

## **Nature of Mathematics**

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At the start of the school year this year, we started a district-wide initiative to implement project based learning experiences into our curriculum. This initiative came from the idea of thinking about what our students need in order to be prepared for the future and making our classroom environment a rigorous enough place that prepares them for their future training/job/college. The project based learning experience allows students to be able to implement and understand the mathematical practices that are within the Common Core Mathematics Standards.

My colleague and I have been working together on this project for our Geometry class. Our goal for this project is to be able to expose students to a real-life project that keeps them engaged and learning while at the same time covering several standards within the math content. Our project that we are going to implement this year is one that has the students design their own blueprint for a house. Throughout this project, students will have to design a house with specific dimensions (to use for scale factor) and specified shapes (for finding area). They will also have a specific budget and be making decisions on types of flooring, appliances, and other things in order to understand calculating costs, tax, etc.

Within this project students will be using most of the common core standards for mathematical practices. They will have to attend to precision in their drawing, measurements and calculations, model with math, use appropriate tools strategically in their blueprint, look for and make use of structure, and reason abstractly and quantitatively when budgeting for the things

they need. All of these standards are important in helping students to think on their own and to think critically, which I believe is something that is missing from our students today.

During this project, we will also be adding in other content areas because it is important for students to see how to make these connections in other classes and how they relate. When it comes to the type of project we are doing, I believe that we can most easily relate this to science content. There are many standards in science that are very directly related to math and vice versa.

According to the Next Generation Science Standards Appendix L, “Science is a quantitative discipline, so it is important for educators to ensure that students’ science learning coheres well with their learning in mathematics. During the middle school and high school years, students develop a number of powerful quantitative tools, from rates and proportional relationships, to basic algebra and functions, to basic statistics and probability. Such tools are applicable far beyond the mathematics classroom. Such tools can also be better understood, and more securely mastered, by applying them in a variety of contexts.” (NGSS, 2013). There are many ways to relate rates and proportional relationships beyond the math classroom and into the science classroom. One way is that I know that our science teachers use the ACT to look at the charts and graphs to be able to calculate rates and look at relationships. There are also ACT math questions that ask you to calculate rates and find proportions. If students are seeing this in multiple classes, and how they relate to one another in real-world situations, I am confident that it has to be beneficial.

There are many other standards in science that specifically relate to math and can be used in the same way. A second example would be that it would be very easy to take a type of

quadratic or exponential function that I teach in Algebra II and relate it to a real-world science concept. Over time, I think it will be very beneficial to myself and my colleagues that teach different content, and most importantly, our students to show them how closely the concepts in mathematics are related to the same concepts in another subject like science. It would be easy to make a connection between exponential functions and the decay of certain organisms. At the same time, the standards for mathematical practices are embedded within this and students are able to think for themselves and reason through real-world problems.

A third example would be with using units. One of the science standards is , N-Q.1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin in graphs and data displays (NGSS, 2013). In math, we discuss and go over using units on a consistent basis. It would be very easy to add in something that was science related to give the students a better understanding.

Through this project, I have been able to reflect on my project based learning experience for my students. The assignment is just one step in moving forward and giving my students the mindset of discovering things on their own and “the nature” of mathematics. I want students to be able to not only implement the mathematical standards within my content but relate it to other content as well.

**Sources:**

Next Generation Science Standards: Appendix L- Connections to the Common Core State Standards for Mathematics. (2013, May). Retrieved February 23, 2020, from [https://www.nextgenscience.org/sites/default/files/resource/files/Appendix-L\\_CCSS Math Connections 06\\_03\\_13.pdf](https://www.nextgenscience.org/sites/default/files/resource/files/Appendix-L_CCSS_Math_Connections_06_03_13.pdf)

Standards for Mathematical Practice. (n.d.). Retrieved February 23, 2020, from <http://www.corestandards.org/Math/Practice/>