

The Water Cycle Module Standard Correlations: Grades 3-7

Next Generation Science Standards

Italics indicate connections between NGSS and The Water Cycle Module.

Performance Expectation	Disciplinary Core Idea	Science and Engineering Practice	Crosscutting Concept
5-PS1-3. Make observations and measurements to identify materials based on their properties.	<p>PS1.A: Structure and Properties of Matter</p> <ul style="list-style-type: none"> Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic scale mechanism of evaporation and condensation.) <p><i>Online Activity: States of Water – students think about properties of water in various states and define transition mechanisms.</i></p>	<p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. <p><i>N/A</i></p>	<p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none"> Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. <p><i>N/A</i></p>
5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	<p>LS2.A: Interdependent Relationships in Ecosystems</p> <ul style="list-style-type: none"> The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. 	<p>Developing and Using Models</p> <ul style="list-style-type: none"> Develop a model to describe phenomena. <p><i>Online Activity: The Water Cycle activity and The Blue Traveler activity - students use, and also through The Blue Traveler, develop unique models of the cycling of water which includes plants, animals and the environment.</i></p> <p>Connections to the Nature of Science</p>	<p>Systems and System Models</p> <ul style="list-style-type: none"> A system can be described in terms of its components and their interactions. <p><i>Online Activity: The Water Cycle activity and The Blue Traveler activity – students view the system of cycling water around the planet as interaction between components.</i></p>

	<p><i>N/A</i></p> <p>LS2.B: Cycles of Matter and Energy Transfer in Ecosystems</p> <ul style="list-style-type: none"> • Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. <p><i>Online Activity: The Water Cycle activity and The Blue Traveler Activity – students observe how water cycles between plants, animals and environment.</i></p>	<p>Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena</p> <ul style="list-style-type: none"> • Science explanations describe the mechanisms for natural events. <p><i>Online Activity – students learn definitions and visualize mechanisms for movement of water around the planet, including between plants, animals and the environment.</i></p>	
<p>5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.</p>	<p>ESS2.A: Earth Materials and Systems</p> <ul style="list-style-type: none"> • Earth’s major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth’s surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. <p><i>Online Activity: The Water Cycle activity and The Blue Planet activity – students use online models to observe interactions between water (hydrosphere) and the geosphere, biosphere and atmosphere. Through the States of Water activity students observe phase changes of water (hydrosphere) as it interacts with the atmosphere.</i></p> <p><i>Students review phase changes through the States of Water model. (My Science Notebook)</i></p>	<p>Developing and Using Models</p> <ul style="list-style-type: none"> • Develop a model using an example to describe a scientific principle. <p><i>Online Activity: Through The Blue Traveler students develop a unique model of the water cycle through interactions of water (hydrosphere) with the geosphere, biosphere and atmosphere.</i></p>	<p>Systems and System Models</p> <ul style="list-style-type: none"> • A system can be described in terms of its components and their interactions. <p><i>Online Activity: The Water Cycle activity and The Blue Planet activity – students use online models to observe the water cycle system through interactions between its components-water (hydrosphere) and the geosphere, biosphere and atmosphere. Through the States of Water activity students</i></p>

			<i>observe phase changes of water (hydrosphere) as it interacts with the atmosphere.</i>
5-ESS2-2. Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.	<p>ESS2.C: The Roles of Water in Earth’s Surface Processes • Nearly all of Earth’s available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.</p> <p><i>Online Activity: Through The Blue Traveler, students gain an appreciation for how often water ends up in the ocean vs. fresh water locations.</i></p>	<p>Using Mathematics and Computational Thinking</p> <ul style="list-style-type: none"> Describe and graph quantities such as area and volume to address scientific questions. <p><i>N/A</i></p>	<p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none"> Standard units are used to measure and describe physical quantities such as weight and volume. <p><i>N/A</i></p>
MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	<p>ESS2.C: The Roles of Water in Earth's Surface Processes</p> <ul style="list-style-type: none"> Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. Global movements of water and its changes in form are propelled by sunlight and gravity. <p><i>Online Activity: The Water Cycle and The Blue Traveler activities address both of these points explicitly.</i></p>	<p>Developing and Using Models</p> <ul style="list-style-type: none"> Develop a model to describe unobservable mechanisms. <p><i>Online Activity: The Water Cycle and especially The Blue Traveler activities show students animated definitions of unobservable mechanisms of water movement as students develop their water cycle models.</i></p>	<p>Energy and Matter</p> <ul style="list-style-type: none"> Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. <p><i>Online Activity: Students learn that the sun and gravity drive the water cycle.</i></p>

Common Core Standards

N/A

Ocean Literacy Standards

<p>(1) The Earth has one big ocean with many features</p>	<p>(f) The ocean is an integral part of the water cycle and is connected to all of the earth's water reservoirs via evaporation and precipitation processes.</p> <p>(g) The ocean is connected to major lakes, watersheds and waterways because all major watersheds on Earth drain to the ocean. Rivers and streams transport nutrients, salts, sediments and pollutants from watersheds to estuaries and to the ocean.</p> <p>(h) Although the ocean is large, it is finite and resources are limited.</p>
<p>(3) The ocean is a major influence on weather and climate.</p>	<p>(b) The ocean absorbs much of the solar radiation reaching Earth. The ocean loses heat by evaporation. This heat loss drives atmospheric circulation when, after it is released into the atmosphere as water vapor, it condenses and forms rain. Condensation of water evaporated from warm seas provides the energy for hurricanes and cyclones.</p>
<p>(6) The ocean and humans are inextricably interconnected.</p>	<p>(a) The ocean affects every human life. It supplies freshwater (most rain comes from the ocean) and nearly all Earth's oxygen. It moderates the Earth's climate, influences our weather, and affects human health.</p> <p>(b) From the ocean we get foods, medicines, and mineral and energy resources. In addition, it provides jobs, supports our nation's economy, serves as a highway for transportation of goods and people, and plays a role in national security.</p> <p>(e) Humans affect the ocean in a variety of ways. Laws, regulations and resource management affect what is taken out and put into the ocean. Human development and activity leads to pollution (point source, non-point source, and noise pollution) and physical modifications (changes to beaches, shores and rivers). In addition, humans have removed most of the large vertebrates from the ocean.</p>

	(g) Everyone is responsible for caring for the ocean. The ocean sustains life on Earth and humans must live in ways that sustain the ocean. Individual and collective actions are needed to effectively manage ocean resources for all.
(7) The ocean is largely unexplored.	(c) Over the last 40 years, use of ocean resources has increased significantly, therefore the future sustainability of ocean resources depends on our understanding of those resources and their potential and limitations.

Source: National Oceanic and Atmospheric Administration, et al. 2006. *Ocean Literacy: The Essential Principles of Ocean Sciences, K-12*. Washington, DC: NOAA.