



Montana Natural History Center

# Exploring Wetlands Curriculum



# Exploring Wetlands Trunk

## Nature Discovery Trunk Contents List

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### **Books:(2 Blue fabric bags)**

- [Amazing Bats](#)
- [Beavers](#)
- [Dragonfly](#)
- [Eliza and the Dragonfly](#)
- [Frog Girl](#)
- [In the Pond](#)
- [Joyful Noise: Poems for Two Voices](#)
- [One Small Square: Pond](#)
- [Pond Life: See The Natural Work Of A Pond As Never Before!](#)
- [Sacred Harvest](#)
- [Salamander Rain: A Lake and Pond Journal](#)
- [Swamp Life: A Close Up Look at the Natural The World of a Swamp](#)
- [Tadpole and Frog](#)
- [The Salamander Room](#)
- [Watching Water Birds](#)

### **Field Guides (Blue fabric bag):**

- [A Golden Guide: Pond Life](#)
- [America's Wetlands: Guide to Plants and Animals](#)
- [Animal Tracks of the Rocky Mountains](#)
- [Frogs, Toads, and Turtles](#)
- [OBIS Pond Guide](#)
- [Pond Life by Gerald Cox](#)
- [Tracks, Scats, and Signs](#)
- [Track Finders Guide](#)
- [Wetlands](#) by the Audubon Society

### **Materials:**

- Being Amphibian card sets (3)
- Ice cube trays (4)
- Jeweler's Loupes (18)
- Plastic viewing containers (5)
- Little Brown Bat mount (Lavender cloth bag)
- Muskrat (Lavender cloth bag)
- Bed Boat Flannel Story (Blue fabric bag)
- Ball of string
- Frog Life Cycle Magnets (9 pieces)
- Frog Life Cycle Toys (4)

### **Track Molds (10)**

- Beaver
- Frog (2)
- Goose
- Great Blue Heron (2)
- Mallard Duck
- Muskrat (2)
- River Otter (2)

### **Music:**

- Marshland Bird Walk CD

### **Plastic Folders:**

- The Web of Life game & directions (36 cards)
- "If It Has 6 Legs And 2 Or More Wings, What Is It?" Insect I.D. Books (5)

## **Curriculum Overview**

### Exploring Wetlands Curriculum

#### *Mission*

The mission of the *Exploring Wetlands* curriculum is to inspire k-5 students to appreciate, understand, and act as stewards of wetland communities.

#### *Vision*

The vision of the *Exploring Wetlands* curriculum is to engage young people in an active exploration of wetland communities. We hope that our curriculum will instill a sense of wonder and excitement for future learning about wetland communities and other natural areas within our local towns and cities. With this curriculum we strive to inspire young children to share their experiences and knowledge with friends and family. We also hope to introduce children to the stewardship of wetlands and other natural areas.

#### *Philosophy*

The curriculum follows a constructivist philosophy which focuses on active and social learning, interactive and student-centered activities, and the teacher as a facilitator. These key components of constructivist philosophy are met within the curriculum by following an instructional model called 5 E's learning cycle.

The learning cycle compliments the constructivist philosophy by identifying students' prior knowledge through engagement in the material, exploring the material through an activity or experience, explaining new material as it relates to the exploration, elaborating on new material within a different context, and evaluating students' individual progress. Not only does the learning cycle promote active learning, but it also promotes student-centered activities that include both group and individual learning. Within the 5 E's learning cycle, student learning is evaluated using an authentic assessment that is both engaging for the students and an effective tool for educators to measure student progress and abilities.

#### *Model*

The *Exploring Wetlands* curriculum supports a single-disciplinary model, which focuses on ecology and is intended for elementary aged students (k-5). *Exploring Wetlands* is designed to be adaptive and educators may incorporate the lessons into their own curriculum as they see fit. To best suit students' needs and their grade level, lessons may be modified or supplemented with extension lessons which are available throughout the curriculum.

The suggested sequence of lessons aims to help students explore wetlands from the lens of "big" to "small". Lesson one acts as the foundation for student understanding of wetlands by focusing on making observations and participation in hands-on activities. In lesson two, by exploring individual habitats, students learn about what animals need to survive in wetlands. The third lesson teaches students to recognize changes in animals as they grow. Specifically, students become familiar with the life cycles of wetland organisms. In the fourth lesson

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students engage in an activity that allows them to experience the intricacies of a wetland food web. Lastly in lesson five, we provide a list of suggested extensions to further explore and celebrate wetlands. We encourage educators to use these extensions as an opportunity to identify class and community service-projects that will promote continued learning and stewardship of wetlands.

