Nature of Mathematics

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Being an educator of mathematics, I thrive on giving the students opportunities to develop skills through problem solving, creativity, deductive and inductive reasoning, cooperative learning, inquiry, and several other aspects. These are concepts that will allow them to be successful not only in the classroom, but when they are pursuing their careers. There are plentiful topics to learn throughout their mathematical career, but one thing remains constant, the standards for mathematical practice.

There are 8 standards for mathematical practice. When I was starting my career as a math teacher, I would keep these standards close by and make sure that I am including them in my lesson planning. Now as a seasoned professional, it has just become a habit. My most frequently used standard is Standard 1: Make sense of problems and persevere in solving them. There is a reason this standard is number one and should be included in every lesson plan. Students in my classroom, on a daily basis, read the problem or the prompt first, ask clarifying questions (if needed), develop a plan to solve and persevere. It is a common problem for many students to see numbers in a word problem and perform an operation without any reasoning behind it. This is due to the fact that they did not take the time to thoroughly read the problem and understand what the problem is asking. Currently, I am the math interventionist for 6th, 7th and 8th. The students have many areas of growth and just making sense of the problems is crucial. I have been guiding them on this standard, and other mathematical standards are needed to help students make sense of the problems. Students that are struggling in mathematics, need more of Standard 4: Model with mathematics. Giving these students a visual representation of the concept or skills has been extremely beneficial. This may be just drawing a picture or putting the word problems in a mathematical equation that represents the situation. One last standard that I would like to address is Standard 5: Use appropriate tools strategically. This could be as basic as using a pencil and paper. However, I like to see students use the correct tools to construct a circle, measure angles, or which side of the ruler would give the more

accurate measurement of a paper clip. In my regular classroom, I did allow the use of calculators for most concepts, for I was assessing the students on the understanding of a concept (example: area of a circle) rather than their computation skills.

Collaboration is key to allow my teaching to be enhanced across disciplines. It is evident that math and science go hand in hand. There have been countless times upon entering the science classroom, I have seen a mathematical equation written on the board. May it have been substituting values in a formula to solving proportions, math is necessary in science. However, it is rare that I have collaborated with the science teacher. Being relevant to what my position is now, my small group time could be enhanced by incorporating what they are learning in their science class. For example, the students had been learning about potential and kinetic energy which involves substituting values in the formulas. If I had collaborated with the science teacher, I could have enriched this concept with my small groups. Therefore, I will collaborate with the science teacher to allow me to give the students a chance to make sense and persevere (Standard 1) a problem in science that requires math and the correct tools (Standard 5). Technology is another area that will enhance my teaching of mathematics. Using 21st century skills in the classroom is much needed. These students will be using 21st century technology throughout their educational career as well as their future endeavors. If they are not used in the classroom, one will miss out on amazing resources and the students will miss out on learning opportunities. The use of Google Tools has been extremely useful in the classroom. As an educator, it has allowed me to provide immediate feedback to my students, and students are able to use the tools to collaborate with one another better than ever. Collaboration is key with myself as an educator with other disciplines, and well as students collaborating with one another.

There are several ways that the Nature of Mathematics and the Nature of Engineering overlap. Upon reading, “Engineering in K-12 Education: Understanding the Status and Improving the Prospects,” it lists the three general principles for K–12 engineering education. One way they overlap is like the standards of mathematics, these principles to be addressed in all engineering courses.

The National Academy of Sciences (National Academies, 2009) addresses these principles. Principle 2 states, “K–12 engineering education should incorporate important and developmentally appropriate mathematics…” Students will need to use that correct mathematics in the development of the engineering design, this is another way math and engineering overlap. The last overlap I would like to address is Principle 3. Principle 3 states, “ K–12 engineering education should promote engineering habits of mind.” I have not heard of “habits of mind.” When reading further into this principle in the article (National Academies, 2009), the habits of mind are skills that are important for the 21st century. Just like in the math classroom and other disciplines, students are given the opportunities to collaborate, be creative, and communicate with one another.

References

Common Core Standards Initiative. (2021). *Standards of Mathematical Practice.* http://www.corestandards.org/Math/Practice/

National Academy of Sciences. (2009). *Engineering in K-12 Education: Understanding the Status and Improving the Prospects (Free Executive Summary).* http://www.nap.edu/catalog/12635.html