

Amanda Patterson
E in STEM
Standards Analysis

Elsa Gamire explained that, “Engineering design involves compromise and teamwork” (Engineering Design Method, Garmire, 2003). Throughout reading this article I often compared teaching with engineering. Teaching children encompasses compromise and teamwork daily and is a beautiful form of engineering. I first analyzed reading standards alongside writing standards when Kentucky first adopted Common Core and found several overlapping areas between the two subjects. However, I had yet to analyze for the purpose of overlapping science, technology, engineering, and math standards before this assignment. Common Core standards are those that I have personally used in the regular classroom along with using the Next Generation Science Standards (NGSS). While looking through the suggested list of standards for this assignment I chose those that I am most familiar with.

There are multiple standards that relate to problem solving or engineering design. In particular, Next Generation Science Standards that focus on Earth’s Systems: Processes that Shape the Earth 4-ESS3-2-*Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans* requires students to work their way through the engineering design process of Ask Questions, Brainstorm Solutions, Design a Solution, Build, Test, Improve. Curriculum that follows a STEM model understands that, “It is important to realize that design is not a linear process-there will be circulatory processes, as new information requires re-thinking past decisions” (Engineering Design Method, Garmire, 2003). One of many Common Core Math and technology standards that relate to problem solving are: Math-Measurement

and Data 3.MD.7.b-*understand concepts of area and relate area to multiplication and to addition*, and Common Core Technology standard EL1.C-*Use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways*. Students could design a project with constraints on area and perimeter of the design so they would need to understand what area and perimeter are. These three standards can be easily combined while working through an engineering design activity with Engineering Standard, 3-5-ETS1-3-*Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved*. While combining these multiple disciplines for engineering design students will utilize such skills as, “apply numerical values, search websites with relevant information for the design problem, test their design while measuring the outcomes” (Engineering Design Method, Harmire, 2003). These standards compare as students will use their critical thinking to work their way through the design process multiple times. These listed standards are different in ways that they could all be taught as stand-alone lessons or activities. Math standards are often very specific with vocabulary such as area, multiplication and addition, and specific problem solving steps. However, it’s more beneficial to combine these standards and overlap their similarities. While reading these articles I often reflect on Bloom’s Taxonomy. I think of the top portion of the pyramid, “Create”. While reviewing Bloom’s Taxonomy I listed the verbs for the top portion of the Bloom’s Pyramid on the “Create” section. These verbs are: design, assemble, construct, develop, formulate, author, and investigate. While teachers have been developing and delivering quality lessons for students that often reached the top portion of Bloom’s it wasn’t until the last decade that

I began to notice multiple disciplines overlapping while reaching the “Create” portion of Bloom’s Pyramid more often than a stand-alone lesson to Create. Students enjoy STEM lessons. During interdisciplinary lessons students work harder, stay on-task longer, and demonstrate positive behavior as well as demonstrate a naturally unifying skill. STEM learning is a Win-Win.