## Lesson 1: Field Trip

### What is a Freshwater Wetland?

**Purpose:** In this lesson children engage in activities that encourage exploration of a freshwater wetland ecosystem.

**Scientific Process Skills:** Observation, communication

**Time:** 45 minutes to 1 hour

**Location:** Identify a wetland (pond/marsh) in your community to visit

#### Materials provided in trunk:

- Journal template to photocopy for students
- Books with pictures of wetlands

#### Materials provided by the teacher:

- White board or large piece of paper
- Markers
- Butcher paper
- Pen/pencils

#### Background Information:

Wetlands encompass an important ecosystem that links land and water. Wetlands are sometimes called a bog, marsh, swamp, mangrove, moor, or a pond. A puddle left after a rainstorm is not considered a wetland because a wetland is an area that is filled or saturated with water for at least part of a year. Commonly wetlands are created after heavy rainfall, snow melt, melting of glaciers from the ice age, or the flooding of a river or ocean.

A wetland is distinguishable from other bodies of water because it has *hydric soils*, *hydrophytic plants*, and a unique *wetland hydrology*. Wetlands contain *hydric soil*, which is soil that is seasonally or permanently saturated, causing it to be anaerobic (low in oxygen). The water saturated soil found in wetlands is home to specially adapted plant species known as *hydrophytic* (water tolerant) vegetation. Examples of hydrophytic vegetation in Montana include water lilies and cattails. Wetland vegetation often includes submerged (completely underwater) and emergent vegetation (plants that have root systems whose leaves and stems extend out of the water). The *wetland hydrology* or the distribution of water over time in wetlands is unique because the water level can fluctuate from at ground's surface, to just below or above.

Depending on where you live, a wetland can be filled with salt or fresh water, and the species present are adapted to thrive in these environments. Wetlands are important to our

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environment because they filter water, they control flooding and help minimize erosion, and they provide important habitat for many types of plants and animals.

### Learning Objectives:

- By participating in a scavenger hunt, students will make observations and explore questions related to a wetland ecosystem.
- Through discussion about wetlands, students will know the three characteristics of a wetland.
- After reviewing the scavenger hunt as a class, students should have a basic understanding that an ecosystem consists of biotic and abiotic factors.
- After each student completes a solo investigation about a question of interest related to wetlands, they will communicate their observations to their peers during a short presentation.

### Key terms:

Ecosystem- A system formed by the interaction of organisms with their environment.

Abiotic factors- Non-living chemical or physical factors in an environment which affect an ecosystem. These factors include: Soil, water, air, temperature, and sunlight (SWATS).

Biotic factors- A living thing that affects an ecosystem. Biotic factors include: plants and animals).

Hydric soil- Soil that is seasonally or permanently saturated.

Hydrophytic vegetation- Water tolerant plants.

Wetland hydrology – Refers to the fluctuation of water in an area over time.

**Procedure:** (The engagement portion of this lesson can take place in the classroom prior to going to a wetland).

Curriculum referenced: WOW! The Wonders of Wetlands

### Part One: ENGAGE

1. Prior to arrival at the wetland, show the students a picture of a wetland. Do not tell them what it is called.
2. Ask the students to pull out their journals and to turn to page 2. Under the heading; "What do you know about \_\_\_\_\_?" ask the students to brainstorm a list of words to describe the picture. Ask the students if they have been to a place like the one in the picture. Encourage them to share their experience. Write down a class list of words on the white board.
3. Ask the students to look at the picture and to come up with questions that they have about the area. Have the students write their question on page 2 of the journal. For example, why are there trees in the water? Write this list on a piece of butcher paper to

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take with you to the wetland). Inform the students that the place they will be going for their field trip is called a wetland.

4. Head to the wetland.

### **Part Two: EXPLORE**

When you arrive at the wetland, divide the students into pairs. Have the students turn to page 3 of their journal to find the activity titled "What is this place?" Notify students that they will be going on a scavenger hunt in this area with a partner. Encourage students to use all five senses of sight, smell, taste (if approved by the instructor), touch, and hearing to help them complete the hunt!

