of soil in an area where the soil is

somewhat protected and damp. Watch for lines of ants marching across the grass or sidewalk.

5. Have fun with the excitement of seeing the “wildlife.”

Wrap Up & Assessment

Ask students to select an animal and draw it in the habitat where it lives. Ask them to use labels as appropriate. Do they depict the food, water and shelter in the habitat?

Questions

- Which parts of the school grounds offer habitat for the greatest number of animals?
- What could we do to provide more habitat for wildlife on our schoolyard?

Extensions

- Establish an aquarium in your classroom or use plastic quart jars to have groups of students create small temporary aquaria. Have students advise you about what should be in the aquarium to provide food, shelter, air and space. If an aerator is not available, you will need aquatic plants that receive sunlight to produce the oxygen needed for the animals. A goldfish bowl is easy because if you only have a couple of fish a bubbler is not required.
- Raising eggs and pollywogs: Collect a small number of eggs, float sprigs of elodea (available at pet shops) or a small amount of pond plants. Pollywogs breathe with gills, they need oxygen produced by plants which are receiving sunlight. They also eat the plants with their small scraping mouths. When the legs develop the creatures begin to breathe air with their newly formed lungs. Transfer them to shallow water. For a brief period while the digestive tract is transforming from their vegetarian life-style they will not eat, but will derive nutrition from the tail that they are absorbing. Your frogs will eat insects. After one hardy meal turn them loose in the pond where you found the eggs.
- Late September or October is a good time to see a woolly bear. To raise a woolly bear, put it in a clear plastic jar with holes in the lid. Put an inch or two of soil in the bottom. Place a twig or two in the jar long enough for the caterpillar to perch on it. Each day collect fresh grass and leaves. Replace them daily to ensure the woolly bear is receiving enough moisture and nothing is molding. With a spray bottle you may spray a small mist in the jar every few days. Be careful not to get soil too moist. In a few days, the caterpillar will begin to hibernate in the soil. Place the jar outside in a protected spot, perhaps covered with mulch. Come spring, as the grass greens, the woolly bear will need fresh food every day again. Watch for it to begin spinning its cocoon, a silky hair-like structure. In a week or so, it will emerge as a lovely Isabella tiger moth. It cannot survive in the jar. Celebrate its life by setting it free!



Resources

Minnesota Weatherguide Environment™ Calendar

online: <https://jeffersfoundation.org/programs/calendar-in-the-classroom/>

Frogs and Toads of Minnesota and Their Habitats

online: https://www.dnr.state.mn.us/reptiles_amphibians/index.html

Fun With Nature Take –Along Guide: Caterpillars, Bugs, and Butterflies by Mel Boring, Diane Burns, & Leslie Dendy

Frogs, Toads and Turtles by Diane Burns

Minnesota Academic Standards

3-D Science Standards

Science Practices:

1. Ask Questions
2. Developing and Using Models
3. Plan and Carry Out Investigations
4. Analyzing and Interpreting Data
7. Engage in Argument from Evidence
8. Obtaining, Evaluating and Communicating Information

Crosscutting Concepts:

1. Patterns
2. Cause and Effect: mechanism and explanation
3. Scale, Proportion, and Quantity
6. Structure and Function

Disciplinary Core Ideas:

LS1: From molecules to organisms: Structures and processes

K: Describe what plants and animals (including humans) need to survive

1st Grade: represent how plants or animals use their external parts to help them survive, grow, and meet their needs.

3rd Grade: organisms have unique and diverse life cycles

LS2: Ecosystems: Interactions, energy, and dynamics

K: Represent the relationship between the needs of different plants and animals (including humans) and the places they live

LS4: Biological evolution: Unity and diversity

K: Compare the diversity of life in different habitats

2nd Grade: evaluate how in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all

ELA Standards and Benchmarks

Grade	Benchmark with Anchor Standard/Code
K	<p>Write routinely (may include a combination of drawing, dictating and writing), with support and guidance. (W2: 0.2.2.1)</p> <p>Make a statement about a topic and offer one or two details about the topic, verbally, visually or in written form, with support and guidance. (W5: 0.2.5.1)</p>
1	<p>Write routinely, through a combination of writing, drawing and speaking. (W2: 1.2.2.1)</p> <p>Write to inform or explain, identifying a topic and stating facts about the topic. (W5: 1.2.5.1)</p>
2	<p>Write routinely, including illustration, for a range of tasks, purposes and audiences (e.g. personal interest, enjoyment, academic tasks). (W2: 2.2.2.1)</p> <p>Write to inform or explain, using details to show understanding of the topic and including an introductory and concluding statement. (W5: 2.2.5.1)</p>
3	<p>Write routinely, including illustration, for a range of tasks, purposes and audiences (e.g. personal interest, enjoyment, academic tasks). (W2: 2.2.2.1)</p> <p>Write to inform or explain, selecting and organizing relevant details to show understanding of the topic, building on skills from previous years. (W5: 3.2.5.1)</p>