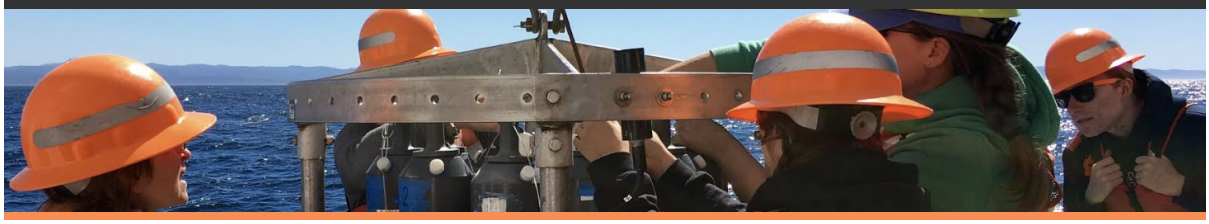
Getting to Know the Oregon Coast STEM Hub, Online Teacher PD Fellowship, OSAS Testing, Elementary NGSS Book Study



THE OREGON SCIENCE TEACHER / FEBRUARY 2019

GETTING TO KNOW THE OREGON COAST STEM HUB

This month, we had the opportunity to connect with the Oregon Coast STEM Hub, based out of Hatfield Marine Science Center in Newport, OR. We had a conversation with several members of their team including **Lisa Blank**, Director, **Tracy Crews**, Student Experiences Coordinator, **Ruth McDonald**, Professional Development Coordinator, **Cait Goodwin**, Communications Coordinator, and **Kama Almasi** and **Kara Allan**, Lincoln County Coordinators. The Coast STEM Hub team shared about ongoing projects they are excited about, their vision for their Hub and their region, and a little bit about how STEM Hubs operate across the state.

TOST: What are some unique opportunities and challenges that teaching along the Oregon Coast present?

Lisa: The Oregon Coast STEM hub serves rural communities located on the coast starting from Brookings all the way up to Astoria. This distinctive landscape provides a unique opportunity for place based learning focused on coastal ecosystems, ocean health, maritime industries, marine science and all the coastal research and outreach that happens through the Hatfield Marine Science Center, NOAA, Fish and Wildlife, USEPA, Tillamook Estuaries Partnership, Oregon Coast Aquarium, South Slough National Estuarine Research Reserve, to name a few. The sheer number of partners working in marine sciences and ocean health is an amazing resource to support STEM futures in collaboration with our P-

20 school districts. We also support a wide array of teacher PD and student STEM experiences outside of marine science such as Picture Perfect teacher PD and Family Engineering Nights, but our location along the ocean is an incredible resource unique to our hub and our communities and one that informs much of our work.

Ruth: One big challenge for our hub is the distance. We host a lot of workshops and meetings online so that people don't have to travel at all. We've gotten pretty good at using Zoom.

TOST: What are some exciting programs the Coast STEM Hub has in the works for Coast teachers and students?

Cait: We have funding from NOAA B-Wet for teachers to get their students outdoors and engaging in stewardship. That includes marine debris, but also bigger topics that have a local focus like climate change and stormwater runoff. Last year, we focused on water quality monitoring. We hosted 5 teacher workshops up and down the coast, with teachers in grades 3-8. We shared online resources and practices, materials, and ideas for working in the field. In one particular workshop we took teachers outside to the creek behind their school. The teachers who were from that particular school knew there was a creek but had not had an opportunity to spend much time back there. We all brainstormed together and gathered data. By the time the workshop was over, the local teachers couldn't wait to teach [their students] at the creek!

Tracy: We run a few engineering challenges every year. One is the MATE Oregon ROV Competition. Before the competition we offer related Teacher PD and have in our trailers kits with tools that teachers can check out. For example, we have ROVs in a bag, so before teachers start building with students, they can take some that are pre-wired, explore how they work and see how they might utilize them. It's a statewide competition that we host in Lincoln City. We have teams from across the state. About half are from the coast and half from the Willamette Valley, and now some are from White Salmon, WA.

