

## PNW Watersheds Giant Floor Map and Story

### Lesson Plan

Grades: 4-6

Time: 60 minutes

### PREPARE

#### NGSS connections:

**4-ESS2-2.** Analyze and interpret data from maps to describe patterns of Earth's features.

**5-ESS3-1.** Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

**ELP Standard 4-5.** Construct meaning from oral presentations and literary and informational text through grade appropriate listening, reading, and viewing.

#### Oregon and Washington Geography Standards

**OR- 4.10** Describe how technological developments, societal decisions, and personal practices affect Oregon's sustainability (dams, wind turbines, climate change and variability, transportation systems, etc.).

**OR-4.9** Identify conflicts involving use of land, natural resources, economic interests, competition for scarce resources, different political views, boundary disputes, and cultural differences within Oregon and between different geographical areas.

**WA- G1.5.4** Use maps, satellite images, photographs, and other representations to explain relationships between the locations of places and regions and their environmental characteristics.

**WA- G3.5.5** Determine how natural and human-made catastrophic events in one place affect people living in other places.

#### Educator Background Information:

Source: <https://opb.pbslearningmedia.org/resource/ket09.sci.ess.water.wshed/what-is-a-watershed/>

Permitted use: Stream, Download and Share

\*Words in **bold** are concepts taught in this lesson.

**“A watershed is any area that funnels rainwater to a common destination. If the common destination is a ditch that runs through a neighborhood, then the watershed is all the neighborhood's surface area that drains into that ditch. If the destination is a lake, then the watershed is all the surface area that drains into that lake.**

But watersheds are complex, too. Smaller watersheds can interconnect to form larger ones, and large watersheds are part of giant watersheds, and so on, all nested together in the largest watershed. So, rainwater in the neighborhood drains into a ditch, but the ditch drains into a creek, and the creek drains into a river or lake, which ultimately drains into a bay or ocean. The neighborhood can be a watershed by itself, but (it) may also be part of other watersheds.

**Wherever we may be, it is important to consider our local, nearby watershed because what enters the water at any point in the watershed can have an impact as it travels downstream. Everything we do on or to the land has potential to impact everyone downstream from us.**

For example, sediments loosened by farming, construction, off-road recreational activities, and logging, wash into waterways every time it rains. **Motor vehicles spray oil, antifreeze, grease, and brake dust onto roads, and then rainwater runoff carries it to waterways. Fertilizer, pesticide, insecticide from yards and farms, and bacteria from uncollected pet and livestock waste enter waterways, too. Even litter gets there. Soaps, detergents, hair products, cosmetics, medicines, and anything else that washes off or out of our bodies make its way through sewage systems to**

waterways. Even though natural processes mitigate some of the effects, these pollutants degrade the quality of water in a watershed, negatively affecting the plants and animals downstream -- including humans.

Individuals can decrease pollutant entry to waterways by employing sound agricultural and landscaping practices, collecting pet waste and litter, keeping motor vehicles in good repair, minimizing use of cleaning products and other pharmaceuticals, and keeping local runoff from reaching sewer and drainage systems and having them leach through soil where water is stored.

Watersheds are affected on a grand scale by flood control in populated areas, water diversion for agricultural purposes or other human use, dams for hydropower generation, the dredging of navigational channels, and other projects. Ideas for best management practices on any scale are evolving as understanding about watersheds and their interconnectivity increase.

Local communities can form partnerships at any watershed level to educate and assist stakeholders in protecting water resources.”

### Additional Notes Helpful to the Lesson-

#### **Nonpoint Source Pollution and Point Source Pollution:**

The U.S. Environmental Protection Agency (EPA) defines **point source pollution** as “any single identifiable source of pollution from which pollutants are discharged, such as a pipe, ditch, ship or factory smokestack.” It states that, “**Nonpoint source (NPS) pollution**, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters and ground waters.

