HIGHER EDUCATION COORDINATING COMMISSION

STEM Investment Council Annual Report to the Legislative Assembly

December 2021

TABLE OF CONTENTS

INTRODUCTION

This report fulfills the STEM Investment Council's obligation under ORS 326.500 to submit an annual report to the State Board of Education, Higher Education Coordinating Commission (HECC) and the Legislative Assembly on progress made toward achieving Oregon's STEM education goals and on state investments in STEM education.

In 2021, the STEM Investment Council focused its efforts on implementing the new Education Plan, in particular to allocate STEM Innovation Grants for 2021-2023.

STEM EDUCATION GOALS

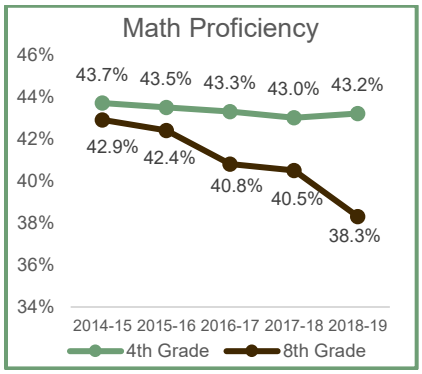
LEGISLATIVELY MANDATED GOALS

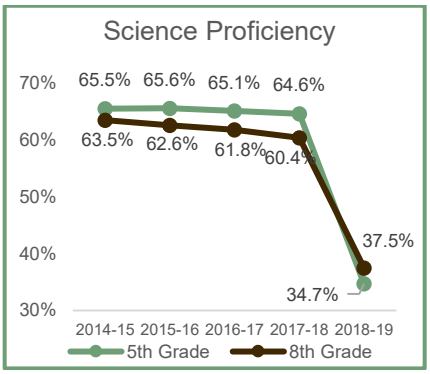
ORS 326.500 sets forth the following STEM education goals for Oregon:

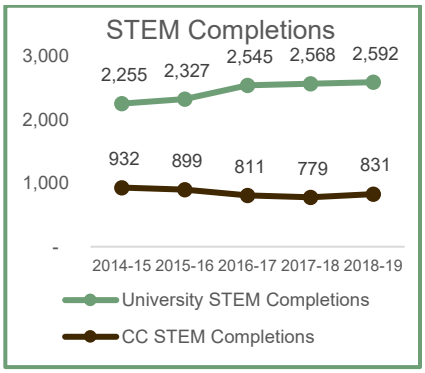
1) Double the percentage of Oregon's students in 4th and 8th grades who are proficient or advanced in mathematics and science by 2025.
2) Double the number of Oregon's students who earn a postsecondary STEM degree or credential by 2025.

These goals are highly ambitious. For context, in 2019, Minnesota had the highest percentage of students scoring proficient or above on the mathematics National Assessment of Educational Progress at 53 percent.[1] Doubling Oregon's percentage of students in the 2018-19 school year scoring proficient or above on its statewide mathematics assessment would mean 76.6 percent of students scoring proficient or better. Further, assessment scores are blunt instruments for gauging progress. Oregon's 2020-2025 STEM Education Plan includes a number of additional goals and indicators, such as STEM identity in students and educators and enrollments in STEM CTE, accelerated learning, and elective courses.

The following tables show the percentage of Oregon students performing proficient or above on statewide 4th and 8th grade mathematics and 5th and 8th grade science assessments[2] and the number of postsecondary STEM degrees and credentials earned at Oregon public community colleges and universities.[3] The science assessment data provided is for 5th grade because Oregon administers statewide science assessments in 5th grade, not 4th grade. As an additional note, Oregon administered for the first time a new statewide science assessment. This accounts for the significant decline in science assessment scores in the 2018-19 school year. The new assessment is aligned to the Next Generation Science Standards and is more rigorous.







[1] The Nation's Report Card, https://www.nationsreportcard.gov/mathematics/states/achievement/?grade=4
[2] Oregon Department of Education
[3] Higher Education Coordinating Commission, Office of Research & Data

STEM INVESTMENT COUNCIL

HISTORY, VISION, AND COMPOSITION

History and Purpose

In 2013, the Legislative Assembly passed and Governor Kitzhaber signed into law House Bill 2636, which, among other things, established the STEM Investment Council. The council's statutory functions are to:

1) Assist the State Board of Education (State Board) and HECC in developing and overseeing a long-term strategy to advance Oregon's target outcomes around STEM education.
2) Advise the Superintendent of Public Instruction and Executive Director of the HECC on the administration of the state's investments in STEM education, including grants for the Regional STEM Hub Network and STEM Innovation grants.
3) Submit an annual report to the State Board, HECC, and Legislative Assembly on progress on Oregon's STEM education goals and the state's investments in STEM education.

The Council also provides guidance to the Regional STEM Hub Network, encourages collaboration between education and business & industry, and raises awareness and understanding of STEM education in the education sector, business & industry, and the broader public.

An Equitable Vision for STEM Education in Oregon

The STEM Investment Council established the following vision for STEM education in Oregon:

"Reimagine and transform how we educate learners in order to enhance their life prospects, empower their communities, and build an inclusive, sustainable, innovation-based economy. Oregonians of all races, economic status, and regions will develop the fundamental STEM-enabled skills and mindsets necessary to:

- Improve the prosperity of all individuals and communities across the state
- Become creative life-long learners who can adapt to changing social and economic conditions
- Fully contribute to an increasingly complex and technologically rich global society
- Address high-demand, competitive workforce and industry needs"

The Council is committed to seeing its vision – and the state's statutory STEM education goals – realized for all student populations – most especially, for students from underserved and underrepresented communities, including black, indigenous, and people of color (BIPOC) students, rural students, economically disadvantaged students, and girls.

Membership

The STEM Investment Council is business-driven, comprising nine voting members from the private sector, jointly appointed by the Superintendent of Public Instruction and Executive Director of the HECC, as well as advisory members from key partner sectors and organizations.

Voting Members

Stefan Bird (Chair)
Pacific Power

Beth Alcouloumre
Trillium Engineering

Marcelino Alvarez
Fresh Consulting

Herb Fricke
Akana

Rita Hansen
Onboard Dynamics

Marv Nelson
A-dec

Lisa Powell
Providence St. Joseph Health

Nikki Salenger
Intel

Paul Stewart
Sky Lakes Medical Center

Advisory Members

Yolanda Coleman
Quatama Elementary

Melissa Dubois
South Metro-Salem STEM Partnership

Andy Grzeskowiak
Siuslaw School District

Jessica Howard
Chemeketa Community College

Katrina Hull
McKay High School

Andrew Lattanner
Oregon Manufacturing Innovation Center

Nagi Naganathan
Oregon Institute of Technology

Kyle Ritchey-Noll
Oregon Business Council

Susan Shugerman
Oregon Health Sciences University

Cara Turano
Technology Association of Oregon

Lela Thieme
Pilot Rock Middle School

Tong Zhang
Oregon MESA

2021-2025 STEM EDUCATION PLAN

The 2021-2025 STEM Education Plan maintains and builds off of the grand vision for STEM education set forth in the 2016 plan. The updated plan attempts to operationalize the existing goals and assign clear indicators, performance targets, and roles. The 2021-2025 plan is highly ambitious, outlining roughly 40 different strategies to implement in order to achieve the plan's four overarching goals. While all outcomes and strategies identified in the plan are essential, the plan identifies 10 priority strategies to guide the state's STEM work over the next biennium:

GOAL 1: Inspire and empower our students to develop the knowledge, skills, and mindsets necessary to thrive in a rapidly changing, technologically rich, global society.

Priority Strategies:

- Incorporate applied learning, project-based learning, and other engaging practices across K-12 curricula.
- Increase time on science in elementary school.

GOAL 2: Ensure equitable opportunities and access for every student to become a part of an inclusive innovation economy.

Priority Strategies:

- Adopt culturally relevant, place-based contexts as the basis for STEM lesson plans, units, and courses.

- Provide financial aid for postsecondary students from underserved/underrepresented communities pursuing STEM postsecondary education and training pathways.
- Reform math and science course content, sequencing, and/or tracking.
- Increase access to high quality out-of-school STEM experiences.

GOAL 3: Continuously improve the effectiveness, support, and number of formal and informal P-20 STEM educators.

Priority Strategies:

- Provide STEM-based professional development sessions and communities of practice.
- Provide high-quality STEM professional development to school and district administrators.

GOAL 4: Develop a sustainable funding and policy environment for STEM and CTE that provides reliable, seamless, and sufficient support across biennia.

Priority Strategies:

- Conduct fundraising outreach to business and philanthropy.
- Collaborate with CTE, workforce, early learning, and educator network leaders, and others to propose, fund, and implement local and regional initiatives.

OREGON DEPARTMENT OF EDUCATION

The Oregon Department of Education (ODE) supports the Regional STEM Hub Network and serves as the administrative agency for STEM Hub Network Grants and STEM Innovation Grants. Nearly one year ago, ODE moved its STEM positions from the Secondary and Postsecondary Transitions team to the Standards and Instructional Support team. This move was intended to create better alignment with related efforts at ODE, such as those being led by ODE's math and science content experts. So far, the move is proving beneficial. ODE created a cross-office STEAM team that meets regularly in an effort to continue to promote alignment across the agency and elevate the work of the STEM Hubs.

Communication and collaboration between ODE and the Regional STEM Hub Network have also grown stronger. As an example, ODE and the STEM Hubs worked together to ensure that high-quality math and science curricula, such as Portland Metro STEM Partnership's High School Patterns Science curriculum, were available through ODE's repository of open educational resources – Oregon Open Learning.

EXPANDING ACCESS TO WELL-ROUNDED COURSES DEMONSTRATION GRANT

Beginning October 2020, the Oregon Department of Education (ODE) received a $9.8 million federal grant for five years to focus its approach to developing, expanding, and implementing a course-access program on expanding access to STEAM-related courses. Specifically, ODE is working toward expanding Oregon's existing STEM program in continued partnership with the STEM Investment Council, regional STEM Hubs, and higher education partners, and building capacity to develop and maintain an arts program to support districts across the state in providing students with access to high quality courses in the arts and to more fully realize STEAM education in Oregon.

ODE has worked with community and education partners across the state to develop a Needs Assessment and project plan that utilizes four strategies:

- Strategy One: Utilizing Oregon's statewide system of regional STEM Hubs, higher education, and CTE partners to both expand development of STEAM-related course content and provide

professional learning opportunities for educators at the local and regional levels to support high-quality instructional practices in delivering STEAM-related courses;
- Strategy Two: Increasing ODE's internal staffing capacity to coordinate engagement of Oregon art educators in developing and identifying existing high-quality creative commons licensed arts-related and arts-integrated course content;
- Strategy Three: Utilizing existing state programs to provide educators with access to STEAM-related course content; and
- Strategy Four: Engaging in a competitive procurement process to identify additional partners to help ODE meet the needs of Oregon students in accessing well-rounded courses.

The Well-Rounded Access Program (WRAP) will meet the needs of students living in rural communities, disadvantaged students, and students experiencing disability through a combination of strategies. First, ODE will center its process for developing and curating course content and providing associated professional learning opportunities for educators around the principles of universal design for learning with a focus on culturally sustaining practices. ODE's plan also emphasizes delivery models that will specifically meet the needs of both students living in rural communities as well as in low-income communities that may not currently have access to well-rounded course offerings. ODE will continue to implement a robust community and education partner engagement process throughout the duration of the grant period to ensure that the work happening under the grant is meeting the needs of students and their communities.

OREGON MATHWAYS

In 2014, the ODE math team began sharing a model for reimagining math education in high schools by developing pathways of courses designed around students' postsecondary goals. This work has been embedded into the Oregon Math Project, a K-12 initiative based on the four key principles of Focus, Engagement, Pathways, and Belonging.

Oregon's educational goals (ORS 329.015)	Oregon Math Project Goals
Provide students with the skills necessary to pursue learning throughout their lives in an ever-changing world. (ORS 329.015(2)(c))	**Focus:** Clearly articulate major, supporting, and additional content within K-12 content standards.
Provide an environment that motivates student to have experience in applying knowledge and skills and demonstrating achievement. (ORS 329.015(2)(b))	**Engagement:** Promote emphasis on explicitly engaging in the mathematical modeling process to solve authentic application problems.
Equip students with the academic and career skills and information necessary to pursue the future of their choice. (ORS 329.015(2)(a)) Prepare students for successful transitions to the next phase of their educational development. (ORS 329.015(2)(d))	**Pathways:** Create high-quality math experiences for all students, aligned to standards, that prepare them for a world that branches into exciting careers, such as data science, construction, health care, and education.
Provide an environment that motivates student to pursue serious scholarship. (ORS 329.015(2)(b))	**Belonging:** Cultivate a positive mathematics identity that positions a learner for success in mathematics, particularly with historically underserved students.

The high school math pathways model, also referred to as "2 plus 1," is built on a "core two" years of mathematics that includes algebra, geometry, and data science concepts necessary for all students. The third, or "plus-one," year of mathematics provides rigorous options that align with students' plans for future education and careers. This "2 plus 1" pathway model was relatively unique to Oregon in 2014. More recently, this work has been highlighted in national reports such as:

- Dana Center Launch Years Project

- Branching Out: Designing High School Math Pathways for Equity
- Invigorating High School Math: Practical Guidance for Long-Overdue Transformation

Revised K-12 mathematics standards were submitted to the State Board of Education for approval in September 2021. These revised standards both support the "2 plus 1" model and create pathways through elementary and middle school so students will be prepared for changes in high school. One of the most recognizable changes in the standards is the inclusion of a data reasoning pathway that starts in kindergarten and culminates in high school with significant content in data science. The revised standards will be followed by the adoption of new instructional materials.

