

ACKNOWLEDGEMENTS

This workbook was created by Watersheds Canada and Kingston Frontenac Public Library with the common goal to educate students and families about the benefits of healthy waterways, lakes, and the surrounding environment for our collective future. This book is linked to the Ontario curriculum for grades K-8. Photography in this book is provided by Watersheds Canada unless otherwise labelled. Cover photo: Getty Images.

Watersheds Canada is a federally incorporated charity (863555223RR0001) committed to providing education and stewardship programs to communities and individuals across the country to enhance and protect the health of their lakes, rivers, and shorelines.

The Kingston Frontenac Public Library (KFPL) serves both the City of Kingston and Frontenac County. KFPL builds and supports community by creating inclusive spaces, services, and collections that advance literacies and invite people to innovate, learn, explore, and connect. KFPL strives to be an organization where communities come together, sparking curiosity and creating possibility for all.

The Kingston Frontenac Public Library acknowledges that our work takes place on the traditional territories of the Algonquin, Anishinaabe, Haudenosaunee, and Huron-Wendat and is home to Shabot Obaadjiwan First Nation, one of ten communities that make up the Algonquins of Ontario. We acknowledge the Mohawks of the Bay of Quinte and recognize that our region is home to First Nations, Métis, and Inuit from across Turtle Island, as well as Indigenous Peoples from other areas of the world. Members of these Indigenous nations and communities share their knowledge, gifts, and stories with our Library community. Our role as a library is strengthened by their contributions, and the relationships we have with local Indigenous Peoples, organizations, and governments. We recognize that these relationships are built on shared values: preserving and passing forward knowledge, exploring literacy in all its forms, environmental stewardship, and creating inclusive communities. The Library must continue to demonstrate these values in how we engage, work, and share together.

This Nature Discovery program is made possible because of support from:













TD Friends of the Environment Foundation



GETTING READY TO EXPLORE NATURE



We are so excited for you to explore your local ponds, lakes, and wetlands. You will learn about different local species and how to protect the health of our local natural spaces and beyond!

You can keep this workbook! This workbook will give you tips to safely explore nature, and information about different animals and plants that are found in Katarokwi / Kingston. You will learn about freshwater and how you can help protect nature, with fun activities along the way!

Please return all field materials in the backpack to the Kingston Frontenac Public Library.

If you are interested in learning more about Watersheds Canada, please visit <u>watersheds.ca</u> or scan this QR code!



STAYING SAFE



Here are some things to keep in mind when exploring outside:

- Bring a hat, snacks, reusable bottle with water, sunscreen, and bug spray.
- Tell someone where you are going and when you will be back.
- Watch wildlife from a safe distance. Do not handle wild things!
- Always swim with an adult nearby who can watch you.
- Please leave nature for everyone to enjoy. Do not pick any plants or bring any wildlife or insects home with you.
- Make sure to bring back your garbage so that you can properly get rid of it at home. With the help of an adult, you can also pick up any garbage you find in nature and bring it home for disposal!
- There are ticks in the area. Wear long sleeves and long pants if walking in a wooded area. Learn more about tick safety: https://www.ontarioparks.com/parksblog/how-to-protect-yourself-from-ticks/

WHAT IS IN MY BACKPACK?

Observation Tools

- Use the jars, magnifier, and pocket microscope to closely look at aquatic invertebrates (fun fact: they have no backbone!) and insects.
- Use the 6 pond rollers to make patterns and stories in the mud and dirt.
- To find invertebrates, try dragging the net along the surface of the water or just below the surface (not through the mud bottom).







Meet watery friends!

Grab your net, magnifier, jar, pocket microscope, and guides and see who lives underwater in a nearby pond, wetland, or lake!



Note for Adults: Any animals or plants taken from a pond and put into a jar or bucket need to stay in water to stay alive. A fish or aquatic snail, for example, should have water to swim in, just like it has in its pond homes. Animals and plants from the wild cannot be taken home as pets and should always go back to their homes in the wild when you are done looking at them.

Be gentle whenever handling pond critters. Do not handle pond critters if you have lotions, sunscreen, or bug spray on your hands as this can pass through the sensitive skin of the critter and hurt it. Be safe when near water and always keep children within arm's reach.

Identification Guides

Use the identification guides to learn more about different types of local biodiversity like aquatic macroinvertebrates, fish, turtles, frogs, and snakes. Each guide shows photos and information about each species like their size.



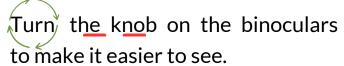




Binoculars



Use this to help you see things that are far away from you!







What do the numbers of binoculars mean? As an example, if binoculars say they are 8x21, they will help you see things 8 times closer and each lens is 22 millimetres wide.

Water quality testkit

Look inside this blue bag to find:



- A thermometer to measure how hot or cold the water and the air is
- Small white test strips to measure pH (how acidic or basic the water is)



An information book



LET'S GET STARTED!

This activity book has many ways for you to connect with local nature and meet different animals. Let's go through an example activity together!





Your goal is to find different critters and learn their names using your identification guides!

Some tips for a safe pond or lake study:



- Fill up big containers with water before starting.
- Don't wear sunscreen or bug spray on your hands if you want to touch animals.
- Use your net to catch pond critters. Gently and quickly put them in your containers.
- When you are done looking, gently empty your container just above the water.
- Refill your containers with new water for your next discoveries!





