Day 2

River habitats: who lives here?

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Introduction

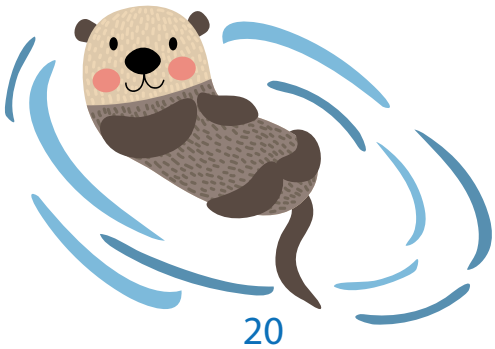
This day focuses on how rivers provide a **habitat** for plants and animals. Many animals and plants live in rivers and their surrounding areas like **wetlands** (**swamps**, **marshes, bogs**). These living things are part of a **food web** and need each other and the water to survive. **Indicator species** can help us learn about the health of a river habitat.

Questions to guide explorations and experiments

- What is a habitat? What kind of habitat is a river?
- What is a wetland? What kind of habitat is a wetland?
- What kind of plants do you find in a wetland?
- What do the animals eat?
- How do the animals change the river?
- How do animals use the river?
- How can you study the health of a river by looking at the animals that live there?

Books and activities

- **Books:** all about wetlands, habitats, and food webs.
- **Activities:** exploring wetlands, observing habitats, and creating food webs.



Children's Books

Fiction

- *Everglades* by Jean Craighead George (Gr K-3)
- *Have You Seen My Duckling* by Nancy Tafuri (Gr K-1)
- *Lotus and Feather* by Ji-li Jiang (Gr 2-5)
- *Make Way for Ducklings* by Robert McCloskey (Gr K-2)
- *Over and Under the Pond* by Kate Messner (Gr 1-3)
- *A River* by Marc Martin (Gr 1-5)
- *The Raft* by Jim LaMarche (Gr 2-5)
- *The Wind in the Willows* by Kenneth Grahame (Gr 1-5)

Poetry

- *How to Cross a Pond: Poems About Water* by Marilyn Singer (Gr 3-5)
- *Over in a River: Flowing Out to Sea* by Marianne Berkes (Gr K-2)
- *Song of the Water Boatman* by Joyce Sidman (Gr 1-3)

Nonfiction

- *Beavers* by Gail Gibbons (Gr 1-3)
- *DK Eyewitness: Pond and River* by Steve Parker (Gr 3-5)
- *DK Eye Wonder: Rivers and Lakes* by DK Publishing (Gr K-2)
- *Explore Rivers and Ponds (25 Great Projects)* by Carla Mooney (Gr K-2, Gr 3-5)
- *Marshes and Swamps* by Gail Gibbons (Gr 1-3)
- *Meadowlands: A Wetlands Survival Story* by Thomas R. Yezerski (Gr 3-5)
- *Otters Love to Play* by Jonathan London (Gr 1-3)
- *River Wild: An Activity Guide to North American Rivers* by Nancy Castaldo (Gr 3-5)
- *Swamp Chomp* by Lola M. Schaefer (Gr K-2)
- *Trout Are Made of Trees* by April Pulley Sayre (Gr 1-3)

Water Words

Biome
A large community of plants and animals adapting to their environment. There are 5 biomes on Earth. Rivers, streams, ponds, lakes, wetlands, estuaries, and oceans are part of the Aquatic Biome.

Bog
Wet, spongy ground, full of decaying mosses that form peat.

Brackish
A mix of freshwater and salt water — what you find in an estuary.

Delta
A triangle of sand and soil deposited where a large river meets the sea.

Ecosystem
A community of living things in a shared environment.

Estuary
The wide mouth of a river, where freshwater meets the salty tidal waters of the sea.

Food chain
A series of living things that are linked to each other because each thing feeds on the one next to it in the series.

Food web
The interlocking food chains within a community.

Habitat
The natural environment of a plant or animal.

Indicator species
Plants or animals whose health confirms the health of the surrounding environment.

Lake
A large area of fresh water, surrounded by land.

Marsh
A low, wet, muddy area, often thick with tall grasses.

Pond
A small body of quiet water, smaller than a lake.

River
A large natural stream of fresh water flowing in a long line across the land.

Swamp
A low, wet area usually covered with water where trees like mangrove and cypress grow.

Wetland
An area of very wet, muddy land with wild plants, such as a swamp or marsh.

2 Anacostia & Potomac Connections

When kids see the connections between what they read about and their own local communities, the information is more relevant to them and expands their background knowledge about the world. Share maps of DC's waterways and wetlands (we've included one on the next page), and on page 26 you'll find links to information about local wildlife.

