

Spiny Snackers: Exploring How Sea Urchins Munch on Kelp

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Developed as part of the ARET@LTERS program, Summer 2024



Teacher: Shelton Reynolds	Unit: Under the Heat: How Marine Heatwaves Impact Oceans
Grade/Course: 6th Grade Science	Lesson Title: Spiny Snackers: Exploring How Sea Urchins Munch on Kelp
Objectives: I can analyze and interpret data about how marine heatwaves impact sea urchin kelp consumption. 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?
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"> ● Planning and Carrying Out Investigation ● Analyzing and Interpreting Data ● Using Mathematics and Computational Thinking ● Constructing Explanations 	
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 current salinity and be able to model and explain how we have different climates on Earth. Students will model why, in Ventura County, we have the climate we have. 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. Students will know how prior knowledge on the following topics depending on the choices they selected from the choice board: sea creatures, beach grooming, sea urchin anatomy, data analysis, oceans and climate change, and snowy plover habitat loss.

Possible Preconceptions/Misconceptions: Students may need to learn to use Google Sheets or graphing skills. Students might need clarification on what data visualizations to use for different data types.

Content Information for Teachers: The teacher should understand how to use Google Sheets for data analysis and how marine heat waves can impact oceans.

Google Slides for Lesson:

https://docs.google.com/presentation/d/1Y-plZkF4MdT6gNQ8932JEt_BxkmWbOIU6pmD3z-YYh0/edit?usp=sharing

5E	Evidence of Use/Student Activity
Explain	Students will explain one-way climate change is impacting our oceans for their science starter.
Engage/Explore/ Evaluate	Students will collect temperature data on the different treatments (MHW vs. non-MHW) and kelp amounts and record their data in a data table.
Explore/Explain	Students will discover how to use Google Sheets. Students will input their data into Google Sheets, and then together, we will make one data visualization. Students then will work on creating their own data visualizations for the other two data tables.
Explain/Evaluate/ Elaborate	Students will explain their findings in the Lab Write-up on Google Classroom and add one of their data visualizations. They will also explain their responses to

	various conclusion questions in the lab write-up.
Explain/ Evaluate/ Elaborate Lesson Closure	To wrap up the lesson, students will elaborate on how marine heat waves impact our oceans with a brainstorming activity. Students will answer the question: How do marine heatwaves impact our oceans on their sticky notes and then discuss two ideas with their lab group to share with the class.