Participants are upper elementary to college, building four levels of ROVs (underwater robots). Students form a company and respond to an RFP. There are 34 regional competitions that feed into the international competition at Monterey Bay. The top levels of teams can get together and compete with 55-60 teams from across the world. Each year the

competition has a different theme. This year, the theme is all around the use of ROVs and freshwater, so it's about inspecting and repairing dams, water quality monitoring, salmon restoration and even releasing salmon fry. Now that the theme information has come out we have teams working on designing and building ROVs. They bring their robot along with a marketing poster and present to a panel of engineering judges. Everyone on the team has a different job: communications, and building and operating the ROV. We have 60-70 volunteers from industry that come help with the competition, with the goal that it's very connected to real-world careers and what's happening in marine tech. The second engineering competition is the Oregon Coast Renewable Energy Challenge for 3-12 grade Oregon Coast students. We offer PD where the teachers learn how to build solar and wind devices. Students can bring wind-wave or solar devices to Hatfield Marine Science Center, where there is a wind tunnel and wave machine to test their devices. Students have to bring a poster and interact with industry professionals. It's another opportunity for career connected learning with a specific focus on climate change and renewable energy.

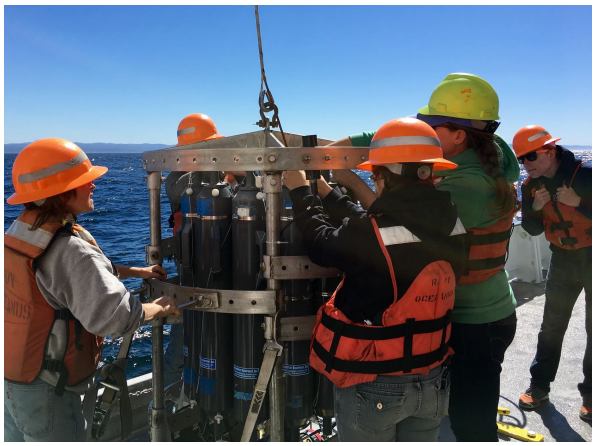
Kama: The STEM hub also sponsors four trailers full of STEM-related materials that teachers can check out in Lincoln, Clatsop, Curry, and Coos County. We have also contributed STEM materials to Tillamook and Florence, but their check-out systems are a bit different than the other four. In Lincoln County, we have one trailer that is full of ROV equipment and the other trailer has everything from boots and waders to Vernier probes, elementary level equipment, family engineering kits, and science/engineering night equipment. We have a courier service that delivers inside of Lincoln City, and Kara and I deliver to teachers outside of Lincoln City. [The other trailers in different areas of the coast have similar equipment and variations on the check out system.]

TOST: How do you make connections with community partners?

Kama: A lot of it is word of mouth. For example, on Saturday we had a guidance counselor from Newport High School, and people coming from around the state with the Gear Up program. They asked if we could put a program together for this group. We went to Lisa, talked it through, and came up with a program for them. It served as a way to get the word out about STEM hubs across the state.

Kara: Some of it is word of mouth, but I also think there are real benefits to Kama and me working for Lincoln County school district and our partnership with the STEM hub. When the STEM hub hosts PD it's great because we get to make contact with specific teachers. We often attend the PD and then can follow up with the teachers who attend. The trailer provides the materials that people need, so we can support learning in the classroom by supporting educators with materials from the trailer, and then we can follow up with the PD and meet them to help with planning.

TOST: What is your vision for the STEM Hub? What goals are you hoping to achieve in the shorter term?



Lisa: STEM hubs are charged with identifying needs, connecting partners and filling the gaps where they find them in the areas they serve. For the Oregon Coast STEM Hub, our mission is to foster STEM futures on the Oregon coast. We use a three-pronged approach that includes STEM teacher PD, student STEM experiences, and connecting partner resources where they are needed. To establish this we do a needs assessment every other year as well as listening tours to make sure we understand the specific needs of our coastal communities. Besides career connected learning for the maritime sector, we also focus on other community needs such as equity, family engagement, Early STEM, ...

