2019 Unit 3 Hydrosphere

Content Area: **Science**
Course(s): **Environmental Science**
Time Period: **November**
Length: **30 Instructional days**
Status: **Published**

Enduring Understandings:

- Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate.
- Earth’s systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes.
- Feedback (negative or positive) can stabilize or destabilize a system.
- Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen.
- The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics.
- The foundation for Earth’s global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy’s re-radiation into space.
- The properties include water's exceptional capacity to absorb, store, and release large amounts of energy; transmit sunlight; expand upon freezing, dissolve and transport materials; and lower the viscosities and melting points of rocks.
- The total amount of carbon cycling among and between the hydrosphere, atmosphere, geosphere, and biosphere is conserved.

Essential Questions:

- How do changes in the geosphere affect the atmosphere?
- How do the properties and movements of water shape Earth's surface and affect its systems?
- How does carbon cycle among the hydrosphere, atmosphere, geosphere, and biosphere?

Lesson Titles:

- Earth's Oceans
- Food Chains and Energy Transfer
- Freshwater
- Groundwater
- Ocean Currents
- Oceans as Temperature Regulators
- The Hydrosphere
- Threats to the Ocean
- Water Pollution

- Water Use and Management

Career Readiness, Life Literacies & Key Skills

WRK.K-12.P.1	Act as a responsible and contributing community members and employee.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.

Inter-Disciplinary Connections:

LA.RL.9-10.1	Cite strong and thorough textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferentially, including determining where the text leaves matters uncertain.
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.
LA.RL.9-10.2	Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details and provide an objective summary of the text.
LA.RL.9-10.4	Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language evokes a sense of time and place; how it sets a formal or informal tone).
LA.RH.9-10.7	Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text, to analyze information presented via different mediums.
LA.RST.9-10.2	Determine the central ideas, themes, or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
MA.A-CED	Creating Equations
MA.A-REI.A	Understand solving equations as a process of reasoning and explain the reasoning
MA.A-REI.C	Solve systems of equations
MA.A-REI.D.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
SOC.9-12.1.1.1	Compare present and past events to evaluate the consequences of past decisions and to apply lessons learned.
SOC.9-12.1.1.2	Analyze how change occurs through time due to shifting values and beliefs as well as technological advancements and changes in the political and economic landscape.
SOC.9-12.1.2.2	Relate current events to the physical and human characteristics of places and regions.

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK:

- Depth and Temperature Graph Act. Sht.

- Delaware River Chromebook Activity
- Delaware River Map Activity
- Density Current Lab
- Desalination Lab
- Design and Build a Water Filter
- Evaporation/Precipitation Graph
- Label an Aquifer Activity Sht
- Ocean FoodWeb Act. Sht
- Ocean FoodWeb Act. Sht
- Point/NonPoint Pollution Act. Sht.
- Porosity Lab
- RiverPuzzleActivity
- Water Ecofootprint Activit
- WaterBudget Graph
- Watershed Surface Lab

Modifications

Benchmark Assessments

Skills-based assessment

Reading response

Writing prompt

Lab practical

Formative Assessment:

- Analyze geoscience data using tools, technologies, and/or models (e.g., computational, mathematical) to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.
- Anticipatory Set
- Closure
- Develop a model based on evidence to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

- Develop a model based on evidence to illustrate the biogeochemical cycles that include the cycling of carbon through the ocean, atmosphere, soil, and biosphere, providing the foundation for living organisms.
- Lab Reports on Ocean Currents, Porosty, Watersheds, Density Currents
- Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
- Warm-Up

Summative Assessment:

- Alternate Assessment
- Lab Practical demonstrating Ocean Currents and Testing Porosity of Sediments
- Marking Period 2 Assessment on Oceans and Fresh Water/Atmosphere Units
- Quizzes on Freshwater Systems and Properties of Oceans
- Unit 3 Assessments on Water Sheds, Fresh Water systems. Ground Water, and Oceans

Alternative Assessments

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Reflective pieces

Concept maps

Case-based scenarios

Portfolios

Resources & Materials:

- Ocean Characteristics: http://tinyurl.com/43y7p77
- Beakers
- Delaware River Chromebook: http://tinyurl.com/pavoxim
- Food Dye
- Sediments of varying Grain size
- Trays
- Triple Beam Balance

- Website: Virtual Water Treatment: http://tinyurl.com/6glpcyf