#### **Native Plants Are Critical to Watershed Wealth**

Source: <https://wmswcd.org/wp-content/uploads/2015/06/Healthy-Streams-Brochure.pdf>

- Native plants fruit and flower when native wildlife needs the food source, and they provide better cover and nesting habitat.
- Native plants better filter excess nutrients from cropland, road run-off, and animal waste.
- Native plants trap sediment before it reaches streams and suffocates fish and other aquatic life.
- The shade from native trees and shrubs keep streams cool for native fish and wildlife.
- Invasive weeds are a nuisance. They crowd out desirable plants and crops, contribute to erosion, and can even lower your property value.”

#### **Vocabulary**

Watershed	A watershed is any area of land that funnels rainwater to a common waterbody.
Point Source Pollution	Pollution originating from a single, identifiable source, such as a discharge pipe from a factory or sewage plant.
Nonpoint Source Pollution	Pollution that does not originate from a single source.
Stakeholder	A person with an interest or concern in something
Slope	A surface of which one end or side is at a higher level than another; a rising or falling
Drain	To cause the water...to run out, leaving it empty, dry or drier
Restoration	The action of returning something to a former condition.

# WHAT IS A WATERSHED?

## The Making of a River



Credit: **Image Credit. A. Vicente, U.S. Forest Service**

<https://www.fs.fed.us/rm/boise/research/techtrans/projects/scienceforkids/watersheds.shtml>

### Materials:






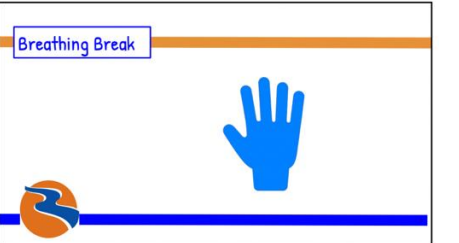
Floor Map/Trunk	Slide Deck (On Google)	Word Bank Poster	Map key poster	Broom/Dustpan
Pre-Post Assessment	Astoria Elementary Story Cards	2 City markers	9 Cones	Eco cleaner and towels
Zip Pouches with 2" pom poms of many colors	Blue Wikki Stix <sup>®</sup>	painters' tape	Wood blocks (if windy -use instead of pom poms)	Tent stakes (if outside)

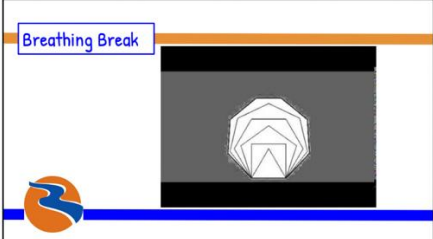
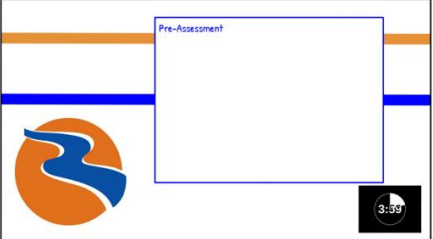
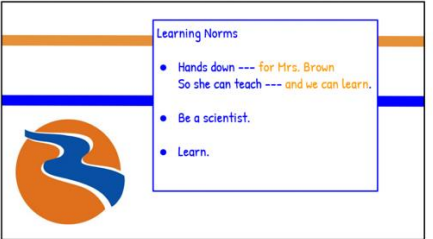
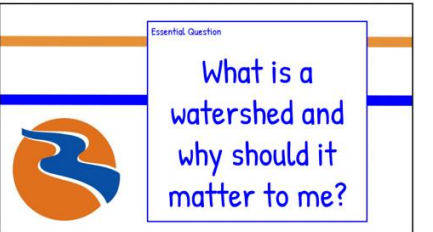
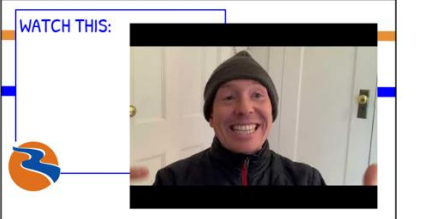
**Optional: STORY CARDS (extends the lesson length 15-30 minutes):** There are two ways to use these cards either before or after you teach the lesson:

Option 1-Print them front to back on cardstock. Give one card to each student (small or large group). Allow students to read the cards. As they read, they hold up the card so classmates can see the photo on the back of the card.

Option 2- Display on the projector. Either allow students to take turns reading slides aloud to the group, or have the teacher read the slides (or go back and forth between student and teacher).

