Nature of Science

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My reflection on how I address the current tenet(s) in my classroom

In all honesty, I would not say that I am teaching in any of the tenets of the nature of science. As I think about my lesson plans and the lessons that my students are learning, I am simply going through the curriculum, and not very well. I know that this is not completely true because my students just finished their science fair projects which include several of the tenets. But, I really took a backseat on the whole experience because I had no idea what was going on and my co-teacher really ran the show. One of the main reasons why I decided to add a STEM certificate to my master's degree was specifically to get out of the way that I am currently teaching science. I teach 5th and 6th grade science and for the most part, I am following what the book tells me. I personally feel so disconnected to what the students (and I) are learning. I am literally going through the lessons with the students and learning with them. Not really learning, but gathering the information. I do consult the science standards for the state of Colorado, and I know that there is more that I should and could be doing. It is terrible that I am admitting it, but I do so to acknowledge that I want it to be different. This class really has lit a fire in me, but I have so little knowledge that I am unsure of the direction I need to go.

How to enhance my teaching with tenets of the Nature of Science

Many of the more recent articles that I have read deal with knowing the students and what the students are interested in. Giving them something that they may have never thought about and how they can think about that phenomena in scientific ways. In the article about being afraid of trees, I can see how life changing that experience would be for a student that spends the

majority of their life in a city and never see what nature can hold. Then there are the articles that deal with minorities and getting to know what type of science they would be interested in. I teach in a school that is in the middle of corn and silage fields, where cows roam around in fields for the winters and crops grow plenty in the summer. Often times I am passing tractors that drive on the main road. I can see how even this environment can change the perspective of the students I teach.

Of the practice tenets, I can use a variety of methods in investigations on how weather affects crops. I can have the students explain why the growth of a plant changes based on light and weather. On the crosscutting concepts side, I can have students explore and research the lives of scientists and engineers and what they have changed about the nature of science. Along these lines, I could have them research the different scientists from around the world and what has made them a leader in their field. Students need to constantly be making observations from the world around them and asking questions about it.

The “Understandings about the Nature of Science” chart (NGSS Release, Appendix H) is dynamic in that it is very thorough in presenting the progression through the grade levels. Because I teach 5th and 6th grade science, I specifically took a look at both of these and made connections that would cover both grade levels. I really appreciate how at every category there is a connection to the previous grade level section. The grade levels build from the prior level and add depth of understanding of each of the tenets. While there is very precise language on what is to be done at each level with each tenet, there is also a lot of freedom in what to do with what the categories have in them. I appreciate that you can go deeper too when the need for differentiation arises and if you want to be less structured you can still accomplish what the tenet is leading you to do.

Overlapping the "Nature Of"

I teach 5th and 6th grade math, science, and social studies. It made sense to me to start with the nature of Math. I then connected it with the Nature of science. As I read the Executive Summary on School Mathematics (NCTM.org), I read through many connections between the Nature of Science and the Nature of Math. One of the ways they overlap is through many of the process standards. While math, of course has its own content standards like science, their processing standards are incredibly similar. I could connect all the processing standards to both, but here are three that stood out the most.

I would connect math and science with the problem solving standard. In both, students create creativity and start to create a habit of inquiry into how to solve a problem. I try to demonstrate this all the time, especially in my 6th grade math class. It is funny how the 5th and 6th grade seem only a grade level apart, but the math is so much more complex. I struggle with 6th grade math and my students see that. But they also see me being persistent and trying to solve problems from different angles and I watch them as they also work through problems with teammates. "Oh, that doesn't see right, what if we tried this". It really is amazing.

Another way the processing standards overlap is through communication. This is a direct link into the problem solving section. Students need to converse to work out problems. The same happens in both math and science.

The third way that the processing standards overlap is with representations. Very similar to science, Math uses many different ways to represent data and other finding in problems. Students can then take this information and analyze what to do with the information. It also gives them the tools to use towards the next steps that they take.

I would be lacking if I didn't mention the role of technology. I know the connections that math and science have, but technology is embedded into all things. The math article (Executive Summary, NCTM.org) was especially direct with making sure that technology also played a role in the teaching and learning of students. So much so that they included it as one of their principles. Simply put, technology is synonymous with science and mathematics.

References:

Next Generation Science Standards, For States, By States. (April 2013). *APPENDIX H - Understanding the Scientific Enterprise: The Nature of Science in the Next Generation Science Standards.* https://www.nextgenscience.org/sites/default/files/Appendix%20D%20Diversity%20and%20Equity%20-%204.9.13.pdf

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