Ruth: As an example of our equity work, a few years ago the STEM hub began offering culturally responsive teacher PD which included in-person workshops in Astoria, Newport and Port Orford. As part of this work we invited colleagues from the equity division of ODE to do an introductory session on cultural relevance and diversity. We followed up with the 30 teacher participants with an online book study where participants could further explore these ideas and what it meant for their classroom and student learning. The next year, which was last year, several districts, including Lincoln County recreated that for their own online book studies for their districts.. This year, we're going to be focusing specifically on equity in STEM teaching now that we've had that initial background in equity. We'll be exploring how to structure your STEM teaching and assessments to ensure they invite all students to engage in STEM learning. This February we are offering the course with an in-person kickoff on Saturday the 9th. Dr. Phillip Bell from the University of Washington will be our keynote speaker where he will share his STEM Teaching Tools with a particular focus on how to use Traditional Ecological Knowledge to connect with Tribal families and communities. After the in-person day, we'll have monthly online community of practices meetings that focus on other specific strategies for equitable STEM teaching and learning. Having a mix of

in-person and online meetings makes it easier for both formal and informal educators up and down the coast to participate.

Lisa: As a team, we focus on supporting families and learners along the P-20 STEM pathway. For example, Josh, our North Coast Coordinator partnered with Tracy on a shipboard project that engaged students and teachers from Warrenton School District from elementary up to high school. A science party of 13 researchers, students, and teachers gathered aboard OSU's research vessel, the Oceanus, for a 4-day research cruise aimed at providing mentoring and career connections at sea. The team mission was to conduct marine mammal and seabird surveys and correlate sightings with oceanographic data and prey distribution. Fourth graders from Warrenton decorated styrofoam cups and the high school students brought them onboard the Oceanus where they sent them deep into the ocean on what is called a CTD sensor. Given the greater pressures, the cups shrink. Josh brought these back to the classes that created the cups where they then explored the evidence for greater pressure and what that means for life in the ocean. After that, the OSU research vessel went to Portland and did two days of outreach for the public. As part of this event, Warrenton School District brought their middle school students to the ship, where they experienced a ship tour by participating marine researchers and learned about the research the high school teacher and students engaged in . . . all in an effort to support career-connected STEM learning from the early years through high school.

Ruth: Connecting and convening partners is our primary goal and where we see gaps, then we work to provide teacher PD and student STEM experiences. We strive to first be conveners, connectors, and facilitators of other partners in our region. If our partners can provide the PD, it is our preference to connect them, but we provide PD where there are gaps. For example, we partnered with OSU pre-college programs to bring i-INVENT camps to the coast. These are camps run by engineering students from OSU up and down the coast. We worked with schools and communities to identify the locations. At the end of the day, our STEM hub work is about partnering to build stronger communities.

OSTA would like to thank the Oregon Coast STEM Hub team for taking the time to share how they support students and teachers in their region! Have you had the opportunity to learn about your local STEM hub? Find out more here: http://stemoregon.org/

OSTA WEBCAST: LET'S CHAT OSAS WITH ODE

How many acronyms will fit into one title? Join Andy Byerly and Leah Plack from OSTA on **February 13, 2019 from 4:30-5:30pm** as we welcome Jamie Rumage and

Noelle Gorbett from ODE to our first OSTA Webcast! Jamie and Noelle will be answering pre-generated questions about the Oregon Science Assessment (click here to add yours to the list). We invite you to kick back, connect with Oregon educators and have your questions answered during this special opportunity. Members and non-members are welcome to attend, but the webcast recording and PDUs will only be available to members. Click here for event details.

OSAS TEST WINDOW BEGINS FEBRUARY 6

New item types, called Cluster/Task Items have been designed to engage students in grade-appropriate, meaningful scientific activity aligned to a specific standard beginning with a phenomenon or design problem that engages student interest and can be explained, modeled, investigated, or designed using the knowledge and skill(s) described by the standard. Item Specification documents are available for Grade 5, Grade 8, and High School for more information. Students will take more time with their 2018-2019 science assessment to demonstrate what they know and can do. ODE expects that it will take the student roughly ninety minutes; that is thirty minutes more than s/he took on average in 2017-2018. To learn more, view this document. Also, join our webcast on February 13!

NSTA MEMBERS: VOTE FOR YOUR DISTRICT XVII DIRECTOR

The annual NSTA Nominations for Board of Directors and Council engages science educators in leadership positions. The NSTA Board of Directors and Council work together to promote excellence and innovation in science teaching and learning for all. The ballot is open to all members who have agreed to receive email from NSTA. The ballot was emailed on December 20, 2019. The subject line in the email is: Vote Now in NSTA's Election! Voting will close on **February 8, 2019**.