What is this place? Scavenger Hunt!

1. Find at least three plants in the water. Draw a picture of each plant.
2. Find the water's edge. Feel the soil near the water. What does it feel like?
3. Smell the water. Do you think it is fresh water or salty water?
4. Find a dry spot. Do you think this spot is always dry? Why or why not?
5. Listen for animals. What do you hear? Name at least three living organisms or draw their picture.

### **Part Three: EXPLAIN**

Review the questions that the class came up with prior to arrival at the wetland. Discuss the observations made during the scavenger hunt. Identify questions from step 2 that the students were able to answer.

As you review the scavenger hunt, discuss the following concepts: hydrophytic vegetation, hydric soil, abiotic factors, biotic factors, wetland hydrology, ecosystem, and biodiversity. Be able to explain how all of the key concepts are related to one another. Ask the students if they still have questions about the wetland, and if so, add them to the list on the piece of butcher paper.

Scavenger Hunt- What does this all mean? (page 4 of the journal)

1. Find at least three different plants in the water. Draw a picture of each plant.  
**Hydrophytic vegetation/ biotic factors**
2. Find the water's edge. Feel the soil near the water. What does it feel like? **Hydric soil**
3. Smell the water. Do you think it is fresh water or salty water? **Abiotic factors**
4. Find a dry spot. Do you think this spot is always dry? Why or why not? **Wetland hydrology**
5. Listen for animals. What do you hear? Name at least three living organisms or draw their picture. **Biotic factors**

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### **Part Four: ELABORATE:**

Invite the students to pick one question from the list of class questions to study further through observation and natural journaling (page 5 in journal). Allow students 10 minutes to explore on their own.

### **Part Five: EVALUATE**

Allot 20 minutes for students to present their observations to the rest of the class. The presentations can be conducted in a manner that meets the needs of your class.

- Observe students as they participate in the scavenger hunt to assess their ability to make detailed observations and explore questions related to a wetland ecosystem. This assessment will also help determine how much time your class needs to complete the exploration phase of the lesson.
- Nature journals can be evaluated for student exploration of the three characteristics of a wetland and their ability to locate biotic and abiotic factors within a wetland ecosystem.
- Observations of student presentations will measure their ability to investigate questions of interest and to communicate their observations to peers.
- Student materials can be assessed based on a scale of poor, fair, good, and excellent.

### **Extensions:**

- For young children (k-2). Read *The Bed-Boat* by Linda Arland and engage in a discussion about who lives in the pond and why they might live there.
- Research types of wetlands. How are they similar and different?
- Wetlands absorb excess water like a sponge! Activity: Take two pans. Put a sponge in one of the pans. Pour about  $\frac{1}{4}$  cup of water into both pans. Make note of the water level in each pan. <http://www.netplaces.com/kids-environment/the-air-and-water/the-importance-of-wetlands.htm>
- Conduct research on the history of your wetland and write an informational brochure, or a short story.
- Supplemental Books- *All Eyes on a Pond* by Michael J. Rosen

## Lesson 2: Field Trip

### Oh, I didn't see you there in your wetland habitat!

**Purpose:** The purpose of this activity is to further familiarize students with the types of organisms that live in a wetland ecosystem.

#### **Scientific Process Skills: Observation, comparison**

**Time:** 1 hour

#### **Materials provided in trunk:**

- Collection containers (5)
- Jeweler's Loupes (18)
- Obis Pond Guide (3)
- A Golden Guide: Pond Life (2)
- Insect I.D. Books (6)
- Journal template to photocopy for students
- Ice cube trays (3)

#### **Materials provided by the teacher:**

- A large piece of butcher paper, or another medium for creating a mural
- Markers, water colors, paints, glue, etc.
- Plastic spoons
- Pen or pencil

#### **Background Information:**

Wetlands ecosystems are home to a variety of different organisms and within each wetland there are unique habitats in which specific organisms live. Each species has adapted to thrive in distinct habitats that provide them with enough *space* to find *food*, *water*, and *shelter*. It is important to examine each individual habitat and the organisms that live there so that we can understand their connection to the larger ecosystem.