What did you find?

Some things to think about:

- Did you find many critters? Did you find different life stages of the same thing (e.g., dragonfly nymph and adult, tadpole and frog)?
- Is your freshwater body biodiverse (many different types of species)? Do you think that means it is healthy or not healthy?

Draw what you heard (© and saw ••• at the pond!

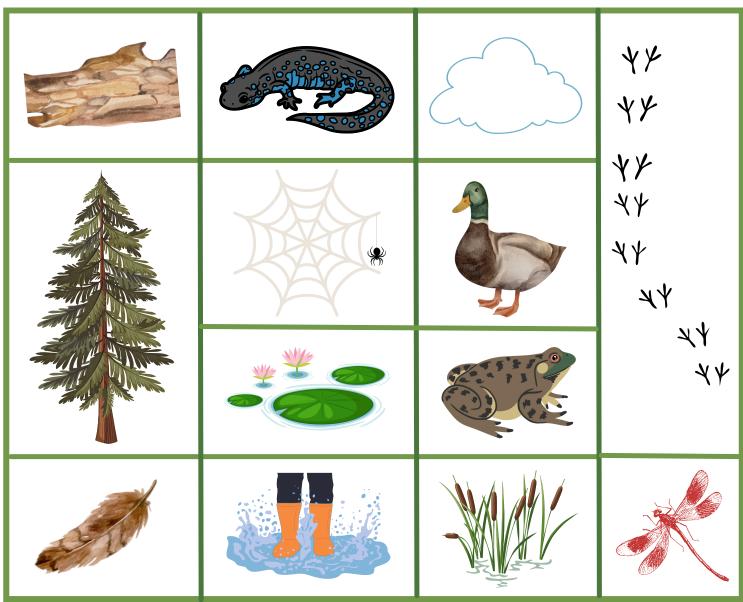






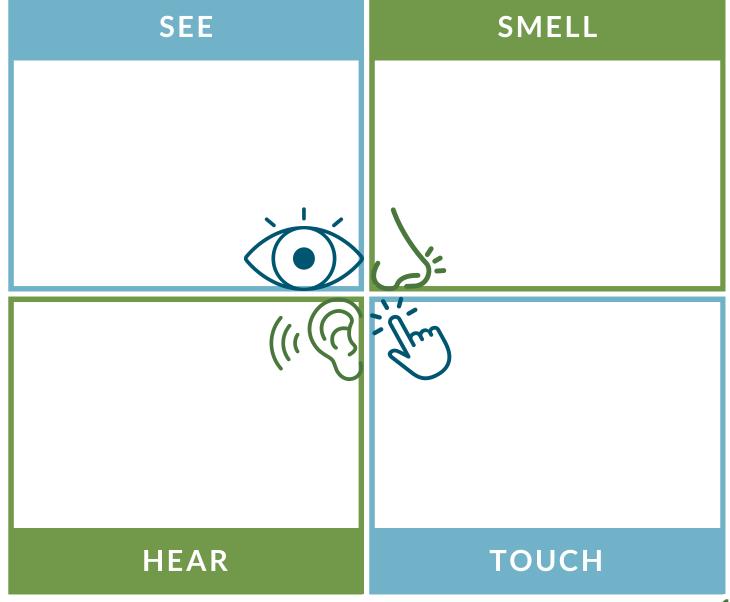
ACTIVITY #1: SCAVENGER HUNT





ACTIVITY #2: SENSES CONNECTION

Find a spot in nature. What do you see? What other senses can you use while in nature? Use your senses and write or draw what you see, hear, smell, and touch.



ACTIVITY #3: WORD SEARCH

Find the hidden words \rightarrow / \downarrow







ACTIVITY #4: WHICH FISH ARE YOU?

Click your preferred choice and count up your results!

Spots





Stripes

Small



or



Large

Being alone



or



Being in groups





Predator

Vegetated waters



or



Open waters

Picky eater





Adventurous eater

Springtime



or



All seasons

How many light blue?

If you chose more light blue, you are a Northern Pike!



How many dark blue?

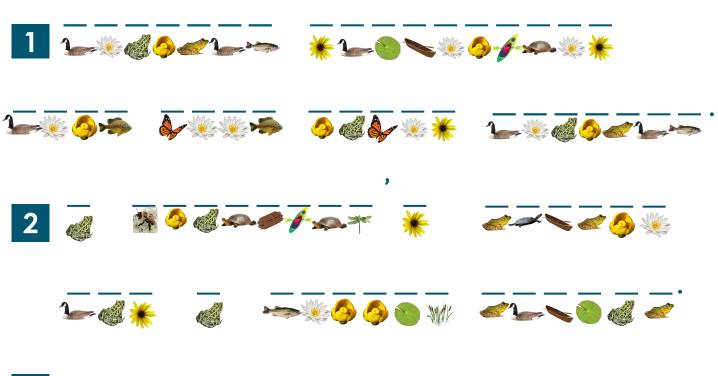
If you chose more dark blue, you are a Yellow Perch!



ACTIVITY #5: CODEBREAKER!

Each letter of the alphabet has a corresponding symbol. Match the symbol to the correct letter to break the code!