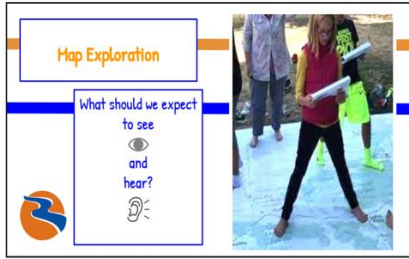
**TEACH:**

<p>1</p>	 <p><b>Watershed Floor Map</b> Audra Brown LCEP Environmental Educator</p> <p>Note: Lesson begins in the classroom with a projector. Class will move to a larger room with the map later.</p>	<p><b>Introduction (20 min) –</b> <b>Use Slide Deck to stay on schedule/topic:</b> Introduce self</p>
<p>2</p>	 <p>5th Grade New</p> <p>Likes: Pizza, Movies, The Outdoors, Science, MarioKart, Traveling, Concerts, Scary Roller Coasters, Science, Working with Kids, and...</p>	<p>Read your likes list. Ask kids to show by holding up fingers--- how many things on this list do we have in common?</p>
<p>3</p>		<p>Share something really important to you—In this case, it's my dog.</p>
<p>4</p>	 <p><b>Learning Targets:</b></p> <ul style="list-style-type: none"> <li>I can <b>define</b> a watershed.</li> <li>I can <b>explain</b> 3 ways a watershed's health might be threatened.</li> <li>I can <b>explain</b> 3 ways that humans can improve watershed health.</li> </ul>	<p>Read the learning targets aloud. Explain that it is ok if they don't know these targets yet. They'll learn soon! Learning Targets are can also be called Learning Responsibilities because students should take on some responsibility in learning these ideas as the lesson is presented.</p>
<p>5</p>	 <p><b>Schedule</b></p> <ul style="list-style-type: none"> <li>• Introductions/ Expectations</li> <li>• What Do you Know?</li> <li>• Vocabulary</li> <li>• Video (Watershed Video)</li> <li>• Feet-On SCIENCE!</li> <li>• What Do you Know NOW?</li> <li>• Wrap-Up</li> </ul>	<p>Read the schedule aloud to the class. As this lesson develops, the lesson might change over time, so update this part of the lesson plan if needed.</p>
<p>6</p>	 <p>Breathing Break</p>	<p>Explain that new situations and new people (like guest speakers) can bring on a little anxiety. Explain to kids that we're going to take a short breathing break so we can do our best learning. When our brains are calm, our learning improves.</p>

7	 <p>Breathing Break</p>	<p>Breathe in as the shape grows....          Breathe out as the shape shrinks...          Compliment students taking the activity seriously.</p>
8	 <p>Pre-Assessment</p> <p>Note: Only Lower Columbia Estuary Partnership (LCEP) educators are required to administer a pre-post assessment. For educators outside of the LCEP organization, you can decide if you'd like to administer a pre-post assessment or not. Generally, the assessment is a personal K-W-L chart asking students what they know and wonder before you teach and what they learned after you teach.</p>	<p><b>Suggested Script:</b>          Scientists, before we begin today, I'd like to measure how much you know about the topic of _____ before I start teaching.</p> <p>Since we've just met, I don't know very much about you as a learner. I'd like to ask for your help in the next 5 minutes. If you could write down or diagram and label everything you know about these learning targets, it would help me to know where to begin teaching. This won't count towards your grade; it just helps me know where to start my teaching.</p> <p>If you don't know anything, it's ok to write "I don't know...YET." My job is to teach you! If you are already an expert on this topic, write as much as you can and then please take on the responsibility of sharing your expertise with others as we work in groups.</p> <p>At the end of my time with you, I'm going to ask you to do this very same activity. It's my hope that you can share more things you learned from me and your fellow scientists by the end of this lesson. Then, I'll use these papers to measure how much learning we did in our hour together!</p> <p>Please use the <b>orange</b> side of the paper now and I'll have you use the <b>blue</b> side at the end of the lesson. <u>I'll read the learning targets aloud to you right now</u>, so please follow along. I'll then set a timer for 5 minutes, so we make sure we have enough time for the activity. Here we go...</p>
9	 <p>Learning Norms</p> <ul style="list-style-type: none"> <li>• Hands down --- for Mrs. Brown So she can teach --- and we can learn.</li> <li>• Be a scientist.</li> <li>• Learn.</li> </ul>	<p>Teach the students your attention signal. Students should know what you will say when you want their full attention.</p> <p>Explain how scientists treat materials with respect, they are curious, and they take their learning seriously.</p> <p>Remind students that they are in charge of their learning and shouldn't disrupt the learning of others.</p>
10	 <p>Essential Question</p> <p>What is a watershed and why should it matter to me?</p>	<p>Read the essential question. Do not explain potential answers at this time.</p>
11	 <p>WATCH THIS:</p>	<p>Let students know that this is a video that will explain what a watershed is. Warn them that it is a little bit silly. But just like Bill Nye videos humor and learning can mix – just listen carefully while you giggle!</p>



