

Pond Science



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STEM-CTE HUB



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Pond Science

The Pond Science Kit provides students with an opportunity to investigate freshwater ecosystems through authentic field research and scientific inquiry. Students explore biodiversity, ecosystem interactions, water chemistry, and environmental health while practicing the same observation and data collection techniques used by environmental scientists, ecologists, and aquatic biologists. Designed for middle and high school learners, this kit supports hands-on investigations in life science, ecology, and environmental science.



Grade Level

6th - 12th

Group Size

Teams of 2

Time Duration

45–120 minutes for field collection and analysis, with additional time for extended investigations

Content of Kits

Components

- 15 small mesh nets
- 15 forceps
- 15 illuminated loupes
- 15 specimen jars
- 15 Oregon Pond Life Field Guides
- 1 large folding fishing net
- 1 observation container
- petri dishes
- pH testing strips
- multi-test testing strips
- pipettes



Usage

Getting Started

1. Inventory and Organize Materials

Begin by unpacking the kit and verifying that all nets, specimen jars, forceps, illuminated loupes, field guides, testing strips, and other materials are present and in working order. Organizing materials by student pairs before arriving at the field site will make investigations more efficient.

2. Review Collection Procedures and Expectations

Discuss proper specimen collection techniques and establish expectations for handling aquatic organisms respectfully and returning them to their habitat after observations are complete. Review field safety procedures and appropriate behavior near water.

3. Familiarize Yourself with Identification and Testing Tools

Spend a few minutes exploring the Oregon Pond Life Field Guides, illuminated loupes, and water quality testing materials. Understanding how to use these tools before entering the field will improve the accuracy of observations and data collection.

4. Prepare a Data Collection System

Develop a method for students to record observations, species identifications, water quality measurements, and environmental conditions. Field journals, data sheets, or digital collection tools can help students organize findings and support later analysis.

Storage

- **Clean and Dry Equipment Before Storage**

After use, rinse nets, specimen jars, petri dishes, forceps, and pipettes with clean water to remove sediment and organic material. Allow all components to dry completely before returning them to the kit.

- **Organize and Protect Small Components**

Store field guides, testing strips, illuminated loupes, and other small components in their designated containers or compartments.

Troubleshooting

- **Few Organisms Are Being Collected**

If students are having difficulty finding pond organisms, try sampling in areas with aquatic plants, submerged branches, or along pond edges where many species prefer to live. Moving slowly and disturbing the water as little as possible often improves collection success.

- **Water Test Results Seem Unusual**

If pH or water quality readings appear inconsistent or unexpected, verify that testing strips are being used according to the instructions and that strips have not been exposed to moisture prior to use. Collecting multiple samples from different locations can help confirm results.



Activity Guide

Beginner

Pond Biodiversity Survey

Student teams collect, observe, and identify aquatic organisms from a local pond or wetland ecosystem. Using field guides and illuminated loupes, students create an inventory of the species found and discuss what biodiversity can tell us about ecosystem health.

Oregon Science Standards Alignment

MS-LS2-5 & HS-LS2-6

Procedure

1. Students work in pairs to collect pond organisms from different areas of the habitat.
2. Transfer specimens to jars or petri dishes for observation.
3. Use field guides and loupes to identify organisms to the lowest possible taxonomic level.
4. Record the number and types of organisms collected.
5. Return all organisms safely to their habitat.

Intermediate

Water Quality Investigation

Students investigate the relationship between water quality and aquatic life by measuring pH and other water chemistry indicators and comparing those results to the organisms present in the pond.

Oregon Science Standards Alignment

MS-LS2-1 & MS-LS2-2

Procedure

1. Collect water samples from several locations around the pond.
2. Use pH and multi-test strips to measure water chemistry.
3. Record water quality measurements for each sampling location.
4. Compare water chemistry data to the organisms found at each site.
5. Discuss how environmental conditions affect aquatic ecosystems.

Advanced

Building a Pond Food Web

Students use their field observations to construct a pond food web that models the movement of matter and energy through the ecosystem. Students identify producers, consumers, decomposers, and predator-prey relationships within the pond community.

Oregon Science Standards Alignment

MS-LS2-3 & MS-LS2-4

Procedure

1. Compile a class list of organisms identified during field investigations.
2. Research the ecological role of each organism.
3. Categorize organisms as producers, consumers, or decomposers.
4. Construct a food web showing energy flow and ecological interactions.
5. Predict how changes in one population could affect the larger ecosystem.



Learning Extensions

STEAM Connections: Science

Learning Objectives:

- Collect, observe, and identify aquatic organisms found in freshwater ecosystems.
- Analyze how abiotic factors such as pH, temperature, and water quality influence aquatic life.
- Investigate biodiversity as an indicator of ecosystem health.
- Develop and use models to explain interactions within pond ecosystems and food webs.
- Collect, record, and interpret field data using scientific tools and procedures.
- Construct evidence-based explanations about ecosystem relationships and environmental change.

Career Connections:

- **Ecologist** – Investigates relationships between organisms and their environments.
- **Environmental Scientist** – Monitors environmental conditions and develops solutions to environmental challenges.
- **Fisheries Biologist** – Studies fish populations and aquatic habitats to support conservation and management efforts.
- **Water Quality Specialist** – Tests and monitors water resources to ensure ecosystem and public health.
- **Wetland Scientist** – Studies and protects wetlands and other freshwater habitats.
- **Conservation Scientist** – Manages and protects natural resources and ecosystems.
- **Park Ranger or Natural Resource Specialist** – Educates the public and helps manage public lands and waterways.

Essential Employability Skills:

- Observation and Attention to Detail
- Critical Thinking
- Communication
- Collaboration
- Problem Solving
- Data Literacy
- Environmental Stewardship





Resources and Accessibility

Safety Guidelines

Practice Safe Behavior Near Water

Always conduct pond investigations under adult supervision and establish clear boundaries for where students may collect samples. Students should be mindful of slippery surfaces, uneven terrain, and changing water conditions while working near ponds or wetlands.

Handle Organisms and Equipment Responsibly

Use nets, forceps, and specimen jars carefully to avoid injuring aquatic organisms or damaging equipment. Return all collected specimens to their habitat as quickly as possible and wash hands thoroughly after handling pond water or organisms.

Accessibility

Provide Multiple Ways to Participate

Students can contribute through specimen collection, species identification, water quality testing, data recording, photography, sketching observations, or managing equipment. Offering a variety of roles allows all students to participate meaningfully in field investigations.

Use Multiple Methods of Observation

Support learners with illuminated loupes, field guides with images, verbal descriptions, and collaborative identification activities. Digital photographs, enlarged images, and shared class observations can help make microscopic or difficult-to-see organisms accessible to all learners.

Library Catalog



Library Resources



Feedback

QR to feedback survey