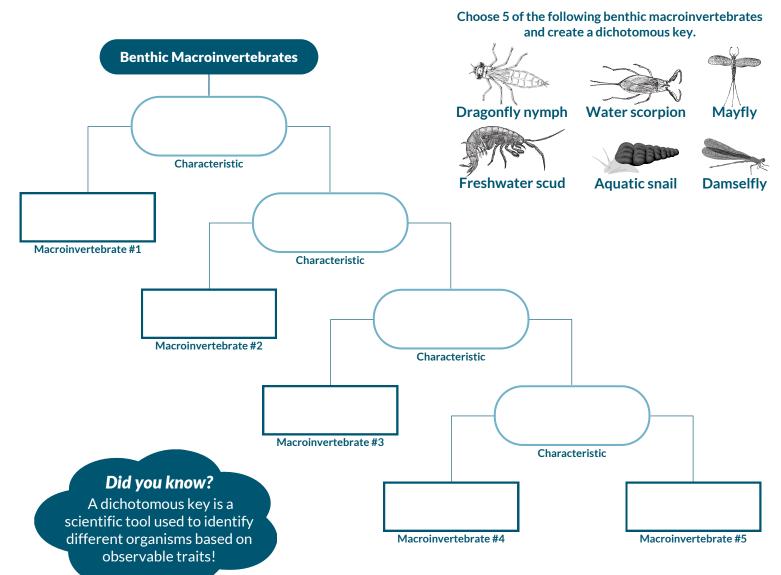






ACTIVITY #6: CREATE A DICHOTOMOUS KEY

A dichotomous key consists of a series of statements involving characteristics with two contrasting alternative choices (i.e., yes/no, wings/no wings) in each step to lead you to the correct species.



Get out the pond guide!



ACTIVITY #7: MY FRESHWATER DIARY

Did you know?

Most of your body is made up of water!

You should try to drink 6-8 cups of water a day! But for some, finding clean freshwater is not as easy as turning on a tap.



How much water do I use?



ACTIVITY

TIMES PER DAY

REASON



2	Shower/Bath	1	To clean myself	
	Flushing the toilet			
	Washing my hands			
	Drinking water/juice			
þ	Washing fruits & veggies			Y
				· [0
/ /				



What can I do to use less freshwater?

?? ACTIVITY #8: ??> WHO AM I?

Meet some new wetland friends! Look at the photos and clues and then write the name of the species living in Ontario.



This medium-sized fish has a green back and sides. Its upper jaw goes past its eye and it has a deep notch between its dorsal fins.



This large bird has a big yellow-orange bill and is found in small ponds, marshes, and bays.



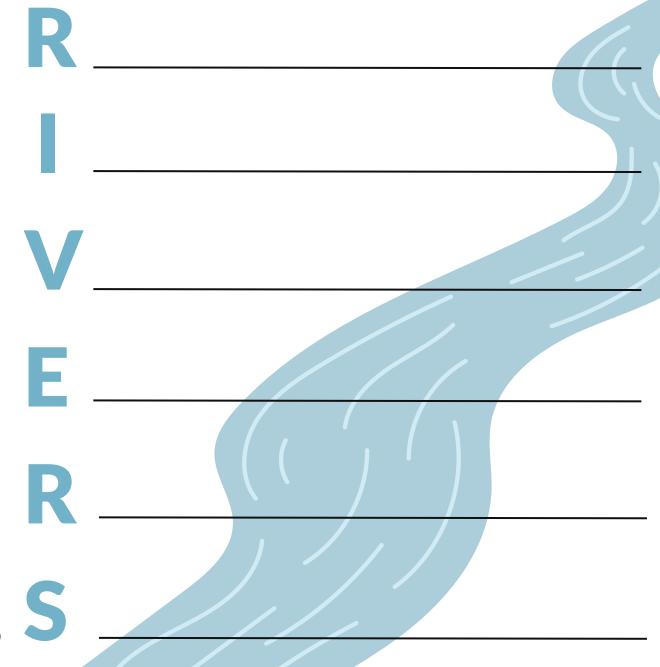
My favourite foods are bugs and spiders. I am often green in colour with dark round spots that have a light edge.



I like to live in ponds, marshes, and lakes that have lots of logs to stretch out on and aquatic vegetation to hide in.

ACTIVITY #9: POETRY

List 6 things that describe what you love about rivers using the first letter of each line. This will make an acrostic poem, where the first letter of each line spells out the word 'rivers' when read vertically. Lines do not have to rhyme.



ACTIVITY #10: TALK TO THE BIRDS



You may hear birdsong or bird calls around a lake or wetland, but have you ever tried to have a conversation with a bird? Try to whistle, sing, and mimic (copy) their noises and then use your binoculars to see if anyone comes to see you!

Three different ways you can do this activity:

#1: Go outside and listen to the sounds you hear, but don't make any sounds back.



#2: Play bird calls in a free mobile app like Merlin



Merlin Bird ID

Play a sound and see who sings back to you!

#3: Go to the next page and learn some bird noises.



Make the sounds yourself and see what bird friends you can make!

