

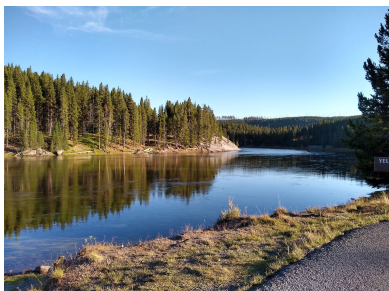


All About Rivers

BACKGROUND INFORMATION

When I was younger, one of my favorite things to do was look for frogs in the creek next to my grandparents' home. This small creek fed into a lake nearby, and I noticed how the water entering the lake was muddier after big rainstorms, how shifting winds could pile up sediment at the mouth of the stream and create a little pond, how that small pool warmed more quickly than the lake itself. Sometimes small fish would get trapped there and I'd try to open the channel to the lake back up so they could swim in the cooler waters; I wasn't sure whether they could survive in water that was warmer and muckier than they were used to... I also loved observing seasonal changes and seeing what types of wildlife I could find in and around the water.

In last week's lesson, I stated that *we're all downstream*, and that was true of my grandparents' little creek as well. One time, I followed the water upstream and was upset to discover that the valley, or "gully" a little ways above the creek used to be a dumping ground for all sorts of things - from glass to garbage and even old washing machines! When I was a little older, I learned that this was pretty common practice to put unwanted materials in valleys. Throwing things "away" meant just tossing it somewhere so that someone else could deal with it, or something else - like a river - could wash it elsewhere, "out of sight out of mind". Now we know that what we do to the environment can hurt others and ourselves, and what we put in our water can end up in us! If we pour chemicals into a sewer they will end up in our drinking water. Bleh! Humans and other living beings need *clean* water to survive, and if that water is polluted, it can make us sick.



RELATED HOLIDAY THIS WEEK:

World Rivers Day ~ September 27th
(generally the last Sunday in September)

[Click here for a free clean up kit from NationalCleanupDay.org!](https://www.nationalcleanupday.org/)

ACTIVITY 1: Testing the Waters

There are various ways to "get to know" your waterway a bit better. If you have a water quality test kit, you can use it to determine things like the water's pH, amount of dissolved oxygen, and a type of bacteria called coliform, which can cause sickness. Be sure to read the directions on any test kit carefully before using it.

You will need:

- ❖ [Macroinvertebrates of the Pacific Northwest](#) (Field Guide by Xerces)
- ❖ Water quality test kit* & gloves
- ❖ River/stream/creek
- ❖ Rain boots/waders/water shoes
- ❖ Net or pool skimmer & bucket (shallow if possible)
- ❖ Viewer (see "Craft" below)
- ❖ Adult supervision



Pictured above is the Lamotte GREEN ↑
Program Low Cost Water Monitoring Kit

Instructions:

- 1) With an adult, head to a nearby river or stream.
- 2) Don (or put on) your rain boots or water shoes.
- 3) First, take a few minutes to see what you can notice. Does the water seem “clean”, polluted, or full of sediment? How fast is the water moving? What aquatic life or plants can you observe in and around the water.
- 4) If you have a bucket, scoop some river water into it.
- 5) Carefully wade into the stream (or stand at the edge) and carefully lift a rock. You can try using a net to collect any small critters that might have been underneath it, but be sure to be gentle with the net so you don’t harm any of them.
- 6) If you use the net and are able to catch something, turn your net inside out in the water-filled bucket.
- 7) Did you catch something of interest? If you have a viewer (see craft below), you might be able to see macroinvertebrates a bit better.
- 8) If you found a small insect-looking critter, review the [macroinvertebrate guide](#) and try to identify what it is. This can help you assess the quality of the stream. (See “**bioindicators**” in the vocabulary section.)
- 9) Be sure to return the water and its contents to the stream before too long so any living beings can be returned to their habitat.

Note: If you have a water quality test kit it is important to read the directions on how to use it before you do any analysis. You don’t want to accidentally pollute the water you’re trying to test!

RELATED WEBSITE: DiscoverWater.org

Check out [this website](#) to learn more about the water cycle, watersheds, and more!



ACTIVITY 2 - Diving In: What’s the status of your local river?

Have you explored a river or stream near where you live? Perhaps you’ve looked for crayfish or swam or canoed, but what do you know about the water *quality*? Have you noticed whether the water is murky or clear? Are the plant and animal species living in it **native**, **introduced**, or **invasive**? What’s the temperature like? At first glance, we might see “just water”, but there is a lot going on under the surface - things like dissolved oxygen, particles, microscopic bacteria, and the speed of the current. How well do you *really* know the stream?