Mapping the Potomac and Anacostia

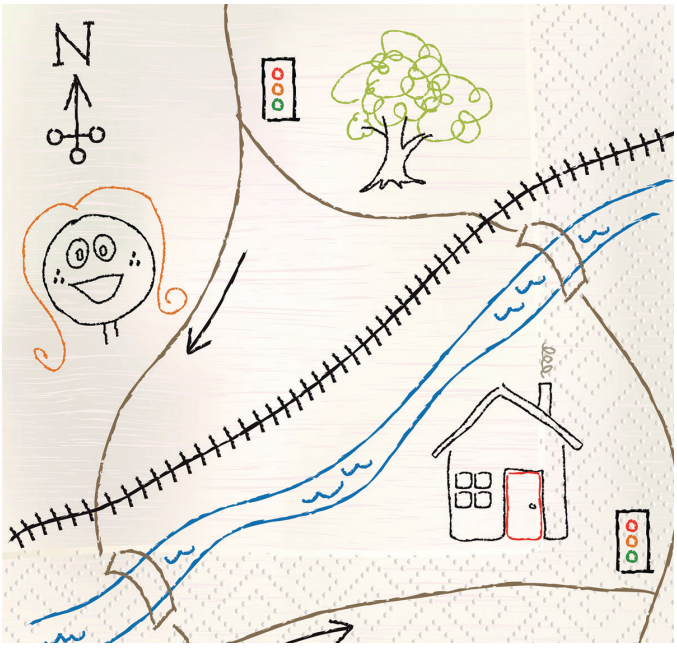
Have kids look at maps of the DC Metro area that show the Potomac River, Anacostia River, and our area's wetlands. We've provided a DC Metro map on the next page, as well as an outline map of DC for kids to use as guides.

Here's a great resource to share with kids, showing where our rivers, streams, and wetlands are:

Wetlands in the District of Columbia
https://doee.dc.gov/sites/default/files/dc/sites/ddoe/publication/attachments/wetland-map_0.pdf

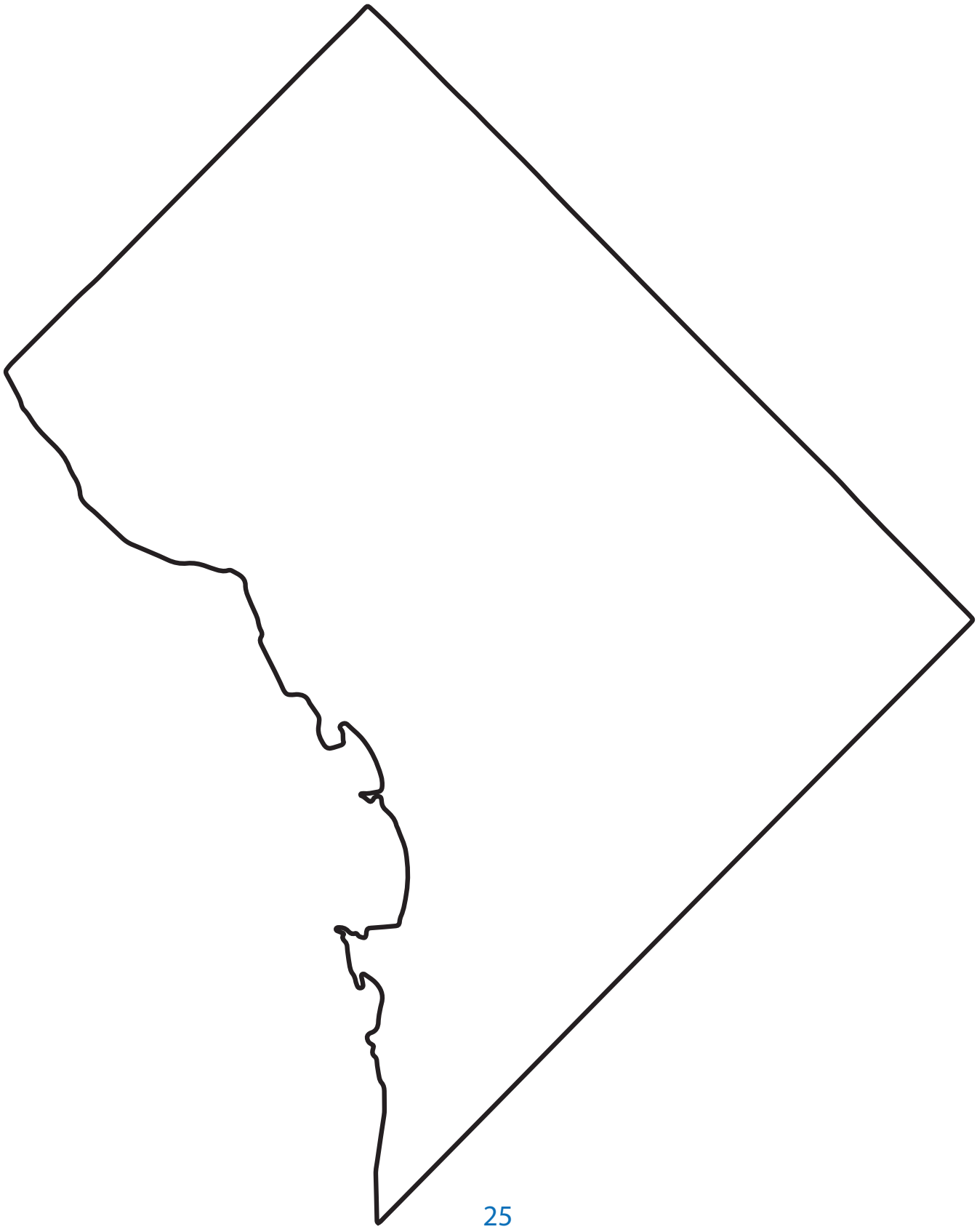
Kids can try drawing their own local maps and add rivers and wetlands in color. They can trace from the outline map draw their own maps freehand style.