Great Blue Heron

- Has blue-gray feathers, a long neck, and long legs
- 1 metre tall, wingspan of 2 metres
- Habitat: trees and bushes near the water's edge
- Sounds: greet their partner with "roh-roh-rohs", signal danger with "go-go-gos" and a "frawnk" squawk that can last up to 20 seconds. Baby chicks give a tik-tik-tik call.





Red-winged Blackbird

- Males have red shoulder patch bordered in yellow (pictured)
- Have a slender, cone-shaped beak
- Habitat: near watery areas like marshes
- Close to the size of an American Robin
- Song sounds like they're singing "conk-la-ree!"

Wood Duck

- Males (pictured) have a glossy green head with white stripes and a chestnut breast. Females are gray-brown with a white-speckled breast.
- Unlike most waterfowl, they perch and nest in trees
- Habitat: wooded swamps, marshes, streams, lakes
- Sounds: female makes loud "oo-eek, oo-eek"



Keep practicing your bird call identification skills with these Apps:





HEALTHY FRESHWATER HOMES FOR WILDLIFE







As the lungs of the lake, aquatic plants produce oxygen and filter out carbon dioxide.

Acting like a shield, shoreline vegetation prevents erosion and invading invasive species!

Forests are known to provide a breath of fresh air through oxygen production, and are important habitat.

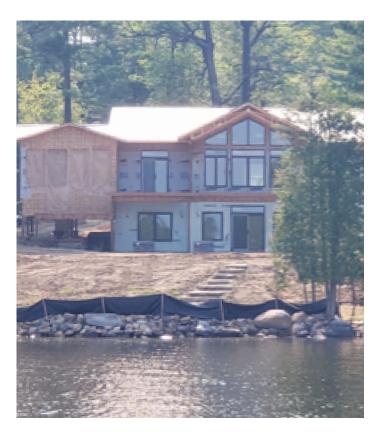


Did you know?

Even woody debris can play a role in supporting life in the environment!

Woody debris acts as an umbrella and safe house to provide shade and shelter for fish and animals alike!

HOW ARE PEOPLE IMPACTING NATURE?



As shorelines become more developed, humans are changing the way shorelines look and the species that can live there.

Some threats to wildlife and water health include: plastic pollution, introducing nonnative (invasive) species, road mortality, and habitat removal and fragmentation.

One way to help is to replant a shoreline with native plants along the edge. This buffer helps to filter and stop things like fertilizers and pesticides from entering the water. Plant roots also help keep soil together in heavy rainstorms which prevents erosion.



ACTIVITY #11: WATER QUALITY EXPERIMENT

The guideline for pH (potential hydrogen) is a range of 7.0 to 10.5 in finished drinking water. Generally, a range of 6.5 to 8.2 is preferred for most life in the water. Different things can affect the pH of the water like an algal bloom or increased pollution (e.g., road salt, car wash soap, fertilizer runoff).

Some aquatic animals are very sensitive to changes in pH, and are often used as living indicators ("bioindicators") of an ecosystem's health. One example is dragonflies because they have a biphasic lifecycle, meaning they spend part of their life in the water as aquatic nymphs and part of their life in the terrestrial environment as adults.







Band-winged Meadowhawk (Sympetrum semicinctum).

¹Health Canada (2015). Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – pH. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. (Catalogue No H144-28/2016E-PDF).

Getting started

Open your Water Rangers test kit. Take out a water test strip. Look at the pH chart. Before you begin testing, guess the pH levels of your water sample (make a hypothesis - an explanation of what you think will happen). Do you think the sample will be preferred by life in the water?



Where and why do you think you will find different conditions for air temperature, water temperature, and pH?

Record your findings each time on the Water Rangers data sheet in the test kit, or below on this page. What did you find?

ACTIVITY #12: SALAMANDER HUNT

binoculars!

magnifier and

You may not see them but that does not mean they are not there!

Here are some tips for finding salamanders using your magnifier:

Notes

 Salamanders are delicate so it is best not to touch them. Instead take photos and enjoy them from afar.

Conditions

- Amphibians tend to wait for rain to move longer distances.
- Sometimes thousands of frogs or salamanders move in mass migrations on warm, rainy nights.

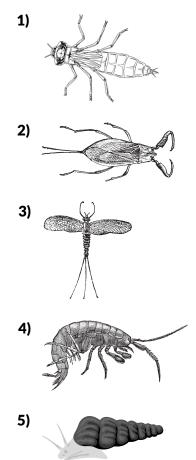
Habitat

- Salamanders prefer cold, damp places so look under rocks, stumps, logs, and leaves.
- Shorelines and wetlands (such as fens, bogs, swamps, meadows, and marshes) are home to a high diversity of reptiles and amphibians.
- Most frogs and salamanders congregate in wetlands during their breeding season (usually spring and early summer) and can be found easily during these times.
- Forests next to open fields, rock barrens, or meadows are a favourite of many reptiles.

ACTIVITY #13: MAKE THE MATCH



Benthic macroinvertebrates have no backbone (spine) and we can see them with our eyes. They live in or around a waterbody their whole life, so they are living indicators that show us how healthy a waterbody is. Draw a line from the species to their name!



A) Aquatic snail

Fun fact: they usually have a coiled shell but sometimes it can be a short, broad cone shape.

B) Freshwater scud

Fun fact: they have seven pairs of hard jointed legs and the first two pairs have small claws.

