

My primary focus is the nature of math, as that is the subject I have taught the longest. Equity in math is an important factor in my teaching, as math was the subject I struggled with the most as a kid. I was also fortunate enough to have a methods instructor as an undergrad who focused on equity in mathematics education. I have spent several years teaching developmental math at the junior college level, and it is my job to not only provide whatever support I can for my students, but also to make sure they are ready for the rigors of college algebra in particular, but also any future math courses my students may take. At the junior high level, my job revolves around creating equity in our math education. I teach math lab (math study hall), where I provide extra help on homework or provide additional activities that practice concepts discussed in math class. In addition, I co-teach three math classes. I am there to help answer questions and provide a little different perspective to our students. In addition, we do some group projects so that students learn from each other. All students are expected to contribute to the group's work, and we as teachers are there to give hints, ask questions, and otherwise facilitate student learning.

Curriculum is a little trickier for me. I am used to following the book and the syllabus, so this is an area that I need to improve. I have slowly begun trying to incorporate different types of lessons that cover the same concepts. The idea that curriculum being more than just the textbook and standards is a big shift in my thinking. One part of curriculum that I do strive for is to at least tell students when or where certain concepts are useful in life outside the math classroom. For example, students ask why learning to graph lines is important. I remind them that graphing is a way of comparing data, and that data is being compared in many areas, such as science, business, the media, etc. One way that I can improve curriculum is create or find rich phenomena that helps students gain greater conceptual understanding.

Teaching is another area, based on the definition given in *The Executive Summary: Principles and Standards for School Mathematics*, that I could certainly improve. I understand what students need to know to go on to the next level, and I have ways of determining what students currently know. Where I feel I struggle is knowing how to build interest in learning math, either through bringing students up to grade level or through challenging students who are more advanced than their peers. Currently, my school's answer to this is use of IXL. This is a useful tool for practice because it gives immediate feedback and shows what skills kids need help with, but the kids are easily either bored or frustrated with it. Incorporating phenomena in math, while a shift in our current system, could be more effective in creating student interest and lead to better understanding.

Incorporating phenomena is one way we can improve student learning. Currently, we teach each individual lesson in the textbook, for the most part. Our day, in general, consists of doing a bell ringer, doing a few examples, and giving time at the end of the hour to work on the handful of problems given as homework. The next day is typically a quiz. While this is okay, it is not the most effective way for

students to learn information deeply. Our students “learn” the material long enough to do the homework and the quiz, usually retain it long enough to take the unit test, but by the time we give the state interim assessments, the students have forgotten what we had discussed earlier. Thus, student learning is an area we need to focus on in my school.

Assessment is something my school does a decent job of at the junior high level in math. We quiz every other day and give unit exams. We use quiz results to determine whether to go back and reteach a lesson or just assign extra practice on IXL. We also use interim state assessment data to determine with what skills students need additional practice. Regardless of the assessment we use, we provide students with feedback about what they did well as well as what they need to keep practicing. We also use assessment data to assess our teaching and what we could do differently to help students learn material better.

Technology is another area where my school could improve. Sure, we use Chromebooks and IXL, and sometimes manipulatives, but there are ways I am certain we could do better. For instance, do we *really* have to drive students crazy by making them calculate nearly everything by hand in junior high? Truthfully, I struggle with this. On one hand, yes, it is important that students know how to calculate by hand. On the other, calculators are much more ubiquitous, so why not allow students to use them and focus on what is truly important about the lesson? Conrad Wolfram in his TED Talk “Teaching Kids Real Math with Computers” argues that math in school looks very different than it does in the real world, and he asks that very question. He argues that the part students currently spend 80% of their time on is calculation, what he calls the “machinery” of math, while losing valuable time that could be spent learning the concepts. (Wolfram, 2010) In addition, using apps to simulate mathematical concepts allows easier to make conjectures and test ideas, thus adding to conceptual knowledge.

The nature of math is related to the nature of science in several important and valuable ways. One of the most important ways is in equity. In Appendix H of the NGSS, equity is addressed as “Science as a Human Endeavor”. Regardless of whether we are discussing math or science, we need to remember that many people, regardless of gender, religion, race, creed, or socioeconomic status, have contributed to both fields. In addition, both fields need to be inclusive of all students, not just the “brightest and best” in a school. Science and math are both so much a part of our everyday lives and are becoming more and more important every day.

Another important relationship is between learning in math and being able to use that knowledge in the context of science. For example, learning about data, measures of central tendency, etc., in math helps us know what to do with data gathered in a scientific investigation. In addition, learning how to interpret data and how data can be manipulated gives students important tools for making inferences about their investigations in science.

A third important relationship is that math and science both use a variety of methods to solve problems. For instance, there are multiple methods of adding or multiplying, just as there are many ways of approaching a scientific investigation into how disease spreads. In both subjects, having a variety of tools at our disposal is invaluable to solve problems.

APPENDIX H -Understanding the Scientific Enterprise: The Nature of Science in the Next Generation Science Standards. (n.d.).

<https://www.nextgenscience.org/sites/default/files/Appendix%20H%20-%20The%20Nature%20of%20Science%20in%20the%20Next%20Generation%20Science%20Standards%204.15.13.pdf>

APPENDIX L -Connections to the Common Core State Standards for Mathematics.

(2013). https://www.nextgenscience.org/sites/default/files/Appendix-L_CCSS%20Math%20Connections%2006_03_13.pdf

Executive Summary Principles and Standards for School Mathematics. (n.d.). https://www.nctm.org/uploadedFiles/Standards_and_Positions/PSSM_ExecutiveSummary.pdf

Wolfram, C. (2010, November 15). *Conrad Wolfram: Teaching kids real math with computers.* YouTube. <https://youtu.be/60OVIfAUPJg>