The Oregon Legislature approved an education budget for the 2021-2023 biennium that includes $2.0 million dedicated to supporting math pathways implementation in grades 9 through 12. These funds will be used to:

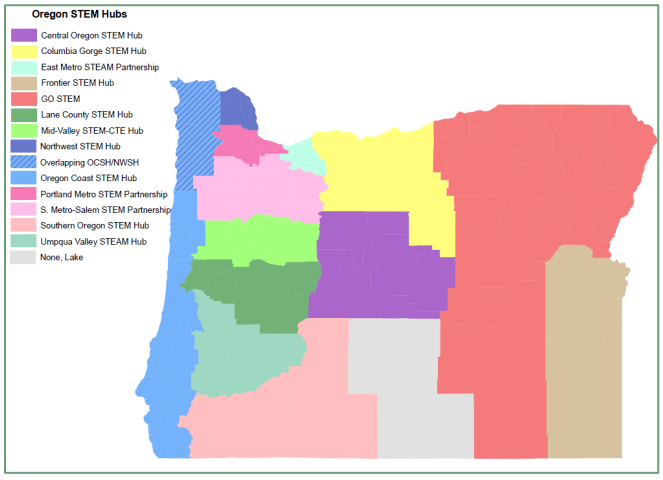
1. Develop professional learning resources that will help math educators statewide use instructional practices that support student belonging.
2. Provide resources to regional partners, such as STEM Hubs, to support development and implementation of instructional materials that increase student engagement.
3. Create a toolkit to help local educators communicate changes in mathematics education to their communities.
4. Convene education partners statewide to address critical policy issues related to implementation of changes in mathematics education.

REGIONAL STEM HUB NETWORK

Oregon's Regional STEM Hub Network comprises 13 STEM Hubs throughout the state. STEM Hubs are multi-sector partnerships linking P-20 educators, schools, school districts, and education service districts to business & industry, CTE regional coordinators, workforce development, economic development and community-based organizations.

Hubs devise local solutions to meet local needs by coordinating regional communication and partnerships, improving student outcomes, building capacity and sustainability for change, and encouraging and supporting local and statewide engagement. Through coordination and alignment, Hubs increase system efficiency.

The Regional STEM Hub Network received nearly $7 million for the 2021-23 biennium, an increase of $2.1 million about the 2019-21 biennium. A snapshot of each hub can be found at the end of this report.



2019-2020 STEM HUB IMPACT DATA[4]

Oregon STEM Hubs - Output and Leveraged Funding		
2019-2021 Biennium		
STEM Hub Output Data	**Value**	**Units**
Number of educators who participated in Hub PD or programs	9,885	Educators
Number of educator hours spent in Hub PD and programs	80,198	Educator Hours
Average number of PD hours per educator	8	Hours
Projected number of students impacted by educator PD participation	363,945	Students
Percent of students in Oregon impacted by STEM Hub PD to their teachers	62.46%	% of students in Oregon
Number of industry volunteers who participated in Hub activities	3,508	Industry Volunteers
Number of industry volunteer hours	18,302	Industry Volunteer Hours
Number of students who participated in Hub directed programs	174,488	Students
Number of student hours in Hub directed programs	374,657	Student Hours
Estimate of students who benefit from equipment loaning programs	30,559	Students
Estimate of teachers who benefit from equipment loaning programs	805	Educators

STEM Hub Leveraged Funding (not including the WRAP grant)	**$**
Grants and sponsorships (current biennium)	$4,466,192.00
Partner investments in Hub initiatives	$1,762,999.80
In-kind time and resources	$1,413,676.11
Funding and in-kind secured for future biennia	$4,451,506.16
Total	$12,094,374.07

RESPONSE TO COVID-19

As communities across Oregon continue to grapple with the effects of the COVID-19 pandemic, the crisis only highlighted the critical need for community-based, collaborative partnerships, like Oregon's STEM Hubs, and the type of engaging, hands-on, project-based learning that is at the core of STEM education. As districts, schools, educators, parents, and students adapted to virtual learning, STEM Hubs stepped up. Over the past year and a half, STEM Hubs have:

- Built and distributed thousands of take-home STEM kits full of hands-on STEM activities and accompanying materials for students and families to do at home. Hubs prioritized the highest-risk students, making kits available in English and Spanish and at school lunch and summer food sites.

[4] Collected by the Regional STEM Hub Network. Data is from July 1, 2019 – September 1, 2021

- Transitioned multiple STEM events for kids and families to virtual platforms.
- Connected students to STEM professionals through virtual "industry chats," field trips, etc.
- Supported hundreds of educators through virtual professional development, including professional development related to teaching in a virtual environment.

OREGON STEM

Oregon STEM worked throughout 2020 and 2021 to develop a 501(c)(3) to support and work in collaboration with the 13 regional STEM Hubs in Oregon. The organization operates with an infrastructure separate from any one hub, with a commitment to advance each hub's regional STEM needs and the larger mission of serving all Oregon communities. The organization has five primary purposes:

- Secure resources that advance each of Oregon's regional STEM Hubs.
- Provide Strategic leadership to Oregon's regional STEM Hubs, along with policy makers, educational leaders, families, and industry partners. Initial priority initiatives include: educator professional development; career connected learning; and Digital Literacy and Computer Science.
- Provide an equity-focused lens to all STEM work and STEM opportunities and ensure underrepresented students (rural students, students of color, female students, and low-income students) are at the forefront of the State's STEM opportunities.
- Provide shared learning to and between Oregon's regional STEM Hubs and promote best practices to STEM Hubs and to other educational leaders throughout Oregon.
- Represent Oregon on National STEM-related issues and work to bring national STEM education investment to Oregon.

The creation of Oregon STEM has been led by four of the hub directors, in collaboration with the entire statewide hub network and cross-sector representatives from throughout the state, representing the Hub regions as members of the Board of Directors.

History and Status

Development of Oregon STEM began in earnest in early 2020 after many discussions with hub leaders and partners about sustainability needs of the Oregon STEM Hub statewide network. Since then, there has been steady progress, including:

- Finalizing bylaws and selecting a founding board, via recommendations from STEM Hubs
- Approval of the Oregon and Federal 501(c)(3) application.
- Establishment of a Board of Directors
- A statewide fundraising event, supported by the Oregon Business Council.
- $87,000 in contributions secured and Ignite matching grant proposal submitted to OCF
- Leadership of the Board shifted from initial STEM Hub leaders to elected officers
- Hired an Interim Executive Director to refine the strategic vision, create foundational infrastructure for the new organization, and develop additional resources.

Board of Directors

Hub Director A - Heidi Larwick, Lane STEM
Hub Director B - Myronda Schiding, NW STEM
Hub Director C - Karla Clark, Southern Oregon STEM
Central Oregon - *seeking nominees*
Columbia Gorge - Christy Christopher, Columbia Gorge STEM Hub Director, *seeking nominees*
East Metro - Jackie Wirz (Board Secretary), Saturday Academy
Frontier - Isabel Lastiri, Youth leader
GO-STEM - Matt Seimears, Eastern Oregon University
Lane - Cara Turano (Board President), Tech Association of Oregon
Mid-Valley - Hema Sundaram, PG&E
Northwest - *seeking nominees*

Oregon Coast - Rusty White, Southwest Oregon Children's Foundation
PMSP - Donna Maleki, Intel
South Metro - Kyle Ritchey-Noll (Board Treasurer), Oregon Business Council
Umpqua - Jared Cordon, Roseburg Public Schools

STEM INNOVATION GRANTS

STEM Innovation Grants are designed to expand the implementation of effective programs related to STEM education, and to test out innovative approaches or programs that transform the way our students learn and improve student outcomes. Funded projects must specify how the program or project will serve a significant number of underserved and underrepresented students and, if proven successful, how the approach will be brought to scale across the state and sustained beyond the term of the grant.

2021-23 GRANTS

In the 2021-23 biennium, the Legislative Assembly funded STEM Innovation Grants at $5.5 million – an increase above current service level. ODE supplemented STEM Innovation Grant funding with funds from other sources in order to fully fund the 2021-23 Innovation Grants.

The STEM Investment Council approved the following 2021-2023 STEM Innovation Grant projects:

Computer Science & Digital Literacy	**$775,684**
Career Connected Learning	**$458,835**
Rural STEAM Leadership Network	**$520,799**
Early Learning STE(A)M	**$464,995**
Design Thinking for STEM Equity	**$195,742**
Industry-connected Classroom Learning	**$110,137**
Oregon Youth Voice in Action in STEM	**$528,696**
Regional Networks for STEM Equity	**$75,600**
STEM Beyond Schools	**$545,062**
High School Science for All	**$395,567**
STEM School Transformation	**$964,476**
Math Leadership Capacity	**$618,924**
STEM Leaders in Elementary Schools	**$618,870**

2019-2021 GRANTS

Descriptions of the 2019-2021 STEM Innovation Grants are below.

Project:	**STE(A)M School Transformation Planning Process**
Lead Hub:	**Portland Metro STEM Partnership**
Participating Hubs:	**Central Oregon STEM Hub, East Metro STEAM Hub, NW STEM, South Metro-Salem STEM Partnership, Umpqua Valley STEAM Hub**
Funding:	**$827,280**

Grant Overview & Goals
Portland Metro STEM Partnership (PMSP) has a STEM School Transformation Planning Process that was designed approximately nine years ago. For the 2019-2021 biennium he STEM Hub Network asked PMSP to be the lead in this work, building off of our experiences in leading our existing process. This funding supported the following outcomes:

- Redesign, test and iterate an improved STE(A)M School Transformation Planning Process. COVID impacted the completion of this goal.
- Build the capacity of five other STE(A)M Hubs to support future planning processes in their regions. COVID impacted the completion of this goal.
- Develop two professional development summer institutes, a 5-day and a 3-day (or equivalent)
- Develop a framework and a set of recommendations for a STE(A)M School Designation Process

Addressing Equity
Whole school transformation is the only way to ensure that all students have access to high quality STE(A)M education by creating a shared leadership and collaborative culture that strongly supports teachers' professional learning so that ALL teachers are exceptional and ALL students benefit.

Outcomes from 2019-21:

- Six STEM Hubs and 10 schools engaged: Central (Buckingham ES, Sisters ES, and Sisters MS), East Metro STEAM (Davis K-5), NW STEM (Hudson Park ES and Jr/Sr High School), Portland Metro STEM (Creston K-8), South Metro-Salem STEM (Scotts Mills ES and Gervais ES), and Umpqua Valley STEAM (Hucrest ES)
- 54 educators plus one parent participate on school-based STE(A)M Leadership Teams during the 2019-20 school year. During the 2020-21 school year, participation dropped off because of COVID and data was only available from four schools that engaged 46 educators in 3,145 person-hours of planning.
- During the summer of 2020, 117 educators from eight schools spanning the six STEM Hub regions participated in a combined total of 2,658 hours of professional development.
- During the summer of 2021, 52 educators from seven schools spanning six STEM Hub regions participated in a combined total of 1,151 hours of professional development.
- Hosted a 2-hour visit to Quatama Elementary School, a full immersion STEAM school in Hillsboro, followed by a 2-hour debrief and discussion opportunity

*****

Project:	**Building Math Leadership Capacity K-8**
Lead Hub:	**Portland Metro STEM Partnership**
Participating Hubs:	**East Metro STEAM Partnership**
Funding:	**$239,355**

Grant Overview & Goals
In the 2019-2021 biennium, the primary goal of this grant was to increase the capacity of the Oregon STEM Hub Network to deliver high quality STEM leadership development opportunities focused on math by creating professional development resources that can be leveraged statewide and utilized annually. The effort focused on developing two institutes, each providing 24 hours of professional learning. Expert educators led the development process that leveraged Equity and cultural expertise. Research-based best practices and a focus on Equity was core to the design principles. A subaward to East Metro STEAM Partnership expanded this work to diversify perspectives on development (e.g., addressing diverse language needs and smaller school districts) and developing EMSP educators as PD facilitators/coaches.

Outcomes from 2019-21

- Six expert educators served on the PD development team and three of these educators also served as course facilitators. Two additional educators served as content reviewers. Three additional educators were trained as course facilitators.

- Four educators with Equity experience and who are a member of a culturally specific community participated in an Advisory Group.
- Two Equity-focused 24-hour PD Institutes were developed, one for K-2 Educators and one for 3-5 Educators: Joy & Justice in Mathematics through Inclusive Practices.
- In the PMSP region, 57 educators from 17 schools participated in the professional development for a total of 1,713 PD person-hours, impacting an estimated 1,825 elementary students. 232 teachers applied to participate. 95% of participants teach in schools with >60% of students qualifying for free/reduced price lunch. 93% of participants teach in schools with >51% Black, Indigenous, and People of Color (BIPOC) youth. All but two schools scored below the math assessment state average of 41%.
- In the EMSP region, 63 educators applied and 37 educators completed the course; those withdrawing cited exhaustion due to the pandemic. A total of 855 PD person-hours were achieved. 73% of participants teach in schools with >50% of students qualifying for free/reduced price lunch. 76% of participants teach in schools with >45% BIPOC youth. "We took the base curriculum established by PMSP and included east county-specific information to tailor it to our area. With the level of diversity and the recent and current political climate, teachers were excited to have a safe place to discuss race/ethnicity and how to be able to reach all of their students," states Jarvez Hall, Director of East Metro STEAM.

*****

Project:	**Professional Learning Communities for NGSS Capacity**
Lead Hub:	**East Metro STEAM Partnership,**
Participating Hubs:	**Portland Metro STEM Partnership, South Metro-Salem STEM Partnership**
Funding:	**$148,849**

Project Summary:
Design Thinking will be utilized to identify the root causes to poor student engagement and achievement in STEM disciplines and begin to address them according to community needs. It is inherently user-centered, and by design demands that those in power engage with users to look to the root causes of challenges in order to identify and execute locally actionable solutions. The strategies of human-centered design inherently and necessarily put the end-user at the middle of the design process. Thus, if one is trying to problem-solve for why Latino males are under-represented in high school STEM electives, then high school aged Latino males are necessarily at the center of the human-centered design process.

The project partners seek to develop the capacity of 2 cohorts of 9 school-based teams of principals and teachers to use Design Thinking as a process to drive a shift in their school's culture of teaching and learning in STEM. This process of capacity building will ultimately serve to help schools meaningfully adopt the Next Generation Science Standards (NGSS) framework for teaching and learning science as well as address other current challenges in STEM teaching and learning (e.g. anti-racist STEM instruction, equitable science teaching, etc). Project partners will engage with a nationally renowned human-centered design coach to lead the work in partnership with local experts in STEM equity and NGSS implementation. Each cohort will have access to ongoing coaching support to allow for development and testing of prototype strategies, with space and time for facilitated feedback.

Outcomes from 2019-21 biennium efforts that advised this project.
- Enrolled 73 teachers across SMSP, PMSP, and Coast STEM Hubs, structures in 21 elementary and middle-school based teams; 7 teams attended with their principal.
- Course was extremely popular and oversubscribed. Coast teachers (not in original budget) were supported by supplemental funds from the Coast and NWSTEM hubs. SMSP and PMSP utilized an equity lens to select school teams prioritizing school ethnic and racial diversity profiles as well as income and geographic constraints.

