



Virtual STEM Workshops (K-12)

Harbor WildWatch now offers a series of virtual STEM workshops for elementary and middle school students. The *Harbor Outreach Program* (HOP) consists of 20 hands-on workshops that explore topics in biology, ecology, geology, physics, basic chemistry, energy, and interdisciplinary environmental sciences through the marine science lens. Workshops are led by biologist educators, are 40-60 minutes in length, and accommodate up to 50 students through your preferred digital platform. All workshops meet national STEM standards and align with the Washington State Next Generation Science Standards (NGSS). **We will resume in-person workshops once school reopen to outside specialists.**

Harbor WildWatch is a Gig Harbor based 501(c)(3) non-profit organization dedicated to inspiring stewardship in our community and beyond. Since Covid-19 has affected our traditional classroom workshops, we transitioned to virtual experiences in March 2020. These virtual programs are available to schools who are teaching 100% online, using a hybrid model, and those who are back in the classroom. Workshops are available to public and private schools, as well as homeschool groups.

The following document lists the individual workshops available to K-12 students. To assist in curricula planning, many workshops are arranged in a series that build on one another. Additional workshops are available outside these series, including custom lessons and field courses.

Series Descriptions:

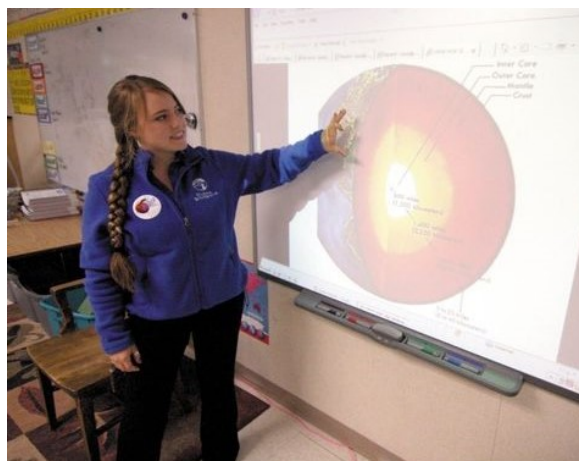
- **Geology Series:** Students learn about the types and formation of rocks, causes of erosion, plate tectonics, and the role glaciers played in the formation of Puget Sound.
- **Water Series:** Students observe the effects of pollution on a watershed, design and build a functioning wetland, and solve the mystery of the estuary by determining the density of various water samples.
- **Life Series:** Students learn about the incredible journey of salmon by building a life-cycle bracelet, following the transfer of energy through Puget Sound's food web, and designing their own intertidal sea creature.
- **Advanced Life Series:** Students learn about the mammals of Washington by becoming a skull detective, examining the anatomy of cephalopods by dissecting a squid, and learning about apex predators and biomagnification through the food web.
- **Individual Workshops:** These workshops do not fit into one of the above series and range from animal classification to ocean acidification.
- **Custom Workshops:** Don't see a workshop that fits your student's needs? We work with teachers to develop a curriculum that suits your existing lesson plan and class needs.
- **Explorer Series:** Explore one of three Pacific Northwest habitats – the beach, estuary, and wetland – through a virtual guided tour.

Thanks to our generous funders, workshops are offered free of charge to all public institutions in Pierce and Kitsap Counties in Washington State. There is a fee for public schools outside our geographic range, private schools, and homeschool groups that do not fall under our grant requirements.

Workshops can be scheduled year-round by contacting Education Director, Rachel Easton. Because we are working remotely, email is the best way to contact her: Rachel@harborwildwatch.org.

GEOLOGY SERIES

#1: Slip Sliding Away-Erosion (3-5) –Geologically, the Puget Sound is incredibly active with many forms of erosion continually altering the environment. Using a presentation and activities, this lesson investigates the physics of gravity, friction and force between wind, water, wave, and chemical influences upon our natural world. NGSS: K-ESS2-2, K-ESS3-3, 2-ESS1-1, 2-ESS2-1, 2-PS1-1, 2-PS1-4, 4-ESS1-1, 4-ESS2-1, 4-ESS3-2



#2: Slip Sliding Away-Tectonics (3-5) – This workshop continues the exploration into erosion via tectonic forces that deform and create new crust through a volcano model simulation and video examination.

