

HISI - Lesson Outline

Module Title _____ Waves _____ LS Team __McKinleyville High School__ Grade level: ____9-12____

Lesson # NA	Title: OCEAN WAVES	Number of Minutes: 180
Mathematical purpose: Calculate wavelength, frequency, period, and speed from certain givens and/or measurements from a wave profile	Scientific Purpose: Understand the parts of a wave profile (crest, trough, wavelength, wave height, still water mark, etc). Be able to see how wavelength, speed and frequency are related. Know how wavelength and wave height factor into a breaking wave.	
Materials needed: wave tanks, cm tape measures, paddles, stoppers, water, food dye, construction paper, masking tape, second hand clock or timer, wave folders (pre-made folder with instruction documents; includes instructions for three activities)	Academic vocabulary: wave, wave length, wave height, trough, crest, still water, wave profile, period, speed, frequency, breaking wave, seiche, progressive, standing waves	
Common Core Standards (copy and paste): CCSS.MATH.CONTENT.7.EE.A.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. CCSS.MATH.CONTENT.HSS.MD.B.7 analyze decisions and strategies using probability concepts	Next Generation Science Standards (copy and paste): HS-ESS2 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.	
When students are finished they will understand: 1. The wavelength to wave height ratio must be 1:7 or less for the wave to break 2. Wavelength is dependent upon speed and period 3. Water doesn't move forward in a wave, just in a circular pattern, until the wave breaks 4. Know the difference between sieche, progressive and standing waves	What are teacher questions or prompts? How does the stopper setting or the paddle pulse effect the wavelength, wave height and wave speed? Do you expect the waves to break in the wave tank? Why or why not? What are the important parts of a wave profile?	
What are questions you anticipate students will have?	What are misconceptions students might have?	

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How many wave profiles do I need to do? How do I figure out what kind of wave I'm making? What happens when waves interact? How do I solve an equation when I don't know enough of the variables?	1. Defining a wave 2. Thinking that water moves forward with the wave not just the energy traveling through the medium.
General outline of the lesson: Before lessons: Have wave tanks setup; 2/3 full of water, dyed a visible color. Have two paddles and two stoppers per tank, a tape measure and a wave folder with directions for the activity Lesson intro: Explain that students will follow activity entitled "wave sets" from the wave lab folder. They will be creating wave profiles to analyze and investigate. Lesson instructions: Written prompts on white board. Then demo how to create a wave of a certain frequency and period using the stoppers and paddles. Show how to achieve an accurate wave profile. Place kids in groups of four and give each a task: recorder, task keeper/instructions reader, wave generator and wave profile maker. Release students to collect data Conclusion of lesson: After students have created all the profiles they need, show them what they should analyze and label per profile. Then they are ready for conclusion/analyzing questions.	

Supplemental files/resources will follow