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Curriculum Units by Fellows of the National Initiative

2020 Volume V: Caretakers versus Exploiters: Impacting Biodiversity in the Age of Humans

Marine Biotoxins: Invisible, Odorless, and Lethal

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Humans have consumed seafood for thousands of years. Proper handling, storage, and preparation of seafood can prevent a variety of food-borne illnesses caused by bacteria and viruses. Some naturally occurring biotoxins produced by algae cannot be removed or mitigated by cooking and pose a serious health risk to consumers. Human contributions to changes in the environment including warming of ocean temperatures attributed to burning of fossil fuels and pollution runoff in waterways are creating conditions allowing toxic algae blooms to proliferate. Smaller ocean organisms including clams, mussels, sardines, anchovies, and crabs are relatively unaffected by some biotoxins. Larger predators including birds, otters, sea lions, whales, and humans are at risk of severe negative health complications, including death, from seafood borne illnesses when consuming toxin contaminated organisms.

This curriculum unit looks at Amnesic Seafood Poisoning (ASP) caused by domoic acid, a marine algae biotoxin, that is appearing more frequently and on a wider scale along California's Pacific coastline. An overview of California's Marine Biotoxin Monitor Program, the longest running program of its kind in the United States, and the techniques used to collect, sample, and make determinations regarding the safety of seafood are introduced. I created this curriculum unit for students taking AP Statistics so they can examine a current environmental problem, examine existing data collection techniques, analyze data from research journals and publicly accessible government databases and agencies, and propose solutions that address local, state, national, and global issues.

(Developed for AP Statistics and AP Seminar, grades 11-12, and Math Analysis, grades 10-12; recommended for Statistics and Biology, grades 9-12)

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