C) Dragonfly nymph

Fun fact: they have 3 pairs of hard jointed legs with 2 claws on each leg.

D) Mayfly

Fun fact: they are the only type of insect that has a winged immature stage.

E) Damselfly

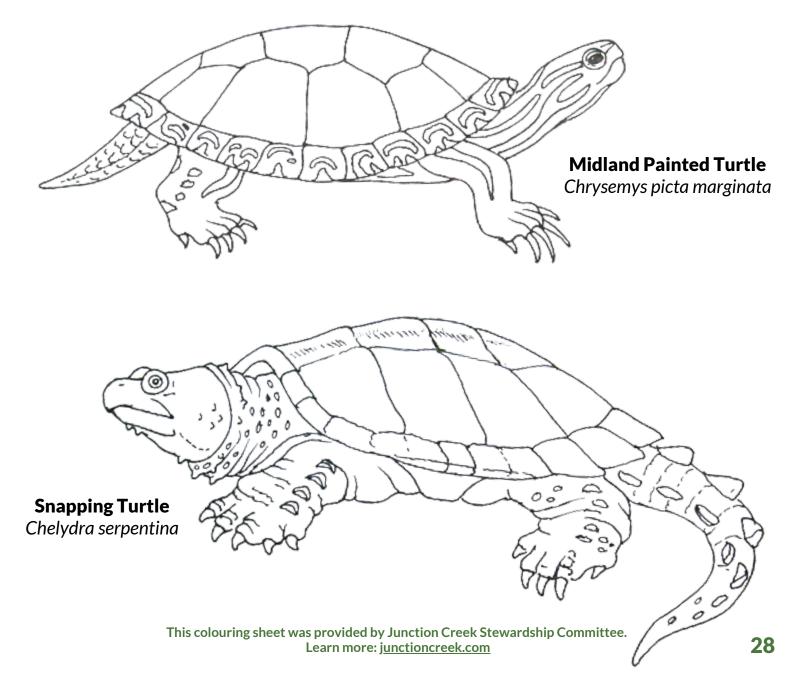
Fun fact: there are over 50 different damselfly species found in Ontario.

F) Water scorpion

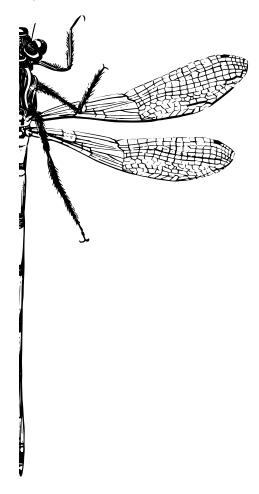
Fun fact: their "tail" is two half-tube structures that can be locked together and used like a snorkel.

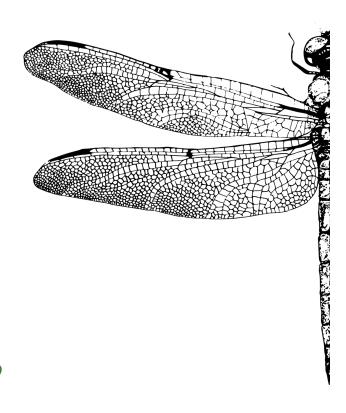
ACTIVITY #14: COLOURING TIME!

Ontario is home to 8 native turtle species. Turtles need healthy lakes and wetlands so they can find food, grow, and lay their eggs.

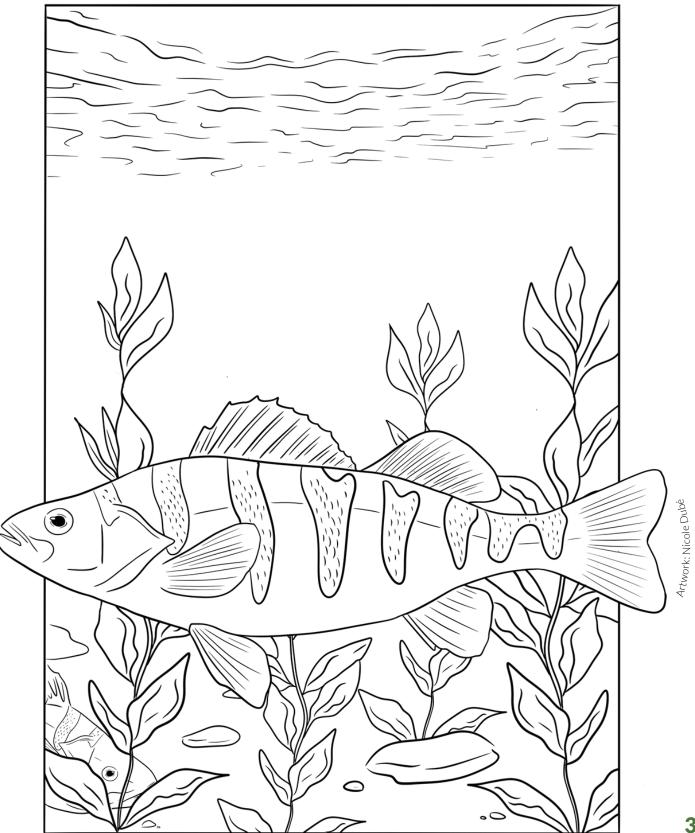


Draw the other half of this damselfly and dragonfly!