12



Let students know that we are going to walk to another location. When they see the big tarp (folded map) on the floor, please sit in a big circle around it. Place shoes along the wall and sit down.

13

Note: This lesson begins in the classroom so that the projector is available to show the slides. You will likely need to leave the room to demonstrate the model lesson on the map because it is so big.

Set clear expectations for students when they arrive in the room with the map.

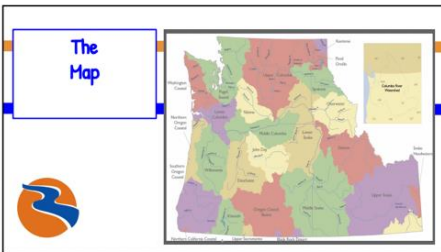


Photo- Pom-Poms in Pouches:



**Pacific Northwest Watersheds Map (25 minutes)**

- Review expectations and transition to map - shoes off, use grommet holes to guide where kids should stand/sit, please don't touch anything until asked, if there are supplies (like pom pom pouches) around the map, please sit in front of them. **Accessibility notes:** If a student is in a wheelchair or needs mobility support, have them sit near Astoria so they can view and participate more easily. They can use the broom handle or laser to point on the map when prompted and toss pom poms in the Lower Columbia watershed.
- **Q: What do you notice and what do you wonder?** Share with people near you. Share out.

**Attn. Signal**

- **Q: What is this a map of?** Just like books have titles, maps have titles too. Point out state borders, the Columbia River, and the Columbia River Basin (like a bathtub-all drains downhill and out to the ocean)
- Instruct students to identify:

Map Feature	Action
state border	put a hand on it
River	trace with your finger from end to end
Watershed	stand in it, one calm jump to another (Or step if energy is too high)

**Attn. Signal**

- **Q. What do you notice is missing?**  
Potential Answers: Cities, roads, mountains, buildings, forests.
- **Add:**

Photo-  
Location Signs and Pollution Pom-Poms:



How this lesson might look:

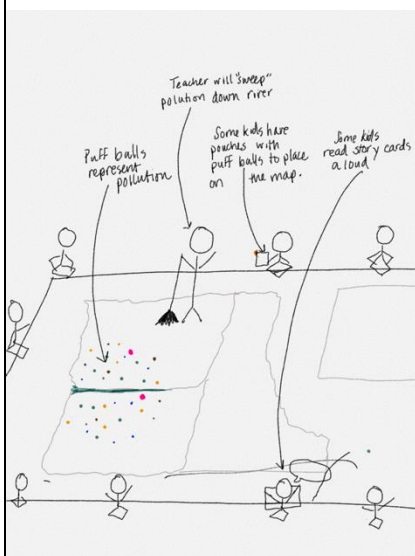


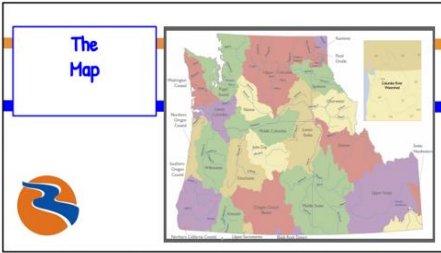
Image- Inset Map Showing Entire Columbia River Drainage Basin:



Item	Symbolizes
Cone	Mt. Hood (at the start of Hood and Sandy River)
Chalkboard Signs	Location of the school you are serving, field trip site, etc.
Blue Wikki Stix®	Nearest creek or river to the student's school or one they will be visiting during their field trip (example: Spring Mountain Elementary, Clackamas- show Mt. Scott Creek).
Only if time allows: Plastic Block and big sponge	Pervious surface Impervious surface

- Pass out colored pom poms in pouches if they were not set up around the map before students arrived. Some students will hold the pouch while others will put the pom poms on the map when instructed.
- **Ask the following questions:**
- Who has car oil as a nonpoint source pollution? It's black. Sometimes, when we don't take our cars in for regular repairs, they can leak fluids like motor oil, coolant, etc. Those fluids can wash down the storm drain when it rains and end up in our waterways. Fish and other wildlife need water that is cool, clean, and clear to survive. These fluids would make it difficult to survive.
- Who has pet waste as a nonpoint source pollution? It's brown. **How many of you take your pets on walks? Well, pets like to poop. It's important that we remember to bring a baggie or container to collect the poop so we can dispose of it properly in the trash or toilet. I know I've made the mistake of forgetting a baggie and had to go back to get the poop later. Don't just leave a plastic bag of it on the side of the road for others to find!**
- Who has herbicides/pesticides as a nonpoint source pollution? It's green. **In the past, I often used weed killer to get rid of the dandelions and clover in the grass in my yard. I've since learned that those plants are helpful for bees! I have also stopped using ant spray around my house because I learned it can kill other beneficial insects. Both chemicals can wash down our storm drains when it rains making their way to the river. If they kill the plants and organisms in the river, the whole food web is impacted.**
- Who has soap (or detergents) as a nonpoint source pollution? It's blue. Discuss. (For optional fun: Play the

Image- Floor Map



song “Workin’ at the Carwash) When I was younger, one of my chores was to wash the car. I’ve since learned that the suds from washing your car can go straight down a storm drain and dump into our local rivers and waterways. Soap doesn’t actually clean up the water. It prevents it from being clean and harms fish, plants and wildlife. I now know to go to the carwash because lawmakers ensured that carwashes clean and reuse the water. If I have to wash at home, I’ve learned to use biodegradable soap and wash the car on a permeable surface like the lawn so the water gets filtered by plants and soils.

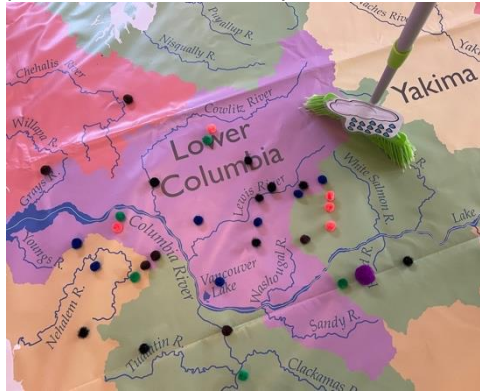
Movement Break--- allow kids to find a new grommet spot.

- Who has litter as a nonpoint source pollution? It’s orange. I think we’ve all talked about litter before with our family or teachers. I think it’s the first thing I learned about pollution. Generally, pick it up and throw it away if an adult says it’s safe. We don’t want plastics or trash in our waterways.
- Who has warm water as a POINT source pollution. It’s magenta. I didn’t really know that warm water was a form of pollution until I was an adult! Factories sometimes release warm water directly into our waterways because they use water to cool machines used in manufacturing or they cool water to prevent technologies from overheating. But when I think about it, it makes sense that water that is too warm would make it difficult for plants and organisms to survive in the watershed. We need to think of warm water runoff as pollution too.
- Review the map key below:

Pollution	Color	Point/Nonpoint	Solution
Vehicle Oil	Black	Nonpoint	Repair vehicles regularly
Animal Waste	Brown	Nonpoint	Pick up pet waste, put in trash or toilet
Herbicides/Pesticides	Green	Nonpoint	Hand weed, use chemicals sparingly
Soaps/Detergents	Blue	Nonpoint	Go to the carwash instead
Litter	Orange	Nonpoint	Pick it up (if safe), and throw in trash



Photo- Broom “cloud” sweeping pollution into waterways as it “rains”



Warm Water  
Runoff

Magenta

Point

Advocate with decision  
makers

- Say, “Once you are done placing pom-poms on the map, please have a seat and put the pouch behind you so it isn’t distracting. Thanks for being a fantastic helper.”
- Prediction time: After pollution is scattered, ask students to predict what will happen.