If your kids show a lot of interest in mapping, you might share some of the picture books in our booklist, **Follow That Map!** http://www.readingrockets.org/booklists/follow-map



DC Metro Rivers & Waterways

DC Map Outline



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Anacostia/Potomac Connection

Online resources about local wildlife

Anacostia River Wildlife Watching (National Park Service)
https://www.nps.gov/anac/planyourvisit/wildlife-watching.htm

Anacostia Watershed Jr. Ranger booklet (National Park Service)
https://www.nps.gov/nace/learn/kidsyouth/upload/jrwatershed2.pdf

Animals living in Potomac River and Chesapeake (Potomac Conservancy)
https://potomac.org/blog/2016/7/28/wildlife-animals-returning-potomac-chesapeake

Birds of Anacostia Park: Checklist (Patuxent Wildlife Research Center)
https://www.mbr-pwrc.usgs.gov/infocenter/Nps/anacintro.htm

Biodiversity of the Anacostia River (iNaturalist) Add your observations!
https://www.inaturalist.org/projects/biodiversity-of-the-anacostia-river

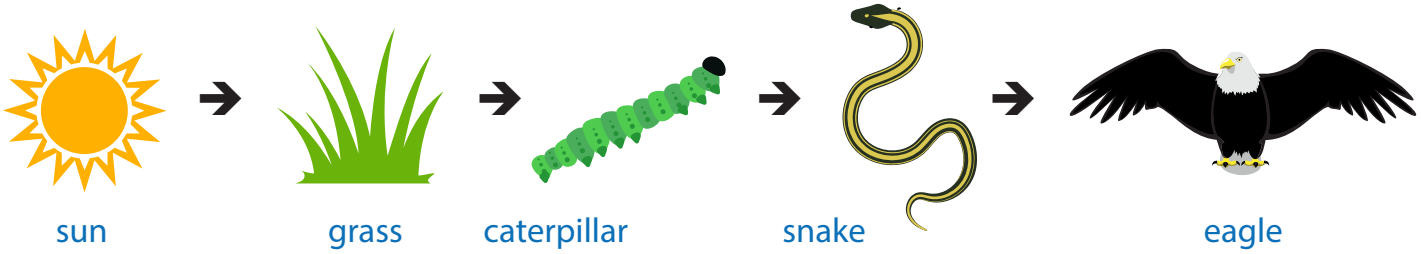
Urban Wildlife on the Anacostia River (video)
https://www.youtube.com/watch?v=xovt3YBRq24

Activity 1: Weaving a Food Web

Introduction

All living things — plants and animals — need energy to live. Spring flowers need energy to grow and bloom. Birds need energy to move their wings for flight. People need energy for all kinds of things, from thinking to laughing to playing soccer to sleeping.

All living things get their energy from food. Green plants use energy from the sun to make their food. Animals get their energy by eating plants or other animals. The sun is at the beginning of every food chain. Here's a simple **food chain**:



sun → grass → caterpillar → snake → eagle

A **food web** is more complex than a food chain. It is made of many interconnected food chains within a community.

In this activity, kids will be creating an active food web with a ball of yarn and their bodies!

Supplies

- Photocopy of the plant and animal cards (pages 38-43), cut along dotted lines
- Ball of yarn
- Tape or safety pins to attach cards to kids' clothing

Get kids thinking ...

Start by asking a couple of questions: What happens to a houseplant if it doesn't get enough sun? Where do you get your energy? Let's say you are eating ice cream — how would you describe the food chain? Where does it start and what's in the chain before the ice cream ends up in your mouth? What happens to your "energy level" if you are out hiking or playing all day and you miss lunch?

Activity 1: Weaving a Food Web

(continued from previous page)

Let's get started!

Photocopy the plant and animal sheets (pages 38-43) and cut along the dotted lines. Have the kids choose one card each and tape or pin it to the front of their shirts. (Be sure that someone is the "sun.") Form a circle, with the sun standing at the center. Have every child introduce themselves as the plant or animal they represent. **Ask the kids:**

- Who in the circle would I give my energy to? (Who might eat me?)
- Who in the circle could give me energy? (Whom could I eat?)

Explain that the ball of yarn represents energy from the sun. Ask the sun to hold onto the loose end of yarn and toss (or walk) the ball of yarn to someone who can use that energy (a green plant). When the kid representing the green plant has the ball of yarn, they toss the yarn to someone next in the food chain. Keep going until the yarn reaches the animal at the top of that food chain (a carnivore — an animal that eats other animals). You've completed one food chain!