#### **Learning Objectives:**

- By observing specific habitats within a wetland, students will be able to identify the four key components of habitat; space, food, water, and shelter.
- By using field guides and the Obis Guide, students will be able to accurately identify at least three organisms.
- By creating a mural and presenting to peers, students will gain familiarity with how the four key components of a wetland habitat vary from habitat to habitat.

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### Key terms:

Biotic factors- A living thing that affects an ecosystem. Biotic factors include: plants and animals).

Abiotic factors- Non-living chemical or physical factors in an environment which affect an ecosystem. These factors include: Soil, water, air, temperature, and sunlight (SWATS).

Biodiversity- Is the variety of life, or living species within a particular region.

Habitat- An environment in which a particular species of plant, animal, or other type of organism lives.

Adapt- to change (something) so that it functions better in a particular environment

### Procedure:

Adapted with permission from Vermont Institute of Natural Science, *Hands-On Nature: Information and Activities for Exploring the Environment with Children* (1986).

#### Part One: ENGAGE

While sitting near a wetland, ask the students: "What do you need to survive?" See if you can solicit the response: space, food, water, shelter without saying it. Possible prompts: "Could you live squished in a room with all your friends, forever? Where do you get your food from? Water? Where do you hide from heavy cold rain?" Ask the students to identify the 4 things that humans need survive. Write the list on a piece of butcher paper. Essential question: "Do all organisms need space, food, water, and shelter to survive?"

#### Part Two: EXPLORE

As a class locate an area close to the wetland to observe. Invite the students to search for an organism. They should look up, down, and under rocks or logs. When they find an organism, ask them "how do you think this particular organism survives?" Invite students to write a response on *page 4* of their journal. As a group identify the space, food source, shelter, and water needs for the identified organism.

#### Part Three: EXPLAIN

Explain that all animals live in a habitat that provides space, food, water, and shelter for particular plants, animals, or other organisms. Engage in a discussion about biodiversity and inform the students that a diverse group of organisms within an ecosystem allows for more food options for organisms. Discuss that organisms adapt to be better suited for their environment. In your discussion be sure identify the characteristics of each habitat found within the wetland ecosystem (encourage students to talk about biotic and abiotic factors).

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**Part Four: ELABORATE**

1. Split the students into four groups. Assign each group to one of the four habitats (surface film, open water, the water's edge, and the bottom).
2. Using collection containers and ice cube trays (if needed) have each group collect specimens from one of the four habitats. *Remind the students to be very careful with the organisms and that not all organisms need to be collected in order to observe them.* Hint: Not all organisms will fit into the collection jars!
3. Use the observation handout to further explore the assigned habitat (on *page 4 and 5* of the journal).

## Woah! What did you find in the wetland?

*Student Worksheet: Adapted from p. 33 of Diving in Binder- "Student Observation Form"*

Group Members: \_\_\_\_\_ Date: \_\_\_\_\_

Habitat name: \_\_\_\_\_

Draw a picture to show the habitat in the space you observed (include plants and animals)