- 24 hours Summer synchronous/asynchronous Summer learning; Fall Implementation plus 4 hours school year followup. Coast teachers were funded by the Coast STEM Hub.
- A second, abbreviated series was offered in Winter 2021.

Outcomes

- 92.3% of respondents felt More or Much More comfortable with creative problem-solving
- 87.2% of respondents felt More or Much More comfortable engaging with stakeholders
- 100% of respondents felt More or Much more comfortable trying ideas early before implementing at scale.
- 74.4% of respondents felt More or Much More comfortable navigating ambiguity

*****

Project:	**Rural STE(A)M Leadership Network**
Lead Hub:	**Central Oregon STEM Hub**
Participating Hubs:	**NW STEM, Oregon Coast STEM Hub, Frontier STEM, Southern Oregon STEM Hub**
Funding:	**$386,716**

The Rural STE(A)M Leadership Network is an emerging multi-STE(A)M Hub collaboration establishing centers of rural K-8 STE(A)M education leadership within five of the predominantly rural STE(A)M hubs in Oregon. This new network is built to specifically address the inequity of K-8 STEAM professional development resources and opportunities in Oregon's rural communities by creating a variety of new collaboration and networking spaces - explicitly defined as made *for* and *by* rural educators and administrators.

Initially designed as a Zoom-based hybrid model, the Rural STE(A)M Leadership Network has transitioned its two different programs smoothly online: Rural Learning Collaboratives and Oregon Science Project Institutes. The new '20-'21 programming menu for both has been developed with input from participants in response to the changing needs of rural educators during COVID-19 restrictions. The network recognizes and responds to the need for increased time on science in elementary, which then integrates and embeds transferable STE(A)M skills and knowledge across the curriculum, ensuring long-term student success in STE(A)M. It also acknowledges the distinct assets of rural educators and the opportunities for innovation within smaller more nimble systems.

Rural Learning Collaboratives:

- Audience – Rural educators, administrators, nonformal partners, and educational service districts
- Number of Registered Participants – 147 representing 21 counties
- Programs offered Spring-Fall 2020 – Regional Learning Collaborative Launch Sessions, Developing STEM Identities in Rural Regions, Land-Based Student and Family Engagement, Math Engagement, STEAM Integration, Virtual Field Trips, and new YouTube Live Interviews on Topics of Interest.

Oregon Science Project (OSP) Learning Facilitation Institutes:

- The OSP model prepares K-8 teachers to teach *other* K-8 teachers about NGSS and STEAM education. A combination of classroom experience, participation in STEAM professional development, and training in adult facilitation techniques prepares OSP Learning Facilitators to lead *from* and *in* their regions for educators nearby, statewide, and beyond. These OSP Learning Facilitators are then hired by ESD's, STEAM Hubs, and others to provide professional development that was not available before in their region, or from their region's rural perspective.
- Number of K-8 Educators Who Completed the Summer 2020 Institute – 20 representing 9 counties *(Spring 2021 Institute Target is additional 30 Teachers)*
- Professional Development Series Offered by Learning Facilitators Fall 2020 – NGSS & Phenomena, Integrating Math into NGSS, Science in Elementary (Nyssa), Distance Learning with Kinders.

*****

Project: **STEAM Leaders in Elementary Schools**
Lead Hub: **GO STEM**
Participating Hubs: **Oregon Coast STEM Hub, Umpqua Valley STEAM Hub, Columbia Gorge STEM Hub**
Funding: **$217,824**

- COVID response kits: GO STEM provided 2,000 at-home STEM kits for all 4th grade students in our region via a grant from OCF.
- We have shifted all programming and events to a fully virtual format to align with safety protocols.
- GO STEM pitched the STEM Bites idea to the STEM Hub Network, which has developed into a project that all hubs support and provide simple STEM lessons for use during COVID.
- Explore Science Club: Developed sets of videos that highlight eastern Oregon careers that include a video of a STEM professional that matches with a video of a complimentary STEM lesson - 9 in total. These are intended to be used by classroom and non-traditional (club) educators around CCL in a virtual classroom, available on both Google Classroom or YouTube.
- Early Learning Kits: As part of this innovation grant, GO STEM provided asynchronous professional development training videos (available on YouTube) that anyone with an early learning kit can utilize when using with their students. Three kits and video PD opportunities include: Wee Engineering, Natural Resources, and Creative Computing.

*****

Project: **High School Science for All**
Lead Hub: **Portland Metro STEM Partnership**
Participating Hubs: **East Metro STEAM Partnership, Frontier STEM Hub, Lane STEM, Oregon Coast STEM Hub, Southern Oregon STEM Hub, South Metro-Salem STEM Partnership, Umpqua Valley STEAM Hub**
Funding: **$351,183**

Grant Overview & Goals
All students accessing rigorous science courses and learning is, at its foundation, an equity issue. The **High School Science for All** project brings three years of high quality NGSS-aligned and vertically- articulated science curriculum to teachers and students. Too many students in Oregon achieve their required science credit requirements through introductory science electives rather than a pathway that supports rigorous development of science literacy. This non-coherent model results in students, disproportionately youth of color and youth qualifying for free or reduced lunch, not accessing classes that would prepare them for college and career.

The **HS Science for All** curriculum is already open-source and available to all educators. This professional development/capacity building project brings support to teachers and administrators implementing this innovative curriculum and approach through the following strategies:

1. Develop a system of support for schools and districts implementing the **High School Science for All** curriculum.
2. Identify and build capacity for instructors and coaches across the state. Update: This goal was dropped in order to develop Comprehensive Distance Learning resources in response to COVID.

Addressing Equity

HS Science for All brings standards aligned gateway science courses to all students, regardless of their race/ethnicity or socioeconomic status. One 3-year sequence with no tracking provides a fully standards aligned learning experience that prepares all students for post-secondary success in STEM.

COVID Response
Because of the COVID 19 pandemic, an urgent need for Comprehensive Distance Learning (CDL) resources emerged. **High School Science for All** was well positioned to effectively respond to this need; we added a CDL curriculum development strategy to our project. By January of 2020, a full-year CDL curriculum for Physics, one for Chemistry, and one for Biology was developed. Development was kept ahead of the pace of teachers needing the resources. Professional development to support the use of the CDL curriculum was also provided.

Outcomes from 2019-2021

- 113.5 hours of professional development was delivered to educators with a total of 1355.1 hours of synchronous and 703 hours of asynchronous educator PD hours achieved.
- Full-year CDL curriculum units were developed for 9th grade Physics, 10th Grade Chemistry, and 11th grade Biology.
- The Physics and Chemistry CDL resources were translated into Spanish.
- This project reached educators in 12 of 13 STEM Hubs including Central Oregon STEM, Columbia Gorge STEM, Coast STEM, East Metro STEM Partnership, Greater Oregon STEM, Lane STEM, Mid-Valley STEM CTE Hub, NW STEM, Portland Metro STEM Partnership, South Metro Salem STEM, Southern Oregon STEM and Umpqua Valley STEM. The STEM Hub Network has been a critical infrastructure and communication apparatus for statewide impact.
- 339 unique educators from 88 Oregon public high schools in 44 districts have participated in professional development and/or utilize the CDL curricular resources developed through this grant
- An estimated 44,094 students in grade 9, 10, and 11 were impacted by this grant.

To our knowledge, **High School Science for All** is the only resource bringing full course CDL curricular and professional development resources to high school educators during the pandemic.

*****

Project:	**Supporting STEAM Education in the Early Years**
Lead Hub:	**Umpqua Valley STEAM Hub**
Participating Hubs:	***Central Oregon STEM Hub, Columbia Gorge STEM Hub, East Metro STEAM Partnership, Frontier STEM Hub, GO STEM, NW STEM, Oregon Coast STEM Hub, Portland Metro STEM Partnership, Southern Oregon STEM Hub***
Funding:	**$282,196**

GRANT OUTCOMES:

- Increased partnerships with Early Learning Hubs, CCR&Rs, and Early Learning Pre-Service Providers, Stronger system of PD providers delivering training for quality early learning STEAM education Increased engagement of parents in STEAM activities with young children
- Increased access to resources (lessons, materials, support) expressed by early learning educators

Progress to Date:

SOUTHWEST/COAST: Hubs in this region have been introducing Wee Engineering through professional development and the purchase of materials for implementation in child care centers and pre-schools. Partnerships with local CCR&Rs, Early Learning Hubs and Community College Early Childhood Education Programs have led to virtual conferences for 125 providers on Wee Engineering, Supporting Young Scientists and Supporting Young Mathematicians. 1100 Early Learning Kits were distributed through libraries, summer

reading programs, Head Start, Relief Nurseries and Pre-School Promise. Kits are also available in Spanish. Virtual sessions, live and recorded, are available to parents to promote quality STEAM thinking. Materials for checkout to pre-schools and day care centers have been purchased with a focus on mathematics and early coding skills in the Umpqua Valley, supported by professional learning.

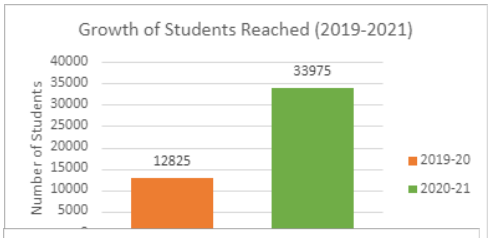
CENTRAL/EASTERN OREGON: Frontier STEM and Greater Oregon STEM Hub, have partnered with 8 Early Learning Hubs across 7 counties to provide STEM Curriculum, kits, and professional development for the early learning providers in our region. The project provide EL providers with five different STEM kit options that will be available for check out. Available STEM kits include: Wee Engineering, LEGO STEAM Park, Natural Resources, and Intro to Robotics (Blu-Bots). Central Oregon has partnered with COCC Early Learning department to offer a 1 credit course entitled "Creating STEM Spaces for Early Learning". The grant covered tuition for 30 educators as well as materials for family engagement.
Leverage funds allowed the development of 10 different kits for 80 families in the Juntos program.

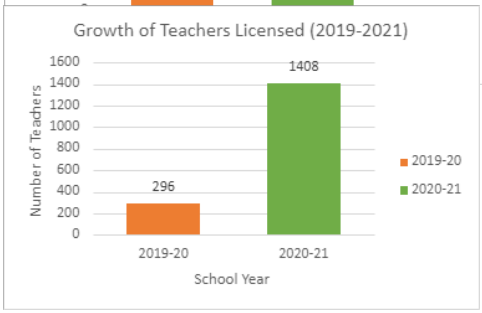
NORTHWEST: The primary focus of PMSP is to bring hands-on minds-on STEM learning to youth of color and youth in poverty. Partners include: Early Learning Multnomah, Early Learning Washington County, United Way of the Columbia-Willamette, NAYA, Latino Network, Kairos PDX, and Immigrant and Refugee Community Organization (IRCO). 3,700 STEM Kits were distributed to families with supporting classes for parents and caregivers to help utilize the kit resources and ideas. Languages included English, Spanish, Nepali, Vietnamese, Arabic, Somali and Russian. The Gorge developed a play-based Early STEM Guide and granted $650 to providers to purchase from a menu of materials to use with the guide. Professional learning was offered to 49 providers in both Spanish and English. NW STEM partnered with their Early Learning Hub and migrant education to provide professional development to 25 providers through Lakeshore to compliment STEM and Naturalist kits . Sessions were held in both Spanish and English.

*****

Project: **Oregon Connections: Industry Connections for Rural and Remote Communities**
Lead Hub: **South Metro-Salem STEM Partnership**
Participating Hubs: **Frontier STEM Hub, Southern Oregon STEM Hub, Umpqua Valley STEAM Hub**
Funding: **$47,966**

Project Summary:
Our approach is to use Oregon Connections, powered by Nepris, to connect students and educators to career professionals in a variety of different fields. Because each region is unique, this will be implemented in a variety of learning environments, in and out of school.
All participating regions will support the integration of Oregon Connections sessions and opportunities to enhance the existing "STEM Bites" effort (a project of the statewide hub network giving teachers access to simple hands-on STEM experiments and projects). This body of elementary-focused STEM projects is perfectly positioned to integrate Oregon Connections "Playlists" and recommendations for industry connection to enhance the experience for students and teachers.

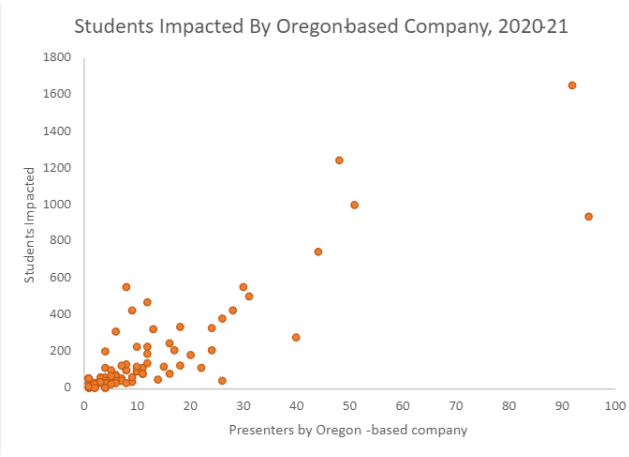




All participating regions will share centralized staff who will create efficiencies and increase
impact in all participating regions- and those who may want to utilize this tool for career awareness and
exploration in future years. Teacher training, calendar coordination, data retrieval, industry roundtables leading to new World of Work

weeks, etc. will free he regions to better support their teachers through the targeted strategies above.

Key strategies by region:



- SMSP: Use regional site license to support Integration of Oregon Connections into AVID programming (MS, HS) to more purposefully and intentionally target underserved students career-connected programming designed to address the Inspiration Gap.
- Umpqua Valley: leverage regional site license to implement a variety of usage models, including development of OrC-embedded curricula at elementary, development of virtual site visits aligned with community college programs of study, and out-of-school usage with non-profits (Boys and Girls Clubs, Upward Bound) and student career clubs.
- Southern Oregon: Southern Oregon brought over nearly 30 new industry partners across multiple sectors to the platform highlighting high wage, high demand careers and will currently focus on training educators and integrating the opportunity into all programming where applicable.
- GO-STEM: utilize regional site license to introduce Oregon Connections in the region for the first time; key emphasis on strategies for rural use.
- Coast: Provide all partnering educators with licensure through regional site license; leverage AVID, Juntos, ASPIRE, and TRIO programs to increase career exploration for BIPOC and rural students on the coast.
- Central: Will utilize existing investments in educator licenses to support targeted usage by educators in the region.

