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# Columbia Crest A-STEM Academy

## Eatonville School District - Ashford, WA

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### Upcycling, Terracycling and Red Worms: How to Be A “Green” Sustainable School

**Students:** Kayden Dewey (kindergarten), Jakob Howard (1<sup>st</sup> grade), Addison Johnson (2<sup>nd</sup> grade)

**Teachers and Advisers:** Krestin Bahr, Superintendent, Eatonville School District; Allison Shew, Principal, Columbia Crest; Katie Hilliker, Teacher, Columbia Crest; Amber Brandt, Teacher, Columbia Crest; Jenny Martinez, Teacher, Columbia Crest

**Grade Level:** Kindergarten, 1st, 2nd

**Community and Industry Partners:** Nisqually Education Project, Mt. Rainier National Park Rangers, Pierce County Conservation Partners

### Project Description

K-2 students work to minimize their carbon impact and implement sustainable strategies for recycling, upcycling and maintaining a compost pile using red worms. Kayden’s project focused on upcycling—reusing trash at school to make innovative items. Jakob’s project focused on reducing the amount of food to go to the landfill from school lunches by having 5 compost bins at our school and observed the red wiggler worms’ impact to the compost. Addison’s project focused on terracycling—reducing waste in the landfill allowed us to reduce the size of our waste receptacle. Items are collected in brigades and sent off to a collector who reuses the material.

#### What did the students learn related to climate and environment?

All garbage that is thrown away ends in landfills. We can minimize our effect and save the earth. Worms use food scraps and paper to recycle and “make” soil. Our school is green and sustainable.

#### What does the STEM Alliance and our legislature need to know about climate literacy?

Students must start young, and local. They can and will change the world if we make sustainability the norm. Let’s invest early.



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# Bordeaux Elementary School

## Shelton School District - Shelton, WA

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### Environmental Factors Affecting Salmon

**Students:** Evelyn Allen, Andrew Luedtke, Sariah Olson, Andi Rooks

**Teachers and Advisers:** Diane Graham, Teacher, Bordeaux Elementary; Bree West, Teacher, Bordeaux Elementary

**Grade Level:** 4th

**Community and Industry Partners:** Pacific Education Institute (PEI), South Sound Salmon Enhancement Group, Taylor Shellfish

### Project Description

In this project, students are investigating the health of a salmon stream to learn about water quality, habitats, lifecycle and the effects the environment and humans might have on salmon. This project has evolved over the last 10 years but was taken to the next level when PEI teamed up with the Shelton School District to create FieldSTEM Experiences utilizing community partners.

#### What did the students learn related to climate and environment?

Water quality (watersheds, pollution and human impact) and salmon. They discovered environmental factors that influence the growth and survival of salmon. Students can make a claim about the merit of a solution to a problem caused when the environment changes. At this grade level our students are building an understanding that changing environments affect organisms' ability to survive.

#### What does the STEM Alliance and our legislature need to know about climate literacy?

Climate literacy and science in general need to be taught in an applied manner and from pre-K through graduation. It is so important that our youngest learners are given the opportunity to develop the knowledge and skills to become science literate, especially with respect to our environment and (as they get older) in respect to our struggling rural economies. Programs like PEI's FieldSTEM offer schools and districts a professional development opportunity to build these programs for kids. If our elementary teachers are not comfortable teaching science, our younger students are not given the opportunities to learn the fundamentals of science/STEM, they are not able to take advantage of or see themselves as being successful in the career opportunities that are abundant in STEM fields. Students need to be immersed in science that is connected to where they live. Funding teacher professional development is extremely important to get all teachers engaged in environmental learning and FieldSTEM projects!



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# Evergreen Middle School

## Everett School District - Everett, WA

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### Energy Matters: Applying NGSS to Energy Conservation in Schools

**Students:** MacKenzie Johnson (8<sup>th</sup> grade), Ali Al Ghanim(9<sup>th</sup> grade)

**Teachers and Advisers:** Craig Marais, Science Teacher, Evergreen Middle School; Meredith Lohr, Executive Director, Washington Green Schools

**Grade Level:** 8th

**Community and Industry Partners:** Washington Green Schools (funded by Boeing and WA State Department of Commerce)

### Project Description

Washington Green Schools in partnership with Everett Public Schools developed the Energy Matters program to strengthen students' mastery and of the Next Generation Science Standards (NGSS) and engage students in energy conservation projects at home and at school. Students in Energy Matters learn about the connections between energy and climate and take action to reduce their impact. Desired Outcomes include: Climate and Environmental Literacy; STEM and 21st Century Skills; Pathways into Environmental Careers; Resource Conservation in Schools.