Where do you see water? \_\_\_\_\_

What is there to eat? \_\_\_\_\_

Where can the organisms (animals, insects, etc.) hide? \_\_\_\_\_

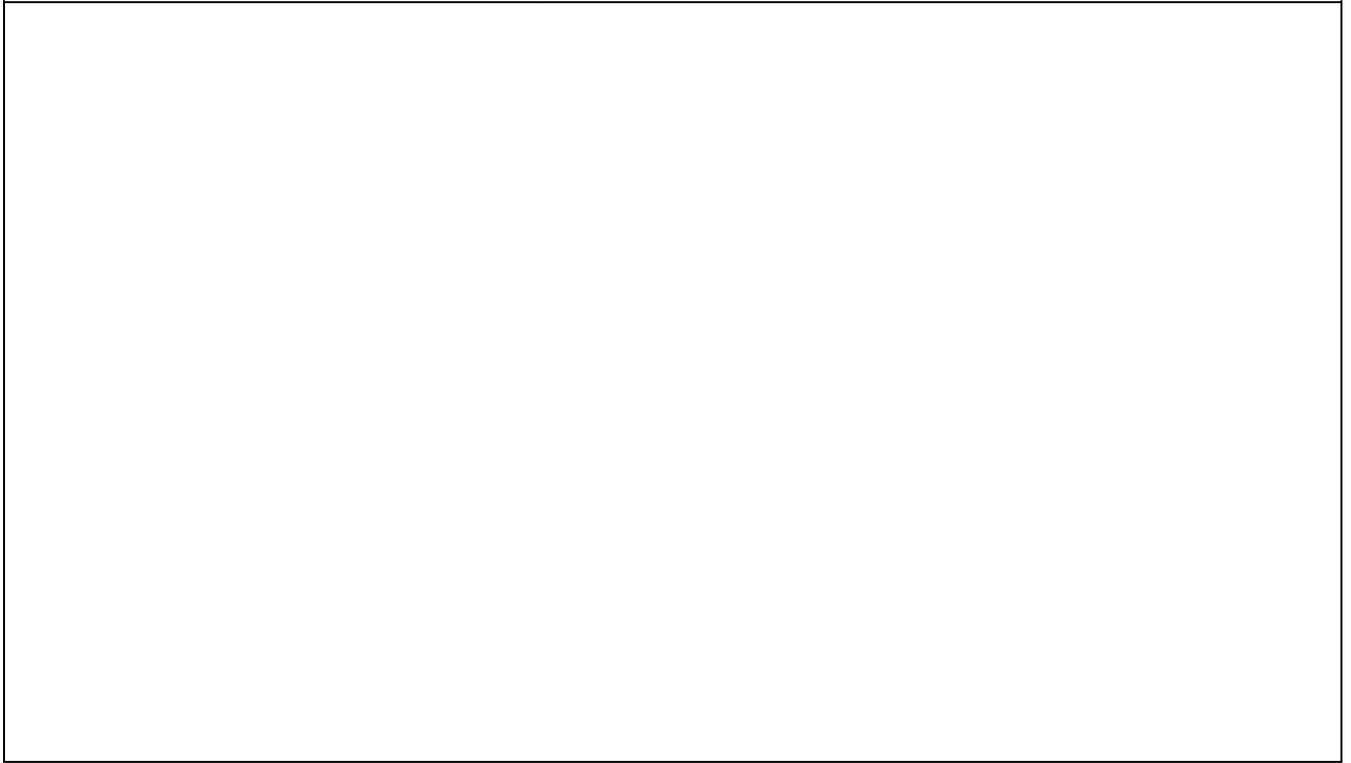
How many organisms can you find? \_\_\_\_\_

Is there enough space for all of them in your habitat? Yes/no

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Use the space below to draw as many organisms as you can find in the habitat:



Using insect I.D. books (6), insect mounts, Obis Pond Guide (3), *A Golden Guide: Pond Life* (2) try to identify at least three organisms. Label these organisms in your picture.

Why might these organisms live here? \_\_\_\_\_

What is living that could be food for the organisms? Shelter? \_\_\_\_\_

What is non-living that can be used by the organism? \_\_\_\_\_

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### **Part Five: EVALUATE**

Each group should create a habitat mural on the classroom wall. Once completed each group should present their habitat to the rest of the class. Once the presentations are complete, ask the students to turn to *page 6* of their journal. Ask them to list one similarity and one difference between the habitat they studied, and one that a peer group studied.

- Observe the students as they explore their assigned habitat within a wetland. Listen for discussion about the four key components of habitat; space, food, water, and shelter. These observations may be used to adjust the time spent exploring the habitat.
- Circulate between the groups as they work to identify organisms using field guides. See if they are able to identify three organisms accurately. If your students are having difficulty with this process, it is advisable that you take the time to identify student's strengths and weaknesses with identification and to provide appropriate instruction.
- In each mural, students should include the 4 key components of a habitat. Students should be able to communicate to the rest how their habitat promotes the survival of organisms. In students' journals, they should be able to list at least one similarity and difference between two habitats in a wetland.

### **Extensions:**

- Play a game of charades. Allow all students 1 minute to observe the behavior of one organism. Choose one student at a time to and have them mimic the behavior of the organism. They should continue mimicking the behavior until another classmate can guess which organism the classmate is mimicking- *Hand's-On Nature*
- Teach your class how to use a dichotomous key to identify macroinvertebrates.
- Try to identify organisms in the wetland ecosystem by looking at animal tracks. You can also follow these tracks around the wetland and then come up with a story to describe the animal's day.

## Lesson 3: Classroom Investigations

### Cycling around in a Wetland

**Purpose:** The purpose of this activity is to introduce students to the concept of a life cycle within the context of a wetland ecosystem.