*****

Project:	**Chief Sciences Officers**
Lead Hub:	**GO STEM**
Participating Hubs:	**Columbia Gorge STEM Hub, Frontier STEM Hub, NW STEM, Southern Oregon STEM Hub**
Funding:	**$230,058**

Through the Chief Science Officer (CSO) and Youth Voice Program, students and STEM professionals become aware of and engaged in STEM education efforts. These leadership opportunities empower middle and high school students to serve as STEM Ambassadors in their schools and communities. The CSO Program is part of a growing international program, partnering with CSO Global, supported by the National Science Foundation, and several state and national governments (AZ, PA, MI, GA, NY, TX, Mexico, Kuwait, and growing). This connection to a larger program provides Oregon with support by leveraging resources, providing curriculum and training, and building connections for youth that extend beyond Oregon's borders.

CSOs are 6th through 12th grade STEM leaders who are selected by their teachers and peers, receive leadership training, and develop a community-minded STEM project, or action plan. These Youth Leaders also advocate for and support STEM opportunities in their region. In schools, they serve as a voice for STEM, identifying, designing and leading experiences that reflect student interests. In the community, CSOs serve as ambassadors and thought leaders, working with school boards, government, business, and industry to promote STEM

awareness and engagement. CSOs attend STEM learning opportunities, provide STEM Hubs with insights, connect with other students & STEM professionals, and learn about the array of STEM careers in their region.

Goals

- Empower a pipeline of diverse STEM leaders, particularly those from underserved, at-risk, and underrepresented populations through leadership and workforce skills training
- Increase student voice in local, state, national, and global STEM conversations
- Enrich school and community STEM culture and awareness through industry interactions and community events
- Develop and strengthen partnerships and support resulting in sustainability
- Increase the number of students who plan to pursue STEM-related careers or degrees

All CSOs participate in a Leadership Training Institute (LTI). Under normal circumstances, the LTI takes place on regional college campuses. This year, due to continued COVID-19 concerns, CSOs and their advisors participated in a statewide virtual leadership training institute.
Whether school was taking place virtually, in-person, or through hybrid learning models, CSOs didn't let COVID-19 slow them down. CSOs continued to meet and collaborate, advancing STEM education.
CSO Action Plan Highlights

- Virtual Science Clubs
- Math & Science Tutoring Platform Supported by CSOs
- Robotics Club Websites
- Math Competitions
- Virtual STEM Lessons for Migrant Preschool Students
- Linking STEM Professionals to Ag Programs
- STEM Lessons & Kits for Elementary Students
- Morning STEM Announcements
- Virtual Panel of STEM Professionals
- 3D Printing of PPE

Oregon CSOs	Middle & High School Sites	Collaborative STEM Hubs (Cabinets)
92	32	6

*****

Project: **ThinkUp!**
Lead Hub: **Oregon Coast STEM Hub**
***Participating Hubs*:** **N/A**
Funding: **$11,550**

CS Drive positions STEM Hubs in Oregon to be regional leaders, facilitating a solution that ensures K-12 Oregon public school students receive aligned, meaningful, high-quality Computer Science (CS) learning experiences at the elementary, middle, and high school levels. CS Drive supports the development of comprehensive, equitable computer science plans in school districts across Oregon, with an emphasis on rural school districts. The project provides participating school districts with Strategic CSforALL Resource & Implementation Planning Tool (SCRIPT) professional development which is centered on equity-focused computer science strategic planning, and facilitates the implementation of evidence-based CS programs and curriculum.

For the 2019-2021 Biennium, the CS Drive project supported the following:

- Two SCRIPT Facilitator workshops produced 23 trained facilitators in the seven participating STEM Hubs.
- Eleven district teams composed of over 60 educators received SCRIPT training and began K-12 computer science education strategic planning aligned to state and national goals. One participating school district is now using district dollars to fund a fulltime CS Teacher on Special Assignment (TOSA) to provide CS for ALL to K-9 students as well as additional CS options for upper grade levels which were not previously available. In another participating district, two trained SCRIPT facilitators (who happened to be the Digital Literacy and STEM TOSAs) worked together to create and pilot an integrated math and CS curriculum to expose all seventh graders in the district to programming and 3D printing while meeting required math standards.
- 215 educators received high-quality CS professional development to support school district plans, including cohorts of educators who completed *Exploring Computer Science* and *Bootstrap Algebra* workshops this summer and are now offering these introductory courses at schools across Oregon.
- Materials to support CS implementation were purchased with CS Drive grant funding. Some of these were provided directly to teachers who completed CS professional development to support implementation while others were added to Regional STEM Hub lending libraries. One school district even developed a district plan that built its summer programing around computer science using resources from their STEM Hub lending library. To date, 4145 students have directly benefitted from CS Drive funded programs and resources.
- Four *Counselors 4 Computing* trainings were provided by the National Center for Women and Information Technology (NCWIT) for counselors and administrators across the state. A total of 85 participants attended these webinars to learn about the wide variety of CS-related career opportunities and pathways, then had additional resources mailed to them.

*****

Project: **STEM BEYOND SCHOOL (SBS)**
Grant Recipient: **Oregon State University - Extension Service**
Funding: **$445,000**

This statewide project focuses on increasing access to STEM professional development (PD) opportunities for out-of- school (OST) educators who work primarily with students navigating poverty, students of color, English Language Learners, and students with disabilities in grades 3-8. For most students, out-of-school programs provide their only access to STEM learning opportunities and it also greatly expands their access to science learning.

SBS is not a prescribed student curriculum. It is the "teach the educator how to fish, not just give them the fish" approach based on a networked community of practice and responsive professional development. SBS empowers OST educators to build in best STEAM practices and flex their programming to respond to youth interests. During and after SBS, educators can continue to shift existing programming and provide responsive, equitable STEAM learning opportunities that center youth, incorporate the practices of the Next Generation Science Standards (NGSS) in community and culturally based programs, and are based on the research-driven 4 Core Student Engagement Strategies:
1. Students are doers and designers. "I (can) do it."
2. Activities are place and community based. "It's relevant to my life."
3. Youth interests drive programming. "I have Voice and Choice."
4. Youth apply their learning to new situations. "I can do what I've learned again and apply it to a new problem."

2019-21
During 2019-21, STEM Beyond School (SBS) continued to provide the SBS networked Community of Practice

for OST educators through high-quality, responsive professional development. SBS built a collaborative, virtual space where educators could share innovations, resources, and problems of practice to respond to a continually changing and uncertain educational environment. SBS responded to identified needs and provided real-time supports (Learning Communities, Office Hours, Webinars, Consulting, Discussion Hours, Curated Resources) as educators navigated the delivery of new virtual, hybrid and child care models with their youth. Since SBS is primarily a virtual network, the focus did not change; we converted in-person PD to hands-on, synchronous and asynchronous trainings and modified content and delivery for emergent needs.

Overall, SBS provided 117 hours of professional development supports addressing SBS 4 Core Student Engagement Strategies, Equity, STE(A)M, NGSS Practices and Consulting, Math Strategies, and Social-Emotional learning aligned with STEAM, and Inclusive Curriculum in STEAM, with access to an additional 42 hours of partner opportunities. This summer we developed two additional NGSS hands-on trainings and math-focused supports to facilitate connections between in and out-of-school learning and student engagement.

Reach

The after- and out-of-school field and staff were highly impacted by pandemic-related school and facility closures. We engaged with 45 participants geographically located in 11 STEM Hubs, 35 of whom participated in the networked community of practice. Collectively, SBS educators completed more than 1700 hours of SBS professional development and aligned partner opportunities. SBS also offered 36 hours of additional summer opportunities, mostly pilots (NGSS hands-on series, math workshop, and bimonthly supported discussions around STEAM and math specifically).

SBS educators represent a wide range of programs: youth development organizations including non-profits, museums, CBOs, 4-H, libraries, and outdoor watershed-based educators. SBS educators report working with students from 35 districts statewide. Informal educators have different delivery models and often serve more than one school or district. School district data includes geography where students were served before and during the pandemic.

Mission

The Central Oregon STEM Hub is a partnership connecting regional pre K-12 education, higher education, industry, and community partners to catalyze opportunities and exploration in science, technology, engineering, and math (STEM).

Vision

Through collaboration, Central Oregon STEM Hub partners prepare students to be critical thinkers, career-ready and college-bound students, and informed global citizens through integrated STEM opportunities in and out of the classroom.

Equity

Objective: Every Central Oregon student has access to and is engaged in high-quality STEM opportunities in and out of school.

Indicator: Number of STEM learning opportunities available across counties (formal and/or informal).

Indicator: Number of [historically underserved and underrepresented] students participating in out-of-school STEM experiences and programs.

School Systems

Objective: STEM learning is integrated and prioritized across grade-levels and addresses student barriers, fosters STEM fluency, and student achievement.

Indicator: Growth in time dedicated to STEM learning (measuring time spent in STEM).

Well-Lit, Aligned Pathways

Objective: Young people are aware and ready to enter STEM post-secondary opportunities and careers.

Indicator: Number of times kids have been exposed to STEM experiences.

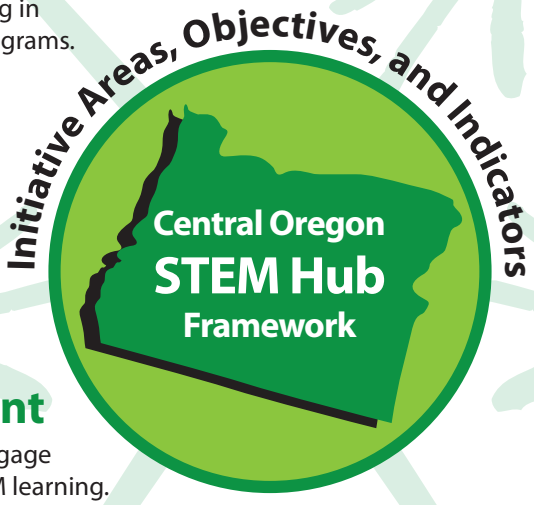
Indicator: Number of STEM certificates and degrees earned [especially by underrepresented and nontraditional students].

Educator Development

Objective: Central Oregon educators engage students in high-quality integrated STEM learning.

Indicator: Educator confidence in teaching STEM.

Indicator: Educator STEM pedagogical and content knowledge.



STEM Identity & Engagement

Objective: Students are interested in and possess STEM knowledge and skills to succeed in a complex future.

Indicator: Number of students enrolled and completing MS/HS/Post-Secondary STEM Courses.

Indicator: Retention in STEM certificate and degree programs.

Indicator: Participation in out-of-school STEM experiences.

Sustained, Reciprocal Investments

Objective: A vibrant STEM ecosystem is part of Central Oregon's reputation and attracts industries and families to live, work, and learn here.

Indicator: Partners use regional assets and environments to spark interest in STEM.

Indicator: Number of business and industry partners engaged in the STEM Hub network.

2019-2021 HIGHLIGHTS BY INITIATIVE AREA

EQUITY	The Central Oregon STEM Hub is committed to equity and creating programs that specifically serve marginalized and non-traditional populations. Our Advisory Board identified this as our top priority and we focused on how to better integrate diversity, equity and inclusion into **all** STEM Hub materials & activities. Examples of specific activities include: an educator workshop series on Integrating Culturally Relevant STEM Practices into Distance Learning, implementing an Assistive Technology Maker Pilot program, and partnering with our local Juntos Aprendemos, Migrant Education, and Jefferson County Library teams to create and distribute 3,000 self-contained bilingual STEM kits to youth and families.
SCHOOL SYSTEMS	Over the biennium, we adapted to invest in our PreK-16 school systems. The Central Oregon STEM Hub aims to create a mindset shift around STEM education - an environment that is less about the acronym and more about how we teach and learn. From sponsoring a Central Oregon Community College STEM class for early learning educators to partnering with the OSU Cascades Co-Innovation Lab to bring high school student interns on board, we attempt to meet the demands of our local school partners around STEM education.
EDUCATOR DEVELOPMENT	We continued to build our PreK-16 relationships, with traditional and non-traditional educators participating in HUB-led professional development ranging from the "Goldmine of Rabbitbrush" to Educator Externships. We provided focused, content-specific trainings and professional learning communities and promoted statewide STEM Hub learning opportunities for our educators. This resulted in over 7500 virtual and in-person professional development hours this biennium. Because of these opportunities, educators are more confident to embrace inquiry, wonder, and real-world learning at the heart of their practice.
WELL-LIT, ALIGNED PATHWAYS	From the earliest STEM learning opportunities, we invite industry and community professionals to participate in our programming and activities. We align our career connected learning priorities to local high growth, high demand STEM careers in the technology, healthcare, manufacturing, construction, and natural resources fields. Specifically, we engaged in in-person and virtual activities such as career exploration events, connecting industry professionals to individual classrooms, and partnering with the High Desert CTE team to support bringing Career Tree and You Science to our schools. At least 4500 youth participated directly in STEM Hub programming this biennium.
STEM IDENTITY & ENGAGEMENT	We strive to build both STEM identity and confidence. Young people are encouraged to be makers, creators, doers, and thinkers in charge of their own learning. Regionally we are focused on gaps in STEM learning specifically related to increasing math, computer science, early learning STEM practices, youth voice, and rural elementary & middle school science.
SUSTAINED, RECIPROCAL INVESTMENTS	We continue to grow the awareness of STEM education in our exponentially growing tri-county region. Despite the challenges of this biennium, the investment of local STEM business and organizational partners in their time, money and insight in our youth continues to expand. Our STEM advocates logged well over 2800 volunteer in-person & virtual hours supporting the youth of Central Oregon.

Columbia Gorge
STEM HUB
Science, Technology, Engineering, & Mathematics

Empowering, informing, and engaging STEM leaders for an evolving world.





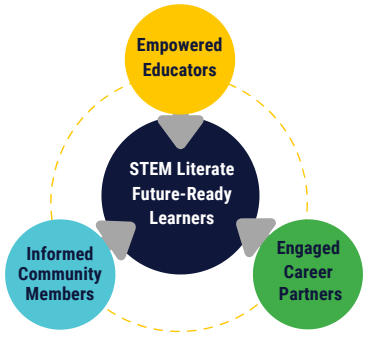

Who We Are

The Columbia Gorge STEM Hub is a regional collaborative devoted to bringing together partners around a shared mission of empowering, informing, and engaging STEM leaders for an evolving world. Our goal is for all youth in the Gorge to grow up to be both STEM-literate and future-ready.