Materials are needed for this workshop. NGSS: K-ESS3-2, 2-ESS1-1, 4-ESS1-1, 4-ESS2-1, 4-ESS2-2

#3: Movin' Glaciers (3-5) – Before the last ice age, the Puget Sound basin was at sea level, merely a lowland valley with enclosed lakes, and closed off from the Pacific Ocean. This lesson explores glacial advances, retreats and how ice has shaped our world through hands-on activities with glacial erosion modeling. *Materials are needed for this workshop.* NGSS: 2-ESS1-1, 2-ESS2-2, 4-ESS1-1, 4-ESS2-1, 5-ESS2-2

WATER SERIES

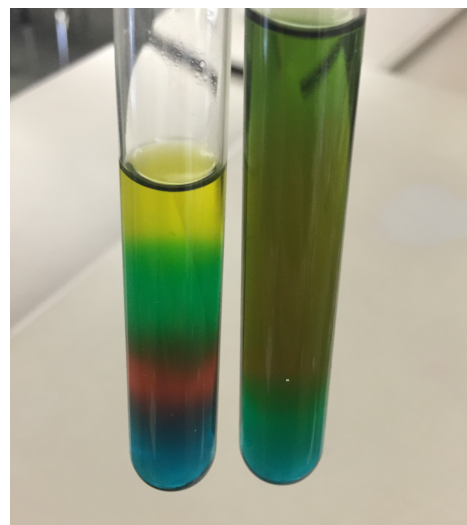
#1: The Watershed Model (3-5) – This lesson investigates how the hydrologic cycle moves non-point pollutants from the mountains to the sea. Students learn how to define a watershed and how Puget Sound is affected by activities in the local watershed with a 3-D model. Strategies on how to mitigate human impacts upon the marine environment are investigated. Students can create an optional watershed model at home. *Materials are needed for this workshop.*

NGSS: K-ESS2-2, K-ESS3-3, K-LS1-1, 2-ESS2-2, 2-ESS2-3, 2-PS1-2, 3-5-ETS1-2, 3-LS4-3, 4-ESS3-1, 5-ESS3-1

#2: Working Wetlands (3-8) – Quagmire, marsh, slough, mudflat, and estuary; no matter what you call them, wetlands serve a vital role in the habitats of the sea and water quality. Through group competition, we see who can replicate the best working wetland. *Materials are needed for this workshop. Tip: This workshop pairs well with the Explore the Wetland field course.*

NGSS: K-ESS2-2, K-ESS3-3, K-LS1-1, 2-ESS2-3, 3-5-ETS1-3, 3-LS4-3, 3-LS4-4

#3: Estuary Mystery (3-6) – Scientists have made a mistake in the lab and need junior scientists to identify where the water samples originated. Students will use test tubes to solve the mystery by examining salinity through the parameter of density. *Materials are needed for this workshop. Tip: This workshop pairs well with the Explore the Estuary field course.* NGSS: K-ESS2-2, 4-LS1-1



LIFE SERIES

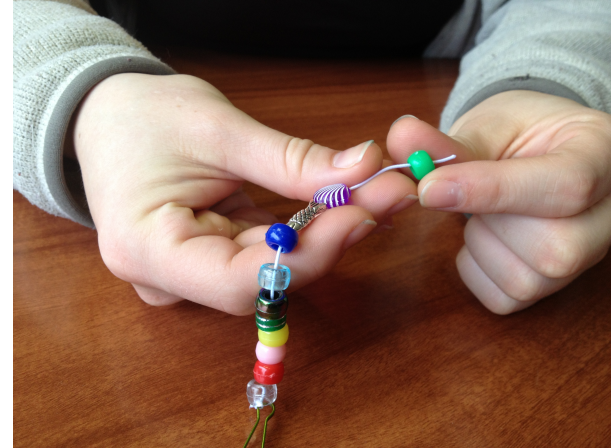
#1: Salmon Struggles (3-6) Salmon have long played an integral role in the history and prosperity of the Pacific Northwest. Learn how unique these indicator species are to our region, their importance to multiple ecosystems, and the obstacles they must overcome to survive by making a life-cycle bracelet. *Materials are needed for this workshop.*

NGSS: K-ESS2-2, K-ESS3-3, K-LS1-1, 2-LS4-1, 3-LS1-1, 3-LS2-1, 3-LS3-2, 3-LS4-2, 3-LS4-3, 4-ESS3-1, 4-LS1-1, 4-LS1-2

#2: Energy through the Worldwide Food Web (3-6) – The concept of energy is difficult to learn. We address this topic through building a marine food web, from base level producers through apex predator, using an interactive card game.

Students can print their own set of cards to play at home. NGSS: K-ESS2-2, K-ESS3-3, K-LS1-1, 2-LS2-1, 2-LS4-1, 4-ESS3-1, 4-LS1-1, 4-LS1-2, 5-LS1-1, 5-LS2-1, 5-PS3-1

#3: Hold On To Your Home (2-6) – Life in the intertidal zone can be harsh. Tides, weather, competition, predation, disturbance and succession all play a role in survival. We discover adaptations that make survival possible while determining ways for a “new” species (designed by students) to be successful in its niche & community. *Materials are needed for this workshop. Tip: This lesson pairs well with an Explore the Beach field course.* NGSS: K-ESS2-2, K-ESS3-1, K-ESS3-3, K-LS1-1, 1-ESS1-1, 1-ESS1-2, 1-LS1-1, 2-LS4-1, 3-LS4-3, 4-LS1-1