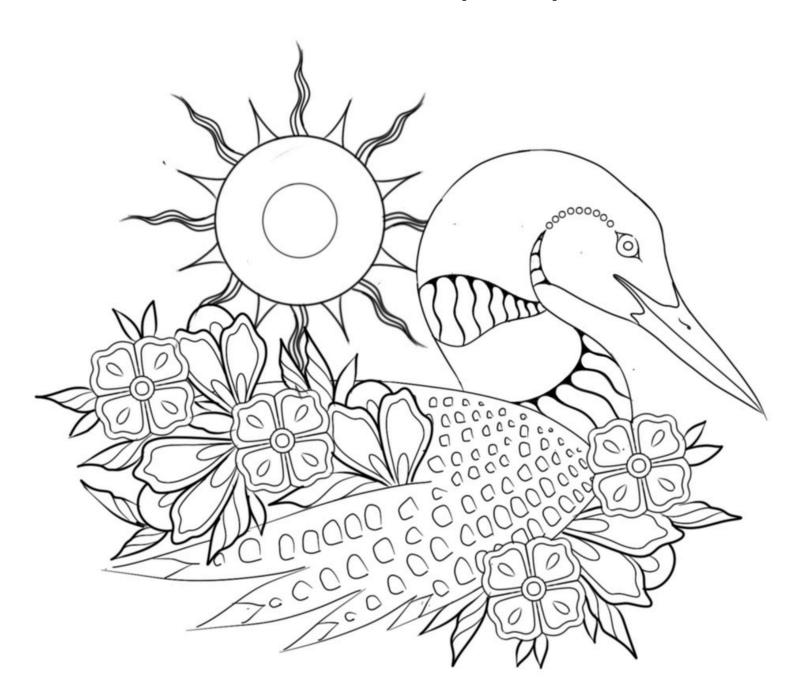


Yellow Perch



30

Meet mwâko! Mwâko is how you say 'loon' in Cree.



This colouring page was created by Ameena Buchanan!

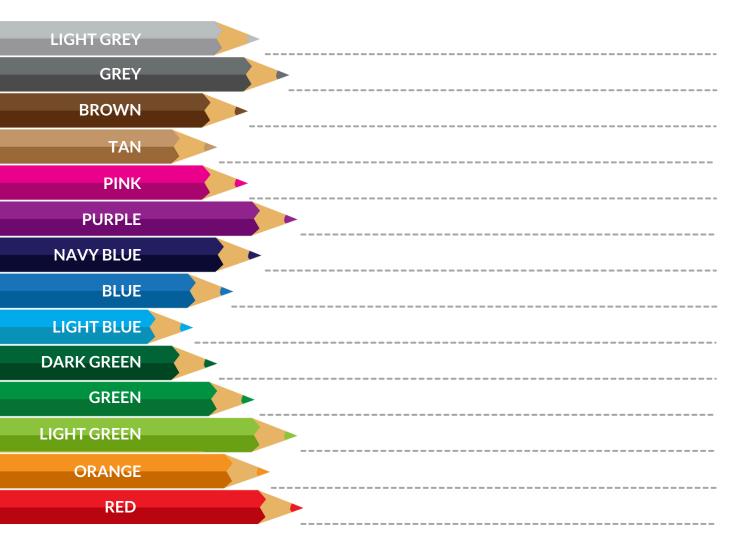
Born and raised in Katarokwi- Kingston Ontario, Ameena Buchanan is an Ojibwe artist whose family comes from Batchewana First Nation. Throughout her life Ameena has grown her creative pursuits through multiple mediums, such as silversmithing, painting, and digital media. Now she is currently tattooing at an indigenous owned studio in Tkaronto, with a focus on woodland florals, and illustrative indigenous designs.

ACTIVITY #15: I SPY

How many different colours can you spot outside? Write what you see next to the pencil crayon matching its colour.

Get out the magnifier and binoculars!

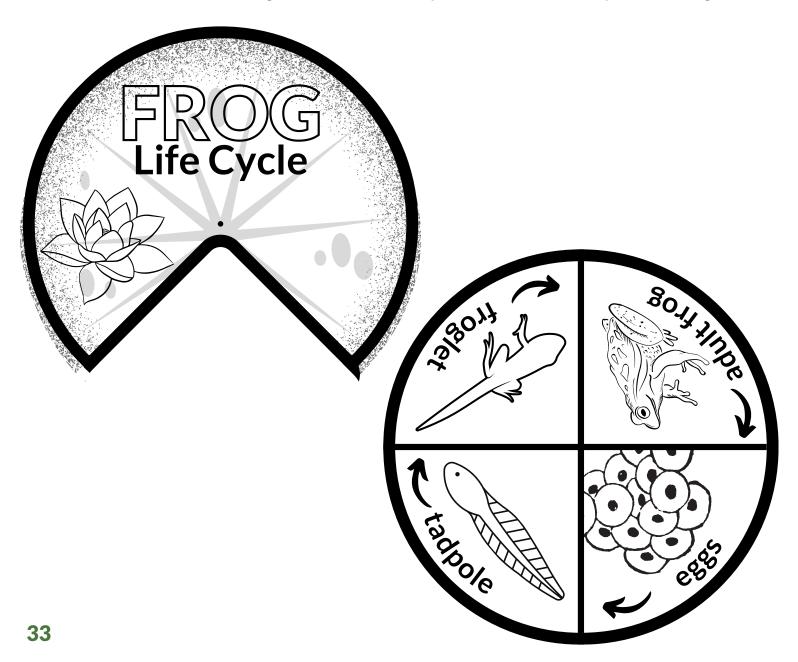
I spy with my little eye something that is...



