



A CULTURE OF STEM

Imagine a classroom of early childhood students with party whistles tipped with a sticky end. What mischief would they create? Only imitating frog behavior by trying to snatch a paper fly with their sticky tongue! Headstart teachers integrated the exploration of the frog life cycle with discoveries around tadpoles, observing and painting frogs, and testing their webbed limbs on swimming their hands in a bucket of water. Children were *immersed* in frogs and used the STEM disciplines to dive in.

This was just one of the curriculum projects where teachers challenged students with integrated STEM learning. Through all of last year, STEM was the focus for preschool children in Baker, La Grande, Union, and Harney Headstarts. How did they change their curriculum and culture to embrace STEM in a holistic way? Headstart had some thoughts about this and actions that may give the rest of us important insight on what it takes to transform how we think about a change in school culture concerning STEM curriculum. Methodically, Headstart teachers and leaders engaged in a plan:

Step 1: Commit. Meeting as a community of teachers, they all agreed to commit to a year-long project to incorporate STEM in their curriculum. This meant that they would work on learning, thinking, planning, and teaching through STEM for an entire year. Leadership committed to employing an ECE STEM specialist to provide teacher workshops and paying teachers for their time and materials needed. *Commitment by everyone was a critical first step because teachers made this effort their priority.*

Step 2: Learn. Teachers gathered for a start-up, day-long workshop to get their feet wet with STEM basics. Sharon DeFrees, a long-time Baker teacher and award winning sustainable rancher (see <https://www.youtube.com/watch?v=qAHLqyThdQY&feature=youtu.be>), provided the workshops based from a Project Wild series: Growing up Wild (See: <http://www.projectwild.org/growingupwild.htm>) From there they participated in half-day training sessions, follow-up work, and ongoing conversation with mentors and peers about implementing STEM in the classroom. *Learning was engaging, long-term, and applied.*

Step 3: Plan and Implement. Teachers implemented the lessons and activities through the year sharing how their classes interacted with the challenges and materials. These experiences provided feedback and adjustment so that in future cycles of teaching and learning improvements might be made. Besides the involved frog unit, teachers also did simple activities to blend STEM in the daily experience with the children. Studying and labeling shapes is an important standard in Pre-K. To emphasize this, teachers had students create pipe cleaner shapes and rehearse their names. They then took their shapes on a nature walk and asked children to use the shape as a filter to see trees, plants and the environment. Amazingly, little eyes were now keenly aware of the preponderance of circles, triangles, rectangles, and squares in their world. Geometry as part of a STEM challenge gave better

meaning to their understanding of shapes. *Curriculum and planning became holistic, integrated, and employed STEM disciplines in thinking about each topic or area of discovery.*

Step 4: Persist. Too often, as educators, we try something, shrug when it doesn't work exactly the way we had planned or thought, and then try something else the next year. Instead, Headstart persists with this theme and will continue to work on their plan to hone the curriculum to suit the needs of the children. They will continue with STEM and Natural Resources this next year and continue to work on integrating the arts, language arts, and motor activities. *Changing the culture of school requires a solid understanding of the purposes of the curriculum, a long view about incremental change, and a dedication and persistence to the task.*

Changing the culture of K-12 and STEM takes the same kind of process. We have to commit, we have to be willing to learn and be transformed, and we have to persist. If you would like to know more about this kind of cultural change, talk to Donna Rainboth at drainbot@eou.edu



GOSTEM CLASSIFIEDS

Can you say 'yes' to any of these question?

- Do you **have** a special STEM talent or expertise?
- Do you **need** a special STEM talent or expertise?
- Do you **have** any STEM materials, equipment, tools or supplies that you don't need?
- Do you **need** any STEM materials, equipment, tools or supplies?

Who could say 'no' to all of these question?

Introducing: GOSTEM CLASSIFIEDS. We are keeping track of things we have that we don't need or want, talents we are willing to share. We are looking for folks that can use these things so posting items on the website. We have already given away glassware, a centrifuge, some petri plates and some curriculum project books. We have lots more. All you have to do is claim it and make arrangements to pick it up. Check out our page at: <http://go-stem.org/stem-classified-haveneed-materials-for-free/>

We are also collecting people's special talents and willingness to share. If you are a whiz at a particular STEM topic, let's hear about it. We'll connect you with those who could use your expertise.



A River Greenway: A Community STEM Project

The Grande Ronde River once meandered through the large horst graben Grande Ronde Valley in north east Oregon with oxbows much like that of the current path of Catherine Creek (See the above photo). In the late 1860's a large loop of the Grande Ronde River was ditched to drain land for agriculture and to protect some residential and business developments from seasonal flooding. To assist in logging, river was also dammed to the west, filled with floating logs and then each spring the dams would be exploded so logs would careen down the river gouging everything in their path. During the mid 20th century and up until the 1980's the

ditch or canal was mined for its sand and gravel. As the years passed the canal deepened from the effects of mining causing steep banks and the need for reinforcements on the margins. For many years the river seemed sterile--a causeway for commerce.

Even though assailed by progress and abuse, the river survived. With the advent of protective inland waters legislation the river has started to recover showing a great deal of beauty and aesthetic appeal. Wildlife clings to the riparian areas along its banks and fishermen and hikers enjoy poking about on the margins. Riverside Park, in La Grande, borders the river to the west. The city has installed a short trail section near the river and a bridge that allows walkers and bikers to enjoy the vista from mid stream. Island City, about a mile down river to the east, plans to create another park similar to Riverside and to connect their park to La Grande's with a Greenway. City and county officials have secured some funds to pay for infrastructure and have drawn-up ideas about how the trail might hug the river from La Grande to Island City. How then is this a Community STEM challenge you might ask?



