

Nature of Science

Nature of Science and CCMP Analysis
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Methods of STEM

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After comparing the Swartz (2009) and Nature of Science articles and matrix, developing an understanding of the importance of teaching science as a dynamic mindset. In a world of constant change, developing explicit skills and practices, and understanding that this may change course with the world's ever evolving context. The Nature of Science Allows opportunities for students to explore and develop an understanding of science in a way that teaches Big Ideas and topics through the NRC Science Framework. Supporting opportunities for learners to explore NGSS and integrating Mathematics and data analysis/interpretation, is critical for future application and understanding the nature of science.

The article "Biomechanics of human movement and its clinical" (2012), supports the NGSS principles of Force and Motion, and also applies to real life application in the engineering design of Prosthetics and Biomechanics. Often, learners study force and motion through application to moving object, but miss opportunities for real life application of "how gravity impacts our bodies and movements." Since my current learning population includes students with prosthetics, we needed to develop empathy for differences and awareness of the structures of our bodies. Many careers need to understand how the body functions, and thus leading to development of items that meet the needs and bigger systems. The analysis of angles, measurement, speed, and motion are interpreted through graphs. Calculus is applied along with knowledge of biological functions and measured with data, represented in graphs. Students practice analyzing movements through ramps, pulleys, creating our own prosthetics with cardboard, and how these tools are used will offer future application to career pathways. Students can develop skills that support understanding how doctors, architects, biomechanics and other careers need to have conceptual understanding of motion, force, and gravity along with the impact of these on our bodies.

It is critical to be reflective with science practices and crosscutting concepts. Relating topics to real life, authentic learning, and application to knowledge to future pathways. Being specific with word choice and questioning, to guide learners to these skills. Using scientific language appropriately and introducing nature of science support the Epistemic Nature of Science (NRC, 2012). Thinking about science as a dynamic process, and embracing the process of evidence analysis and explanatory models under separate contexts, one begins internalizing the nature of science. Often, misuse of language causes students to develop misconceptions of the nature of science. For example, in Swartz (2009 page 44-45) discusses "dead words" and the rephrasing of science questions. Using "provide evidence" rather prove and "valid evidence based" instead of is that true. Using appropriate guided questioning, cautious to avoid developing these misconceptions, allows students to be objective rather than

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rigid (Swartz, 2009, page 42).

Developing the ability to gather quantitative evidence to support and understanding the importance of using evidence based practice, allows the mindset of science as dynamic, or changing process related to its current context. The study of biomechanics and impact of gravity on the human body, offers opportunities for learners to develop an understanding for the nature of science and mathematical interpretation through integrated content and NGSS practices.

References:

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