SHIFTING TO THE NGSS: PROFESSIONAL BOOK STUDY FOR ELEMENTARY SCHOOL TEACHERS

Are you an elementary school teacher working to enhance your knowledge and understanding of the Next Generation Science Standards (NGSS)? Register to participate in the Shifting to the NGSS: Professional Book Study, taking place in February-March, 2019!

NSTA has developed an Online Book Study around the Enhanced E-book: Discover the NGSS: Primer and Unit Planner. This enhanced e-book offers a comprehensive introduction to the NGSS, including background information, each of the three dimensions in depth, and steps to move teachers toward classroom implementation.

During the online book study, elementary school teachers attend live web seminars and participate in asynchronous discussions with other participants and with the web seminar presenters, Tricia Shelton and Jessica Holman. The web seminars support use of the Enhanced E-book to deepen participant understanding of the innovations of the NGSS. Presenters also share examples and stories from the

classroom to illustrate HOW this understanding can be used to translate the NGSS into classroom teaching and learning.

Cost to individuals:

- NSTA Member: $63
- Non-member: $79

Dates: **February 12, February 26, March 12, March 26**

PRESIDENTIAL AWARD FOR EXCELLENCE IN MATHEMATICS AND SCIENCE

Deadline to nominate an 7-12 grade science educator is **March 1, 2019** and application deadline is May 1, 2019.

The Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST) are the highest honors bestowed by the United States government specifically for K-12 science, technology, engineering, mathematics, and/or computer science teaching. Awards are given to science, technology, engineering, mathematics, and/or computer science teachers.

Awardees reflect the expertise and dedication of the Nation's teaching corps, and they demonstrate the positive impact of excellent teachers on student achievement. The National Science Foundation administers PAEMST on behalf of The White House Office of Science and Technology Policy.

SATELLITE EARTH TEACHER WORKSHOP

Education and Research: Testing Hypotheses (EARTH) is a professional development program that brings together educators and researchers with the goal of bringing real data into classrooms. During this workshop, you will be introduced to a local scientist engaged in current research. The presentation will focus on learning about how and why data is collected in order to help you incorporate near/real-time data into your curriculum. EARTH is hosted by Monterey Bay Aquarium Research Institute (MBARI). For more information, please visit the EARTH website at http://www.mbari.org/earth/

When: **March 2, 2019**

Time: 9:00 am - 3:00 pm

Where: North Bay Elementary School, 93670 Viking Lane, North Bend, OR 97459. View flyer here.

ADI 101 - ARGUMENT-DRIVEN INQUIRY FOR ELEMENTARY

This OSTA-sponsored workshop is an introduction to the Argument-Driven Inquiry (ADI) instructional model. Participants will first learn about the limitations of typical laboratory instruction and why ADI can help all students develop the knowledge and skills they need to be proficient in science. Next, the participants

will have an opportunity to learn about the ADI instructional model by participating in all eight stages of two different ADI lab investigations from start to finish. Finally, the participants will learn how ADI is aligned with state science standards and CCSS for English-Language Arts.

6 PDUs are available through OSTA! Workshop is for teachers teaching grades 3-5, but could be adapted for younger or older students. Date: **March 15, 2019**. Location: Redmond High School, 675 SW Rimrock, Redmond, OR. Cost: $160 per participant, 25 participant minimum. Click here for more information, and to register.

UPCOMING SCIENCE EVENTS AND PROFESSIONAL DEVELOPMENT

Don't forget to check the Oregon Science Calendar for more!

Online learning

- Engaging People of Color in STEM, February 8
- Shifting to the NGSS book study, begins February 12 (K-5)
- OSTA Webcast: Let's Talk OSAS With ODE, February 13
- Performance Assessment in the NGSS Classroom: Implications for Practice, self-paced until March 31
- Developing Instructionally-Embedded Performance Assessments for the NGSS Classroom, self-paced until March 31
- Student-Centered Classrooms, A Constructivist Approach, 3/4-4/28
- Cascadia Earthquake Education course. Self-paced.
- UO Real Solutions for NGSS Science Teaching. Self-paced.

