From classroom to coastline: An educator workshop about marine and freshwater harmful algal blooms (HABs)

Thursday, December 14th, 2023

Next Generation Science Standards Links for: Pond monitoring – what, where, when, and how

ESS1.C and LS4.A Rock Strata -Stomatolites- reveal oldest fossil record used as evidence of major historical event in Earth's history.

ESS2.C The roles of water in Earth's surface process. Cape Cod's Coastal Ponds – Kettle hole ponds from glacial ice left behind during the glaciers retreat approx. 10-12K yrs ago, ground water aquifers.

ESS2.D Weather and Climate. Cape Cod temperatures buffered by the surrounding sea waters.

ESS3.C Human Impacts on Earth systems. Pond water quality changes through time as land use and population density have changed. Sustainability requires responsible management of natural resources.

LS1.A Structure and function -Cyanobacteria prokaryote vs eukaryotic cells.

LS1.B and LS4.C Adaptation, Growth and development of organisms – Cyanobacteria have strategies using their photosynthetic apparatus, nitrogen-fixing heterocyst, and gas vesicles.

LS2.A Interdependent relationships in ecosystems – Cyanobacteria can outcompete other phytoplankton depending on resource availability possibly influencing the genetic diversity within populations and toxin production.

LS2.B Cycles of matter and energy transfer in ecosystems – Cyanobacteria are eaten by zooplankton and herring, they produce O2 and respire at night which during blooms can cause oxygen depletion and fish kills.

LS2.C Ecosystem dynamics, functioning, and resilience – Pond ecosystems are changing due to human activities, we are monitoring to evaluate the health of the system.

PS3.D Energy in chemical processes and everyday life -Cyanobacteria are photosynthetic and can capture radiation from the sun at depths in water with special light-harvesting pigments.

PS4.A Wave properties – Depending on the amplitude and frequency of the light wavelength it will be absorbed or pass further/deeper into the water column where cyanobacteria have the advantageous pigments to absorb those wavelengths.