**Scientific Process Skills:** Observation, inference, comparison

**Time:** 45 minutes to 1 hour

**Location:** Classroom

**Materials provided in trunk:**

- Frog life cycle magnets (9 magnets)
- *Eliza and the Dragonfly* by Susie Caldwell Rinehart
- *Dragonfly* by Barrie Watts
- *Tadpole and Frog* by Christine Back and Barrie Watts

**Materials provided by the teacher:**

- White board and markers

**Background Information:**

A life cycle is a biological term that refers to the series of changes that an organism undergoes as they develop from the egg (zygote), to a mature state, and to the inception of a new generation.

*Frog Life Cycle:* egg (zygote)>> tadpole that lives in water>> young frog>> adult

**Learning Objectives:**

- After discussing the life cycle of humans, students will be able to make inferences about the life cycle of a frog.
- Provided with the life cycle sequence of frogs, students will be able to recognize the four main stages within a life cycle.
- As a group students will investigate the life cycle of a wetland organism and be able to explain its life cycle to their peers.
- In their journals, students will be able to draw or explain the life cycle of at least three other organisms.

**Key terms:**

Life cycle- The sequence of physical changes that an organism undergoes in its life time prior to the start of a new generation.

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Metamorphosis- A biological process by which an organism drastically changes its physical appearance (the form or structure) between the time of birth and adulthood.

Zygote- A fertilized egg

### **Procedure:**

#### **Part One:** *ENGAGE*

1. Ask students to describe the ways in which humans bodies change as they as they age. As the students describe each change, draw a diagram on the board to represent the life cycle of a human.
2. Challenge the class to identify the developmental stages of a frog. With input from the class, invite a student to draw on the board the developmental stages of a frog.

#### **Part Two:** *EXPLORE*

1. On the white board place the frog life cycle magnets in an “un-sequenced” manner. The objective is for students to try to sequence the frog life cycle as a group. As the teacher, you may take a supervisory role in this activity, but allow the students to facilitate the process.
2. Assign three tasks to students in the group. 1) Magnet mover, 2) Coach, 3) Student advocate. The role of the magnet mover is to re-arrange the magnets as directed by the coach. The coach listens to the students and based on their input decides where to place the various magnets on the board. The student advocate acts as the teacher, calling on students to give input and ensure that all students have a say in the process.
3. When the students decide that the cycle is complete, ask the students to try to explain why they chose the sequence that they did.

#### **Part Three:** *EXPLAIN*

Review the final cycle with the students. Discuss each stage and explain whether or not the group was correct and why. Explain the concept of a life cycle with reference to humans and frogs. Be sure to make it clear that although the magnet replica of the life cycle has 9 pieces, that there are four main stages of a frog’s life cycle (egg, tadpole that lives in water, young frog, adult). Circle the four stages on the diagram. Explain metamorphosis, and have the students locate the most drastic changes in the physical appearance of the frog throughout its life cycle.

#### **Part Four:** *ELABORATE*

Divide students into small groups. Allow each group an opportunity to pick another wetland life cycle to study using books, field guides, media resources, etc. In the groups have the students create a play, a painting, a PowerPoint presentation, a digital image, or a story that

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depicts the life cycle of their chosen organism. Have the students present their project to the rest of the class (these projects can be adapted for grade level, technology, interests, etc.).

Possible life cycles to study include:

- Dragonflies
- Salamanders
- Turtles
- Butterflies
- Ants

### **Part Five: EVALUATE**

Give each group 5 minutes to present their project to the rest of the class (15 minutes). After each presentation allow each student 2 minutes to draw a picture or write out the stages of at least four of the life cycles presented by their peers. (*Page 6 and 7 of the journal*)

- As the students work in groups to identify the life stages of a frog, students should be monitored on their ability to work together to complete the activity.
- Through observation of student discussion you may evaluate their ability to make inferences about the life cycle of frogs.
- Using the presentation as a tool, students should be able to identify the four main stages of development within each life cycle. In their journals, students should be able to describe the life cycle of at least three other wetland organisms.

### **Extensions:**

- Many of the life cycles of wetland organisms can be studied beyond the four main stages. You may engage in an advanced study of these stages and their individual adaptations.
- If you have easy access to a wetland you could go to the area on a monthly basis to conduct a phenological study. See if you can find organisms in various stages of their life cycle.