Central Oregon and the Columbia Gorge

- Lunch with a STEM Professional, February 18
- Introduce a Girl to Engineering, February 20, 21, 23
- Algorithms and Artificial Intelligence: Science Takes on Fake News, February 26
- Argument-Driven Inquiry for Elementary, March 15

Greater Oregon

- Return of the Condors, February 28
- Argument-Driven Inquiry for Elementary, March 15

Lane County

- Project Wild Workshop and NGSS Training, February 13

Oregon Coast

- Computer Science Fundamentals Workshop, February 9 (K-5)
- Culturally Responsive STEM Teaching Community of Practice, February 9
- Climate Workshop - Teachers on the Estuary, February 15-17
- Outdoor School Educator Workshop, March 1
- Green Crabs in Oregon MBARI Earth Workshop, March 2

Portland Metro

- The Effect of Coastal Upwelling on el Nino and la Nina, February 1
- Data Science for Social Justice, February 2
- Arduinos and Microcontrollers: Fundamentals, February 4
- Engineer a Shoe, February 9
- Oregon MESA Day, February 16
- A Systems Thinking Toolkit, February 17
- Oregon Ag in the Classroom workshop, March 4

Southern Oregon

- Twelfth Annual Explore Event at UCC, February 6
- PopUp SuperQuest - Intro to 3D Printing, February 8
- Computer Science Fundamentals Workshop, February 9 (K-5)

South Metro-Salem

- World of Speed Makers' Fair, February 23
- Oregon Ag in the Classroom workshop, March 4
- Geofest, March 9
- Rise Above Plastics day, March 14
- Leap Into Science, April 6

OREGON'S STEM LEARNING ECOSYSTEM
by Lisa Blank, Director of the Oregon Coast STEM Hub

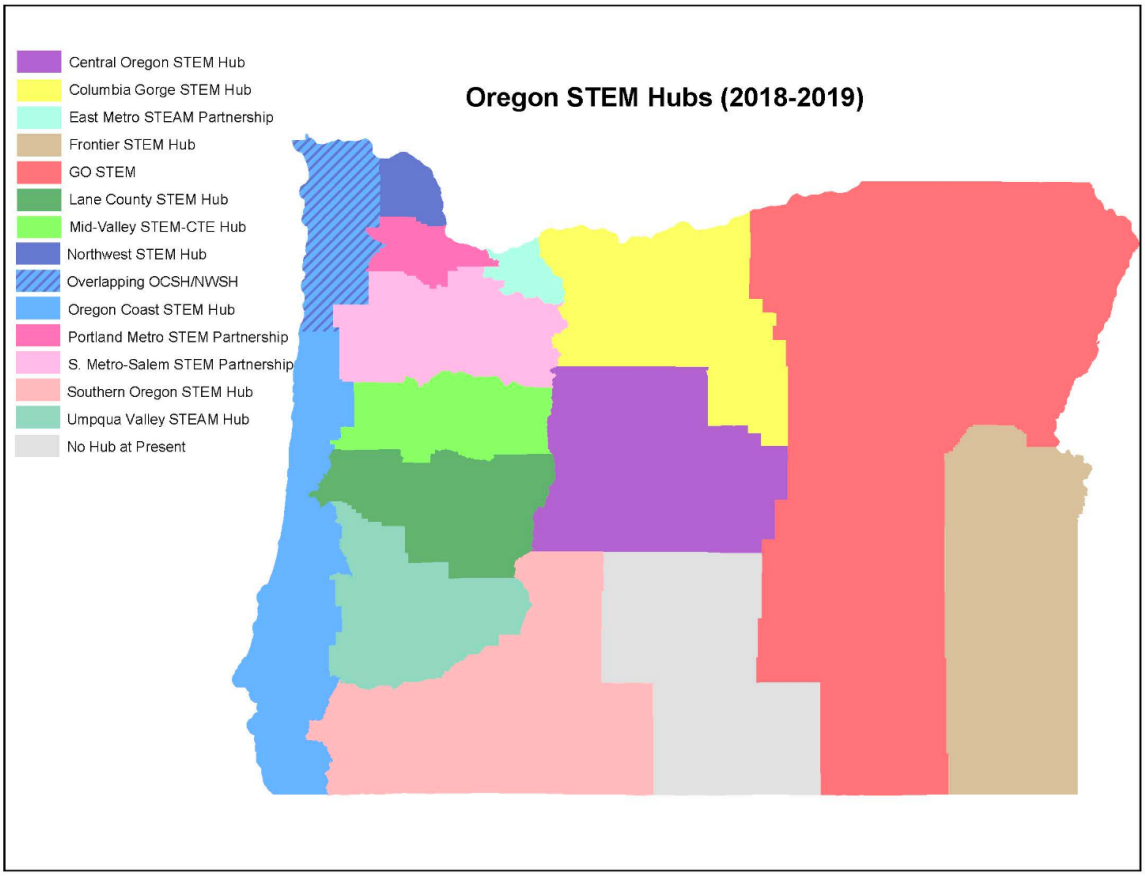
Oregon science teachers are fortunate to be teaching in a state that supports a STEM Learning Ecosystem approach.

