Aquatic Ecosystems

Field Study

Medina County Park District

In this field study, we will explore life in aquatic ecosystems of Medina County. Aquatic ecosystems are best explored from mid-spring through mid-fall when the greatest numbers of aquatic organisms are both alive and active.

An ecosystem is comprised of the organisms living and interacting within an environment. Aquatic ecosystems are those taking place in water. These can include lakes, rivers, ponds, wetlands, streams, vernal pools, and more. Everyone lives within a watershed -- an area where water drains from surrounding land to the same place. The purpose of this study is to explore the aquatic ecosystems within a watershed to learn more about the aquatic life found within them.

Aquatic Ecosystem Activities

Follow along for activities you can do in your own home or backyard to learn about aquatic ecosystems.

Macroinvertebrate Stretch Break

Macroinvertebrates are organisms large enough to be seen with an unaided eye that lack backbones. The following are examples of different behaviors that can be observed in aquatic macroinvertebrates as they search for food. Take a stretch break to try these behaviors.

Macroinvertebrate	Macroinvertebrate Behaviors	Try These Behavior Stretches!
Mayfly Nymph	Some species are: Scrapers – Scrape algae off of rocks and sticks	Lock arms straight, move up and down like a zombie trying to scratch an itch
Caddisfly Larva	Some species are: Scrapers – Scrape algae off of rocks and sticks	Lock arms straight, move up and down like a zombie trying to scratch an itch
Stonefly Nymph	Some species are: Shredders – Wait for plant debris to fall into the water, like leaves, then tear it apart	Use your imagination or an actual piece of paper and move hands as if to pick or tear something apart
Dragonfly Nymph	All species are: Predators – Have long mouth parts that can be thrust forward from their faces to catch prey	Hold hands, palms together, in front of mouth, then send hands forward and open as if to catch or hug something
Black Fly Larva	Most species are: Collectors – Have an appendage resembling a net on their heads used to catch plant debris and algae	Raise hands over head and scoop them down toward mouth in a forward “C”-shaped motion
Cranefly Larva	Some species are: Collectors – The body wiggles like a worm in search of plants	Think like a wiggling worm and walk or dance across the room

Scrapers eat: _____ Predators eat: _____

Shredders eat: _____ Collectors eat: _____

Based upon their behaviors, fill in the chart below to classify the macroinvertebrates by eating habits.	
Carnivore	
Omnivore	
Herbivore	

ANSWER: Carnivore: Dragonflies; Herbivore: Mayflies, Caddisflies, Stoneflies, Craneflies; Omnivores: Blackflies

To learn more about these and other macroinvertebrates, explore the picture keys available through The Stroud Water Research Center and The Atlas of Common Freshwater Macroinvertebrates of Eastern North America at the following websites.

Stroud Water Research Center: https://stroudcenter.org/macros/key/

The Atlas of Common Freshwater Macroinvertebrates of Eastern North America: https://www.macroinvertebrates.org/

Aquatic Food Chains

Even the smallest aquatic organisms can be predators, which can make the study of aquatic food chains very interesting. For example:

Algae → Mayfly Nymph → Dragonfly Nymph

All of these organisms are quite small. This means that the possibility for an extensive food chain exists as larger organisms consume these smaller organisms.

A more extensive food chain might include:

Algae → Mayfly → Dragonfly → Green Frog → Large Mouth Bass → Mink → Great Horned Owl

Have you observed any of these organisms in your backyard or at a local park? Watch how these and other animals living near water behave. It may lead you to discover what they eat and who eats them.
Describe observations here: _____

_____

_____

_____

Aquatic Lifecycles

To learn more about aquatic lifecycles, please refer to the "Lifecycles Field Study." This field study explores the lifecycle of a frog, which is a common member of aquatic ecosystems and an important member of its food chains. Frogs are also important bioindicators or living indicators of the health of their habitat. Their permeable skin allows for the movement and absorption of air and water but can also allow for toxins and chemicals to move into their bodies. A lack of frogs, or a population of sick frogs, can indicate the poor health of an environment. Learning and understanding the lifecycle of these important amphibians can lead to a deeper understanding of life in aquatic ecosystems.

Wetland Functions

Wetlands are places that are full of both plants and water. The soil holds water year round and can be quite smelly. The plants growing in these places have to be adapted to having their roots under water since they will be covered for most of the year. One plant you might find is a cattail, which looks like a corndog on a long blade of grass. While you may not be able to see a wetland in your own backyard, a kitchen sink and a few basic supplies can help to explore the function of wetlands in an ecosystem.

In addition to these important functions, wetlands also help to slow the flow of flood water during rain events (which reduces flooding), reduce erosion, serve as important habitat and nursery habitat for young animals, and recycle nutrients.

If necessary, use an additional piece of paper to record observations.

Function	Experiment	Observation
Absorb	Wetlands act as sponges, absorbing excess water in an ecosystem. 1. Take a sponge, place it into a bowl, and pour one teaspoon of water over the sponge. 2. Using a measuring cup, see how much water remains in the bowl when the sponge is removed. 3. Repeat Steps 1 and 2 with one tablespoon of water. 4. Repeat Steps 1 and 2 with ¼ cup of water. 5. Repeat Steps 1 and 2 with ½ cup of water. 6. Repeat Steps 1 and 2 with 1 cup of water.	*Did the sponge (wetland) absorb water? How much water was it able to absorb? How might this help the rest of the watershed?*
Filter	Wetlands serve as filters to remove excess particles, nutrients, and even toxins from water as it travels through a watershed. 1. Find two equal size, clear cups; one coffee filter; dirt and or sand; water; and a third cup suitable for creating dirty water. 2. Secure a coffee filter in the opening of one of the two clear cups (this will be the wetland). 3. Mix dirt and/or sand with water in the third cup. 4. Pour half of the dirty or sandy water into the cup with no filter. 5. Pour the other half through the filter in the second cup. 6. Wait until all water has passed through the filter of the second cup and compare.	*How did the two cups compare? Did the filter impact the clarity of the water? How might this impact an entire watershed?*
Recreation	Wetlands are important habitats for animals. This makes them important places for humans to recreate. Wetlands are great places for birding, photography, fishing, canoeing, and kayaking. 1. Using everyday supplies from around the home including foil, wax paper, cardboard, tape, straws, etc., construct a boat. 2. Fill a bowl or sink with three or four inches of water. *Wetlands are areas of shallow water, often so shallow that sunlight reaches the bottom of the entire wetland allowing for plants to grow throughout.* 3. Test the boat by seeing if it will float in the bowl or sink that represents a wetland.	*Did the boat float across the shallow wetland? What materials worked best to create a floating boat suitable to explore a wetland?*