

Authenticity is a highly engaging quality of student work! When the learner has an understanding that real people need to know how to do the work they are being asked to do in the classroom they are more apt to be behaviorally, emotionally, and cognitively engaged in their learning experiences. As a result, the students are better equipped to see connections to their world or the world at large. The thought of engineering design problem solving as a “unifying” process between technology, science, and mathematics provides a real-world context to three subjects often taught in isolation. Any time, we as teachers are able to make learning experiences purposeful for our students and help them better understand the “why” behind the learning, it will often result in higher levels of student engagement.

As we dig deeper into the standards we are able clearly see a common thread, problem solving and engineering design. When examining the technology standards, Standard 3 requires students to develop an understanding of the relationships among technologies and the connections between technology and other fields of study. We have too many teachers who approach the teaching of technology concepts and skills in isolation. Often times, technology is defined as a computer, the end and period. When we delve into the Technology Standards we learn “technology is how humans modify the world around them to meet their needs and wants or to solve practical problems.” It is why the App Generation exists. “Technology

extends human potential by allowing people to do things they could not otherwise do.” The analogy used in the standards referring to science and technology being like conjoined twins provides clarity for the need to bridge the two subjects, because one doesn’t come to fruition without the other. “Science provides knowledge about the natural world that underlies most technological products today. In return, technology provides science with the tools needed to explore the world.” However, it is important to note, a distinct difference between them is that “*science seeks to understand a universe that already exists, while technology is creating a universe that has existed only in the minds of inventors.*” In addition to the strong connectedness of science and technology, similar connections can be made between science and mathematics as well as technology and mathematics. Mathematics provide a means to express relationships in science and technology provides tools to make the jobs of scientists and engineers doable. The Design Standards 8, 9, and 10 focus on the core problem-solving process of technological development. As stated in the standards, the design process is equally as important to technology as reading is to language arts!

The importance of problem solving in the mathematics standards is of such that the first standard for mathematical practices is “Make sense of problems and persevere in solving them.” We see this theme run throughout the mathematics standards, always encouraging the learner to ask themselves

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Standards Analysis Assignment

the question, “Does this make sense?” While this is a standard for mathematics it applies nicely with the design of technology products as well as scientific investigations and engineering practices. Overlapping concepts between science, mathematics and technology are found in standards for mathematical practice five - Use appropriate tools strategically a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software.

Teachers of technology, mathematics, and science courses taught in isolation or silos are often asked by discouraged learners, “Why do I need to learn this? OR When will I ever use this?” Making sense of challenging content without real-world context often results in student failure. “Unifying” concept/skill through engineering design problem solving provides the answers for our learners to why we need to learn this as well as when you will use it.