Return the yarn to the sun and start a new chain, and continue making food chains until every kid is holding at least one piece of yarn. **Ask the kids:**

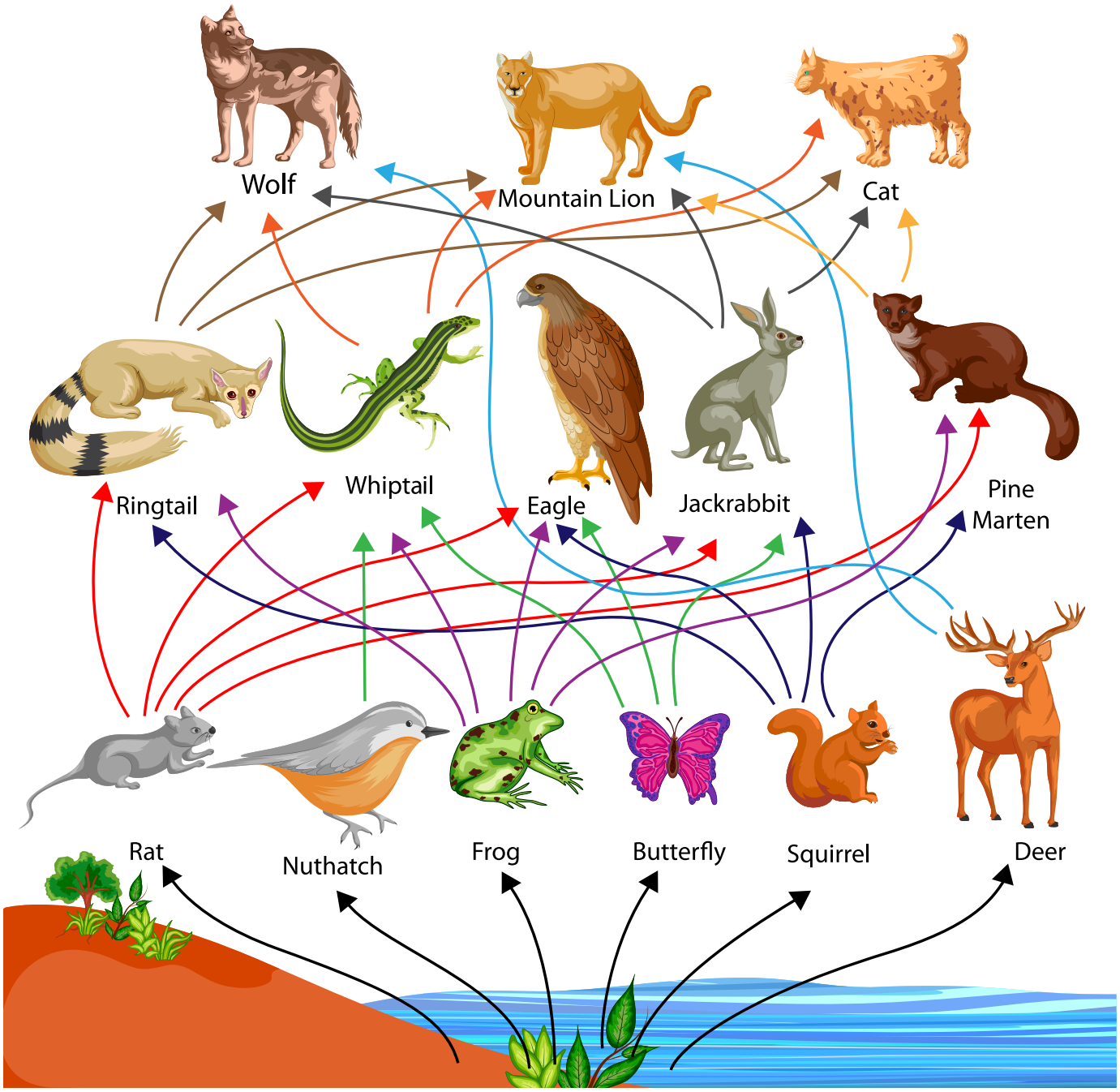
- Have we made food chains? (*Yes, many!*)
- What do all of our food chains together look like? (*A food web*)
- Who is holding the most pieces of yarn and why? (*The sun, because every food chain starts with the sun*)
- What else is part of many food chains (*Green plants*)

More activities

Food Chain Natural Links
https://www.themailbox.com/magazines/science-idea-food-chain/natural-links

Food Chain Stacking Cups
http://rovingfiddlehead.com/kidlit/flannel-friday-food-chain-stacking-cups/

Food Web


Wolf
Mountain Lion
Cat
Ringtail
Whiptail
Eagle
Jackrabbit
Pine Marten
Rat
Nuthatch
Frog
Butterfly
Squirrel
Deer

Activity 2: Water Detectives

Introduction

Are your kids ready to dive deeper into streams and rivers without getting all wet? Help them make a dipping net and an underwater viewer to get a closer look at what's living in the water.

