

Dive into the Wonders of Oceans and Beaches

Paige Shelton Reynolds- Middle School Science Teacher
Monte Vista Middle School, Camarillo, CA

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Teacher: Shelton Reynolds	Unit: Under the Heat: How Marine Heatwaves Impact Oceans
Grade/Course: 6th Grade Science	Lesson Title: Dive into the Wonders of Oceans and Beaches
Objectives: I can ask questions about marine heatwaves, oceans, and climate change. I can explain how marine heat waves could impact our oceans.	Investigative Question: How does the heat from marine heat waves affect sea urchin kelp consumption? How can marine heatwaves impact our oceans? How can we protect our oceans?
NGSS Performance Expectation: MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	
Real World Phenomenon Addressed in the Lesson: Marine Heatwaves & Our Ocean	
3 Dimensions of Science	
Science & Engineering Practice(s) Used:	
<ul style="list-style-type: none"> ● Asking Questions ● Analyzing and Interpreting Data ● Constructing Explanations ● Obtaining, Evaluating, and Communicating Information 	
Crosscutting Concept(s) Used:	
<ul style="list-style-type: none"> ● System and System Models ● Patterns ● Stability and Change 	
Disciplinary Core Idea(s)	
<ul style="list-style-type: none"> ● Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities. (MS-ESS3-5) ● Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. (MS-ESS3-3) 	

Background Information

Prior Student Knowledge: Students will engage in this mini-unit after our oceans, atmosphere, and climate unit and before our climate change unit. Students will have information on ocean currents and salinity and be able to model and explain how we have different climates on Earth. Students will model why we have the climate in Ventura County. Students will learn what El Nio/ La Nia is and how it can also impact our ocean temperatures. Students only have a little information on the kelp forest ecosystems at this point besides looking at some organisms from the kelp forest under a microscope in our cells unit. Furthermore, students will have background information on marine heatwaves, why they have been increasing, and some curiosities about how they might impact the oceans.

Possible Preconceptions/Misconceptions: Students may think that marine heat waves happen to the same extent every year throughout the Earth's history. Students may think that climate change doesn't impact our oceans. Students may only understand some of the different uses of the ocean besides the fact that animals live there.

Content Information for Teacher: The teacher should understand the different topics covered in the choice board, such as oceans and climate change, snowy plovers, beach grooming, sea urchin anatomy, sea creatures, and data analysis.

Google Slides for Lesson:

https://docs.google.com/presentation/d/14yAjXVpkDn3CmloTkwH8BXeD2AuXutHO6VAAx_KZIS4/e/dit?usp=sharing

5E	Evidence of Use/Student Activity
Engage/Explore/ Evaluate	Students will collect temperature data on the different treatments (MHW vs non-MHW) and record their data in their data table.
Engage/Explore/Explain/Evaluate/ Elaborate	Students will engage in our Marine Heat Waves, Oceans, and Climate Change Exploration Choice Board . They will have one required activity: reading an article about oceans and climate change and creating a one-pager. Students then have the choice to engage in one more activity that they wish to explore. The activities are a Sea Urchin Data Nugget, Save the Snowy Plover, Explore a Sea Creature Poster, Virtual Urchin Dissection, or Beach Grooming 101.
Explain/ Evaluate Lesson Closure	To wrap up the lesson and choice board, students will share one thing they learned from the choice board with their lab table group, and we will share it as a class as well.