Our Mission

STEM Literacy + **Future Readiness** = **SUCCESS: Adaptable learners prepared for an ever-evolving world**

Theory of Change

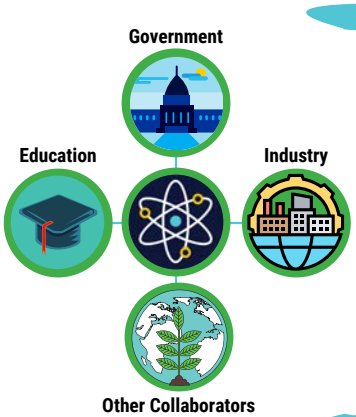


What is STEM?

STEM stands for science, technology, engineering, and math, but it's more than the individual subjects that make up the name. STEM education is about taking an integrated approach to learning, just like how discovery and development happen in the real world.

Why STEM?

STEM is about instilling curiosity, problem-solving skills, connections to career, and a life-long love for learning. Learners who are comfortable with STEM concepts will be well equipped to enter the workforce in our ever evolving world.



How We Work

We seek out opportunities to have the greatest impact across the region through strategic and targeted engagement, focusing on enabling other networks of learners and leaders, working with numerous partners to infuse STEM into their work. Through **collective impact**, we cultivate cross-sector STEM champions with a shared goal of increasing access to STEM.

Our Service Area
Gilliam, Hood River, Sherman, Wasco, & Wheeler counties
(also collaborate with partners in Klickitat & Skamania counties in WA)

541-296-2046 | gorgestem@cgesd.k12.or.us | www.gorgestem.org

Columbia Gorge
STEM HUB
Science, Technology, Engineering, & Mathematics

Significant Projects in 2019-2020 & 2020-2021

Empowering Educators

We envision collaboration between educators, designated STEM leaders at schools and districts, all schools with STEM enrichment, and utilization of STEM Hub resources.

- Monthly opportunities **e-newsletter** and quarterly paper newsletter for resource sharing
- **Elementary STEAM Leaders Cohort -** PD & teamwork to increase time on science and STEM
- Gorge **STEM PreK -** best-practices guide, training, and durable materials for early learning providers, offered in English & Spanish.
- **Microgrants** for educators to increase access to STEM in their schools and community
- Annual **STEM Symposium** training for educators
- **Maker Clubs -** after school clubs lead by local STEM champions, especially for Title I schools

Informing Community

We strive to create and disseminate family-friendly, bilingual information about what STEM is, why it's important, and how students and families can get involved.

- **Chief Science Officers** - student leaders at middle and high school who are focused on elevating the importance of science and STEM
- **Elementary STEM Nights** (support schools in hosting) & community outreach events
- Public communications, including **STEM newspaper insert** and regular press releases
- **STEM Champions contacts** - list of key point people working with populations underrepresented in STEM, to partner in sharing information

Engaging Career Partners

We work to facilitate connections between educators and industry leaders, make it easy for businesses to engage, and facilitate alignment efforts and sharing of best practices about what works across the region.

- Coordinated, **regional approach to career connected learning,** to include a regional college & career expo and other shared efforts
- **Lunch with a STEM Professional**, hosted at a regional location and shifting to school-based offerings for increased access
- New for-credit **STEM-CTE internship pilot**, launched in September 2021

Distance Learning Response

Since the initial school closures in March 2019, we have worked collaboratively to find innovative solutions to the disruptions caused by the COVID-19 pandemic. This has included:

- Spearheaded a team at Columbia Gorge ESD to curate a **comprehensive learning at home resources list** for families.
- Shifted **all professional development offerings to virtual**, with hands-on materials sent to educators' homes.
- Awarded **microgrants** focused on unique needs of distance learning*
- Design, assembled, and distributed **2500 STEM at Home Kits**, with hands-on explorations tied to local careers, to elementary students*
- Created training videos for Maker Club curriculum, to use during distance learning & beyond

*Funded in part by a grant from the Oregon Community Foundation

Learn more and get involved! Visit us at **www.gorgestem.org**.

Our Mission

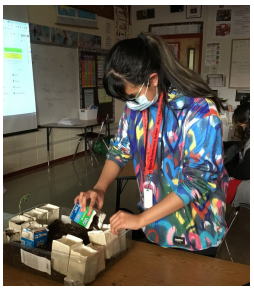
To support, develop, and promote quality Science, Technology, Engineering, and Math (STEM) education for all students of Malheur County to advance Oregon's 40-40-20 goal for students to achieve college and career readiness resulting in long-term economic growth and increased competitive and creative capacity for the region.

Our Vision

STEM education that inspires and empowers all learners to develop knowledge, skills, and mindsets necessary to adapt and contribute to and succeed in an increasingly complex and technologically rich society, building our shared prosperity and economic vitality.

FRONTIER STEM HUB

SCIENCE TECHNOLOGY ENGINEERING MATH



The Frontier STEM Hub serves Malheur County, a large geographic and rural region in Eastern Oregon. The students and districts Frontier STEM serves often face challenges resulting from geographic isolation and limited availability of services, opportunities, and resources. The young people of Malheur County also face challenges associated with the highest child poverty rate in the state at 35% compared to Oregon's average of 18%. Poverty can limit a child's social, educational, and personal development due to reduced access to opportunities.

The Frontier STEM Hub leverages the work of diverse partners and collective impact to create innovative solutions to overcome these challenges and reduce barriers.

To achieve their vision, Frontier STEM has identified the following four goals:

1. Support, develop, and promote formal and informal STEM-learning opportunities, increasing exposure and interest of P20 students to increase proficiency, interest, and attainment of post-secondary credentials and degrees in STEM and CTE
2. Continuously improve the effectiveness of STEM education through quality professional development and support
3. Strengthen industry, higher education, and Career Technical Education (CTE) partnerships that will increase graduation rates with students who are prepared and on track to pursue college and career pathways
4. Sustain an equity committee to ensure that the initiatives of the Frontier STEM Hub incorporate and adopt the principles of Oregon's Equity Lens, ensuring quality, culturally responsive educational opportunities for all students of Malheur County

Frontier STEM Hub Impact Data 2019 - 2021

CSO Monica leading a dual-language, virtual, pre-school STEM lesson for students and families.

- 4,473 students participated in Frontier STEM Hub supported programs, resulting in 13,577 hours of STEM engagement.
- 318 educators received a total of 3,740 hours of STEM-related professional development, reaching an estimated 4,866 students.
- 77 eductors borrowed STEM equipment from the Frontier STEM Hub lending library, engaging over 3,500 students.
- $463,750 in grants and partner investments were secured to support STEM education in Malheur County.

Engaging Youth in STEM

- **Chief Science Officers:** CSOs are youth STEM Ambassadors on their campus and in the community.
  The goals of the CSO program are to:
  - Create a global network of diverse STEM leaders
  - Foster communication and collaboration among CSOs
  - Enrich STEM culture and career awareness
  - Amplify student voice in STEM conversations in the community
- **Mobile Maker Spaces:** Educational spaces, in classrooms, labs, libraries, or community spaces, that provide opportunities for formal and informal educators and students to learn new technologies together. In these mobile spaces, young people all over the county, including remote rural regions, are encouraged to tinker, build, create, and invent, developing skills and mindsets necessary to be successful in today's workforce.

Malheur Works summer intern inspects equipment at Integra Resources.

- **Malheur Works Internship Program:** Through a collaborative effort with local community and industry partners, Frontier STEM supported the development of Malheur Works, an internship program connecting the learning needs of students with the talent needs of industry. In its inaugural cohort, Malheur Works placed ten high school graduates in full-time, paid, summer internships.

Empowering Educators

- **Rural STEM Collaboratives:** Virtual professional learning collaboratives seeking to increase equitable access to STEM education resources, opportunities, and funding to rural and remote communities, while also building new platforms and pathways for rural educators to lead and network at the regional and statewide level.
- **Computer Science for ALL:** Supporting the development of CS education plans for school districts. As a result of this initiative, one local, rural district has allocated funding for a full-time k-12 CS educator and has developed plans for ALL district students, k-9, to receive computer science instruction.
- **STEM PD for Preschool Providers:** Supporting the implementation and use of STEM kits in preschool classrooms and through home providers. STEM kit themes include natural resources, engineering, and robotics.
- **Education Technology and STEM Specialist:** Facilitating and providing teacher leadership for professional learning and instructional practices, applying technology to transform curriculum and instruction and support comprehensive distance learning, as well as, supporting and facilitating STEM education for students and teachers through digital fabrication experiences and the use of STEM maker spaces.

Nickie Shira, STEM & Innovation Coordinator | nickie.shira@malesd.org | 541.473.4865

GO·STEM

Greater Oregon Science Technology Engineering & Math

Background

Vision

Greater Oregon (GO) STEM is a regional partnership that values **STEM learning**, prepares youth for **successful STEM careers**, and **builds pathways and pipelines** to meet workforce needs.

Region

GO STEM serves almost 30% of Oregon's geographical area. Its 7 eastern Oregon counties are Baker, Harney, Grant, Morrow, Umatilla, Union, and Wallowa. Despite its large area, the region's population is relatively low and very dispersed—out of the region's 36 school districts, 30 (88%) are in areas classified as "rural," "remote," or "frontier."

Each county in eastern Oregon is unique and has its own distinctive needs. However, commonalities around the region include rural living, an abundance of public lands, and a history of natural resource-based economies (primarily logging, agriculture and ranching). There are pockets of industry primarily focused on food processing and packaging that form significant numbers of jobs in some counties. GO STEM's mission is to employ these commonalities and align shared values, which will lead to a thriving workforce, career-ready rural youth, and regional prosperity.

Priorities

1. ***STEM Awareness, Pipelines & Pathways:*** Develop a STEM workforce that includes a variety of opportunities for different educational levels.
2. ***STEM Systems for Education:*** Ensure quality STEM educational offerings across Eastern Oregon. This will increase the number of regional high school graduates with full-time employment plans or post-secondary educational plans related to STEM fields.
3. ***Communicating Rural STEM Perspectives, Needs, Solutions and Opportunities:*** Communicate rural values and needs between employers, educators, students, and government.

Achievements to Address Priorities

Pre-K and Parent Engagement (STEM Awareness, STEM Education & Rural STEM Perspectives)
GO STEM has designed classroom kits and professional development focused on STEM learning. The kits continue to be distributed to our three Early Learning hubs who will replicate and distribute the kit numbers across our region. The kits included are: Natural Resources, Wee Engineering, and Creative Computing.

STEAM Leaders in Elementary Schools (STEM Awareness & STEM Education)
GO STEM is working to develop STEAM Leaders in elementary classrooms and to increase the time spent on quality STEAM learning in the classroom. GO STEM is the lead hub on this project, partnering with the Columbia Gorge STEM Hub, the Umpqua Valley STEAM Hub, the Frontier STEM Hub, and the Portland Metro STEM Partnership. In 2021, GO STEM had: 16 participating teachers in 2nd to 5th grades, from 4 counties, 4

districts, and 7 elementary schools. The project is growing with a new cohort of teachers and continuation with the first cohort as they begin year two of the project.

Youth Voice – Chief Science Officers (STEM Awareness & Rural STEM Perspectives)
GO-STEM participates in the nationwide Chief Science Officer (CSO) Program. CSOs are high school students who choose to serve as local STEM leaders. Regional teams complete Action Plans to create STEM Awareness in their community. In 2021, GO STEM has 16 CSOs and 4 advisors across 3 counties.

COVID Response STEM Kits STEM Kits (STEM Awareness, STEM Education & Rural STEM Perspectives)

- 2,000 STEM kits delivered to all 4th grade students in the 7-county region of GO STEM at the end of 2020. Kits were provided to address the needs of the rural communities of eastern Oregon.
- GO STEM is working to provide a second round of kits during the winter of 2021 to all fourth-grade students across the region.

Explore Science Club (STEM Awareness, STEM Education & Rural STEM Perspectives)

- Nine pairs of videos were designed to provide students an opportunity to learn about STEM careers from STEM professionals matched with lesson videos that are relevant to the STEM career.
- Available in multiple formats – both YouTube and Google Classroom.

STEM Stays Here (STEM Awareness & Rural STEM Perspectives)

- Videos are created that highlight jobs and professions in eastern Oregon.
- Address the "talent drain" in eastern Oregon and serve those farthest from the opportunities. This includes both students and teachers.
- Currently developing a video to highlight healthcare careers and pipelines with the Confederated Tribes of the Umatilla.

Career Connected Learning (STEM Awareness, STEM Education & Rural Perspectives)

- GO STEM has worked with regional partners in Harney, Wallowa, and Union counties to develop the pilot program “Eastern Oregon Works” which connects high school students to internship opportunities.
- Virtual Career Exploration Event connected students to STEM professionals and partnered with the CSO program, brining over 50 students from across the GO STEM region to learn about various careers.

STEM Outreach (STEM Awareness, STEM Education, & Rural STEM Perspectives)

- Social media outreach including STEM stories, news, and events across eastern Oregon and beyond.
- Outreach platforms include: Facebook, Instagram, YouTube, Newsletter, Regional newspaper, and webpage.

By the Numbers

Within the 2019-2020 biennium:

3,643 teacher professional development hours	9,654 student participation hours to 3,723 students	740 hours donated from 95 industry professionals

Connected Lane County

LaneSTEM

2020 – 2021 Legislative Report

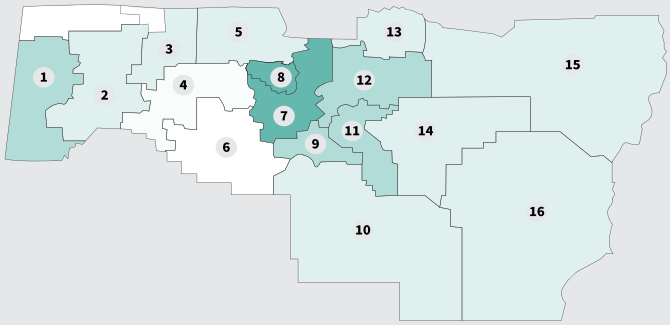
Elevate

by Connected Lane County

Total County Participation

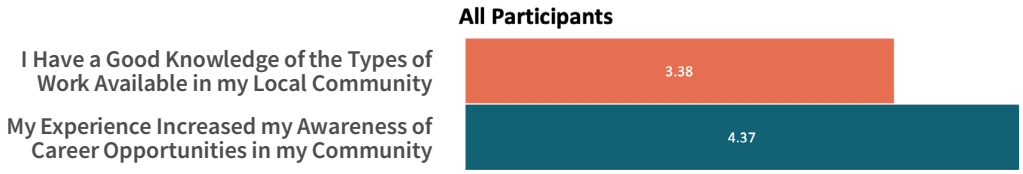
2,117

Elevate is a Connected Lane County initiative, focusing on career-connected learning and post-secondary success, connecting students to high-wage, high-demand jobs in our community.