Supplies (for each child)

- Old pair of tights or panty hose
- Wire coat hanger
- Duct tape
- Small diameter bamboo stake or pole
- Needle and thread
- Scissors and possibly pliers
- Large, sturdy cylindrical plastic container from the recycling bin (such as a 1 lb yogurt container)
- Piece of clear plastic (for example, part of a shower curtain or a large resealable storage bag) or thick plastic wrap
- Thick rubber band
- Clean empty tub(s) or bucket(s)
- Large plastic spoons

Illustration © Monterey Bay Aquarium

Get kids thinking ...

What animals, birds, plants, and insects might you expect to see at a river or stream? **Ask the kids:** How do they live there? How do they rely on each other to survive? How do they get food? How is a river habitat different from other habitats? What do they think life in the water is like? What does the wildlife say about the health of the river?

Help them further explore those questions with the help of a homemade dipping net and underwater viewer and a trip to a river or stream.

Activity 2: Water Detectives
(continued from previous page)

Let's get started!

To make a dipping net, take an old pair of tights or panty hose and cut off the legs mid-thigh. Have kids tightly tie the open ends of the legs together to form a net. Take a wire coat hanger and stretch the wire triangle into a square. Kids will need help to stretch the elastic waist of the tights over the square frame, fold the waistband over the wire, and sew the waistband closed around the wire with needle and thread. To form a handle for the net, completely straighten the hook of the hanger — adult hands and pliers may be helpful — and insert it into the bamboo pole. Secure it with duct tape and kids are ready to dip!

To make an underwater viewer, cut off the bottom of a cylindrical container. Have kids stretch a piece of clear plastic over the bottom of the cylinder. Fasten it with a rubber band and seal with duct tape.

Have kids gather their new tools for exploring, along with a tub or bucket and some large plastic spoons and head to the water! You might also want to bring a magnifying glass, towels, and some hand sanitizer.

Activity 2: Water Detectives
(continued from previous page)

Make sure kids stay at water's edge until everyone understands and agrees to water safety rules. Talk with them about what they think they might find in the water and share ideas about what to look for — bugs, insect and frog larvae, worms, tadpoles, small fish.

Start by filling the tub or bucket with water from the river or stream. Let kids test their underwater viewer. Have them lower the viewer into the tub of water and look through the open end of the viewer. What do they see?

To get dipping nets going, let kids stand at water's edge and sweep the nets slowly through the water, avoiding stirring up the bottom too much. You can use plastic spoons to help them transfer whatever ends up in the net into the tub filled with river water so they can get an up close look and try to identify their finds using their underwater viewers.

Move upstream and downstream to sample from different sections of the stream or river. Talk with kids about how the physical characteristics of the stream or river create different habitats for different plants and animals. For example, shallow depths and a rocky bottom make a habitat with plenty of light and oxygen for plants and creatures that eat plants. Small, irregular waves or riffles on the water's surface can help you find this type of river habitat.

Indicator species

Indicator species are especially sensitive to their environment — even small ecosystem changes can affect their health and survival. Indicator species are one of the best ways to determine the health of a river or wetland. Here are some common indicator species to look for as you explore your river:

- **Mayflies, caddisflies or stoneflies** are very sensitive to the amount of oxygen in the water. If you see lots of these insects, it means that the river is pretty healthy!
- **Freshwater mussels** don't move around and they feed by filtering nutrient-rich water, which makes them sensitive to changes in water temperature, oxygen, and acidity.
- **Frogs, toads, and salamanders** have skin that is moist and permeable, making it easy for pollutants to get into their bodies. Do you see lots of tadpoles? That's a sign that the water is relatively clean.

Activity 2: Water Detectives
(continued from previous page)

- **Striped bass and brook trout**: ask kids why fish are a good river indicator species.
- **Ospreys** are at the top of the food chain, which means they will be affected by environmental changes. They eat fish and they hunt very close to their nest. If something's affecting the fish population, the ospreys will show telltale signs indicating a problem. They are also very visible, making them easy to monitor!
- **River otters** "eat local" (fish, crustaceans, frogs, and insects) so if the river ecosystem is polluted, those contaminants can affect the otters' health.

You might want to try the Creek Critters app from the Audubon Naturalist Society. It allows kids to find and identify small organisms that live in freshwater streams, and to report what they find. https://anshome.org/creek-critters/

Encourage kids to take plenty of notes about their observations. Ask the kids: Is there a plant, animal, or insect you'd like to learn more about? Head back to hit the books and find out more!

More activities

Make-and-take field equipment (Oregon Department of Fish & Wildlife)
http://www.dfw.state.or.us/fish/STEP/docs/SS10_FieldEquiptment.pdf

Make your own monitoring equipment (Maryland Department of Natural Resources)
http://dnr.maryland.gov/education/Documents/MakeYourOwnMonitoringEquipment.pdf

Writing About Rivers

Writing helps kids process and solidify new knowledge and gives them an opportunity to use new vocabulary and concepts. Offer one or more of these prompts or questions to get your River Rangers writing.

Journal writing

- Write observations from the river visit in a nature journal. What is the water like? Fast or slow? Muddy or clear? Does the air change as you get closer to the river bank? What plants and wildlife do you see on the river banks?
- What did you find with your dipping nets and waterscopes? Include drawings of what you saw. After your river visit, look online or in nature books to identify the plants and animals you observed.