The Grand Ronde River, like any waterway, is a natural ecosystem that can be impacted by human intervention. Aquatic creatures and the riparian areas can be altered, damaged, or ruined. Understanding the science of the river system, the plants and animals, the water ebb and flow, and the riparian ecosystem becomes a critical part of understanding the river and concern for a human pathway. Impact analyses, reports and permits are required to assess the **scientific impact** of the project.

Engineers examined the planned route and then calculated the amount and kind of fill necessary, the make-up of the potential project bridge, and the composition and preparation for the path itself. The engineers alone could not conduct this work without considering the aesthetics, safety, legality, and utility of their design. Engineers must also consider the kind of materials and different **technology** available to solve specific problems: Whether to use metal netting to contain bank stabilizing riprap, the materials to be considered for a bridge and the long-term considerations for maintenance, and whether pre-fabricated, elevated concrete walkways may solve certain problems when placing the trail near the water.

Finally, the Greenway committee had to deal with the overall **applied mathematics** of the project. What were the features of each option and how would the committee recommend one route over another? Surveys, rating systems, and statistical analyses were required to help bring the best solution forward. And, almost the most important variable, what were the costs associated with the project? Careful prediction of cost per square foot of trail and each additional feature required had to be computed.

Of course, the STEM disciplines only provided the background facts. The city, county and State officials and landowners still have to consider property owners, easements, land use restrictions, and other technical matters. The Greenway project is a real example of how STEM professionals inform and shape problem solving within a meaningful context. It is the kind of critical thinking we hope our students will do and the kind of learning we expect as they acquire knowledge and skills in the STEM disciplines.

What are you doing in your classrooms, schools or communities to get students involved with real individual, classroom, school, or community projects? Tell us your story. Let's help each other design meaningful STEM explorations where students can make a difference.

[STEM LAUNCH POINTS](#)

Each month GOSTEM will showcase a different **STEM Launch Point** and the connections that can be explored in each STEM discipline. These stories are quick summaries of interesting people and circumstances where using STEM was as an integrated way of thinking and necessary to solve the problem. The story we offer in this month's newsletter is *George Carver: From Nothing to Amazing!*



The story of George Washington Carver is one of the most well known of all scientists in the United States. His role in developing a school of agriculture and science for African American students in order to improve their lives is a tale of dedication and genius. Starting with no more than an empty building at Tuskegee Institute, Carver built laboratories, taught a generation of students and discovered important agricultural practices that would impact the southern United States. This unit engages students in scavenging, like Carver, for materials and supplies, and in inventing uses for various agricultural products. See <https://sites.google.com/a/eou.edu/stem-stories/carver>



UPCOMING EVENTS! Lots of things coming up. Mark your calendars!

- **April 20, 2018:** Manufacturing Day 2018 Behind the scenes tour of Lamb Weston, Portland General Electric Coyote Springs Plant, and Workforce Training Center. Limited to 30 High School Students. To Register: FILL OUT FORM
- **April 21, 2018:** Brain Awareness Teacher Workshop Livestream at OHSU School of Nursing in La Grande. More Info:
- **April 21, 2018:** Baker High School, Baker City, OR OREGON STATE UNIVERSITY EXTENSION SERVICE A one-day mini-college for family forestland owners, foresters, farmers, contractors, loggers, arborists, teachers, and the general public. See more information here.

- **May 1, 2018:** EOU Health Speaker Series featuring Dr. Dale Robinson, OB/GYN. Dr. Robinson obtained his medical degree from the University of Chicago. He completed his obstetrics and gynecology residency at Wilford Hall Medical Center in San Antonio, Texas. After fulfilling his Air Force commitment, he served as Residency Coordinator for the Louisiana State University Obstetrics and Gynecology training program in Baton Rouge, Louisiana. While at LSU, he lectured nationally for the Osler organization and published 12 articles. Dr. Robinson left academic medicine and has worked at Grande Ronde Hospital for the last 12 years, formerly serving as President of the Medical Staff and Chief of Obstetrics and Gynecology. Dr. Robinson has extensive knowledge and experience in the rural practice of obstetrics and gynecology. He also has a passion for helping pre-health students navigate complex career choices and loves to discuss traditional and alternative health careers with them. He answers health career questions at www.prehealthguy.com and www.prehealthguy.blogspot.com. [More Info here!](#)

- **May 5th – May 13th 2018, STEM Week Oregon,**<http://stemoregon.org/stemweek2018/>

- **May 28, 2018:** Applications Due for Renewable Energy Leadership Lab. See [more here](#)
- **June 17 – June 22, 2018:** [Cottonwood Crossing Summer Institute](#), is now accepting applications from regional high school students and teachers to attend the week-long residential field studies program held June 17-22, 2018 at Cottonwood Canyon State Park. CCSI began in 2015 as a collaborative project with partners from Oregon State Parks, Greater Eastern Regional Solutions and Eastern Oregon University. Beginning this year, EOU has taken a lead role in coordinating the program. Check out the website (eou.edu/cottonwood-crossing) to learn more about the projects that will take place this year and to access the application portal. Please forward this opportunity to any students or teachers who would be interested
 - **June 18-22:** [MedQuest Camp](#)
- **October 13:** Share your expertise with educators around the state! OSTA is accepting proposals for Sessions on Friday, October 12 and Workshops on Saturday, October 13th. For details on the strand descriptions and to submit your proposal, check out their conference webpage at <http://oregonscience.org/OSTA18>.

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