

We3 Bridging Document: Minnesota Department of Natural Resources Water Habitat Site Study

Grade 5

Science standards connections in this bridging document are for 5th grade Science (below), but this activity is appropriate for grades 3–5 and above.

Abstract

In this activity, students explore a local water ecosystem and discover organisms living in various habitats. Many of these organisms provide food and cover for fish. Each student collects aquatic invertebrates using dip nets and sorts through muck scooped from the lake or creek bottom. Students also use a rake to collect aquatic plant specimens. They'll have the opportunity to sketch the specimens, and to use field guides and identification keys to study and identify the plants and animals. From these sketches, they'll make a pond, stream, or lake discovery book.

Connection to State Science Standards (Grade 5)

Strand I – History and Nature of Science

Sub-Strand B – Scientific Inquiry

Standard – The student will understand the process of scientific investigations.

Benchmark

1. The student will perform a controlled experiment using a specific step-by-step procedure and present conclusions supported by the evidence.

Strand I – History and Nature of Science

Sub-Strand C – Scientific Enterprise

Standard – The student will recognize that science and technology involve different kinds of work and engages men and women of all backgrounds.

Benchmark

1. The student will describe different kinds of work done in science and technology.

See the comprehensive Department of Natural Resources **Minnesota Academic Standards Correlation Database** (www.mndnr.gov/education/teachers/edstandards_intro.html) for 5th grade Language Arts standards and for 3rd and 4th grade Science and Language Arts standards correlations for this activity. This comprehensive database contains correlations with Project WET!, Project WILD, Project Learning Tree, and MinnAqua.

Activity

Water Habitat Site Study

"Water Habitat Site Study" is in Chapter 1, Lesson 4 in *Fishing: Get in the Habitat!*. This is a leader's guide and curriculum focused on fishing and aquatic education. It was developed by the MinnAqua Program of the Minnesota Department of Natural Resources. The comprehensive manual provides background information, materials, tips, connections to Minnesota state standards and Minnesota Environmental Scope and Sequence, worksheets and lesson descriptions.

To view information about the guide:

www.mndnr.gov/minnaqua/leadersguide/index.html

To find the MinnAqua representative in your area and sign up to take a workshop and receive the full manual, see www.mndnr.gov/minnaqua/index.html#Contacts

Students' prior knowledge or alternate conceptions about key concepts/ideas and implications for teachers/advisors

Conceptions and Alternate Conceptions About the Living Environment

- † Go to this link: www.project2061.org/publications/bsl/online/index.php?chapter=15§ion=C&band=5#5
- † Choose "5. The Living Environment."
- † Scroll down and review the following sections for insights into conceptions and alternate conceptions related to this activity:
 - 5a. Diversity of Life
 - 5c. Interdependence of Life

Common Misconceptions in the Life Sciences

<http://homepage.mac.com/vtalsma/misconcept.html#biology>

Common Misconceptions About Ecosystems

<http://homepage.mac.com/vtalsma/misconcept.html#ecosystems>

Materials

From *Fishing: Get in the Habitat!* manual

- *Aquatic Insect Life Cycle Sheet*, one per student
- *Water Habitat Site Study ID Key* to plants and animals
- *Water Habitat Site Study Check-Off Sheet*, one per group or per student

Other materials

- Various pond life field guides such as *A Guide to Aquatic Plants* (Minnesota DNR) and *Through the Looking Glass: A Guide to Aquatic Plants*, (U of Wisconsin-Extension)
- Kitchen strainers, dip nets, or Hester-Dendy collectors
- Rake
- Shovel
- Buckets, two
- White trays with sides (such as plastic ice cube trays to separate organisms for study), three or more
- Assorted containers and plastic cups
- Spoons
- Tweezers or forceps
- Magnifying lenses (worn on straps)
- Clipboards, preferably plastic covered, or 5 by 7-inch spiral-bound sketchbooks
- Pencils
- Paper, for drawing pictures of organisms
- Camera and film, to document field conditions
- Video program about pond life (optional)
- Drawing paper and materials for creating a class pond, stream or lake discovery book

Basic safety equipment for field activities

- Waterproof shoes, rubber boots, or waders
- Walking stick (with measurements) for balance, probing and measuring
- Insect repellent and sunscreen
- First aid kit
- Tarps, for gathering areas, sitting, and setting trays
- Towels, in case someone gets wet
- Whistle to summon help in emergencies, and to signal the beginning and end of activities
- Refreshments and drinking water

Key concepts/ideas

- Aquatic macroinvertebrates are animals without backbones (invertebrates) that are large enough to be seen with the unaided eye (macro) and spend most or all of their life cycles in water (aquatic).
- Aquatic plants and macroinvertebrates are indicators of water quality.
- Pollution impairs water quality.
- Some species of macroinvertebrates are more tolerant of pollution and low water oxygen levels than others.
- Identification and observation of diversity of organisms builds understanding.
- Aquatic plants are important to fish and to other organisms in the ecosystem.