Poetry prompt

Write a cinquain poem about rivers. The poem can be inspired by a river visit or by books you've read about rivers and the plants and animals that live there. Warm up your writing muscles by writing down some good descriptive words.

What is a cinquain? A cinquain is a non-rhyming 5-line poem inspired by the natural world. Here are the rules:

Line 1: One word title, a noun that identifies your topic
Line 2: Two adjectives that describe your topic
Line 3: Three "ing" verbs that describe action
Line 4: A phrase that describes something about your topic
Line 5: A noun that is a synonym or another way to name your topic

Here's an example, about trees:

tree
white, tall
reaching, bending, fluttering
leaves and twigs in the wind
aspen

Writing About Rivers

Animal homes

Select an animal that fascinates you and find out about its habitat, life cycle, behavior, social life — and its home. Does it live in shallow water, a hive, nest, burrow, or tree hollow? Take the point of view of the animal and write a one-page descriptive essay using specific details and rich language to describe your home and why it's perfect for you. You can include a drawing, too!

Here are some picture books about animal homes:

- *Whose House Is This? A Look at Animal Homes: Webs, Nests, and Shells*
- *Pop-Up: Animal Homes* (National Geographic Action Book)
- *Animal Homes* (Usborne Lift-the-Flap Book)
- *Is This a House for a Hermit Crab?*

Wetland metaphors

Many functions of wetlands can be explored through the use of metaphors. A metaphor is a figure of speech that is used to make a comparison between two things that aren't alike but do have something in common. Examples: "my brain is a computer" or "the moon is a white balloon" or "my brother is a night owl."

Using this worksheet, you can explore how wetlands are like a "sponge" or a "playground" or a "filter" and more.

Wetland Metaphors Worksheet (Southwest Florida Water Management)
https://www.swfwmd.state.fl.us/files/database/site_file_sets/2588/WetlandMetaphors.pdf

Kid-friendly Websites and Apps

Websites

Wild DC (Arkive)
http://www.arkive.org/c/wilddc

Wetlands for Kids
http://kids.lovetoknow.com/wiki/Wetlands_for_Kids

Ponds and Wetlands Science (Earth's Kids)
http://www.earthskids.com/ek_science-pond-wetland.htm

FrogWatch (DC.gov)
https://doee.dc.gov/service/frogwatch

Freshwater Habitats (National Geographic Kids)
https://kids.nationalgeographic.com/explore/nature/habitats/freshwater/

Build a Food Chain (online game)
http://eschooltoday.com/ecosystems/build-a-food-chain-game.html

Educational apps

Habitactics $
https://www.commonsense.org/education/app/habitactics

iBiome: Wetland $
https://www.commonsense.org/education/app/ibiome-wetland

Meet the Insects: Water and Grass Edition $
https://www.commonsensemedia.org/app-reviews/meet-the-insects-water-grass-edition

Project Noah: "citizen science" field guides
https://www.commonsense.org/education/app/project-noah

Water Life: Where Rivers Meet the Sea
https://www.commonsensemedia.org/game-reviews/waterlife-where-rivers-meet-the-sea

Outings in the DC Area

Visiting a river or stream is a fun experience and a rewarding activity for both kids and grownups, but anyone visiting should be aware of potential hazards and follow safety guidelines. Before you head to the river, make time to review water safety.

Water Safety: Rivers and Streams provides helpful resources, hazards to avoid, and tips that could save your life.
https://www.recreation.gov/marketing.do?goto=acm/Explore_And_More/exploreArticles/water-safety-rivers-and-streams.htm

Places to visit and things to do

Dyke Marsh
https://www.nps.gov/gwmp/planyourvisit/dykemarsh.htm

Glen Echo Park Aquarium $
https://glenechopark.org/aquarium

Huntley Meadows Park
https://www.fairfaxcounty.gov/parks/huntley-meadows

Kenilworth Park and Aquatic Gardens
https://www.nps.gov/keaq/index.htm

Kingman and Heritage Islands
http://www.kingmanisland.org/things-to-do/

National Zoo: Amazonia exhibit
https://nationalzoo.si.edu/animals/exhibits/amazonia

Potomac Overlook Regional Park and Nature Center
https://www.novaparks.com/parks/potomac-overlook-regional-park

