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Week 4 Assignment
Nature of STEM

I am grappling with the challenge of accommodating two levels of learning outcomes for scientific investigation, middle (8th grade) and high school (NY Living Environment Regents). I feel I cover more high school performance expectations but end up having some limitations because of ranging math skill level and maturity. Students typically perform one procedure. The "nature of science" (NOS) encompasses understanding the scientific process, the development of scientific knowledge, and the characteristics that define scientific inquiry. In my current teaching of the Living Environment curriculum, I integrate NOS, primarily through inquiry-based learning and hands-on activities. One specific lesson where I address the tenets of NOS is the Enzyme Activity Lab. This lab is designed to help students understand how enzymes function and how environmental factors influence enzyme activity. Students investigate the effect of temperature or pH on enzyme activity by measuring the rate of reaction of catalase breaking down hydrogen peroxide. Despite the students following the same procedure they do measure reaction rates by observing changes in substrate concentration over time, emphasizing that scientific knowledge is based on empirical evidence. Areas of revisions are considered and discussed but we do not restructure and perform other experiments. Instead I have them apply what they have learned to an authentic scenario where they are acting as a veterinarian who has a patient losing weight despite a healthy appetite. I reworked the activity that can be found on explore learning (Enzyme Virtual Lab) to magnify the data on the lab work so students can make scientific assumptions and conclude the medical treatments we can offer the

patient. My students really get into this, they then will bring up their own pets and relatives.

In an effort to make this activity more integrated STEM and NOS learning outcome “scientific investigation uses a variety of methods”, I would frame the lab as an engineering challenge where students must design an experiment to optimize enzyme activity. This could involve modifying environmental conditions or creating new experimental setups. If the anchor can be using the veterinarian case study, the desired outcome for students to gain the understanding of enzymes and their function should be achieved. Incorporating crossing cutting concepts into the enzyme lab will help students develop a deeper understanding of scientific principles and see how these concepts apply universally. Students can identify and analyze patterns in their data regarding how different conditions (temperature, pH, substrate concentration) affect enzyme activity. Graphical representations, quantitative analysis, and other CCCs can be embedded into this activity in order to help students see the connections between different scientific principles and disciplines.

After taking the time to break down and look over a specific activity, I think I apply more of the NOS to my teaching pedagogy than I realized. Adjusting more lessons to incorporate more data analysis tools can further enhance students' understanding and engagement. With the above activity mentioned students tend to link the variety of supplements once can take to improve athletic performance. I am trying to figure out how to pull in the research that is out there to make informed decisions about these scientifically based issues.