## Lesson 4: Classroom Investigations

### Wetland Webs

**Purpose:** To actively engage students in the creation and understanding of a wetland food web.

**Scientific Process Skills:** Inquiry, communication, classification

**Time:** 45 minutes to 1 hour

**Location:** Classroom

**Materials provided in the trunk:**

- Blue folder with laminated organism cards attached to string
- Ball of yarn
- Journal template to photocopy for students

**Materials provided by the teacher:**

- A white board with markers or a large piece of paper
- Copies of Journal for every student

**Background information:**

Wetlands are home to many different organisms, and their survival is dependent on one another. This lesson introduces students to the food web in a wetland community, with an emphasis on the protection of wetland habitat and organisms as a means of sustaining ecological integrity in these communities. A food web consists of the many different food chains present in a single ecosystem. Each chain includes an energy source, producers, consumers, and decomposers.

**Learning Objectives:**

- After completing the string activity, students will be able to describe a food web and a food chain, how energy moves in a food web, the impacts of the loss of an organism on a food web, and how the loss of energy in a food chain affects the size of the chain. Also students should be able to name producers, consumers, and decomposers.
- Through this activity students will use inquiry to explore a wetland food web and be able to communicate their understanding of the web as they proceed with the activity.
- After researching individual organisms, students will be able to classify the organism studied as a producer, consumer, or decomposer and be able identify its place in the food web.

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### Key terms:

Food chain- A linear sequence of who eats who in a food web. The chain begins with an energy source (the sun!) which feeds producers. Producers are eaten by consumers. And decomposers eat and re-cycle organic matter.

Food web- A food web consists of the many interconnected food chains present in a single ecosystem

Producer- Plants are called producers because they produce their own food through the process of photosynthesis or chemosynthesis (they use the energy from the sun, carbon dioxide, and water to produce food in the form of glucose/sugar).

Photosynthesis- The process by which plants convert light energy, carbon dioxide, and water into sugar and oxygen.

Consumer-Animals are called consumers because they cannot produce their own food, so they must consume or eat producers or other consumers for energy. There are three types of consumers: herbivores (animals which only eat plants), carnivores (animals which only eat meat), omnivores (animals which eat plants and animals), and detritivores (organisms that feed on and break down dead plant and animal matter).

Decomposer- A decomposer is an organism that breaks down dead or decaying organisms, thus helping with the process of decomposition (organic substances are broken down into simpler forms of matter).

**Procedure:** *Lesson adapted from Fathom That! Creations, The Web of Life -in a freshwater wetland*

### Part One: ENGAGE

Essential Question: *How do organisms relate to one another?*

1. Gather the class and form a large circle (ideally outside and at a wetland). Ask the students to describe their home. Ask them, "What do you eat and where does your food come from? Do any other animals eat what you eat?"
2. Have students respond to the above questions through a "think, pair, share" activity. Step 1: *Think* (and write down responses on *page 7* of the journal). Step 2: *Pair* up and *share* with a partner. Step 3: *Share* with the group.
3. Using a white board or a piece of butcher paper, draw a diagram with a picture of a student in the middle. As the students share their responses, write and draw the various connections on the board. Conclude the activity by emphasizing that all organisms are interconnected.

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4. Have the students close their eyes as you describe a wetland community. Ask them to think about, "What lives in a wetland and what lives close to a wetland? Ask them "why might a frog depend on a mosquito?" Ask the students to write their responses in their journal on *page 7, question 4 and 5*.

### **Part Two: EXPLORATION**

1. Distribute one organism card to each student. This activity is best played with at least 12 students, but it can be played with a smaller group as long as your web is complete with an energy source (sun), a producer (plant), a consumer (an organism that eats the plant or other organisms), and a decomposer (e.g. bacteria- an organism that breaks down dead plants and animals).
2. Ask them to look at their card, and to think about what their organism might eat. Ask them to turn over their card, to see if they are correct. At this point the students may place the cards around their neck using the piece of string attached to the card.
3. Ask, "Where might the web of life begin within our wetland ecosystem?" Encourage the students to identify the sun as an important energy source for the web of life. Hand the ball of string to the student with the sun card. Ask the students to think about, "What organisms might use the energy from the sun to help them grow?" When the students have identified the producers in the group, the ball of string should be passed to a student with a producer card.
4. Pass the string from one student/organism to another without letting go of the string. Encourage students to think about all the different options of organisms that produce their food, and which organisms might consume them!
5. When the ball reaches "bacteria" you can congratulate the students on completing the web of life in a wetland community. Explain that "bacteria" is a decomposer. A decomposer breaks down dead material and recycles the nutrients used by plants and then the cycle begins again.
6. Ask the students to gently pull on the string, so that they can feel their connection to each other. After all students have felt the connection through the string, you may collect the ball of yarn.