Theodore Roosevelt Island
https://www.nps.gov/this/index.htm

Food Web Card 1

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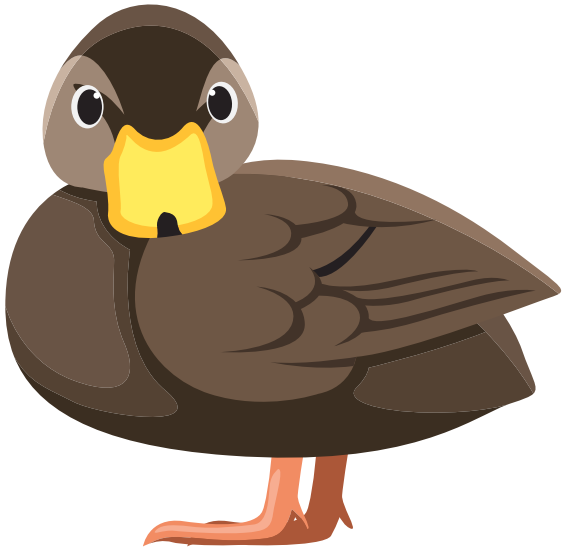
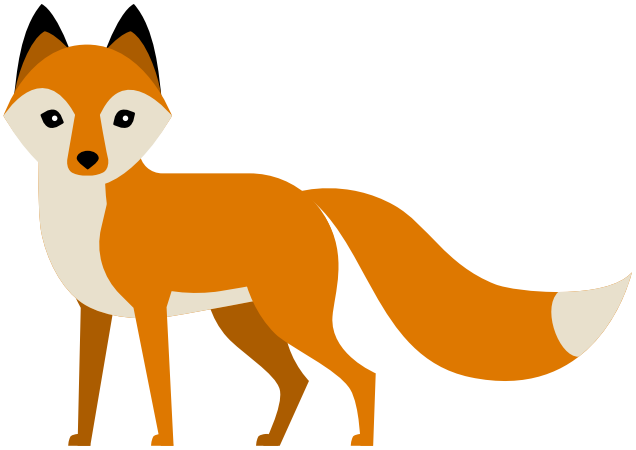
Human



