



About **Oceans**

DeltaScienceModules, THIRD EDITION

Students investigate our watery planet with a graphic model that compares water to land, salt water to fresh water, oceans to seas, and the Atlantic to the Pacific Ocean. Then, they get their hands wet investigating several ocean phenomena: saltiness, wave action, and currents. Students use ocean depth data to create a 3-D model of the ocean floor, make hydrometers to measure water density, and assemble a tidal dial to explore the ocean's rise and fall. Students model adaptive features of fish and marine mammals and use sea specimens to study an assortment of mollusks and other creatures of the intertidal zone.

In the Delta Science Reader *Oceans*, students explore the ocean, the great body of salt water that covers nearly three-fourths of Earth's surface. They learn about the composition of ocean water, features of the ocean floor, how ocean waters move, and how oceans affect weather and climate. They find out about the many resources the ocean provides. They also read about marine biologist Dr. Sylvia Earle and undersea explorer Jacques-Yves Cousteau. Finally, students learn about deep-ocean exploration.

Overview Chart for Hands-on Activities

Hands-on Activity	Student Objectives
1 The Water Planet <i>page 13</i>	<ul style="list-style-type: none"> • use a paper ruler as a bar graph to represent the ratio of land to water on Earth • record on the ruler the ratio of salt water to fresh water on Earth • identify the five oceans that make up the world ocean • compare the relative sizes of the five oceans, and record the data on the ruler
2 Composition of Ocean Water <i>page 23</i>	<ul style="list-style-type: none"> • discuss ways to distinguish between samples of fresh water (tap water) and salt water (“ocean water”) • evaporate the water from each sample and examine the substance that remains • compare the crystal residue from the salt water sample to ordinary table salt • speculate about how the oceans became salty
3 Properties of Ocean Water <i>page 31</i>	<ul style="list-style-type: none"> • discover how the presence of salt increases the density of ocean water • observe that the denser a liquid, the higher things float in that liquid • make a simple hydrometer and use it to measure the relative density of salt water samples
4 Mapping the Ocean Floor <i>page 43</i>	<ul style="list-style-type: none"> • review some of the landforms that exist on dry land and speculate about the shape of the ocean floor • make depth profiles by graphing sets of ocean depth data • infer the shape of the ocean floor based on their depth profiles • make a three-dimensional model of the ocean floor from the depth profiles
5 The Water Cycle <i>page 55</i>	<ul style="list-style-type: none"> • build a closed system for the evaporation and condensation of water • observe and then diagram the movement of water in the water cycle chamber • compare their simulated water cycle with the water cycle in the environment • conclude that most of the precipitation that falls on Earth both originates in and returns to the oceans
6 Ocean Waves <i>page 65</i>	<ul style="list-style-type: none"> • observe how waves are produced by the friction of wind against the surface of water • identify the parts of a wave • model the movement of waves with a wave bottle • discover that a wave travels forward but the water does not
7 Surface Currents <i>page 75</i>	<ul style="list-style-type: none"> • model the formation of a surface current • observe what happens to surface currents when they are interrupted by landforms • discover how Earth's rotation affects the movement of surface currents north and south of the equator
8 Density Currents <i>page 89</i>	<ul style="list-style-type: none"> • review the concept of density and some factors that may affect the density of water • model the formation of density currents due to differences in salinity • model the formation of density currents due to differences in water temperature
9 Tides <i>page 99</i>	<ul style="list-style-type: none"> • review the spatial relationship between Earth and the Moon • model the effect of the Moon's gravitational pull on Earth and its oceans • infer from the model that there are two high tides and two low tides along most coastal regions each day
10 Adapting to Life in the Ocean <i>page 113</i>	<ul style="list-style-type: none"> • model how a fish uses its swim bladder to control buoyancy • demonstrate how marine mammals maintain a warm body temperature in cold water • discover that blubber also helps marine mammals float
11 Life at the Ocean's Edge <i>page 125</i>	<ul style="list-style-type: none"> • discuss the conditions in the intertidal zone • infer the importance of a hard exterior for survival in the intertidal zone • examine a variety of mollusk shells, and learn to distinguish between bivalves and univalves
12 Curious Sea Creatures <i>page 135</i>	<ul style="list-style-type: none"> • discuss the conditions in the neritic zone • examine the skeletons of some sea creatures commonly found in the intertidal zone and the shallow ocean area covering the continental shelf
Assessment <i>page 143</i>	<ul style="list-style-type: none"> • See page 143.

