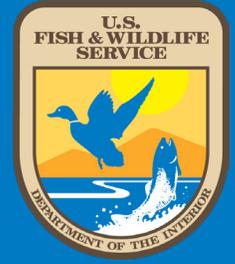


Pond Science Activity Packet

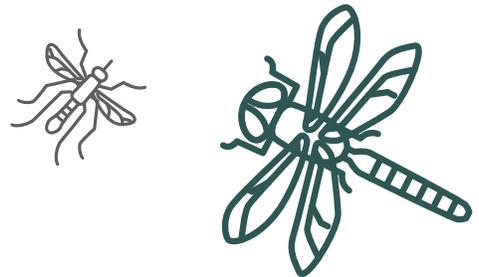


Minnesota Valley National Wildlife Refuge

Grade Level: 4-6

Activities in this packet:

- Scoop it Up! Activity, [page 2](#)
- Health of the Wetland Activity, [page 3](#)
- Pond Life Nature Journal, [page 6](#)
- Pond Life Scavenger Hunt, [page 7](#)
- Pond Life Word Search, [page 8](#)
- [Key to Pond Life](#)
- Video Links
 - Virtual Field Trip: Pond Science <https://youtu.be/ulzfAQUhyis>
 - Macro 'robics (Macroinvertebrate Aerobics) <https://youtu.be/WfJ3gxj7hi0>



Resources and Other Activities

- [Bugs Don't Bug Me Coloring Book](#)
- Macroinvertebrate quiz <https://sites.allegHENY.edu/creekconnections/classroom-resources/macroinvertebrate-identification-game/>
- Learn more about dissolved oxygen <https://youtu.be/oVW5LAzd7Ec>
- Take it a step further, keep our waters clean by adopting a drain <https://www.adopt-a-drain.org/>
- Being a responsible pet owner (Scoop the Poop song) <https://www.youtube.com/watch?v=uYO1OlwBHhA>
- Picking up trash (How to Use Litterati) <http://www2.oaklandnet.com/oakca1/groups/pwa/documents/report/oak066246.pdf>
- Critter Catch Game (Match Game) <http://www.troutintheclassroom.org/teachers/library/catch-critter-game>

Pond Science

Scoop it Up!



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Gather these materials:

- 2 buckets or old large yogurt containers
- Smaller containers like an ice cube tray, small yogurt container, microwavable dinner tray (look through your recycle bin, just make sure it's clean!)
- Spoons for scooping
- Download and print: [Key to Pond Life](#)

Vocabulary to know:

Macro-invertebrate: organisms that don't have a backbone and are large enough to see without a microscope

Looking closer:

1. Watch the Virtual Pond Science Field Trip <https://youtu.be/ulzfAQUhyis>
2. Scoop some water from the pond into your bucket.
3. Next, using either a net or another container scoop some water from near the bottom of the pond or by some plants in the water.
4. Pour the contents into the larger bucket.
5. Look closely! Do you see anything moving?
6. Scoop some water and pond life into the smaller containers.
7. Observe the creatures you found.
 - How do they move?
 - Can you tell how they breathe?
 - Do they have wings?
 - Do they have tails?
8. Draw your creatures in your nature journal, [see page 6](#).
9. Identify which creatures you've found using the Key to Pond Life. Write them in your nature journal.
10. Return all pond life back to the location where you found them. They can't live on land or in your bathtub.

Pond Science

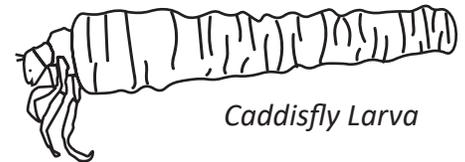
Health of the Wetland



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Gather these materials:

- Download and print: Pollution index of Marsh
- Water Quality Index- Pond Data Sheet, [page 5](#)
- Nature Journal, [page 6](#)



Caddisfly Larva

Vocabulary to know:

Tolerant- organisms that can survive in poor water quality. Often have adaptations that allow them to survive in such conditions. Also described as pollution-tolerant

Intolerant- Organisms that require good water quality to survive. Often described in terms of mid tolerance and low tolerance or pollution-sensitive

Things you should know:

- Gill breathers absorb oxygen that is dissolved in the water. This group of animals is generally **intolerant of water pollution**. These low-tolerance invertebrates include mayflies, stoneflies, caddisflies and gill-breathing snails.
 - Although they are gill breathers, dragonfly and damselfly larvae are slightly more tolerant of pollution present in their environment.
- Air breathing invertebrates have two breathing methods:
 1. An air tube, functioning like a snorkel, extends from their bodies and stick out above the water. Invertebrates with air tubes include mosquitoes, blackfly larvae, and water scorpions.
 2. Other air breathers carry an air bubble on their body. These invertebrates come to the surface, grab a bubble of air, and then dive back underwater. Once the air bubble is used up, they return to the surface to grab another bubble of air. Water boatman and diving beetles are air bubble breathers. Since air breathers do not depend on water for their oxygen, they are generally **tolerant of many types of water pollution**.