Duck

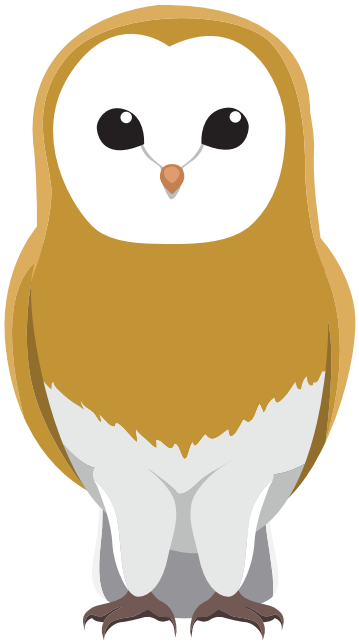
Dandelion



Fox

Food Web Card 2

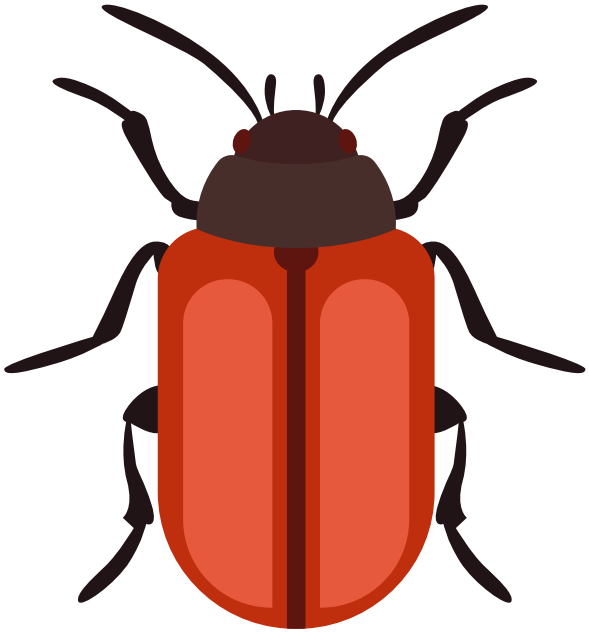
2



Owl

Bobcat

Cattail



Beetle

Food Web Card 3

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Mouse

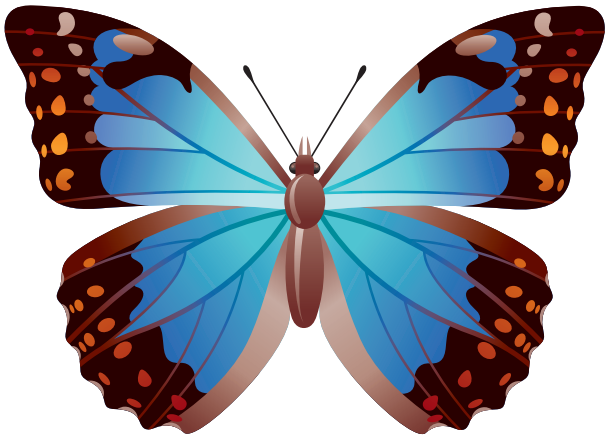
Sunflower

Robin

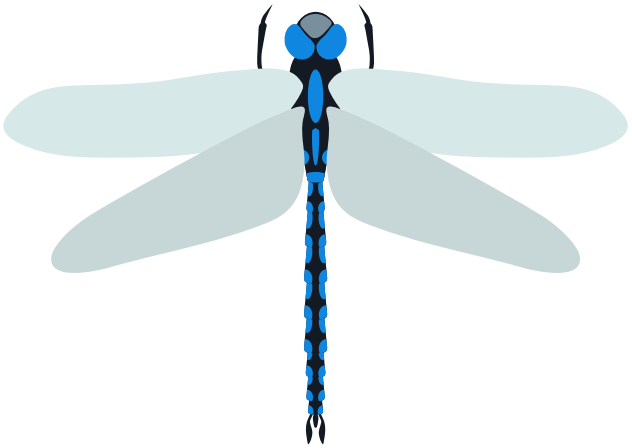
Blue Jay

Food Web Card 4

2



Butterfly



Dragonfly

Wildflowers

Coyote

Food Web Card 5

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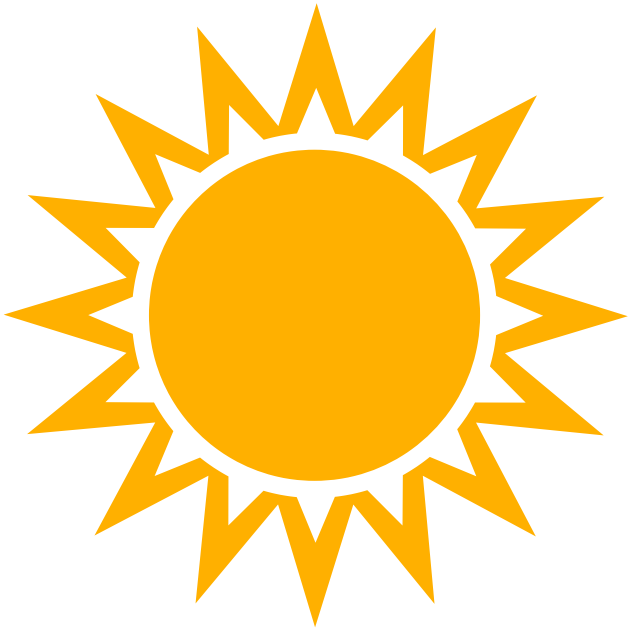
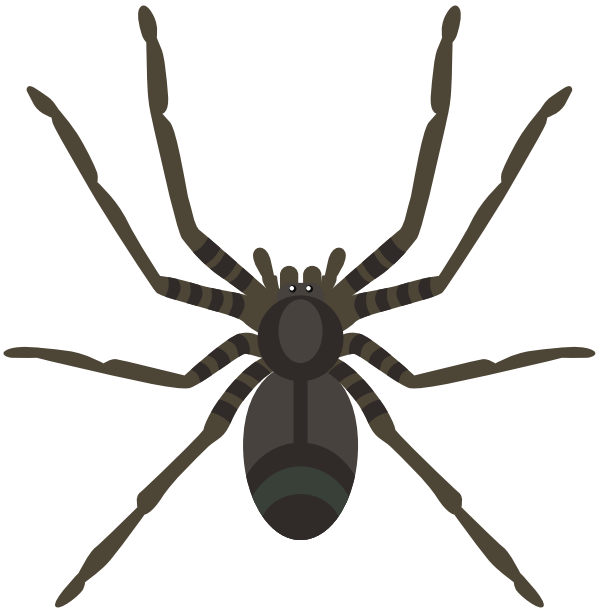


Sun

Grass

Rabbit



Spider

Food Web Card 6

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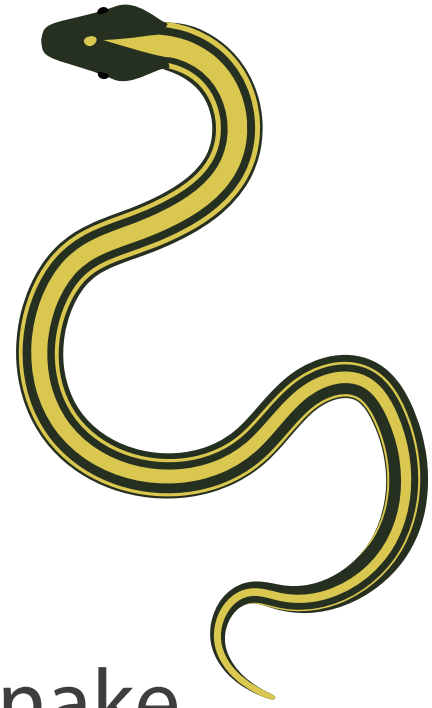
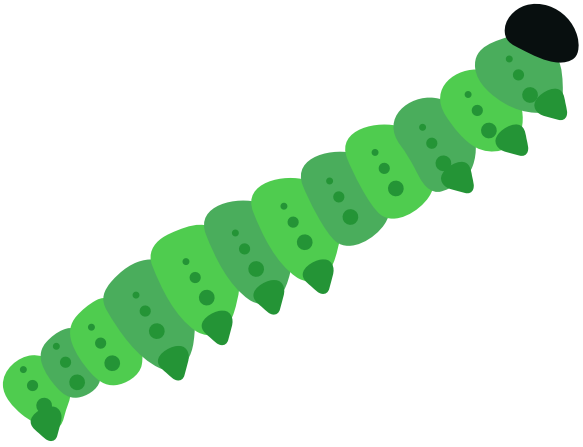


Snake

Frog



Caterpillar

Hawk