Student Reported Local Career Knowledge Before & After Participation in an Elevate Program

Pre: n=158
Post: n=60



Anna R, McKenzie

The confidence boost has helped—winning and **knowing that I can finish and present something of high quality.** Working in that environment [codeORcreate] under a time limit makes things easier knowing that it's happened before and I can do it again.

Megan Shultz, 15th Night

Connected Lane County is the bridge—we have employers who need a skilled, qualified workforce and educators who are trying to keep kids engaged in school and on the path to graduation. CLC helps provide **the pathway for both partners to reach their goals** by breaking down the silos.

2ND ANNUAL code OR create

XS MEDIA

Link Source IT

EMERALD BROADBAND

49 students
12 teams
11 industry mentors

NEW

sparklab

4,000 sq. ft. for youth and educators to invent and explore new skills:

- ***Woodshop***
- ***CNC router***
- ***CNC mill***
- ***3D printers***
- ***Laser cutter***
- ***CAD/CAM drafting***
- ***Micro-controllers***
- ***Screen printing***
- ***Vinyl cutter***
- ***Textiles***
- ***Digital arts***
- ***Traditional arts***

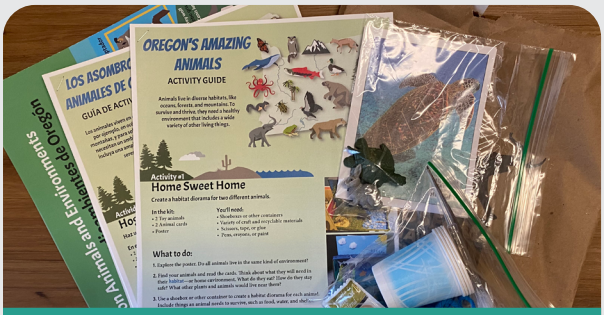
A place where community, education, & industry come together to support Lane County youth in invention, education, and career-connected learning

Oakridge, Lowell, Crow-Appleate-Lorane, Cottage Grove, McKenzie

TAKE-HOME LEARNING

Summer Learning 2021

1,000 Museum Kits
800 Books
50 STEM Kits
100 Activity Kits

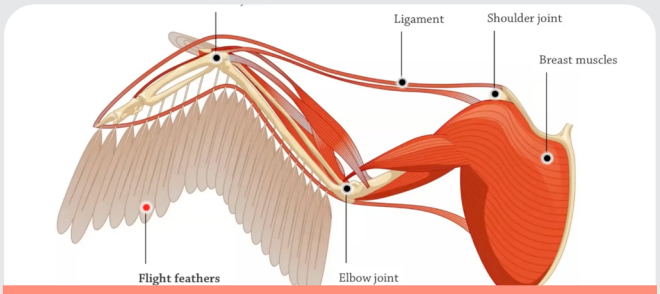


South Lane, Lowell, Crow-Applegate-Lorane, Junction City, Mapleton, McKenzie, Oakridge, Pleasant Hill

MUSEUM OF NATURAL AND CULTURAL HISTORY

At-Home Learning Kits

9 rural schools
1,900 education kits



4J, Junction City, Oakridge, Lowell

Family STEAM Night Kits

*Over **1,100 Kits** Distributed to K-6 Students*

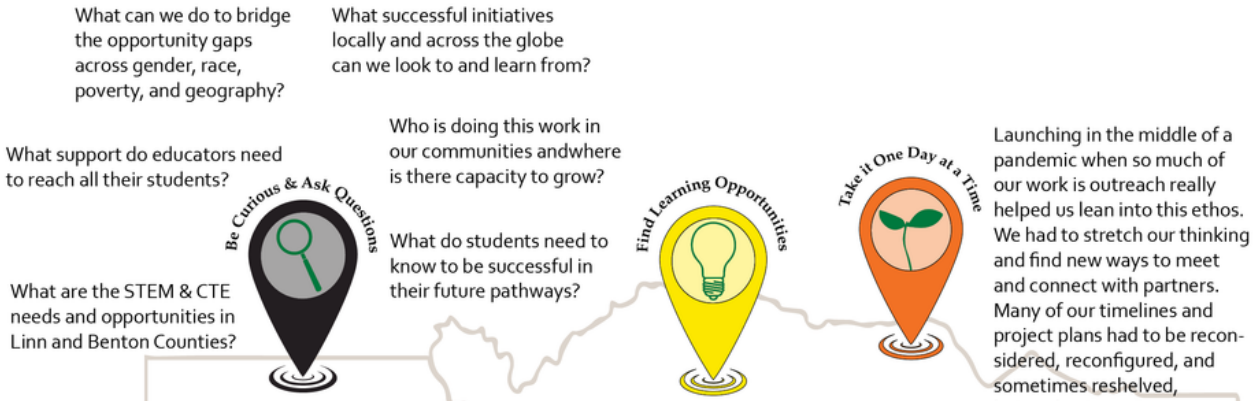
Mid-Valley
STEM-CTE HUB

"Be curious, ask questions, network, and find learning opportunities.
Take it one day at a time and you will get there. And, most importantly, you belong."

-Sisi Virasak, LBCC Computer Systems Faculty

A Message from Mid-Valley STEM-CTE Hub Director, Sarah Whiteside

As I think about where we are today at the conclusion of our first year as the newest Hub to Oregon's network of 13 STEM Hubs, this quote from our friend and colleague, Sisi Virasak, Computer Systems Faculty at Linn-Benton Community College, sums it up perfectly. We may have only just launched as an organization last August, but Sisi's advice, while intended for her students, also works as a kind of roadmap for the path we at the Hub have taken this past year.



Access our entire annual report:
www.midvalleystem.org/annual-reports

TESTIMONIALS

"Through our partnership with Mid-Valley STEM_CTE Hub, we were able to reach new students and audiences that we previously had been missing. Our project, Manley Jobs, has been recognized on a national level at this point. Thanks to the hub for all the assistance and grant opportunities they provided, so we could take a small idea to the next level."

Blake Manley, Teacher at
Sweet Home High School

"Through our partnership with Mid-Valley STEM-CTE Hub, we brought together invention educators, drone and coding educators, curriculum developers, computer scientists, and professional dancers to create, pilot, and refine a STEAM integrated pedagogical model of invention education with culturally responsive practices that engage youth in artistic performances requiring them to learn about and use invention practices in the context of technologies controlled by coding."

Darryl Thomas, Founder
Code Can Dance

"With funds from the Micro-grants made available by the Mid-Valley STEM-CTE Hub, Greater Albany Public Schools middle school and high school science teachers were able to enhance distance-learning and hybrid instruction during the 2020-21 school year. Seventh and eighth-grade students received individual kits to engage in an engineering design activity. High School science teachers were able to provide quality inquiry and lab-based activities through the use of Pivot Interactives. The Mid-Valley STEM-CTE Hub continues to support our district's teachers by providing Job-Alike learning opportunities and offering materials for teacher-checkout to provide enriching STEM experiences."

Cindy Drouhard, K-12 Science
Program Assistant
Greater Albany Public Schools

"The Lebanon Public Library's partnership with the Hub has been incredibly beneficial. For library employees, it has strengthened our collaboration with youth services staff at neighboring Albany Public Library. Our two libraries share monthly STEM kits (funded by the Hub) that have been extremely popular with our young patrons. The kits have helped us stay engaged during the pandemic while we're unable to offer in-person programming. The kits also provide stimulating, hands-on activities that educate and entertain children while providing a break from excessive screen time due to online schooling. The Hub awarded our library grant funds that allowed us to create an entire STEAM collection (over 50 items) for our Library of Things. The Hub's website and social media are great places to find inspiration and fun experiments. We're grateful to the Hub and appreciate the work they do in helping us promote the importance of STEM education to our patrons."

Kendra Antila, Director
Lebanon Public Library

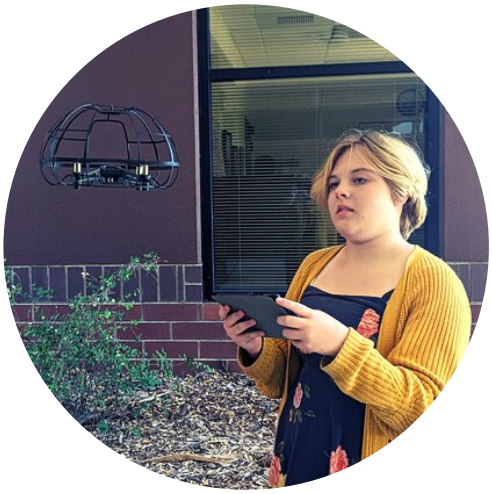
"The Hub has worked with Seven Oak Middle School to provide students with more opportunities surrounding college and careers that they otherwise would not be provided. With the help of the Hub, teachers at SOK have organized career days for our 650 student population. All students are able to meet with professionals from across the Willamette Valley and beyond. Students have reflected that it's been incredible to hear the variety in jobs and understanding that not all jobs require a traditional four-year degree, which is intimidating to some of our population at SOK."

Chelsea Heater, Teacher
Seven Oak Middle School

"We started a brand new alternative school last year. Our funding was extremely limited. But with a microgrant from the Hub, I was able to get a top-notch 3D printer as the cornerstone of our budding STEM program and maker space. Even with our small student body, dozens have started learning 3D modeling and bring their designs to life with 3D printing."

Robert Zarfas, Teacher
Philomath Academy

COVID-19 RESPONSE: MICROGRANTS



The Mid-Valley STEM-CTE Hub's goal is to ensure that all students in our region have access to meaningful STEM and CTE experiences. We firmly believe that supporting great teaching is one of the best ways to achieve that goal.

There is ample evidence that COVID widened the already existing systemic education and inequality gaps. Our grant program aimed to work with teachers and community-based organizations to create inclusive plans to reduce barriers and support students.

The MVSCH microgrants funded equity-focused, STEM-CTE-related projects or initiatives, especially for those furthest from opportunity:

- **First-round: A total of $78,019 was awarded to fund 35 projects.**
- **Second-round: A total of $88,881 was awarded to fund 33 projects.**
- **Third-round: A total of $90,592.98 was awarded to fund 40 projects.**

With the conclusion of our third and final round, we supported **108 projects with a total of $257,492.98**.

These microgrants were made possible with funding and support from the Oregon Department of Education, the Ford Family Foundation, the Oregon Community Foundation, and the John and Ginger Niemeyer Foundation.

Learn more about our 2020-2021 grant program at **www.midvalleystem.org/covid-19-response/**.

Overview

The Northwest STEM Hub is housed within the Instructional Services Department at Northwest Regional Education Service District located in Hillsboro, Oregon. The NW STEM Hub provides regional resources and services to three, rural counties within the NWRESD's service area, which are Clatsop, Columbia, and Tillamook and the thirteen school districts within those counties. NW STEM Hub embraces the goal of leveraging community partnerships to elevate STEM opportunities for pre-K through 20 youth throughout the region. The cross-sector community partnership of K-12 educators, post-secondary education, community-based organizations, internal partners within NWRESD, families, and industry are critical to the success of the Hub and it's programs.

Impact Data

Within the 2019-21 biennium, the Northwest STEM Hub has developed **39 programs**, which served **299 educators**, engaged **636 industry volunteers**, and engaged **6,575 youth** in Hub-related programs. Considering this biennium included the perils of COVID and the global pandemic, many adaptations were able to be made to ensure regional youth had access to as many programs and classroom materials as possible.

Programs

Throughout its existence, the NW STEM Hub focused on fostering connections between partners to collaborate towards common goals. These goals are currently centered around four distinct program areas: regional internship and work based learning opportunities for youth, the development of STEM and CTE educator professional development, providing STEM-based education to early learning educators and families, and developing granting opportunities to support STEM program growth. Both the internship and professional development initiatives require fostering deep collaborations between industry and education partners. Educators engaged in these programs receive ongoing coaching, funding support to launch their own initiatives, a voice at the statewide table, and shape the development of future statewide and regional STEM programming. The NW STEM Hub facilitates connections between industry and education partners with the goals of aligning school-based programs with industry and workforce needs, supporting the development of equitable and accessible career pathways, and contributing to the long-term economic vitality of the communities we serve.

Key Initiatives:

1. **Career Connected Learning through regional Works programs**
   The Northwest STEM Hub has been actively engaged in promoting a Career Connected Learning initiative throughout our region, which includes Clatsop, Columbia, and Tillamook counties. This work includes continuing to expand Clatsop Works, a paid, summer internship program for

youth in Clatsop County. Clatsop Works recruits students from the county's five school districts, along with engaging Clatsop Community College students and programs. The NW STEM Hub has also has also engaged cross-sector partners to replicate Clatsop's best practices to establish Columbia Works and Tillamook Works, leveraging the unique assets and community partners within each county. While COVID was an obstacle for some industry partners to host interns, the regional Works programs were able to host **34 interns** regionally during the summer of 2021: 12 students at various sites with Clatsop Works, 13 at OMIC R&D with Columbia Works, and 9 at various sites with Tillamook Works. Throughout the next year, we are working with our partners to offer additional programming during the school year, more opportunities to develop career readiness skills and connect with local industry.

2. **Professional Development**

   Northwest STEM Hub's goal is to provide pockets of professional development opportunities for P-20 educators. Some examples of these opportunities are:

   - Early Learning- In collaboration with the NW Early Learning Hub, CCR&R, and the Migrant Education team, we provide bilingual STEM professional development for early learning service providers and families.
   - Elementary and Middle School- Through our STEM Innovation projects with the Rural Learning Collaboratives, the Oregon Science Project, and the STEM Transformation Schools, we were able to provide targeted NGSS professional development to elementary and middle school formal and non-formal educators.
   - High School and Post-Secondary- Through our unique partnership with the Oregon Manufacturing Innovation Center (OMIC) and regional manufacturing industry partners, we are providing CTE teachers and guidance counselors opportunities to learn more about OMIC technical skill development and program alignment.