You will need:

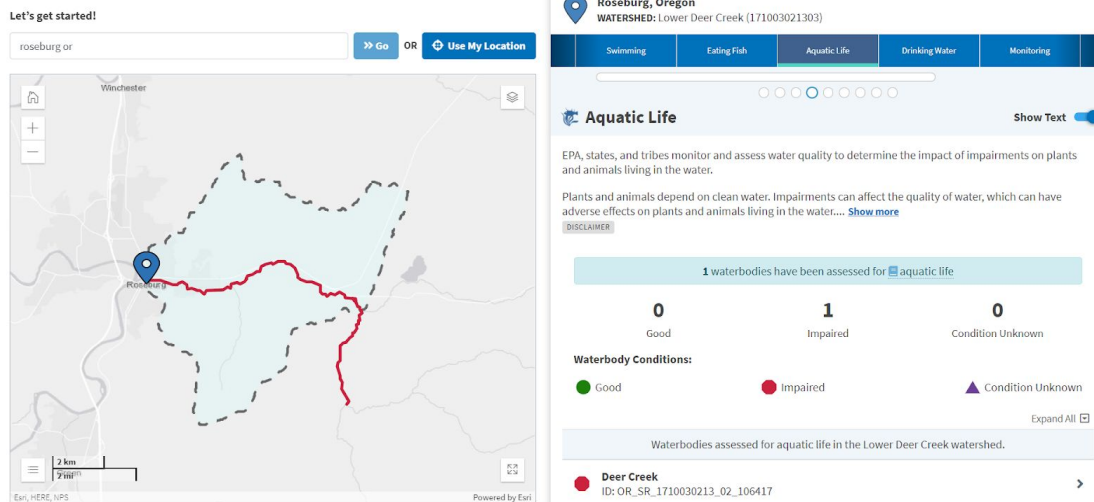
- ❖ Laptop/computer

Instructions:

- 1) Go to <https://mywaterway.epa.gov/> (or click on the map below).
- 2) Type in your city or zip code to bring up a waterway near you.
- 3) Explore the issues impacting that river or stream. For example, according to the **EPA**, Deer Creek offers “good” drinking water, but is “**impaired**” when it comes to fish and aquatic life. Further investigation on the site reveals that while the level of dissolved oxygen in the water is sufficient, the habitat and temperature are not.
- 4) Once you have learned a little about the challenges your local waterway faces, brainstorm possible solutions. In the example of Deer Creek, what do you think could be improved or altered to keep

the water from getting too hot? How might habitat be improved for fish spawning? Come up with some of your own questions too, and try to answer them.

(See Extension B below for additional questions to answer if you're having difficulty coming up with some.)



GAME (for Young Children): Pooh Sticks

How to Play:

- 1) Each player needs to find a natural item such as a stick or twig.
- 2) With everyone facing the same side of the bridge (over water), toss the sticks in and see whose comes out the other side the fastest!

This can be an introduction to buoyancy (Did the stick sink or float?) and could be adapted for older children/students to involve building a boat or other floating vessel. See below for an extension activity about determining stream speed/velocity.

CRAFT: Build a Water Viewer

You will need:

- ❖ Clean, empty milk jug (a half-gallon plastic one should work well), or a plastic tennis ball tube
- ❖ Scissors
- ❖ Duct tape
- ❖ Rubber band
- ❖ Plastic wrap (heavy duty if you have it)

Instructions

- 1) Remove the lid of the container.
- 2) Cut (or have an adult help you cut) the bottom of the plastic container.

- 3) Stretch the plastic wrap over the bottom so that it is smooth, and use the rubber band to hold it in place. Attaching duct tape around the rubber band can help ensure that the plastic wrap stays in place and water doesn't get into the viewer.
- 4) The next time you head to a river or other waterway, you can place the bottom of the viewer into the water (and look into the top) to see things under the surface!