Connection to Minnesota Environmental Literacy Scope and Sequence Benchmarks

- Social and natural systems are made of parts. (PreK – 2)
- Social and natural systems may not continue to function if some of their parts are missing. (PreK – 2)
- When the parts of social and natural systems are put together, they can do things they couldn't do by themselves. (PreK – 2)
- In social and natural systems that consist of many parts, the parts usually influence one another. (3 – 5)
- Social and natural systems may not function as well if parts are missing, damaged, mismatched or misconnected. (3 – 5)

For the full Minnesota Environmental Literacy Scope and Sequence, see www.seek.state.mn.us/eemn_c.cfm

Connection to Minnesota Environmental Education Goals

To view Minnesota State Statute § 115A.073, "Environmental education goals and plans," go to www.seek.state.mn.us/eemn_g.cfm and scroll down to Statute 115.073. It is the second statute listed on this page.

Instruction tips

Tips and tricks for conducting this activity are available within this lesson in *Fishing: Get in the Habitat!* See the "Activity" section on page 1 of this bridging document for information on receiving the leader's guide.

Background knowledge for teachers

Full background information on all of the topics below is available within this lesson in *Fishing: Get in the Habitat!* See "Activity" section on page 1 of this bridging document for information on receiving this leader's guide.

Aquatic, Aquatic Ecosystem, Habitat, Aquatic Plants (free-floating plants, emergent plants, floating-leaf plants, submerged plants), runoff, Aquatic Macroinvertebrates (aquatic insects, metamorphosis, complete metamorphosis, incomplete metamorphosis), Aquatic Vertebrates, Pollution, Benthic organisms

How to make this activity relevant to students' learning and lives

Macroinvertebrates can indicate water quality. Water quality affects the students' lives via their connection to water through swimming and playing in lakes and streams, drinking water, and fishing.

Related state agency K-12 outreach resources

Related to water

- Project WET! www.mndnr.gov/projectwet/index.html
- *Minnesota Conservation Volunteer*, Young Naturalists, "Life in a Jar: What are those little critters you scoop up from a pond?" www.mndnr.gov/young_naturalists/pond_life/index.html
- Healthy Rivers CD
- MinnAqua water and land education programs

Additional DNR Resources for PreK-12 Educators

Go to www.mndnr.gov/education/index.html

- Project Learning Tree
- Project WILD
- School Forest Program
- State Park programs – field trips
- *Minnesota Conservation Volunteer Magazine*
- Minnesota Minerals Education Workshop – for K-12 Educators
- *All About Minnesota's Forests and Trees* – for those who care about forests and trees and want to share our knowledge with others.

Assessment options

From *Fishing: Get in the Habitat!* Chapter 1, Lesson 4, Water Habitat Site Study

1. Observe students working in groups at the site and as they create the book chapters. Assess each group's chapter, group participation, and contributions to class discussions.
2. Have students make a poster or graphic organizer that describes the various sampling methods they used to collect plants and animals at the site. They should also describe the types of organisms found using each method.
3. Have each student choose an organism from one of his or her drawings and describe the adaptations that help it survive in its watery habitat.
4. Write an article for the school newspaper or website about the field trip and the discovery book created by the class.
5. Assessment options include the Checklist and Rubric on included in the lesson.

We save—Ideas for action

1. **Stream monitoring projects:** Have your students participate in a local volunteer stream monitoring effort, on school grounds, if a stream or lake exists there, or nearby. They'll learn more about how some types of aquatic macroinvertebrates are more sensitive to water pollution, and that others are more tolerant of pollution or degraded conditions (including turbidity and silt, low oxygen levels, and toxins.) Contact your local watershed district, the Volunteer Stream Monitoring Partnership (Twin Cities area), or the Minnesota Pollution Control Agency Citizen Stream-Monitoring Program <http://proteus.pca.state.mn.us/water/csmp.html>
2. **The water stewardship chapter in *Fishing: Get in the Habitat!*** also provides additional lessons that develop deeper understanding of water quality, including sources of pollution and things that students can do themselves to improve water quality. In particular, "Lesson 3: Wonderful Watersheds" and "Lesson 4: Would you Drink the Water?" are recommended.