Health of a Wetland, continued on page 4

Health of a Wetland, continued from page 3

- Other organisms that live in and near wetlands breath by absorbing oxygen through their skin.
 - Animals that absorb oxygen through their skin include aquatic worms, leeches, some snails, and most amphibians (frogs, toads, and salamanders).
 - Amphibians start their lives in the water as gill breathers. They are more susceptible to pollution as both larvae and adults or have a low tolerance.

Determining the Health of your Wetland:

1. After identifying the creatures you found using the Key to Pond Life, use the [Water Quality Index- Pond Data Sheet](#) on the next page to calculate how healthy the water is in the pond that you sampled. Watch the **Virtual Pond Science Field Trip** <https://youtu.be/ulzfAQUhyis> starting at 9 minutes 47 seconds to see how the data sheet is used.
2. To use the Water Quality Index- Pond Data Sheet, place an X next to the invertebrates that you have collected.
3. Add up the number of macro-invertebrates found in each group. Multiply the number by the group's weighting factor. This gives you the GROUP SCORE.
4. Add up all the group scores for the TOTAL GROUP SCORE.
5. Add up the # in each group for the TOTAL NUMBER of GROUPS.
6. Divide the total group score (from step 4) by the total number of groups (from step 2). This will give you the WATER QUALITY INDEX for the pond.
7. Using the table circle the pond's water quality index.
 - Does your sampling pond have excellent, good, fair or poor water quality? Write the answer in your nature journal.

Protect our ponds and lakes

Poisons and fertilizers may be invisible to the human eye when suspended in the water. By observing the life in the pond, biologists can look for signs of contamination. For example, fertilizers will increase the amount of plant life found in the water. Some types of algae “blooms” are signs of fertilizer runoff. Poisons can sicken or even kill fish, and the animals that feed on fish.

A common and inexpensive field sampling method biologists use to determine water quality is to sample species of plants and animals present. Biologists can determine if a water system is “healthy” or “unhealthy” based on what they find living in the water.

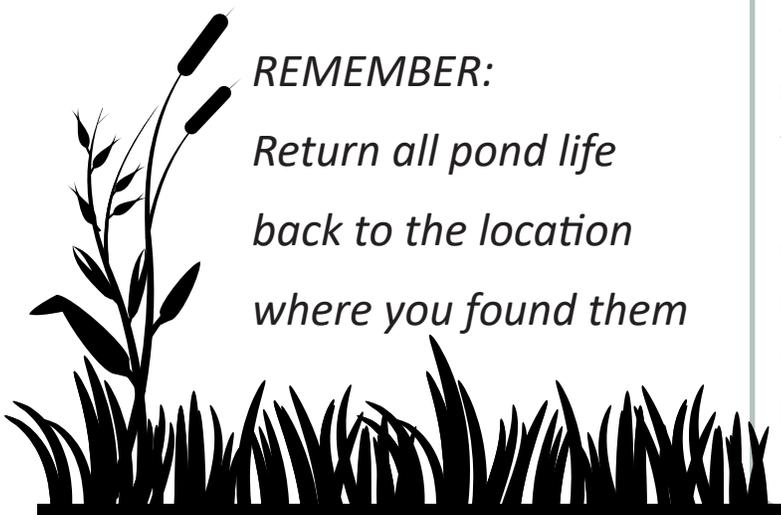
Water Quality Index- Pond Data Sheet

	Group 1 Intolerant to pollution	Group 2 Moderately tolerant to pollution	Group 3 Fairly tolerant to pollution	Group 4 Very tolerant to pollution
Macroinvertebrates (record the total number of each species you found)	Alderfly _____	Caddisfly _____	Black Fly _____	Aquatic Worm _____
	Dobsonfly _____	Clam/Mussel _____	Midge _____	Blood Worm _____
	Stonefly _____	Cranefly _____	Gilled Snail _____	Leech _____
	Snipe Fly _____	Crayfish _____	Scud _____	Pouch Snail _____
		Damselfly _____	Water Scorpion _____	Mosquito Larva _____
		Dragonfly _____	Crayfish _____	Water boatman _____
		Mayfly _____	Fingernail Clam _____	Backswimmer _____
		Riffle Beetle _____	Water Strider _____	
	Whirligig Beetle _____	Water Mite _____		
# in each Group (in each group)	(f)	(g)	(h)	(i)
Weighting Factor	x 1	x 2	x 3	x 4
Group Score (Species x weighting factor)	= _____(a)	= _____(b)	= _____(c)	= _____(d)

