Lily Rutledge-Ellison
Nature of Science
October 2020

With our planet undergoing revolutionary changes, the next generation requires preparation beyond what we have previously provided. Gloria Ladson-Billings asserts that “we are no longer in a society that can afford to send some students to a course called general science that actually would better be called “reading about science” (2007). This paper will serve as a tool for reflection; exploring the ways in which my classroom teaches the true nature of science, and the ways it does not yet.

The first principle addresses how science is subject to change based on interpretation of existing evidence. Within my classroom (pre quarantine) we have briefly talked about topics like geocentrism, but I don’t remember making a point to explain how changes in thinking happen all the time. This school year I planned for our 5th unit of the year to explore the discoveries of humankind, and how new discoveries change understanding and practices, this was meant to go hand in hand with content covering clean energy, and persuasive writing.

The second principle explores the way interpretations are made from observation. I believe I have incorporated this into my daily routine this year with our video observations. I trained students to observe audibly and openly by watching live animal cams every morning as a soft start. There was no expectation to do “traditional work” around the observations (yet) and so the threat of failure subsided as the weeks went on. I used these skills to encourage video reflections on phenomena like the red sky in Oregon this last September. We talked about the different ways it was being interpreted before we stretched our thinking with an atmospheric map. We discussed how our thinking changed as we received more information. Which in fact, is supporting the first principle in the Nature of Science.

Upon reflecting on the first two, I believe that the “red sky” investigation I structured this last month was supportive of almost all the tenets, but I would like to consider some of my classroom work before this class started shaping the way I taught.

When it comes to the principle of inferential, imaginative, and creative nature of science I believe our work as a school around “open-mindedness” has been a great support. However, I believe I was too intimidated at the thought of letting students design experiments in the past. I remember a student wanted to make a spoon windmill to measure wind speed and my biggest concern was that the other students didn’t have access to the same erector set as her. I played down her construction in

hindsight, because I wanted to have an experiment that everyone could take part in. This is something I believe I can vastly improve on.

I don't think I have ever substantially addressed the subjective nature of science within my classroom. It would be incredibly simple to connect this tenet to our many discussions about diverse backgrounds, and understanding multiple perspectives. Perhaps the closest we have come to exploring subjectivity was within our persuasive debates about zoos. Students were able to see the validity from both sides of conservation efforts.

Finally, the socially and culturally embedded nature of science has been in my classroom for the past 4 years. I have always made it a point to weave in conversations about climate change and climate refugees no matter what grade I taught. It was a topic that was close to my heart, so I would make it fit the curriculum. I have not yet empowered my students to further their social justice in other scientific arenas, and so this will be my next step.

When it comes to addressing other disciplines I can usually include reading and writing the easiest. With the "red sky" investigation I am hoping to engage my students in the atmospheric data to create an authentic context for comparing 3 digit numbers. The parts per million can be subtracted to find differences between regions. I have been reading the book "The Wild Robot" which handles the different ways you can adapt to an environment. I hope to challenge their thinking in how plants and animals will adapt to the air quality and other climate consequences. From there we will design ways that humans can adapt as well. The book has been full of teachable science moments, but also humanizes the animals that are being affected by rising sea levels, earlier winters, and polluted air. I have had them start creative writing pieces that put them in the perspective of someone, or something experiencing that air quality. This unit is called "Sharing the Planet."

My next unit, How the World Works, must focus on the natural world and its laws. I hoped to focus on form and structure. By analyzing predictable structures like time, and thus celestial patterns, we can understand how knowing the form allows us to interact with it. I hope to make this connection to patterns within mathematics (multiplication/division), the predictable form of text structure, and the structure of expository texts. I have always wanted to explore the phenomena of "sacred geometry," but I am sure there are even more phenomena that could ignite the same discussions. I worry about how the shift in curriculum will reframe how I teach this unit.

I believe that the nature of Technology and the nature of Science overlap in many clear ways. The first I wish to explore is the connection to the cultural, social, economic, and political sphere. The Nature of Science asks us to recognize the social context that it is produced in, and the Nature of Technology does the same. Some technology is developed for industry and would be framed in that context. There may be more economic ties to it, where science may look at its impact on the surrounding land and communities. Medical technologies may change with a shift in scientific priorities. The funding and availability of information may also be dependent on the current state of social/political spheres. Science and technology are both constantly developed to maintain current systems and improve on them where possible. The subjective nature of science changes how the public reacts to findings, just as the subjective way information is displayed can influence how the public reacts. Finally, technology intertwines with all other disciplines in the same way Science does. Together they make the marriage of content possible in a way that leads to more authentic learning.

References

Dugger Jr, W. E. (2000). Standards for Technological Literacy. Content for the Study of Technology. Technology Teacher, 59(5), 8-13.

Ladson-Billings, G. (2007). I used to love science and then I went to school: The challenge of school science in urban schools. Teaching science to every child: Using culture as a starting point, xiii-xix.

Tenets of the nature of science. (2011, October 07). Retrieved October 03, 2020, from https://www.sciencelearn.org.nz/resources/413-tenets-of-the-nature-of-science