What is a STEM Learning Ecosystem and How Do you as a Science Teacher Benefit?

One, STEM ecosystems convene strategic partners to improve education and connect all learners to STEM experiences across multiple learning environments, from school buildings to libraries to creek beds to factory floors, igniting students' passions, interests and aspirations. **In short, STEM Learning Ecosystems are your everyday partner in supporting your work with students.**

Two, STEM Learning Ecosystems were identified in a 2018 federal report as the top strategy for improving STEM literacy. **This means Oregon is well - positioned to secure federal funding for STEM educators - this includes science teachers!**

The Oregon Department of Education supports thirteen STEM Learning Ecosystems that are most often referred to as STE(A)M Hubs. The map below can help you identify and connect with your STE(A)M hub. As well, you can find more information about your STE(A)M hub by visiting: http://stemoregon.org/.



One consistent message STE(A)M Hubs hear from educators is that they would like more specific teaching supports. To that end, OSTA will begin providing monthly, place-based anchoring phenomena that are unique to each hub landscape, aligned with NGSS, and includes connections to community partners for your students to further investigate the phenomena.

The **Oregon STE(A)M Hub Anchoring Phenomena** column launches in March with an anchoring phenomena provided by the Oregon Coast STEM Hub. This means you can expect an anchoring phenomena that helps students better understand Oregon's marine and coastal ecosystems and the questions practicing marine scientists daily ponder.

What Makes a Quality Anchoring Phenomenon?

Central to the changes outlined in the NGSS is the understanding that teachers should “anchor” their instruction in observable, complex, and puzzling events that require students to use their science understandings to explain or predict phenomena.

Known as “anchoring phenomena,” these events focus teaching and learning episodes, integrate math and science learning across several weeks of instruction, and require multiple lines of evidence and reasoning on the part of students.

Let's use a marine science example to illustrate. Dr. Leigh Torres (Marine Mammal Institute, Hatfield Marine Science Center) and colleagues are using drone technology to develop a new whale body size metric - termed “Body Area Index” - that enables marine mammal researchers to compare whale body size within and among whale populations over time.

This research context provides an excellent opportunity to anchor student investigations: How can Body Area Index be used to assess the health of whales? What measurements are essential for creating a Body Area Index? Why? How does the Body Area Index vary from the Body Mass Index for humans? What is the ideal Body Area Index for whales? How is the health of whales related to food availability? Do whale populations struggle with food security or obesity like human populations? How should these findings inform commercial and/or recreational fishing policies?

These questions are too complex for students to explain after a single lesson or online search. Possible explanations are observable to students, require the integration of important math and science concepts and access to data, images, and text to engage in a range of ideas, and depend on considering important stakeholders such as recreational and commercial fisheries. As well, understanding the Body Area Index builds upon the familiar concept of Body Mass Index. These criteria are essential for developing quality anchoring phenomena (Bell, 2016).

Curious? We hope so! See you next month when the Oregon Coast STEM Hub provides a fully developed anchoring phenomena for you to use in your science classroom. Questions? Contact Lisa M. Blank at lisa.blank@oregonstate.edu.

Contact us!
971.361.OSTA | 4110 SE Hawthorne Blvd, #1025 | Portland, OR 97214-5246
www.oregonscience.org| Facebook | Twitter