Total Group Score	(a) + (b) + (c) + (d)	(e)
Total Number of Groups	(f) + (g) + (h) + (i)	(j)
WATER QUALITY INDEX (e) / (j)		

Water Quality Index (circle one)

Excellent	1.0 – 2.0
Good	2.1 – 2.5
Fair	2.6 – 3.5
Poor	Greater than 3.5



REMEMBER:

*Return all pond life
back to the location
where you found them*

Cool Fact

“Clean” and “healthy” have different meanings. Pond water may not be fit for humans to drink; however, many of the small organisms and plant material seen floating in the water may be food for a multitude of other creatures living in the water. Most pond life would die if left too long in sterile drinking water.

Pond Science

Pond Life Nature Journal



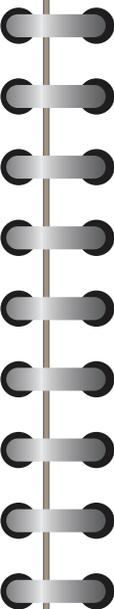
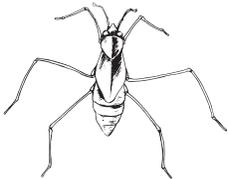
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Gather these materials:

- Nature Journal or blank paper
- A wetland area out your window, in your yard, on the street, at a local park
- Pencil/crayons/colored pencils/markers
- Scoop it Up! activity from [page 2](#)

Pond Life Journal:

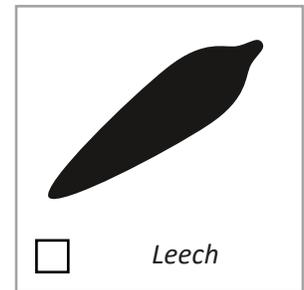
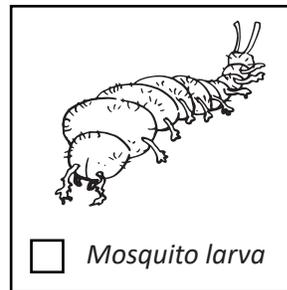
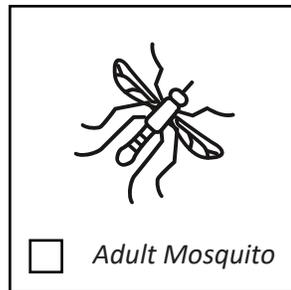
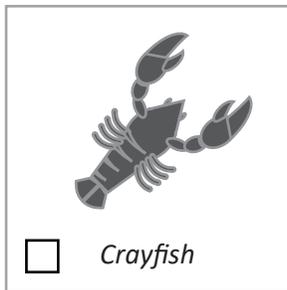
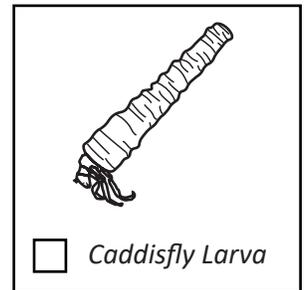
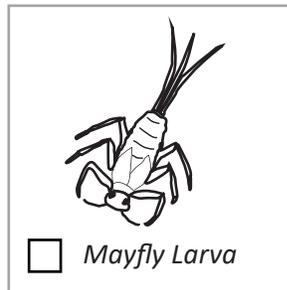
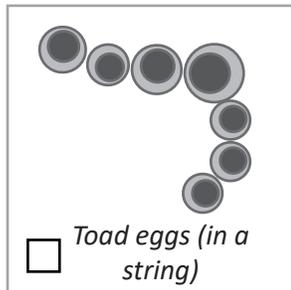
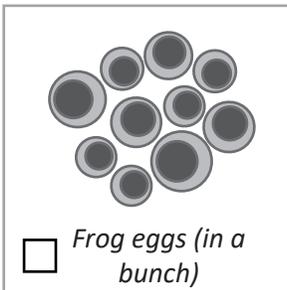
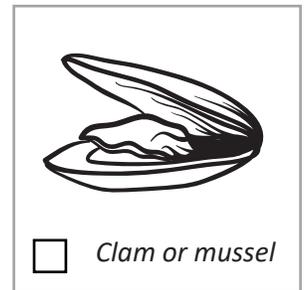
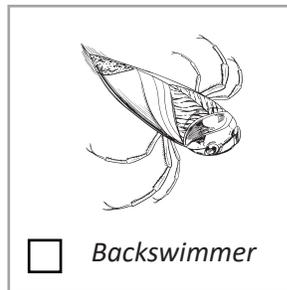
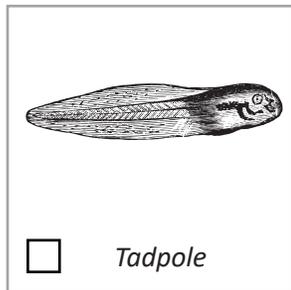
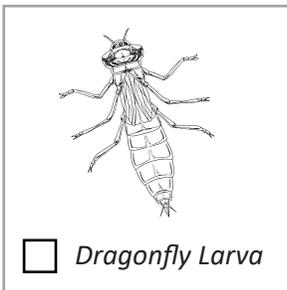
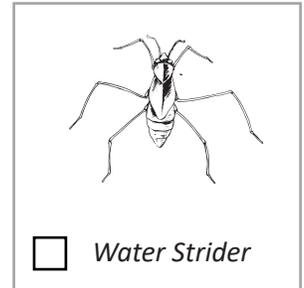
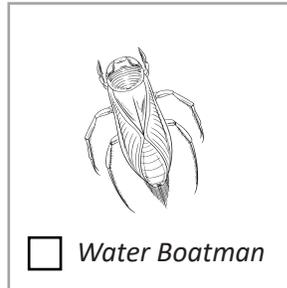
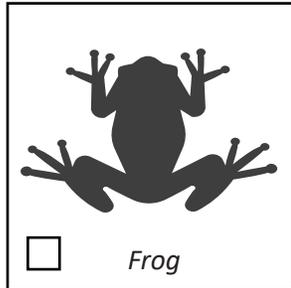
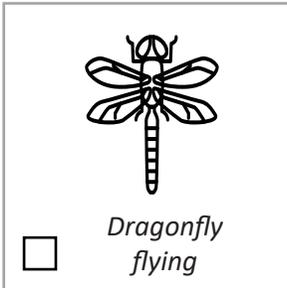
1. After scooping water from the pond, record what you see in your nature journal.
2. Do this several times from spring to fall, recording your observations each time. After a few visits to the pond, compare how things have changed. Write your answers on a blank page in your nature journal.
 - Do you notice new insects or that some are no longer present? Why do you think this is? Are there new plants present in the pond?
 - Have you caught any large organisms like fish or frogs?
 - How have some of the organisms changed? Have tadpoles become frogs? Have dragonfly larva turned into the adults?

