

Engaging Contexts Data Integration Proposal

Relating the characteristics of sound and light wave to the observable characteristics of ocean waves.

Standard P.8.6: Students will demonstrate an understanding of the properties, behaviors, and application of waves.

Objective P.8.6.4: Use scientific processes to plan and conduct controlled investigations to conclude sound is a wave phenomenon that is characterized by amplitude and frequency.

Guiding question: How do amplitude and frequency affect the behaviors and performance of waves?

Goal: After observing data on ocean waves, a phenomenon they can see and are familiar with, students will conclude that waves are characterized by frequency and amplitude. This real-world base will be applied to sound and light waves. This part focuses on sound waves.

Data Source: The title for this lesson and data is Waves. Students will collect and record data on waves from <http://www.ndbc.noaa.gov/> using the tsunami filter. Students will collect data from three different buoys (one off the coast of a country of their choosing, one mid ocean buoy, and one off the coast of the Gulf of Mexico) for 5 days. Students will record their data on a word document that I will develop. I will not instruct them on what they are recording but allow them to discover amplitude and frequency through data analysis and their prior knowledge about waves. Followed by the question: Why do you think they call sound and light “waves?”

Lesson Enhancement and Visual Representation: Living only 150 miles north of the Gulf of Mexico and next to a large reservoir, all my students are familiar with and have observed the properties of waves; they just don't know what they are observing. I believe that if I activate their prior knowledge, use Socratic Questioning, I can lead students to fully understand amplitude, frequency, and wavelength before I introduce the “fancy” science words. I believe

this will prevent students from shutting down when they hear the “big” words. After I pair their observations with amplitude, frequency, and wavelength, students will find it easier to transfer their prior knowledge to the study of sound and light waves. Providing a base this solid, will allow students to go deeper into the properties of waves and how they interact with matter and energy. In the past, students have had a hard time with the basics because their prior knowledge was not activated.

Interdisciplinary: Providing a real-world example and investigating the properties of waves in science should make visualization of the mathematical properties of parabolas become more than a line on a graph. As well, some of my students will relate better to the calculations than the observations. I believe both classes would benefit greatly as we explore this unit together. This unit would also help student in choir or music to better understand pitch, resonance, volume, how string instruments work...etc. And finally, in STEM class students could build a musical instrument that must play a certain note from everyday materials.

Using Data: I love using data, personally and in the classroom. There is no greater joy, to me, than when a student recognizes their first pattern. Data is the great equalizer. I can use complex data for high level students and less complex data sets for low level students with the same result; they both learn to see patterns in number. I can find, generate, or have students collect data at a level specific to their needs. Once students break through the barrier of seeing a pattern the process almost becomes addictive but it does become easier.

References

Mississippi Department of Education Office of Curriculum Development. (2018). Grade 8:

Physical Science. Jackson, MS: Mississippi Department of Education.

National Data Buoy Center. (2018). Retrieved from National Oceanic and Atmospheric

Administration website: <http://www.ndbc.noaa.gov/>