Process Skills	Vocabulary	Delta Science Reader
use numbers; collect, record, display, or interpret data; compare	sea, world ocean	page 2
communicate, compare, infer	dissolve, salinity	pages 3, 11
define based on observations, measure	density, hydrometer	page 3
use numbers, make and use models, infer	abyssal plain, continental shelf, continental slope, depth profile, island, mid-ocean ridge, rift, seamount, sonar, trench	pages 4–5, 15
make and use models, predict, observe, compare	condensation, evaporation, precipitation, runoff, water cycle	page 10
observe, make and use models, communicate	breaker, crest, trough, wave height, wavelength	page 7
make and use models, observe, use variables	Coriolis effect, current, prevailing winds, surface current	page 8
make and use models, observe, compare	density current	page 8
use numbers; collect, record, display, or interpret data; infer	gravitational pull, high tide, low tide, tides	page 9
make and use models, experiment	adaptation, buoyancy, cold-blooded, swim bladder, warm-blooded	pages 12–13, 14, 15
communicate, infer, observe, compare, classify	bivalve, exoskeleton, gastropod, intertidal zone, mollusk, univalve	page 6
predict, observe, communicate	invertebrate, neritic zone, vertebrate	pages 12–13, 14

See the following page for the Delta Science Reader Overview Chart.

Overview Chart for Delta Science Reader

Oceans

Selections	Vocabulary	Related Activity
Think About...		
<p>Why Is Earth the Water Planet? <i>page 2</i></p> <ul style="list-style-type: none"> • Ocean Water <i>page 3</i> • Features of the Ocean Floor <i>page 4</i> • Where Ocean Meets Land <i>page 6</i> 	<p>bay, gulf, ocean</p> <p>density, salinity, water pressure</p> <p>abyssal plain, atoll, continental rise, continental shelf, continental slope, coral reef, mid-ocean ridge, ocean basin, rift, sea-floor spreading, seamount, trench</p> <p>estuary, headland, jetty, shoreline</p>	<p>Activity 1</p> <p>Activities 2, 3</p> <p>Activity 4</p> <p>Activity 11</p>
<p>How Does Ocean Water Move? <i>page 7</i></p> <ul style="list-style-type: none"> • Waves <i>page 7</i> • Currents <i>page 8</i> • Tides <i>page 9</i> 	<p>crest, trough, wave</p> <p>current, deep-water current, surface current, upwelling</p> <p>tide</p>	<p>Activity 6</p> <p>Activities 7, 8</p> <p>Activity 9</p>
<p>How Do Oceans Affect Weather and Climate? <i>page 10</i></p>	<p>water cycle</p>	<p>Activity 5</p>
<p>Ocean Resources <i>page 11</i></p>	<p>desalination</p>	<p>Activity 2</p>
<p>Ocean Habitats <i>page 12</i></p>	<p>intertidal zone, near-shore zone, nekton, open-ocean zone, plankton, tide pool</p>	<p>Activities 10, 11, 12</p>
People in Science		
<ul style="list-style-type: none"> • Marine Biologists <i>page 14</i> 	<p>marine biologist</p>	<p>Activities 10, 11, 12</p>
Did You Know?		
<ul style="list-style-type: none"> • About Deep-Ocean Exploration <i>page 15</i> 	<p>hydrothermal vent, submersible</p>	<p>Activities 4, 10</p>

See pages 151–159 for teaching suggestions for the Delta Science Reader.