*Photo: US Dept of Energy, Bonneville Power Administration, March 15, 2010.*

#### **What did the students learn related to climate and environment?**

Students learn how energy is used at school, why it matters in terms of climate and environmental impact, and what they can do to make a difference. By tracking their school's energy use on the Washington Green Schools Energy Dashboard, they see how increased conservation and efficiency can lead to reductions in carbon emissions.

#### **What does the STEM Alliance and our legislature need to know about climate literacy?**

Climate change is the issue of our time; the impacts have already reached the Pacific Northwest. To ensure a healthy future, we must safeguard our environment, and education must be part of the solution. Environmental education is a mandate in Washington State; however, it is not available for every child, and climate literacy is uncommon in our schools and communities. Washington Green Schools' vision is that every student in Washington will become climate and environmentally literate during their schooling.

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# Taholah High School

## Taholah School District - Taholah, WA

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### Hypoxia

**Students:** Crystal Vessey, Niamya Culey-Sailto

**Teachers and Advisers:** Jerry Walther, CTE Natural Resources Teacher, Taholah High School; Nicole Harris, NOAA; Joe Schumacker, Ocean Marine Biologist, Quinault Department of Natural Resources; Patricia Larriva, Taholah School Principal

**Grade Level:** 9th

**Community and Industry Partners:** Quinault Indian Nation Tribal Council and Elders, Quinault Department of Natural Resources, University of Washington, University of Oregon, Western Washington University, Northwest Indian College, Taholah School District Board Members

### Project Description

The main focus was to teach the students the importance of their environment and the need to maintain it for the following generations (their responsibilities). We were asked to be a part of the hypoxia study with the Quinault Department of Natural Resources Ocean and Marine Biologist, Joe Schumacker. The students were taught how to document, monitor and graph the info and send it to the Quinault Nation to be added to the report for the National Science Foundation. Students also studied the effects of acidification and algae blooms.



#### **What did the students learn related to climate and environment?**

Using the technology that is available for this type of work, students learned the approximate time hypoxia happens in our area, its effects on sea life and human needs (economy) and the effect that acidification has on the ocean and various life cycles. They also studied the ways that ocean currents, plankton blooms and upwelling and down welling from the Quinault Canyon contribute to the process.

#### **What does the STEM Alliance and our legislature need to know about climate literacy?**

There are human-driven activities but also natural events that effect our oceans and streams. More studies need to be done in order to come up with ideas of how to solve the problems we face. Working in cooperative groups gives our students more knowledge with the professionals to understand that working together to solve issues brings more knowledge to the table.

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# Sumner High School

## Sumner School District - Sumner, WA

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### The Biological Hazards and Toxicity of Chloride Road Deicers to *Ceriodaphnia Dubia*

**Students:** Makenzie Campbell, Kate Harris

**Teachers and Advisers:** Jessica Olaiya, Teacher, Sumner High School; Maria Montoya, Teacher, Sumner High School

**Grade Level:** 12th

**Community and Industry Partners:** Washington State University Puyallup Research and Extension Center – Washington Stormwater Center

#### Project Description

The purpose of this experimentation was to determine the toxicity of chloride road salts to organisms that come in contact with highway runoff and assess the extent that these salts contribute to the known toxicity of highway runoff. These chemicals are used in many areas of the country throughout the winter and it is important to understand the impact that they could be having on local ecosystems. Based on the results, it is clear that deicing salts have a detrimental toxicity to organisms.

#### What did the students learn related to climate and environment?

By attempting to make roads safer for human transportation, the water coming from those roads is becoming deadlier to living organisms. There is potential for an increased need for deicers as the climate changes. Many areas of the country are facing record cold temperatures, which results in added chemicals being placed on the roads.

#### What does the STEM Alliance and our legislature need to know about climate literacy?

There are many facts to climate change. It is important that people are educated about the impacts not only on humans, but on our entire planet from plants to wildlife, water and soil. Education is key to help not only reduce the emissions and human activities that cause climate change, but also to manage the impacts of climate change as it occurs. These students presented this project at the National FFA Agrisciences Fair in Indianapolis, Indiana last October, ranking 3rd the Environmental and Natural Resources Services category.