**Q: When it rains, what do you think will happen to all the pollution? Where will it end up?**

Potential Answers: Pollution will flow downhill and into creeks and rivers. Pollution will end up in the ocean. Pollution will stay. Pollution will soak in the ground. Animals will eat the pollution.

**Q: Does any of it soak into the ground?**

MOVEMENT BREAK: students walk clockwise halfway around the map while they are thinking. Invite them to find a new grommet spot to sit.

- Use the broom “cloud” to move all pollution pom poms down the watershed and into the Columbia River near Astoria. Leave a couple behind to illustrate some pollution can be filtered by native plants.

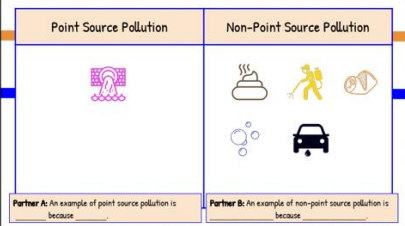


**Reflection (3-5 mins.) Q. What do you notice and wonder NOW?**


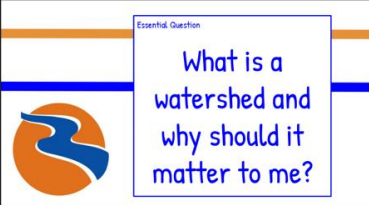


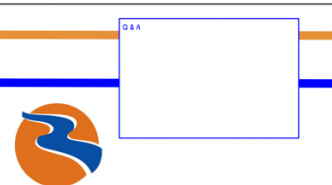

Reflect with the class.

**Q: How can people keep watersheds healthy?**

Have a volunteer student or another adult write student responses on poster or dry erase board.

- Walk or ride bikes, keep cars in good repair
- Pick up pet waste, dispose of properly
- Hand weed, limit chemical use, plant native plants
- Pick up litter (with adult supervision)
- Wash car in grass or at car wash
- Reach out to decision makers about making changes that improve waterways

14		<p>Remind students about the difference between point source pollution and nonpoint source pollution.</p> <p><b>Point-Source Pollution:</b> Pollution originating from a single, identifiable source, such as a discharge pipe from a factory or sewage plant.</p> <p><b>Nonpoint-Source Pollution:</b> Pollution that does not originate from a single source.</p>								
15	<table border="1" data-bbox="207 436 610 653"> <thead> <tr> <th>Watershed</th> <th>Stakeholder</th> <th>Point Source Pollution</th> <th>Non-Point Source Pollution</th> </tr> </thead> <tbody> <tr> <td>an area of land that drains all the rivers, streams, and rainfall to a common outlet</td> <td>a person with an interest or concern in something</td> <td>water pollution that comes in larger amounts from one place</td> <td>water pollution that comes in smaller amounts from many places</td> </tr> </tbody> </table>	Watershed	Stakeholder	Point Source Pollution	Non-Point Source Pollution	an area of land that drains all the rivers, streams, and rainfall to a common outlet	a person with an interest or concern in something	water pollution that comes in larger amounts from one place	water pollution that comes in smaller amounts from many places	<p>Review the vocabulary with students.</p> <p>Cover the definitions for the post-assessment but leave the words up on display.</p>
Watershed	Stakeholder	Point Source Pollution	Non-Point Source Pollution							
an area of land that drains all the rivers, streams, and rainfall to a common outlet	a person with an interest or concern in something	water pollution that comes in larger amounts from one place	water pollution that comes in smaller amounts from many places							
16	<div data-bbox="207 674 610 898"> <p>Clean Up:</p> <ul style="list-style-type: none"> <li>Return "pollution puffs" to the zip pouches.</li> <li>Turn in the zip pouches to the counting captain.</li> <li>Put shoes on (if you took them off).</li> <li>Sit at your map spot and wait for teacher directions.</li> </ul> </div>	<p>Helpful Hint: Choose 3 responsible helpers to do clean up. Instruct the rest of the students to get shoes on and lead them back to class. Fold the map into the trunk at a time where students are elsewhere—it takes energy and brainpower.</p>								
17		<p>Remind students about the features of a watershed. Try to show with body movements how water travels downhill as it rains, draining to rivers, creeks, and streams into a common outlet. Leave this on display for students to see during their post-assessment.</p>								
18	<div data-bbox="207 1169 610 1394">  <div data-bbox="345 1180 557 1346" style="border: 1px solid black; padding: 10px; width: fit-content; margin-left: auto; margin-right: auto;"> <p>What Kids Can Do?</p> </div> </div>	<p>Kids can....</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>(Encourage adults to) repair vehicles regularly, ride bikes or walk when conditions allow</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>Pick up pet waste, put in trash or toilet</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>Hand weed, (encourage adults to) use chemicals sparingly</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>Go to the carwash instead or wash cars on the lawn or permeable surface with biodegradable soap so the soil and grass filters out detergents.</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>Pick up litter (if safe), and throw in trash</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>Advocate with decision makers by letter writing, requesting informational meetings, make presentations, encouraging adults to vote</p> </div>								