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### **Part Three: *EXPLANATION***

Using a large white board or poster board, encourage the students to try to remember who they were connected to in the web. As the students recall their web, draw a diagram that mimics the food web that they created as a group. Label the diagram with the names of each organism, and key concepts such as food web, food chain, energy source, producers, consumers, decomposers, and photosynthesis.

### **Part Four: *ELABORATE***

Ask the students, "What would happen if the frog disappeared?" "How many organisms would feel the loss of the frog?" "What would happen if the willows were trampled by big trucks?" "What if we removed bacteria, or worms?" "Who is affected by these losses?" Relevant environmental issues of your particular area can be included in this discussion.

Discussion: The organisms in the wetland ecosystem or community rely on each other in order for survival. Ask the students, "Why is the wetland community an important ecosystem?" and "What can you do to help protect it?"

### **Part Five: *EVALUATE***

Have each student research one organism to develop a deeper understanding of where the organism lives, what it eats, and what eats it. Once students have completed the research, provide them with time to create informational posters about the organism of study. Finished posters can be added to the habitat mural. You may use a string to draw a visual connection between the organism poster and the appropriate habitat.

- Observe the students as they engage in the web building activity. Students should be able to identify organisms in a wetland and make inquiries about how and why living and non-living things relate to one another in a wetland ecosystem. Look for student communication throughout the process. This assessment may be used to inform further explanation of a wetland food web.
- After completion of the string activity students should be able to describe a food web and a food chain, how energy moves in a food web, the impacts of the loss of an organism on a food web, and how the loss of energy in a food chain affects the size of the chain. Also students should be able to name producers, consumers, and decomposers.
- Using the final poster as a tool, students should be able to classify the organism studied as a producer, consumer, or decomposer and be able to identify its place in the food web.

### **Extensions:**

- Research adaptations that specific organisms might have for this environment.
- Explore the history of your area, how has the wetland changed? What environmental factors have or might have an impact on the food web of your wetland?

## Exploring Wetlands Nature Discovery Traveling Trunk

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- Start with a large ball of play dough that represents energy. Each time a student receives the ball of dough they must remove a portion of it, and continue to pass it along. This activity allows students to see the way that energy is transferred through the food chain.
- Supplemental books: *In The Pond* by Ermanno Cristini and Luigi Puricelli, *Pond Life* by Gerald Cox, *The Salamander Room* by Anne Mazer

## Lesson 5: Field Trip Extensions

### Let's Celebrate Wetlands!

The following is a list of suggested extensions that you may try with your class after completion of the *Wacky and Wild Wetlands curriculum*. Activities can be adapted to be age appropriate. The purpose of these extensions is to provide students with an additional opportunity to explore and celebrate wetlands.

#### Extensions:

- Visit a wetland with your class to look at the impacts on the area. Generate a list of observed positive and negative impacts. Using resources available through the *National Service Learning Clearinghouse* (<http://gsn.nylc.org/plan>) you can plan an action-oriented service project with your class. Projects can be as simple as picking up trash at your wetland, or working on a year-long restoration project.
- Visit your local wetland various times throughout the year to look for familiar and new organisms. Do you notice anything different about them? Can you find the same organisms each time?
- Go to a wetland and create a map of the area. For ideas on how to do this and suggestions for other activities we recommend reading *Mapmaking with Children* by David Sobel.
- Write a final reflection or create a drawing in the blank pages of the journal about your experiences at the wetland. For tips on nature journaling visit [http://www.sierraclub.org/education/nature\\_journal.asp](http://www.sierraclub.org/education/nature_journal.asp). Suggested reading: *Keeping a Nature Journal: Discover a Whole New Way of Seeing the World Around You* by Clare Walker Leslie and Charles E. Roth