

The Nature of STEM

When starting this STEM journey, I thought STEM was something that I would incorporate into my classroom every now and then, but I have learned through readings and discussions that this isn't true. STEM education is something that will be extremely important in our Educational System in the upcoming years. We, as a society, are facing problems that we didn't see coming, and now we are depending on others to solve these problems for us, but were these people adequately prepared for these situations? Did they learn to persevere through problems? Did they learn to think abstractly? Are we as a nation preparing students to face the next set of generational challenges?

For this assignment, I was asked to look into how I incorporate the Standards for Mathematical Practice into my class. Looking at the 8 standards there are some that I use daily, while there are others that are vastly important that I don't use enough. For example, in my class we just covered our Integer Unit. I had students model how to Add and Subtract integers using a number line. This lesson would cover MP 4 (Model with Mathematics), MP 5 (Use appropriate tools strategically), and MP 6 (Attend to precision). Students used a number line (tool) to model a given problem and find the answer. I would have students explain how they did a problem, or make them use written expression for their answers. Oftentimes Math lends itself to a cool model/tool and we drill to students how important it is to get a correct answer, and I feel as if I can often reach my students by finding a good strategy/song for them to be successful. With this being said I need to do a better job of incorporating all Mathematical Practices.

While I list the three Mathematical Practices above for daily use, I notice that this means there are 5 practices that I don't use often enough. MP 1 (make sense of problems and persevere in solving them), MP 2 (Reason abstractly and quantitatively), MP 3 (Construct viable arguments and critique the reasoning of others), MP 7 (Look for and make use of structure), and MP 8 (Look for and express regularity in repeated reasoning) are all Mathematical Practices that require me to give up control of my classroom and allow students to make mistakes and struggle. For example, going back

to my Integer unit, when I was teaching students how to solve word problems I gave them the strategies I wanted them to use. I didn't even think to take the time and ask them what they would do to solve the problem or have them attempt to solve the problem and then work with a partner and see who was correct. Allowing students to work this way would tie in Mathematical Practices 2, 3, and 8. I must do a better job of allowing students to discover their own way to critically think about problems because when they are taking the State test I cannot assist them. If they can find a way to reason abstractly and gain better problem solving skills then test scores will go up and my job will be easier. In all seriousness, the Nature of Mathematics isn't overly complicated, there is a basic need to teach students how to persevere through tough tasks by using a variety of different reasons and also force students to appropriately convey their thought process through words/written expression. These skills I just mentioned are truly real-world skills every working person MUST have to be successful. As a teacher, my job is to express the importance of these skills to students and give them the tool needed to continue to grow these skills.

For my Nature of comparison, I have decided to relate Mathematical Practices to the Standards for Technological Literacy. The first comparison I would like to make is MP 1 and Standard for Technological Literacy 5. Mathematical Practice 1 states that students should make sense of problems and persevere in solving them, while Standard for Technological Literacy 5 states that students will develop an understanding of design. For both of these standards we are asking students to deep dive into the constraints of a problem and find a solution. For example in Math students might have to guess and check to get a question correct, whereas in technology they will follow the engineering design process to test and rebuild an innovation multiple times before completing a task. In Math students might be more reliant on solving a problem with pencil and paper, whereas in Technology your problem solving will be more computer/software based. Regardless of how a problem is solved, students will still have to proactively think about a solution using whatever knowledge they have.

For my second Nature of comparison I would like to look at Mathematical Practice 3, construct viable arguments and critique the reasoning of others, and Standard of Technological Literacy 4, students will develop an understanding of Technology and Society. For both of these tenets we are asking students to express to others how they got an answer/solution or express why they think their answer or solution is a good fit given the situation and the knowledge of the situation. In both Math and Technology, with more in-depth knowledge a student's understanding of the world will become clearer and clearer.

For my last Nature of comparison I would like to compare Mathematical Practice 7, look for and make use of structure, and Standard of Technological Literacy 7, students will develop an understanding of the designed world. For this Technology standard we are asking students to look at specific technologies and how they function in society. I believe that these two tenets are related because as students discover how these specific technologies function in society they will be able to analyze data and patterns to see which technologies truly better society. Almost every business related decision made in our current society is a numbers based decision. If students can look for and make use of patterns and structure, then they can effectively being to make informed decisions about what will better our society as a whole.