

STEMIFICATION: Beyond Science and Math
Diving Deeper Into the True Nature of STEM in ALL Classrooms

Between time constraints and content demand, English Language Arts (ELA) and Social Studies (SS) teachers may feel they have been left out or all together forgotten in the STEM mania of today. According to Open Education Resources, an organization which provides opportunities for systemic change in teaching and learning content through connecting educators and open resource development, “A STEM literate person considers how STEM can improve the social, cultural, economic, and environmental conditions of their local and global communities.” (OER, 2016) Basing the purpose of STEM literacy on This cannot be further from reality, a truly strong STEM education is an education as rich in its humanity as it is in science. Throughout the Endeavor STEM Leadership Program, I have been exposed to countless examples of the true nature of science and STEM literacy. It is a privilege to be able to share the resources and insights I’ve gained through this program with my colleagues through professional development and conversations.

From the planning stages to delivery, the professional development experience we designed was a collaborative effort between myself and my Endeavor partner, Ms Kelly Shirk. We worked together to design a professional development experience that would bridge two schools and two different content focus areas for a learning community grades 6-8 that feeds one common high school. Our instructional coaches came alongside our project helping us reach out to English Language Arts and Social Studies teachers who don’t often get invited to STEM focused professional development during the school year. Ms Shirk focussed her work with the Social Studies teachers from both schools and I focussed my work with English Language Arts teachers. We developed separate presentations but kept our format similar for continuity. Our original plan was to offer these presentations during the school day common planning times for each content area on two separate days and traveling between the schools for delivery. This plan had to be modified as we started preparing teachers for potential online learning and a COVID-19 shut down. We were able to offer a modified training for English Language Arts after school on 3/11/20. This was a voluntary training for a group of 9 educators at one school location. The presentation was roughly 30 minutes with an additional 30 minutes for exploration, discussion, and future planning. Unfortunately our school system went to “social distancing” and online learning on 3/13/20 and we were not able to do the other scheduled in person training sessions. We held our second session on 3/20/20 for approximately 60 minutes as an online learning experience. This session was focused more on social studies and offered to all teachers from both schools with attendance of approximately 15 teachers.

This joint venture into the NASA Endeavor STEM leadership program has been a part of an effort to unify these feeder schools in their approach to STEM education and integrated technology through jointly developed STEM labs and Robotics programs. Our goal was to reach the 20 grade level content teachers

from Eastbrook Middle and Valley Point Middle school who teach either English Language Arts(ELA) or Social Studies(SS) in grades 6-8. By doing so, we would be able to impact roughly 1200 common students who feed the same high school. We did not get to deliver to all the teachers we had targeted but we were able to get enough interest that we have a commitment to continue the professional development in the Fall with our instructional coaches at a much deeper level. This is an exciting shift that will help us focus as a school system on integrated learning with a STEM focus that promotes 21st century skills and specifically STEM Literacy and Problem Solving.

The professional learning sessions were designed to highlight ways that ELA and SS teachers can infuse STEM thinking to reap academic rewards far beyond the scope of traditional learning formats. While attention was paid to highlight the specific content areas of ELA and SS, there were three areas of focus emphasized throughout each presentation. First, "Data in the Driver's Seat" highlighted using real world data to drive content not just instruction. We focused on highlighting research and resources that could be used to improve content discourse and writing. We looked at current expectations for CSET (Claim, Set Up, Evidence, and Tie In) currently used in our English classes and practiced evaluating evidence for a scientific argument using the [Evidence Gradient Tool and Analyzing Argument Activity](#) shared in the Methods of Stem Education course. Teachers participated in a shortened version of a [Socratic Smackdown](#) using the Jonassen article, "Toward a Design Theory of Problem Solving". Next, we highlighted using "Real World Resources" to add authenticity and relevance. Participants were able to experience data sites such as [NASA's GENELab](#), [Tracking Deer Habitats](#), and the [State of the World's Children](#) as seen through data by Unicef. Finally, we emphasized the importance of "Addressing Real Problems" to build problem solving and computational thinking in every content area. [Computational thinking](#) was shared without being identified using resources from the Coding, Robotics, and 1;1 Devices course and many of the teachers thought the standards for computational thinking were actually their own content standards. Conversations about the increased need for teaching thinking skills in order for students to grow in all areas of traditional content dominated the rest of our session together.

After the professional development session, teacher participants were surveyed using a Google Form instrument. Teachers responded positively to the experience with one exception. All wanted more time to work with the resources and more time to try things with students. The biggest take away from the session seemed to be the importance of critical thinking and the need to explicitly teach strategies for evaluation of arguments and evidence. One comment that really struck me was, "I really never considered that explicitly teaching critical thinking is actually the step before evaluating writing effective arguments or evaluating evidence." All of the participants were excited to sign up for NASA Express, and a few have been participating in webinars from NASA learning about their resources as part of their weekly professional development requirements during the Covid-19 shut down. I was also fortunate that one of the participants in my session was the school level instructional coach. Together, we reviewed the feedback and have begun making follow up session plans for next school year. Overall the experience of sharing NASA Endeavor and my love for STEM Education with my colleagues has been really exciting and I look forward to future opportunities for growing STEM in my classroom and beyond..

References:

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