'Critical Questions' Series
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Why STEM?

I am the kind of person who jumps in with both feet, without checking the depth of the water. When a few of my colleagues here at South Colby Elementary in Port Orchard, WA, approached our staff with the idea of becoming a STEM (science, technology, engineering, mathematics) school, I was all in. After a year or so of dabbling, I quickly learned that STEM is not stacking cups to build the tallest tower. STEM is a philosophy that supports and integrates *all* disciplines.

The purpose of STEM education is to guide students toward becoming innovators, to think outside of the box. According to the article <u>What is STEM Education,</u> "Technology helps us communicate; Math is the language; Science and Engineering are the processes for thinking; all this leads to Innovation." (www.education.com/reference/article/what-stem-education-science-technology/) This was one of those times where jumping in paid off. It has changed the way I teach and the way my students learn.

Last year, my 5th grade students found a problem at our school. They did not like how our upper recess field closed on rainy days because the field was too soggy to use. After countless observations and interviews with peers and staff, they decided that in order for the field to be opened we needed to plant more grass seeds. Our patchy field became too muddy to access on a rainy day.

The only problem was we didn't know what kind of grass seeds to plant; we needed to test multiple samples and find the best for our climate and the most durable for our busy field. The students decided that our school needed a greenhouse so experiments, such as this one, could be done. We found a local grant and *the students* applied. I submitted *their* grant request. To my surprise, they received the grant!

We purchased a greenhouse kit. As it was en route to our school, the students had to find a location, measure the perimeter, calculate the area of needed gravel, price out the gravel, request additional funds, and receive approval from building and district administration. The best part about the whole process… it wasn't me! In fact, they thought of things that I had yet to process. All I could think was, "Wow! Is this that magical phenomenon I've heard so much about when students take over their own learning?"

By the time our greenhouse kit arrived, the students had completely prepared the site and were ready to begin building. On a cold, blustery day in February our greenhouse was built with the help of some adult volunteers. The students had to follow directions, problem solve, work as a team, design, redesign and most importantly, get their hands dirty. The finished product was amazing. Proud is not a strong enough word to describe how the students felt, let alone how I felt.

To begin to test grass seeds we needed quite a few supplies. We needed tools, trays, shelving, seeds, soil and more. The students decided that they needed to raise additional money for the supplies. They voted to create a Donors Choose project requesting the items we needed. After only one day live on Donors Choose, we had been fully funded and our items were shipped to our school. We were able to answer our initial question which was, "How can we improve the upper field during the rainy season?" The students submitted a proposal to our administrator detailing their work and findings, and strongly suggested a brand of grass seed based on their tests and collected data.

The components of STEM were woven through every piece of this large project the students took on. It wasn't until about mid-year when I realized that STEM is so much more than building the tallest spaghetti noodle and marshmallow tower. Our STEM project started science-based and *quickly* included technology, engineering, mathematics, informational texts, research skills, speaking and listening, persuasive writing… the list goes on. According to research from The Journal of Pre-College Engineering, "STEM integration offers students one of the best opportunities to experience learning in a real world situation, rather than to learn bits and pieces and then to have to assimilate them at a later time." (Hui-Hui et al) Teaching and applying these skills in a real world situation made the learning relevant and engaged all the learners in my classroom.

I consider myself a STEM teacher. Did I get there overnight? No. Did I do it justice my first two years? No. Was the time, effort and additional learning on my part worth it? Yes, a million times over! It has changed my approach to teaching and has made cross-discipline, real-world, relevant instruction possible.

References

http://www.education.com/reference/article/what-stem-education-science-technology/

Journal of Pre-College Engineering Education Research
STEM Integration: Teacher Perceptions and Practice
Hui-Hui Wang, Tamara J. Moore, Gillian H. Roehrig, and Mi Sun Park

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