ADVANCED LIFE SERIES

#1: Skull Sleuths (5-8) – A lesson in marine mammal comparative anatomy, told through our bone and fossil collection. Students draw clues from anatomy to match skulls with the animals they came from. NGSS: K-LS1-1, 1-LS1-1, 4-LS1-1, 4-LS1-2

#2: Squid Dissection (5-8) – An introduction to dissection, students will explore this animal and its adaptations to life in Puget Sound. Students learn about digestive, reproductive, circulatory, and nervous systems of cephalopods. *Materials are needed for this workshop.* NGSS: K-ESS3-3, K-LS1-1, 4-LS1-1, 4-LS1-2



#3: Apex Predators (5-8) – Students will become familiar with the adaptations that have helped sharks survive millions of years ago in the primitive oceans as well as today in Puget Sound. Comparisons to Orca whales and other apex predators will be discussed as well as the idea of biomagnification of toxins through the food web via PowerPoint presentation. NGSS: K-ESS3-1, K-ESS3-3, K-LS1-1, 1-LS1-1, 2-LS4-1, 3-LS2-1, 4-ESS3-1, 4-LS1-1, 4-LS1-2

INDIVIDUAL WORKSHOPS

Two by Two (PreK-2) – An early introduction into classification through observation and examining the similarities and differences between terrestrial and marine animals utilizing an interactive matching game. NGSS: K-ESS3-3, K-LS1-1, 2-LS4-1, 2-PS1-1, 4-LS1-1

Blubber (K-4) – Marine mammals are found in all the oceans of the world. The greater Puget Sound is home to many, including seals, porpoises, sea otters and three pods of orcas. We investigate what makes mammals unique in the animal kingdom and what adaptations warm-blooded marine mammals have acquired to survive in frigid to near freezing waters. *Materials are needed for this workshop.* NGSS: K-ESS2-2, K-ESS3-3, K-LS1-1, 3-LS4-3, 4-LS1-1

Where is the Water (1-3) - Water is Earth's most unique and precious compound. This workshop investigates the origins of water and its significance to the workings of our planet. Students learn how to identify the properties of water and explore different states of water as it moves through the hydrologic cycle. After the lesson, students can print and play a game of bingo with their families. *Materials are needed for this workshop.* NGSS: K-ESS2-2, K-ESS3-3, 1-LS1-1, 2-ESS2-3, 2-LS2-1, 4-LS1-1

Ocean Acidification (5-8) – Carbon dioxide in our atmosphere is absorbed by the oceans, causing them to be more acidic. Students will learn about the effect of acids on a variety of substrates, including corals, and mollusk shells, sand, rocks and more. Discussion of how ocean acidification affects Puget Sound and brainstorming solutions follows the experiments. *Materials are needed for this workshop.* NGSS: K-ESS3-3, K-LS1-1, 3-LS4-3, 4-ESS3-1, 4-LS1-1

The Keys to Life (5-8) – Students are members of a very large and complex world. To understand their place in the biosphere we utilize a classification model to discuss how scientists have developed familial hierarchies. Students also learn how to identify living organisms through the use a dichotomous key. NGSS: 2-LS4-1, 2-PS1-1, 4-LS1-1



Symbiosis, The Great Equalizer (6-8) – Using a PowerPoint presentation and videos, this lesson explores symbiotic relationships, co-evolution, and the effects that climate change has on those relationships. NGSS: K-ESS2-2, K-ESS3-3, K-LS1-1, 3-LS4-3, 4-LS1-1, 4-LS1-2

CUSTOM WORKSHOPS

Custom Workshops (K-12): The Harbor WildWatch team will work with you to create a workshop that best fits your curricula and class needs. These workshops are available by request and at the discretion of the Education Director. Contact Rachel Easton (Rachel@harborwildwatch.org) for more details.

EXPLORER SERIES

In addition to virtual classroom workshops, we also offer virtual field courses for K-12 students. Students will explore one of three natural environments in the Pacific Northwest through a series of videos with a biologist education and complementary curricula.

Explore the Estuary: Estuaries provide important habitat for a variety of marine and terrestrial animals – including salmon! Students will learn about stream health, salmon lifecycle, and predation in this fun field course.

Five videos are currently available.

Explore the Wetland: Wetlands offer amazing opportunities to experience STEM in action. These guided tours explore the different micro habitats of Sehmel Homestead Park in Gig Harbor. Students will engage their powers of observation to understand how critical wetlands are to clean water. This field trip is available year-round.

Video series coming soon.

Explore the Beach: Each spring, the Puget Sound area experiences some of the lowest tides of the year. Our guided tours begin with a brief beach etiquette lesson on how to be a good guest at the beach, followed by a tour of beach zones and various plants and animals in the intertidal habitat. *Video series coming soon.*



In order to access digital Explorer Series curriculum, please complete the teacher information form on our website: <https://www.harborwildwatch.org/programs/youth-programs/classroom-workshops/>.

To learn more about all Harbor WildWatch programs, please visit our website: www.harborwildwatch.org.