

Advanced Science Curriculum

Unit 1: Water Quality

Big Idea:

- What is water quality and what parameters are considered in assessing a body of water?
- Essential Questions What are physical and biological parameters of water quality?
- How are organisms dependent on dissolved oxygen and how is it measured?
- How is pH determined and what are pH parameters for aquatic organisms?
- How can macro invertebrates be sampled and identified?
- How is coliform presence related to aquatic health?

Vocabulary: Water quality, indicator species, pH, homeostasis, dissolved oxygen, coliform, chemical indicator, bacteria, cellular respiration, fermentation, sampling, macro invertebrates, kinetic energy, polarity, covalent bond

NGSS Priority Standards

HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

HS-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

HS-LS4-3 Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.

HS-LS4-5 Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.

HS-LS4-6 Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.*

HS-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

HS-ESS2-6 Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

Common Core Math and ELA

RST.9-10.1 Cite specific textual evidence to support analysis of science/technical texts...

RST.9-10.7 Translate quantitative/technical info in words in a text into visual

RST.9-10.8 Assess extent to which reasoning/evidence text support author's claim

WHST.9-12.2 Write informative/explanatory texts...

WHST.9-12.5 Develop/strengthen writing by planning/revising/editing/rewriting...

WHST.9-12.7 Conduct short & more sustained research projects to answer a question.

WHST.9-12.9 Draw evidence from info texts support analysis/reflection/research

MP.2 Reason abstractly and quantitatively

HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.

HSN.Q.A.3 Choose a level of accuracy appropriate to limits on measurement when reporting