3. **Equity-focused Educator and Families Engagement Supports**

   A long-term goal of the Northwest STEM Hub has been to support equitable student/youth engagement and program accessibility through developing funding resources and grants for curriculum, materials, and supplies for educators and families. Examples of this work are:

   - Community Innovation and Makerspace Mini-grants offered to regional partners in P-20 education
   - Support of non-formal education partners including the Columbia River Maritime Museum, Consejo Hispano, and the regional public library systems
   - Distribution of STEM kits and materials throughout the region as comprehensive distance learning engagement tools, as well as providing access to hands-on learning opportunities for all students

Covid Response

The NW STEM Hub has been a partner in several COVID response collaborations since 2020:

1. In partnership with NWRESD's Migrant Ed program and the NW Early Learning Hub, we developed and distributed over 250 monthly kits from May- August 2020 for regional

Migrant Ed families. The kits included STEM activities and materials, early learning literacy and social-emotional learning components in Spanish.

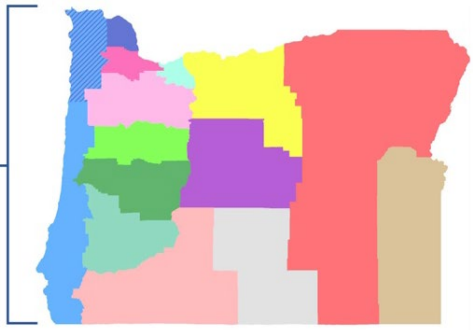
2. In collaboration with regional community partners, the NW STEM Hub distributed over 875 Lego and Micro:bit kits to support comprehensive distance learning throughout the region and 1600 Naturalist kits to K-5 students in Tillamook County.

Innovation Grant Participation:

NW STEM is a sub-awardee in several innovation grants including: Early Learning, CSO, Rural Learning Collaboratives, Computer Science, and STEM Transformation Schools.

Oregon Coast STEM Hub

Who We Are



Headquartered at the Hatfield Marine Science Center in Newport, the **Oregon Coast STEM Hub** (OCSH) serves coastal educators, youth, and rural communities along the entire Oregon coastline, from Brookings to Astoria. Our Hub's geographic region provides unique opportunities for place-based learning focused on coastal ecosystems, marine science and technologies, and career-connected learning for the maritime sector and other coastal industries. The OCSH supports a wide array of STEM teacher professional development and student experiences in a variety of STEM fields, collaborating with more than 60 partners throughout the region. Our partners include 20 school districts and five post-secondary education institutions, as well as a broad coalition of industry, community organizations, and government agencies committed to our vision to foster a culture of STEM innovation.

Student STEM Experiences * Teacher PD * Community Partnerships

VISION: *Fostering a culture of STEM innovation by engaging people of all ages to create a vibrant and prosperous region.*

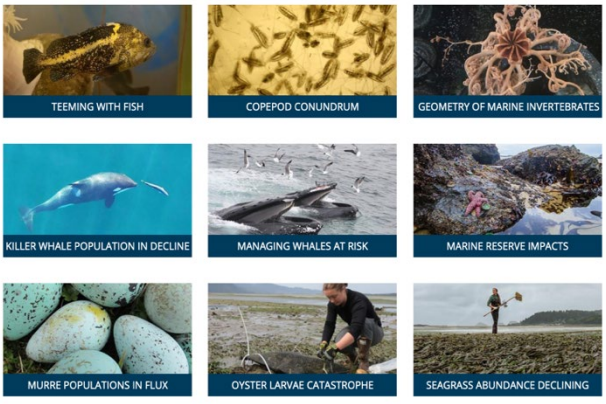
MISSION: *The Oregon Coast STEM Hub engages learners with STEM by leveraging local and regional resources and collaborating with diverse partners.*

Oregon Coast STEM Hub

2021 HIGHLIGHTS & IMPACTS

- → **1,680** students directly engaged in STEM Hub educational programs
- → **317** educators completed **1,155** hours of STEM professional development, reaching **23,846** students
- → **120** STEM industry and community volunteers contributed **415** hours to support STEM experiences
- → **$623,500** grants and sponsorships secured for the Oregon Coast

ORSEA PROFESSIONAL DEVELOPMENT – In 2021, the Oregon Marine Scientist and Educator Alliance (ORSEA) partnered 14 middle and high school math and science teachers with 7 scientists who worked in teams to co-create lessons focused on marine phenomena. ORSEA math and science units engage students in data exploration and include career-connected learning. **https://oregoncoaststem.oregonstate.edu/orsea**



"Together our ORSEA partnership created meaningful, collaborative, and ongoing relationships that interconnect current research, meet education standards, and provide opportunities our students wouldn't have otherwise."

– 2021 ORSEA team

One Story of Our Impact: Yachats Youth and Family Activities Program (YYFAP) is a non-profit organization that serves children and families in South Lincoln County. Like many small organizations, YYFAP has limited resources and depends on our STEM Hub to help them meet their goals. This year, YYFAP staff participated in OCSH Early Learning Workshops and used the activities to integrate STEM into their preschool programs. YYFAP staff also checked out materials from the STEM Hub Resource Trailer to engage youth in hands-on activities during their summer camp programs. They distributed OCSH-created STEM Backpacks to young children through their *Families Together* program, and hosted an iINVENT Camp for middle school students that the OCSH facilitated through our partnership with OSU PreCollege Programs.

LEARNING IN PLACES

This STEM workshop series held in spring 2021 provided 22 of our rural elementary educators with engaging field-based lessons and activities intended to foster equitable and culturally-relevant science exploration, engage families in student learning, and align with Next Generation Science Standards. Participating K-6 teachers implemented lessons with 425 students and shared their experiences with one another in an online learning community.

THRIVING COASTAL COMMUNITIES

In June, 33 Oregon Coast leaders attended a virtual summit on economic and Blue Sector workforce development on the Oregon Coast. Cross-sector participants learned about the OCSH, Oregon Ocean Innovation Hub (O2IH), and efforts to expand broadband access in rural coastal communities, and participated in discussions to develop coast-wide strategies to address rural challenges.

Portland Metro STEM Partnership
650 NW 118th Avenue
Portland, OR 97229
info@pdxstem.org

OVERVIEW

Portland Metro STEM Partnership (PMSP) is a regional collaboration of public and private organizations with a shared goal of transforming science, technology, engineering, and mathematics (STEM) education for P-20 students. Launched in 2011 as a Collective Impact initiative, PMSP was the precursor for the Oregon STEM Hubs. We are now one of 13 STE(A)M Hubs across Oregon (STEAM hubs incorporate arts learning into the other four core STEM subjects). We believe that high-quality STEM education is critical for not only preparing youth for a STEM-based economy but for developing a STEM literate society able to fully participate in our democracy. PMSP supports the creation of world-class STEM learning environments that are highly relevant for ALL students, regardless of background or zip code. PMSP's primary geographic area is defined by the boundaries of our five school district partners: Portland Public, Beaverton, Hillsboro, Forest Grove, and Banks. Our actual region extends beyond these boundaries as we engage community-based organizations, business/industry and other partners outside these school district boundaries.

CORE INITIATIVES

PMSP supports the creation of world-class STEM learning environments that are captivating and relevant for ALL students, regardless of background. We work with education, industry, government, and community partners in the following core areas:

- Provide access to effective professional development: All educators need high- quality professional development that addresses both STEM instruction and assessment.
- Facilitate STEM school transformation: Schools need the resources and support to become STEM- or STEAM- focused
- Develop in-school/out-of-school partnerships: Students deserve expanded STEM learning opportunities. Community-based organizations have access to networking, technical assistance, professional development, and other resources through our STEM network for community educators, the Collaboratory.
- Cultivate career-connected learning: Students and educators benefit from encounters with real-world content and experiences to understand how STEM courses and careers are intertwined.
- Support STEM educators' use of evidence: Educators want to know what's working and what isn't when it comes to creating strong learning environments for all youth.

PMSP addresses these endeavors collectively, resulting in greater impact, by:

- Connecting and convening educators, businesses, professionals, and community programs to work together toward shared STEM education goals with larger effect.
- Identifying resources and relationships across the region, leveraging the strengths and assets of partners to improve outcomes while reducing duplication of efforts and maximizing effectiveness.

- Designing and implementing STEM & STEAM programming for youth in multi-partner projects.
- Providing tools, sharing proven methods, and offering consultations to strengthen our partners and bridge the gap between research and practice to improve STEM learning for all youth.

SUPPORT DURING THE COVID-19 PANDEMIC

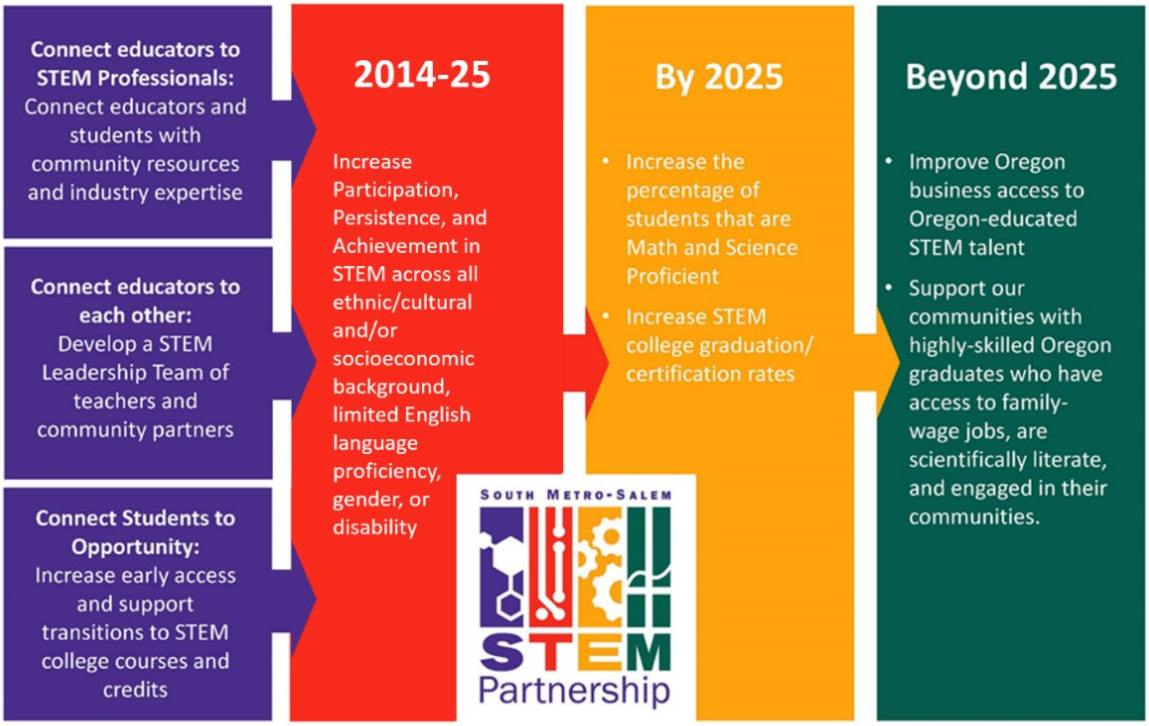
All work of the Portland Metro STEM Partnership pivoted to support educators, youth, and families during the COVID pandemic. Two examples include: Developing and distributing **6,700 Elementary STEAM kits**. These kits brought high quality STEM learning opportunities and all necessary supplies to the homes of families most in need. We partnered with our school districts, their elementary STEM teacher leaders and their school lunch services, to design the highly engaging kits and to deliver them in concert with district lunches. A second example is developing a **full Comprehensive Distance Learning (CDL) curriculum for 9th grade Physics, 10th grade Chemistry, and 11th grade Biology**, as part of our **High School Science for All** initiative. To our knowledge, this is the only resource bringing full course CDL curricular and professional development resources to high school educators during the pandemic.

IMPACTS THIS BIENNIUM

Impact Area	Value
Number of educators who participated in Hub PD or programs	1,405 educators
Number of educator hours spent in Hub PD and programs	15,237 educator hours
Project number of students impacted by educator PD participation	96,334 students impacted
Number of industry volunteers who participated in Hub activities	534 industry volunteers
Number of industry volunteer hours	1,303.5 volunteer hours
Number of students who participated in Hub support programs	14,051 students
Number of student hours in Hub support programs	28,129 student hours
Estimate of students who benefit from equipment loaning programs	3,250 students
Estimate of teachers who benefit from equipment loaning programs	26 teachers

PMSP Leveraged Funds (non-state funds):	Value
Grants and sponsorships (2019-2021)	$786,300
Partner investments in Hub initiatives (2019-2021)	$773,548
In-kind time and resources (2019-2021)	$394,560
Funding secured during this biennium for the future (2021-2023)	$453,721
Total	**$2,408,129**

The South Metro-Salem STEM STEM Partnership (SMSP) is a collaborative of community leaders, representing 17 K-12 school districts, 5 higher education institutions, and more than two dozen industry, civic, non-profit, and community organizations, with the vision to catalyze Oregon students to achieve STEM degrees and certificates, and reach Oregon's education goals by increasing the access, excitement and engagement of students in STEM courses and experiential learning. Since 2012, we have leveraged more than $3.9M of external funding ($402K in new dollars, 2019-21), in addition to state funds, for projects to advance our STEM goals among and in support of our partnering organizations. We seek to achieve these goals by focusing our efforts on activities and objectives that support three core strategy areas that represent the assets, needs, and opportunities in our region, with particular emphasis on strategies that have potential for scalability and/or transferability within the STEM Oregon regional hub network.



The SMSP region is comprised of the suburban and rural areas south and southeast of Portland, continuing through rural regions surrounding the I-5 corridor extending into the urban community of Salem. The 17 partnering school districts serve over 125,000 students, or about 25% of the state's K-12 students. While our partners acknowledge that our region is rich in STEM resources, there has not historically been cross-district or cross-sector collaboration to tap these resources in a coordinated, systemic, equitable manner. Localized economic and geographic disparities have largely determined which students could access high quality STEM educational resources. Local employers are unable to fill open, well-paying STEM jobs with students from their community, all of which are increasingly ethnically and racially diverse. Systemic coordination of efforts, collection of data, encouragement of new partnerships, and initiation of new opportunities to acquire resources are needed. *The hub backbone enables such cross-sector collaboration across our three core strategies to ensure that best practices and valuable resources are shared among educators, across sectors, and between partner institutions for the good of all students in our region, our workforce, and our communities.*

Since 2012, the SMSP partners have engaged in a number of activities and initiatives related to the main core strategies that have resulted in demonstrable change to the regional STEM education landscape (Key initiatives bolded).