CHALLENGE! What is the farthest away living thing you can see?

ACTIVITY #16: FROG LIFE CYCLES

Colour and cut out both pieces. Then attach the pieces together with a brad (metal fastener) through the center dot. Spin and see the life cycle of a frog!



ACTIVITY #17: DESIGN A NATURAL SHORELINE

Can you help Tisna and her family plant their shoreline? Draw different plants in the riparian zone that will help hold the soil together!



The place where the water meets the land is called the shoreline, or riparian zone. The shoreline area is the first 30 metres of land around a lake or river. This area helps almost all plants and animals grow during their life.

ACTIVITY #18: BECOME A COMMUNITY SCIENTIST

When you enter your animal or plant observations online, it can help scientists and nature groups keep track of different populations over time.

Here are some community science programs you can pick from:











delivered in partnership with QuébecOiseaux.













ACTIVITY #19: FRESHWATER HELPER

Cross out the 5 human actions that can harm freshwater fish and their watery home with a big \times !















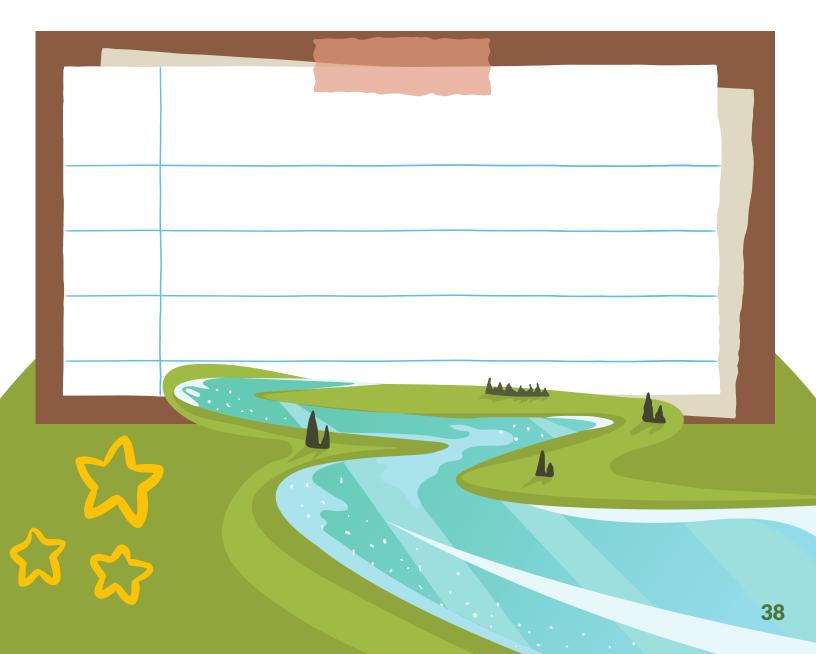






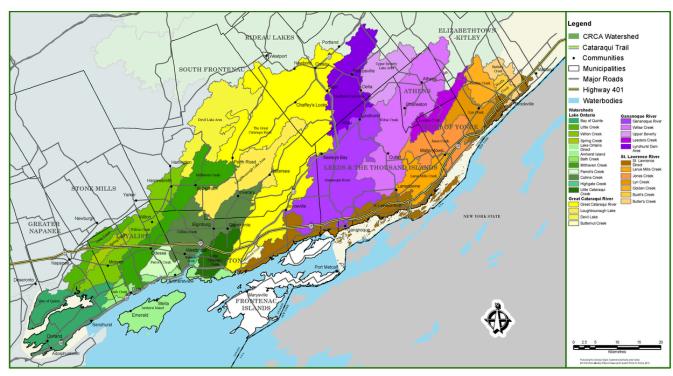
What can you do to help save the St. Lawrence River from pollution and storm water runoff?

Write down your action plan here!



WHAT IS A WATERSHED?

- A **watershed** is an area of land that water flows through or across on its way to a particular water body, like a stream, river, wetland, lake, or coastline.
- A watershed is the land where precipitation like rain falls and flows to a common, watery place!
- Kingston is located in the Cataraqui watershed. Many smaller watersheds all drain toward the eastern end of Lake Ontario and the beginning of the St. Lawrence River, which eventually flows into the Atlantic Ocean.