<p><i>May 20, 2020</i></p> <p><i>Location: City park pond</i> <i>Temperature: 65° degrees F</i> <i>Weather: Partly cloudy</i></p> <p><i>I scooped water from the pond and put it in a bucket. I put some pond weeds in the bucket too. When I first looked in the bucket I didn't see anything. After five minutes things started to move and swim around!</i></p> <p><i>I wonder what I will see next time!</i></p>		 <p><i>Water Boatman</i></p>  <p><i>Water Strider</i> <i>This one was walking on the water!</i></p>  <p><i>Dragonfly Nymph</i></p>
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Pond Life Scavenger Hunt

Date: _____

Check the box when you find an item below



Images provided by Vecteezy.com

Pond Life Word Search

Scan the letters below to find fishing related words.

R Y F I J N A E C L H A Y O Y G R S E M
 E D R A G O N F L Y A J Y L O A G T T I
 M J I N T O L E R A N T F R V P Q R E A
 V W A A O T Q P M Q B Y F J J J A I Q J
 M S Z P Q W V Z D C A I X J B M H D B H
 A D Z R K H E E T M Z Z F J C E P E R Y
 D H R D F J E B P G I L L S D M O R M A
 W A T E R W M D A M S E L F L Y L B M U
 O C J Y K S E N R G E I O R G V L B N K
 S A Y C O U N T U R T L E I D B U M J B
 Q D U F I S H A O V J X G O M B T A J T
 C D T N K B Z A I P H Y O Z Z N I F R E
 Q I T L F Q H S C L L F Y S B Y O P Q I
 P S P M E T A M O R P H O S I S N U A L
 F F E X Y E X N I S I T O L E R A N T Q
 Y L E C K C C H Q L T L I F E A S N E K
 M Y X Y Q B W H J Y Y N Y M P H W J S L
 M N K C D P O I V U V K M N T S A E S U
 J K S L V R L U O A R U C Z N A K Y Z A
 B V S E Y S H P L A R V A E E M E U N V

Caddisfly
 Damselfly
 Larvae
 Gills
 Frog
 Food Web

Exoskeleton
 Duckweed
 Dragonfly
 Mayfly
 Pollution
 Water Strider

Turtle
 Shallow
 Whirlygig
 Metamorphosis
 Life Cycle
 Nymph

Intolerant
 Tolerant
 Leech
 Fish
 Pupa
 Snail

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