1. Connect educators and students with community resources and industry

   Key Achievements in 2019-21 biennium:

   - **Establish regional site licensing model for Oregon Connections, powered by Nepris, an online platform facilitating real-time virtual skills-based connections between educators and STEM industry volunteers.** This was critically important during school closures and distance learning. 8 of 13 STEM Hubs currently hold licenses for educators in their regions. Statewide, 1763 educators and 165 industry users have been added since July 2019, reaching 46,800 students. SMSP trained 331 new education users and supported incorporation of the tool into classroom and distance learning during this period.
   - Led effort to engage industry to sponsor Oregon Connections, powered by Nepris, resulting in 100% private support for the statewide whitelabel license for 2021-22.
   - SMSP teachers have used Oregon Connections to engage 9,488 students in real-time interactions with professionals. SMSP teachers have participated in over 1,100 real-time experiences for students. Nearly 2230 archived sessions have been accessed from the video library by Oregon* educators and students. **Video usage is currently difficult to disaggregate by region.*
   - Hosted 5th and 6th Annual STEM Industry Networking event for educators. Hosted virtually on Oregon Connections, 135 educators engaged with 30 industry professionals from 11 sectors.
   - Orchestrated cross-sector collaboration among K-12, higher ed, workforce, and healthcare partners to successfully secure $120,000 from Oregon Community Foundation to support healthcare-focused career-related experiences for BIPOC students across the region.
   - Maintain STEMOregon.org as a central shared asset for STEM education in Oregon.

2. Connect educators to each other.

   Key Achievements in 2019-21 biennium:

   - Engaged >70 teachers from 21 K-8 schools in human centered design process for addressing hurdles related to Fall 2020 School Re-Entry.
   - Engaged 32 teachers from 8 high-need elementary and middle schools in Maker-based education professional development, culminating in distriubtion of more than 2300 maker kits for hands-on learning at home during distance learning.
   - Served as Oregon's nucleus for the Northwest Earth Space Science Pipeline collaborative with University of Washington; hosted ROADs on Mars and ROADS on Asteroids Challenges for >100 middle and high school students (drone and robotics challenge). Currently launching virtual ROADs on Icy Worlds Challenge for 2022.
   - Awarded $284K over next 5 years to expand successful NASA Northwest Earth Space Science middle school educator professional development to Central and Southern Oregon.
   - Collaborated with Willamette ESD to engage >145 teachers in summer externships.
   - Engaged two rural elementary schools (Silver Falls, Gervais) in STEM Transformation Planning through STEM Innovation Funds.

Southern Oregon STEAM Hub 2020-2021

Background

The Southern Oregon STEAM Hub uses the collective impact approach serving formal and informal educational organizations in Josephine, Jackson and Klamath counties, including 13 school districts with 8 percent of Oregon's school aged population.

Core strategies and Initiatives

Southern Oregon STEAM Hub's mission infuses STEAM (Science, Technology, Engineering, Arts, and Mathematics) into every classroom and beyond. Scientific inquiry, creativity and innovation, computational thinking, project-based learning, and collaborative problem solving are the hallmarks of the 21st century workplace and SOESD schools. These skills, along with core relationship competencies and mindsets, drive the outcomes necessary for our region to thrive and bring economic prosperity to all! Southern Oregon STEM Hub's mission is to create a learner-focused ecosystem of STEM/CTE/Career-Related learning experiences and pathways that benefit students, teachers, families, and industries in our regional community.

1. Educator Professional Development

This biennium we finished strong developing **teacher leaders.** Math teachers crave instruction and encouragement for how to help struggling students catch up, while simultaneously moving the entire class forward to stay the course with grade level expectations. Teachers Development Group provided training for teachers this year answering this plea. Debbie Knapp from Prospect Charter school presented during our Teacher Symposium in October and shared her lesson plan on the **Oregon Open Learning** site.

Teacher Leaders are emerging through our work with the **Oregon Science Project** with Heather Armstrong from Talent Middle School, Ben DeCarlow from Butte Falls Charter. Both prepared and hosted sessions for teachers statewide to attend and will host sessions this year. Heather is launching a data science course and club called "Dear Data". Ben is teaching "Placed Based Learning" and is mentoring teachers statewide using his Natural Resource Center in Butte Falls. Four more teacher leaders attended Rural Learning Facilitator Training and will launch their work and expertise to be shared this fall.

2. Youth Voice Initiative

Our 20-21 school year has 7 schools hosting **24 Chief Science Officers (CSO's)** with Central Point joining this program for the 2021-2022 school year. We utilized the Oregon Connections NEPRIS platform for an industry panel during winter of 2021; Valley Immediate Care, Quantum Innovations, Oregon Tech and Southern Oregon University joined our CSO's to share about STEM careers. YOUSCIENCE is another platform that we are utilizing in our region to help students understand their own aptitudes and interests for career pathways. The platform informs them of their natural gifts and talents so they can make decisions for themselves regarding career exploration and course selection. Our industry representations since last spring will be informed using the students voice and choice regarding what they want to explore. This collective impact approach is encouraging for our students and their career connected learning.

3. Partnerships

Partnerships and collaboration are a vital component of sustainable programming and efforts to maximize impact and outcomes. Southern Oregon Steam Hub and **Gordon Elwood Foundation partnered with Camp Invention** creating **4 summer camp locations serving 121 students** from Jackson, Josephine and Klamath counties during summer of 2020 and nearly 300 during summer of 2021.

Maintaining our partnerships is a priority and the SOESD currently lists over 40 active industry, business, community, and government agencies with whom we robustly collaborate on STEAM events, activities, and opportunities for educators, students, and their families. Partnerships with **Talent Maker City** include the makings of STEM lessons ready for teacher use at the elementary, middle and high schools. Our **Josephine and Jackson County Libraries** are helping us distribute 250 STEM kits for early learners. **Science Works** is preparing to launch virtual elementary age STEAM lessons available for live student interaction over the Oregon Connections Platform; these lessons will align to the state-wide featured career focuses each month. We supplied the **Boys and Girls Club** with engineering equipment and supplies for after school programming in Grants Pass.

4. Data-driven Decision Making

Dialogues in Action conducted a regional needs assessment revealing a definite gap in construction programming and health care across all three counties. This data informed our IGNITE Oregon Community Foundation projects; including the Bus to Home Build Project which launched with 2 buses to start in Jackson county and a BOLI approved Pre-Apprenticeship Program which launched in Klamath. The Bus to Home Build Project has momentum; 3 more buses have been donated and 1 will be placed with Rogue Valley Trades to begin build this fall. Talent Maker City and South Medford High School are working to complete the first 2 bus to home builds. Klamath Community College is preparing to deploy a mobile construction trailer complete with tools and instruction that will tour Klamath County to provide students access to awareness and exploration of the construction trades. Our IGNITE work would not be possible to date without the Skoolie Home Foundation, Phoenix Talent and Ashland School Districts, Rogue Workforce Partnerships and collaborating businesses and Project Youth Plus, Klamath County and City Schools and many more partners! To partner with us on our IGNITE work or to learn more, click here.

High-lights with a shift since COVID and Community Supports

1. Southern Oregon STEAM Hub Lending Library

During the onset of COVID, we were able to lend our 3 -D Printers to Talent Maker City and to CTE teachers and students to aid in the designing and printing of face shields and other PPE for our community. This effort was orchestrated largely by our local industry and community partners who call themselves COVID Skunkworks. Summer of 2021 brought a new excitement for our teachers and after school/summer programming partners to utilize our lending library. Many of our schools are hiring STEM teachers in the elementary and MS level in an effort to intentionally bring STEM to the younger grades and prepare students for CTE and other pathways. While educators were more spread thin during this last year and less available for professional development, we shifted from professional development with NASA for the teachers and brought it to the classroom for both teacher and students. This approach is igniting excitement by the way of awareness and exploration for both teachers and students together for career connected learning!

2. Oregon Connections and STEM Kits

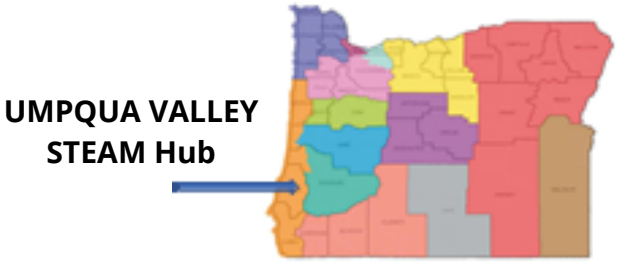
We had a greater need to connect virtually last year, giving opportunity for some to connect with more and simultaneously, we have families who lack internet access or have other challenges. Braiding resources, we utilized our funding to strengthen vertical alignment in pathways and provide awareness and exploration opportunities at every level both digital and hands on materials that help students stay active and learning. The launch of our regional site license through Oregon Connections was made available to every educator in our region. Through this virtual platform, we were able to bring 29 local industry partners to the classroom for industry chats, tours and interviews. Early Learning STEM kits went out to over 1100 families during 2020-2021 after a regional survey was done and families told us that next to food and diapers, they wanted ideas of what to do with their kids. Early learning STEM videos were made and shared for families to have lively fun instruction on how to use their STEM kits! The videos were provided in English and Spanish and made available on local websites that families utilize.

The fires from 2020 in Southern Oregon compounded the effects of COVID for some families. We partnered with Southern Oregon Fire Ecology to gather donated, brand new art and school supplies for 500 students and partnered with Phoenix Talent School district and other helping hands to distribute the kits to families who had lost their homes.

INTRODUCTION

The mission of the Umpqua Valley STEAM Hub is to support and provide inspiring, engaging, authentic STEAM learning experiences for youth in Douglas County preparing them for future careers and a meaningful future.

The Umpqua Valley STEAM Hub serves the geographic area of Douglas County which includes 13 school districts meeting the educational needs of 14,000 students. All districts are considered rural with 10 of 13 having 60% or more qualifying for Free/Reduced lunch. We also serve early learning providers, private and home school youth, youth-serving organizations, libraries, business/industry and our community at large.



STRATEGIC GOALS

1. Improve the quality of STEAM learning experiences PreK – 16+ both in and out of school by supporting educators through professional development and a resource lending library.
2. Expand opportunities for family and community engagement in STEAM Learning experiences to build community ownership for quality STEAM education.
3. Increase the number of students engaged in STEAM career connected learning experiences through awareness, exploration and preparation with support for future planning including post-secondary education

PROFESSIONAL DEVELOPMENT SUPPORT

Professional Development support has necessarily taken on a new look in the virtual environment, expanding opportunities and flexibility for STEAM educators in the Umpqua Valley. Our signature Summer STEAM Institute held each August offered Next Generation Science Standards Professional Development, Project-Based Learning , Oregon Connections, Early Learning Strategies, Argument Driven Inquiry, zSpace Augmented/Virtual Reality and Computer Science Fundamentals sessions for 60 educators in 2021. Both virtual and face-to-face sessions were offered with follow-up planned during the coming year.

Our Elementary STEAM Leaders project has engaged 21 teachers in 45 hours of PD (to develop quality STEAM learning experiences in their classrooms and schools. Hucrest Elementary School completed their inital STEAM Transformation plan led by Portland Metro STEM Partnership, becoming leaders of STEAM Education in our county.

Three local educators attended professional learning sessions to be leaders in SCRIPT computer science planning and have led 1 district to complete their plan. We also supported facilitators for Argument Driven Inquiry professional learning and Rural Distance Learning Strategies.

RESOURCE LENDING LIBRARY

The Umpqua Valley Resource Lending Library had over 130 different items to support quality STEAM education in classrooms and beyond school environments. Recently, we have increased Computer Science and Early Learning resources. We serve learners and educators PreK to community college. We currently have over 200 registered users and distributed materials to over 100 user events from July 1, 2020 to September 30, 2021. In response to COVID, all items have sanitary protocols.

STEAM Kits

Supported by mulitple funding sources including innovation funds and The Ford Family Foundation, 2500 K-5 STEAM kits were distributed across the Umpqua Valley through the summer lunch program. 250 Early Learning Kits were distributed to families in partnership with our CCR&R, Head Start, Relief Nurseries and Pre-School Promise.

COMMUNITY ENGAGEMENT

STEAM EXTRAVAGANZA

The annual STEAM Extravaganza was virtual again this year with several community partners including schools making kits available to youth they serve to coincide with Oregon STEM Week activities. Facebook, local media and our website was alive with several activities for our families, building a culture of STEAM Thinking.

COMMUNICATION and STORY SHARING

Through the support of communication specialists, the stories of STEAM education in the Umpqua Valley are shared regularly through websites (www.dcpss.org and www.brightfuturesumpqua.com), social media, television, radio and local newspapers.

BRIGHT FUTURES UMPQUA

The Bright Futures Umpqua initiative emphasizes the connection between quality STEAM education and future careers leading to personal and community vitality.

BRIGHTWORKS CLUBS

Using the Chief Science Officer model develop through Arizona SciTech, we launched virtual Brightworks Clubs to elevate the youth voice and engagement in STEAM education linked to future careers. Two AmeriCorps members facilitated the clubs across all high schools in the Umpqua Valley as well as home-schooled youth. In addition, several virtual workshops for career development were held reaching over 125 youth.

OREGON CONNECTIONS

Oregon Connections provides career connected learning through virtual field trips, “chats” with industry professionals. 203 total educators have been trained, 2172 students reached, 13 virtual field trips completed and 20 career workshops. We are currently developing a series connecting local industry to educational pathways at Umpqua Community College.

EXPANDING HORIZONS CAREER CAMPS

We are in our fifth year of providing week long STEAM/CTE camps in the Trades, Manufacturing/Technology, Ag/Natural Resources and Auto to middle and high school students. This summer we served 58 students in two camps.

BUSINESS/INDUSTRY PARTNERSHIPS

We have expanded our engagement with business/industry through a partnership with the Southwest Oregon Workforce Investment Board and the Douglas ESD, working with them to provide mentoring, industry tours and internships.

COMMITMENT TO EQUITY

Our commitment to equity is reflected in our partnerships with community organizations that work with traditionally underserved populations. We work regularly with high school TRIO programs, youth transition programs, our homeless and ELL liaisons, Title 1 Family Liasons and our local Tribe.