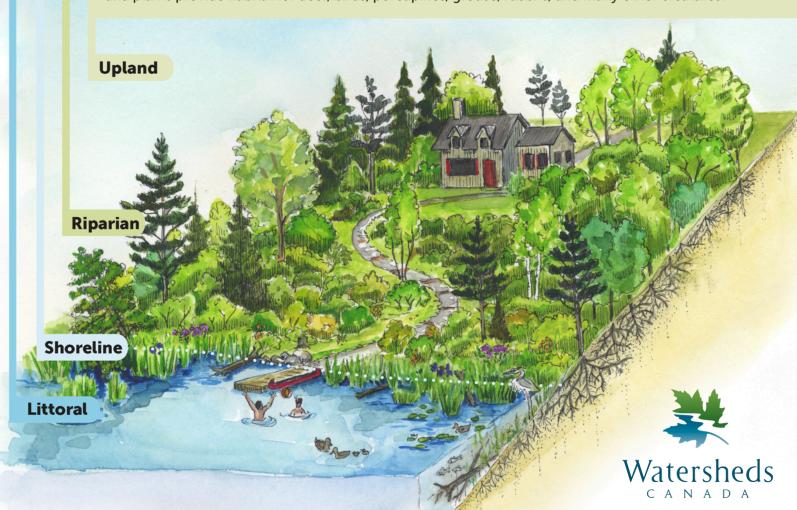
RESILIENT SHORELANDS

The **Littoral Zone** extends from the water's edge to where sunlight no longer penetrates to the bottom of the water. This is where docks are built and people swim. However, we share this area with an incredible array of biodiversity as up to 90% of lake species (e.g., pike, ducks, otters and turtles) are born, raised, fed, or live in the littoral zone.

The **Shoreline** is the edge where the land and water meet. The mix of plants, shrubs, and trees form an intricate web of roots, foliage, and fallen limbs that hold the waterfront together and fend off erosion from wind, rain, boat wakes and ice.

The **Riparian Zone**, also known as the Ribbon of Life, extends inland from the shoreline for at least 15 metres and may be flooded during high water periods. It is a natural buffer protecting the shoreline, water quality, and natural habitat both on land and in the water. It is made up of trees, shrubs and grasses that absorb excess nutrients (e.g., fertilizers) and pollutants (e.g., seepage from septic systems, oil, gas and pesticides) before they can contaminate the water.

The **Upland Zone** is a drier forested area with better drainage compared to the riparian zone. The deep roots of trees stabilize the slope, the foliage buffers the effects of wind, the canopy cools its surroundings, and plants provide habitat for deer, birds, porcupines, grouse, rabbits, and many other creatures.



WAYS TO HELP

	Gather data. Take photos and write observations of animals and plants you see and submit them to online databases like <u>iNaturalist</u> , <u>eBird</u> , or <u>MonarchWatch</u> .		
	Be natural. Consider adding native plants to provide wildlife habitat, water and food areas, migration rest points, and soil stabilization to your urban or shoreline property. You can create pocket meadows and forests, make part of your lawn a "no-mow" area, or consider other ways to make your property bird and pollinator friendly. Learn what native plants are suitable to plant on your property by using this free database: naturaledge.watersheds.ca/plant-database		
	Keep it clean. Prevent the spread of invasive species by staying on trails while hiking and by cleaning equipment after boating. Learn more: ontario.ca/page/invasive-species-fact-sheets		
	Get connected locally. Visit a local trail or park like the <u>Cataraqui Trail</u> or <u>Lake Ontario Park</u> , join the <u>Kingston Field Naturalists</u> or the Kingston Junior Naturalists, visit the <u>Great Lakes Museum</u> , or join <u>Sustainable Kingston</u> .		
Learn more abore Relations La	· · · · · · · · · · · · · · · · · · ·		
	Follow the Kingston Frontenac Public Library online! Get program and even updates on the Library website (calendar.kfpl.ca/events) or by following the Library on Facebook and Instagram (both platforms - @KingstonFrontenacPL).		
Borrow more from the Library! Sign-out an Ontario Parks pass, Little Creek pass, Gould Lake Conservation Area pass, or Rideau Trail A			

RESOURCES FOR PARENTS

Rewilding Lawns and Public Spaces

We can all make a positive difference for wildlife and pollinators living in Kingston! Some ways we can help on our public and private properties include:

- Creating pocket meadows and forests by planting native species of wildflowers, shrubs, and trees that are beneficial to local wildlife and pollinators throughout the year.
- Promoting a "no-mow" area of your lawn.
- Making properties bird and pollinator friendly by adding native plants (food and shelter), bird houses, natural water areas, and applying bird friendly anti-collision tape to your windows.



Reducing Single-Use Plastics

Shop in bulk at zero-waste refill stores to reuse containers you already have. Consider other alternatives to plastic products and items.

- Some local low/zero-waste stores you can shop at are: The Keep Refillery Kingston, Harlowe Green Refillery + Eco Shop, Tara Natural Foods, and Bulk Barn.
- Learn about proper disposal of waste, what can be recycled, the waste app, and more on the City of Kingston's website: cityofkingston.ca/garbage-and-recycling

LIGHT POLLUTION

Many of us have likely sat out at night and noticed the lights at properties across the way or in the sky. Take a moment to reflect on how this makes you feel and consider if light from your property is also contributing to this. This doesn't mean we have to get rid of all our outdoor lights, though! Perhaps we do not need as many or they can be retrofitted to reduce the glare. Here are some questions to ask:

- Does the area on my property really need to be lit?
- Does it need to be this bright?
- Is the light transmitted further than it needs to be?

Learn more: https://watersheds.ca/light

Not Recommended: Glare Lights







Recommended: Shielded Lights