EXTENSIONS (for older youths or those wanting to take it a little further)

A) Determine Stream Speed/Velocity

You will need:

- ❖ String or yarn
- ❖ Stick or other floating object
- ❖ Pencil and paper (to record data)
- ❖ Stopwatch (or phone with this function)
- ❖ Tape measure or measuring stick
- ❖ Partner or parent/guardian



Instructions

- 1) Find a length of stream that's not **stagnant**, but also not an area that is too deep, or with a current too strong. (An adult can help you find an area that's appropriate.)
- 2) Mark start and finish lines a certain distance (such as 20 feet) apart using the string/yarn. The "finish" line should be downstream/the water should be flowing from "start" towards "finish".
- 3) Drop a floating object such as a stick into the river or creek (nothing harmful to the environment of course), at the "start" line (upstream) and start the timer. If you have a partner/helper have that person start the timer when you drop the item so that your data is accurate.
- 4) Stop the timer when the item passes the "finish" line and record the time it took for the object to travel the distance. Record this in seconds (if you have minutes, convert them to seconds - remember, there are 60 seconds in a minute).
- 5) Collect the item/stick if possible and repeat the process (steps 3-4) four additional times so that you have five "runs".
- 6) Add the time values (in seconds) and divide by **5** (the number of runs).
- 7) Then, divide the distance your object traveled (for example, 20 feet), by the average time you just calculated.
- 8) Your result (in feet per second), is the stream's speed, or velocity if you include the direction of travel.

B) Additional Questions to Research

- 1) What aquatic life can be found in Umpqua River (or Oregon's rivers)?
- 2) How do the plants and animals found in freshwater differ from those living in saltwater (such as the ocean)?
- 3) How can pollution be removed from a waterway?
- 4) What chemicals or particles, besides H₂O, can be found in a stream?
- 5) Where does my drinking water come from - and how is it cleaned before it reaches me?
- 6) Where does sewer water go, and how is it cleaned so that it doesn't harm wildlife?
- 7) What other qualities/factors make a river or stream considered "healthy"?

C) Enjoying and Exploring Rivers

Another way to enjoy a river is by rafting, canoeing, or kayaking (with adult supervision). Be sure to wear a life vest/life jacket/life preserver!

VOCABULARY

Bioindicators - species that can help you determine the health of an aquatic (or other) ecosystem. For example, macroinvertebrates that are “sensitive” to pollution or human disturbance will generally only be found in undisturbed streams with clean water, and thus indicate that the ecosystem is healthier than one which doesn’t contain them (on the other hand, species that are more tolerant of pollution or disturbance can survive in a much more polluted stream/ecosystem)

Degraded Aquatic Habitat - according to the EPA website, this “occurs when naturally occurring stream channels are changed or diverted through manmade channels and/or removal of native vegetation from shorelines and stream banks. These actions can reduce the habitat that fish and other animals need to reproduce, feed, and find shelter, and can also affect the appearance and value of waterfront property”

Impaired - some aspect of water quality does not meet necessary standards/levels such as temperature being too high or too low to sustain aquatic life, too much pollution, not enough vegetation or habitat, too much or too little bacteria...

EPA - abbreviation for Environmental Protection Agency, a governmental group responsible for protecting the health of humans and the environment (including other living beings)

Introduced Species - plants, animals, or other living things that were brought somewhere from elsewhere; these may or may not be harmful to the local ecosystem

Invasive Species - living things that are considered “invasive” are generally introduced and also harmful - kind of like bullies, they have a deleterious effect on the creatures already living in the ecosystem, which may not have ways to effectively compete with this rude newcomer

Macroinvertebrate - boneless creature that is large enough for the eye to see, such as a crayfish, snail, or worm

Native Species - a species that has “always” been in an area (or one that has lived there for a really long time, and is generally a valuable component of the food web; there is a reciprocal relationship between this being and others, meaning that it benefits other species in the ecosystem, and other species benefit it)

Stagnant - water or air that is not flowing/moving, and often becomes foul-smelling

Lessons & Activities For This Week Adapted from:

“The Kids’ Guide to Nature Adventures” by Joe Rhatigan (p. 96, 98-99)

“Teaching Green: The Middle Years” Edited by Tim Grant & Gail Littlejohn (p. 170-174)

“The Kids’ Outdoor Adventure Book” by Stacy Tornio & Ken Keffer (p. 13)

Coming Up:

Umpqua Watersheds will be starting a **book club** for youths and adults! More information will be posted soon!

**Umpqua Watersheds will be ordering a few water quality test kits that we will loan out to local environmental explorers and their families. Or, you can order your own!*

Thanks for joining me for this week's Home Explorer activities from the Umpqua Watersheds Education Program. There will be new lessons, projects, crafts (and more) posted weekly!

With smiles :)
~ Miss Ryan

