

Nature of STEM

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Sarah Justis

Endeavor

Dr. Karen Woodruff

Fall 2021

Education is constantly growing and changing to meet the needs of students in the classroom. Within recent years educators are discovering the importance of incorporating STEM in the classroom, schools and districts. To keep up with student needs, standards in multiple subject areas are being written to both aid and require teachers to use STEM in their classrooms. I teach 8th grade Science in Kentucky which means that I use NGSS standards. The NGSS standards include the Nature of Science tenets that help teachers fully understand how to incorporate STEM in their classrooms. Below is a description of a science lesson that I teach, to show how I use the Nature of Science tenets in my classroom.

SmartPhone Addiction is one of my most favorite units that I teach. Students are tasked with researching the effects of smartphones on the nervous system and the prevalence of smartphone use. Students start this unit with watching a short video clip of Denzel Washington saying “you don’t think you are addicted, try turning it off for one day” this sparks my students interest. Students then answer the question: do you think you're addicted to your smart phone and explain. Beneath that question is a table that each day students have to record their screen time usage from the previous day. This creates not only a real world application but also allows students the opportunity to discuss their daily routine outside of school. This part of my unit addresses the Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena, through providing students with a phenomena Smartphone Addiction and real world application, how they use their phone and how it affects their nervous system. This also addresses Scientific Knowledge is Open to Revision in Light of New Evidence. The “are you addicted to you cell phone” question is rediscussed everyday after students record their screen time use. This helps students understand that not only can a hypothesis change based on new data but the reason and explanation can change as well.

During the Smartphone Addiction unit students complete two reaction time labs. The first lab students complete multiple trials and record their average visual, audio, and tactile reaction times. The second reaction time lab is the exact same as the first, however they have to text or talk on their phone while testing their reaction times. Students compare the data from each lab to determine which sense was most affected by cellphones. They compare this information with other students in their group and discuss results, explain analysis of their results. This lab addresses the Scientific Investigations Use a Variety of Methods, by tasking students with completing a hands on lab, recording data, analyzing the collected data and sharing their results with their group members.

As a teacher I am constantly striving to grow and develop to modify and improve my teaching abilities. Currently I feel that I struggle the most with cross curricular teaching. STEM is not meant to be taught in one classroom without having overlap in other content areas. This is where I feel that appendix H can be the most help to me, to help me improve my STEM teaching method.

Based on appendix H cross cutting concepts is an integral part of teaching not only science but fully incorporating STEM. This does not limit cross curricular teaching to just STEM areas, but also includes writing, reading and history. Through reviewing the history of science and how it has changed, comparing that information to current scientific reading and displaying their knowledge. Students are more likely to understand the nature of science, which is that science is ever changing and is a learning process, not a right or wrong answer. Within NGSS there is a section for cross cutting concepts. This provides areas where science concepts can easily incorporate other content areas. In my current district there is a closed door policy, each teacher teaches their own content only within the four walls of their classroom. This can make

overlapping content in my classroom very difficult. However, through using the layout that is provided by NGSS it makes incorporating other content areas more accessible for me as a teacher.

Through using NGSS I have seen my STEM teaching method improve and become more dynamic. This is mostly due to the fact that NGSS focuses not on right and wrong but as growth. Because of this, if I am going to require my students to have a growth mindset then I must display a growth mindset as well. My goal over the past two years has been to move from a sit and get classroom to a student-led instruction. My future goal is to become a fully integrated STEM classroom that fully incorporates other content areas.

Engineering is the current content that I am attempting to incorporate into my classroom. There are several areas in the Nature of Science that easily overlap with the Nature of Engineering. The Nature of Engineering focuses on solving problems not correct or incorrect answers, it places importance on cross-cutting curriculum, and emphasizes the importance of collaboration and communication. There are multiple standards in science that incorporate an engineering design process which makes incorporating engineering in my classroom more fluid.