19	 <p><b>Learning Targets:</b></p> <p>I can <b>define</b> a watershed.</p> <p>I can <b>explain</b> 3 ways a watershed's health might be threatened.</p> <p>I can <b>explain</b> 3 ways that humans can improve watershed health.</p>	<p>Re-read the learning targets aloud. Give a chance for students to pair-share the learning target that is most difficult for them to explain/describe/define. Those are called the “tricky targets.” Allowing students to talk about their learning before they need to write about their learning on a post-assessment or project improves outcomes and confidence for students.</p>
20	 <p><b>Essential Question</b></p> <p>What is a watershed and why should it matter to me?</p>	<p>Explain that we all live in a watershed and we all need water to survive, so it's in our best interest to keep it COOL, CLEAN, AND CLEAR</p>
21	 <p><b>Post-Assessment</b></p> <p>3:59</p> <p>Note: Only Lower Columbia Estuary Partnership (LCEP) educators are required to administer a pre-post assessment. For educators outside of the LCEP organization, you can decide if you'd like to administer a pre-post assessment or not. Generally, the assessment is a personal K-W-L chart asking students what they know and wonder before you teach and what they learned after you teach.</p>	<p><b>Suggested Script:</b> Scientists, thank you so much for returning your learning space to how you found it. We just pair-shared our “tricky targets” and talked with our partners about what learning target is most difficult to explain. I would like you to return to your desk and return to the paper I gave you at the very beginning of our time together.</p> <p>Please flip to the <b>blue</b> side of the paper. Could you please take 5 quiet minutes to show me what you <b>NOW</b> know about _____? Write or diagram and label everything you can about one, two, or three of these three learning targets. If you choose to make a diagram, please make sure you add labels so I can see what you learned.</p> <p>I will post a list of words you might choose to include, but you're not required to use them. I just thought you might want to know how to spell them if you did. I'm going to <u>read the learning targets one more time aloud</u> and then set a timer again for 5 min. I want to be respectful of your teacher's time and I know your teacher has other topics they would like to teach today.</p> <p><b>Collect pre-post assessments, binder clip them and turn them into the person designated to score the assessments.</b></p>
22	 <p>Symbols that might help in your reflection...</p>	<p>While students are taking their post- assessment, display the symbols for pollution, the vocabulary words without definitions, and a picture of the watershed to help students as they list what they now know.</p>
23	 <p>Q&amp;A</p>	<p>If time allows, ask student if they have any additional questions.</p>
24	 <p><b>Movement Break</b></p> <p>DANCE ALONG</p> <p>POP! POP!</p> <p>GoHoDdie</p>	<p>If time allows, let students be a little silly with this movement break. It's written for preschool, but if you admit that and invite kids to just have fun/be silly, many will take you up on the offer. This will get the wiggles out, so students are ready for their next lesson.</p>