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# Colton High School

Colton School District - Colton, WA

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## Soil Health Benefits of Cover Crops and Grazing Cover Crops

**Students:** Jackson Meyer

**Teachers and Advisers:** Nathan Moore, Agriculture Teacher, Colton High School

**Grade Level:** 10th

**Community and Industry Partners:** Palouse Conservation District - Regional Conservation Partnership Program

### Project Description

During the spring of 2017, the Meyer family, who live on a farm South of Pullman in a no-till operation with an average rainfall of 20 inches, a 3-year study was started to research the effectiveness of utilizing cover crops and incorporating grazing livestock to determine an alternative cropping system. Jackson, a freshman at the time, decided to assist his family and use this project as an FFA Supervised Agricultural Experience. Goals include: find a more sustainable way for farming while protecting natural resources; test our ability to build soil health using cover crops and cattle on the Palouse; learn if this plan economically feasible. Jackson was enrolled in our high school Agriculture Food and Natural Resources (AFNR) class when this project started and a majority of this project took place over the summer and was performed on his own time as an extension of CTE coursework. The project covers several Next Generation Science Standards.



#### **What did the students learn related to climate and environment?**

Major learning included: improving soil fertility and air quality, maintaining accurate records, decision-making and understanding different testing procedures (e.g., soil and acid analysis). Jackson and his family are working to reduce the carbon footprint left on their farm, while finding alternative methods of producing agriculture products. The use of direct seeding helps reduce the loss of organic matter and breakdown of soil. Jackson has also learned about the importance of conserving our natural resources.

#### **What does the STEM Alliance and our legislature need to know about climate literacy?**

A program like this will assist stakeholders to see that students do have a voice in climate literacy and will play an active role in the future of agricultural production in our country.

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# Tesla STEM High School

Lake Washington School District - Redmond, WA

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## Operation Sustain

**Students:** Rayan Krishnan, Anne Lee

**Teachers and Advisers:** Arny Leslie, Teacher, Tesla STEM High School

**Grade Level:** 11th & 12th

**Community and Industry Partners:** University of Washington Earth Games, Code 4 Charity, Seattle Youth Climate Action Network (CAN)

## Project Description

Operation Sustain is an organization run by six high school students who have the goal of promoting climate change education among youth. They found that elementary students either don't understand climate change or think that the problem is too big to solve. To make the science behind climate change and the solutions more transparent, the team developed a computer simulation game in which students design their own city while learning about renewable energies and sustainability. Then, they developed curriculum and implemented it into third through fifth grade classes with successful results based on Next Generation Science Standards. The team recently won the Lexus Eco Challenge and a \$10,000 prize for their work, and in the past, placed first at Imagine Tomorrow, Washington State University's Science & Engineering Contest. They aim to integrate the program into the Lake Washington School District's curriculum and spread it across the United States. They are looking for a non-profit partner organization, such as the National Wildlife Federation, to expand their mission nationally. All the curriculum is correlated to the Next Generation Science Standards. This program is awe-inspiring. The kids have spent 3 years writing the code, testing the effectiveness of the game and the level of achievement of the elementary students.



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### What did the students learn related to climate and environment?

How different carbon choices have significantly different carbon footprints based on different energy choices.

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# Tesla STEM High School

Lake Washington School District - Redmond, WA

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## Schools Under 2C (SU2)

**Students:** Daniela Shuman, Roshan Nair

**Teachers and Advisers:** Mike Town, Teacher, Tesla STEM High School

**Grade Level:** 11th

**Community and Industry Partners:** City of Redmond (SchoolPool), King County Green Schools Program, Alliance for Jobs & Clean Energy, Sustainability Ambassadors

### Project Description

When it appeared likely that we would withdraw from the Paris Climate Accord, students at Tesla STEM High School decided to take action by launching Schools Under 2C, a climate awareness organization. Students worked together with faculty to reduce Tesla STEM High School's monthly carbon footprint to Paris levels by implementing a composting program and lighting reduction plan, which has resulted in over two tons of carbon emission reductions each month. The team also partnered with the City of Redmond to develop a mobile application that encourages students to take greener modes of transportation. Then, they started challenging other schools across the world to do the same thing. Over 50 schools have taken the Schools Under 2C pledge to take action in their own community.



### Additional information and comments:

SU2C won the President's Environmental Youth Award from the EPA. This award is usually given to students by the President of the US in the Rose Garden. The current administration moved the ceremony to the basement of a federal office building with a junior official and refused to fund the students to come to DC.