

## Activity Goals, Science Topics, and Standards Correlations for Immersion Presents *Secrets of the Gulf*

The Immersion Presents *Secrets of the Gulf* Adventure Series consists of eight activities covering geology, history, coral biology, ecology, archaeology, the nature of science, technology, and careers. The hands-on activities are geared toward grades 5 to 8 and are written at a sixth grade level. All of the activities are correlated to the National Science Education Standards for grades 5 to 8 as well as the 2005 Ocean Literacy Essential Principles and Fundamental Concepts.

Activity	Goals <i>Participants will:</i>	Science Topics
1: Rising to the Top	<ul style="list-style-type: none"> <li>learn about the origin and formation of salt domes in the Gulf of Mexico</li> <li>identify three common types of sedimentary rock found in the Gulf</li> <li>learn how petroleum is formed</li> <li>model the rise of a salt dome</li> </ul>	rocks and minerals, sedimentary rock formation, petroleum formation, density
2: Colorful Corals	<ul style="list-style-type: none"> <li>learn about basic coral anatomy</li> <li>make a model coral colony</li> <li>simulate how coral polyps eat</li> </ul>	coral biology, structure and function
3: Coral Construction	<ul style="list-style-type: none"> <li>learn about the history of coral reef formation at the Flower Garden Banks</li> <li>identify several conditions that must be present for hard corals to survive</li> <li>name the seven different biological zones at the Flower Garden Banks</li> <li>model the beginning of coral reef formation at the Flower Garden Banks</li> </ul>	coral reef formation, biotic and abiotic factors
4: It's All Connected	<ul style="list-style-type: none"> <li>learn how organisms can be classified according to how they get energy and what they eat</li> <li>identify some of the organisms that live at the Flower Garden Banks</li> <li>construct a Flower Garden Banks food web</li> </ul>	food chains, food webs
5: Manta Mysteries	<ul style="list-style-type: none"> <li>learn how photographs help researchers identify manta rays</li> <li>describe how acoustic tagging is being used to investigate manta ray movement patterns at the Flower Garden Banks</li> <li>play a game to simulate the identification of manta rays in the field</li> </ul>	manta ray biology, photo identification, acoustic tagging, nature of science
6: Journey to the Deep Seep	<ul style="list-style-type: none"> <li>learn about the brine seep features at the East Flower Garden Bank</li> <li>define <i>density</i> and identify how it relates to the brine seep features</li> <li>make a model of a brine lake</li> </ul>	underwater seeps, density, biotic and abiotic factors
7: Undersea Archaeology	<ul style="list-style-type: none"> <li>identify some of the unanswered questions in American archaeology</li> <li>describe the archaeology component of the Secrets of the Gulf expedition</li> <li>build and bury an ancient shoreline</li> <li>model the use of a sub-bottom profiler to locate and map a buried shoreline</li> </ul>	marine archaeology, sea level changes, technologies used in ocean exploration
8: All Aboard!	<ul style="list-style-type: none"> <li>learn about the vehicles used in the Secrets of the Gulf expedition</li> <li>describe the science goals of the expedition</li> <li>play a game to learn more about the qualifications and roles of some of the people who participated in the expedition</li> </ul>	careers, archaeology, biology, geology, technologies used in ocean exploration

Activity	Correlations to National Science Education Standards (Grades 5–8)*	Correlations to Ocean Literacy Essential Principles and Fundamental Concepts**
1: Rising to the Top	<p><i>Standard D: Earth and Space Science</i></p> <ul style="list-style-type: none"> <li>• Structure of the Earth system</li> <li>• Earth's history</li> </ul>	<p><i>Essential Principle 2: Ocean Shapes the Features of Earth</i></p> <p>a: Earth materials and geochemical cycles that originate in the ocean b: Sea level changes over time</p>
2: Colorful Corals	<p><i>Standard C: Life Science</i></p> <ul style="list-style-type: none"> <li>• Structure and function in living systems</li> <li>• Populations and ecosystems</li> </ul> <p><i>Standard D: Earth and Space Science</i></p> <ul style="list-style-type: none"> <li>• Structure of the Earth system</li> </ul>	<p><i>Essential Principle 2: Ocean Shapes the Features of Earth</i></p> <p>a: Earth materials and geochemical cycles that originate in the ocean</p> <p><i>Essential Principle 5: Diversity of Life in the Ocean</i></p> <p>d: Life cycles, adaptations, and relationships among ocean organisms</p>
3: Coral Construction	<p><i>Standard C: Life Science</i></p> <ul style="list-style-type: none"> <li>• Populations and ecosystems</li> <li>• Diversity and adaptations of organisms</li> </ul> <p><i>Standard D: Earth and Space Science</i></p> <ul style="list-style-type: none"> <li>• Structure of the Earth system</li> </ul>	<p><i>Essential Principle 2: Ocean Shapes the Features of Earth</i></p> <p>a: Earth materials and geochemical cycles that originate in the ocean b: Sea level changes over time</p> <p><i>Essential Principle 5: Diversity of Life in the Ocean</i></p> <p>d: Life cycles, adaptations, and relationships among ocean organisms e: Diverse ocean habitats from the surface to the sea floor f: Influence of environmental factors on ocean life</p> <p><i>Essential Principle 7: Ocean Exploration</i></p> <p>d: Technologies, sensors, and tools used in ocean exploration</p>
4: It's All Connected	<p><i>Standard C: Life Science</i></p> <ul style="list-style-type: none"> <li>• Populations and ecosystems</li> </ul>	<p><i>Essential Principle 5: Diversity of Life in the Ocean</i></p> <p>a: Huge range in size of living things in ocean d: Life cycles, adaptations, and relationships among ocean organisms</p>
5: Manta Mysteries	<p><i>Standard A: Science as Inquiry</i></p> <ul style="list-style-type: none"> <li>• Abilities necessary to do scientific inquiry</li> <li>• Understandings about scientific inquiry</li> </ul> <p><i>Standard C: Life Science</i></p> <ul style="list-style-type: none"> <li>• Populations and ecosystems</li> </ul> <p><i>Standard E: Science and Technology</i></p> <ul style="list-style-type: none"> <li>• Understandings about science and technology</li> </ul> <p><i>Standard F: Science in Personal and Social Perspectives</i></p> <ul style="list-style-type: none"> <li>• Science and technology in society</li> </ul> <p><i>Standard G: History and Nature of Science</i></p> <ul style="list-style-type: none"> <li>• Science as a human endeavor</li> <li>• Nature of science</li> </ul>	<p><i>Essential Principle 5: Diversity of Life in the Ocean</i></p> <p>a: Huge range in size of living things in ocean d: Life cycles, adaptations, and relationships among ocean organisms</p> <p><i>Essential Principle 7: Ocean Exploration</i></p> <p>b: Exploration, inquiry, and study of ocean systems and processes d: Technologies, sensors, and tools used in ocean exploration</p>
6: Journey to the Deep Seep	<p><i>Standard A: Science as Inquiry</i></p> <ul style="list-style-type: none"> <li>• Understandings about scientific inquiry</li> </ul> <p><i>Standard B: Physical Science</i></p> <ul style="list-style-type: none"> <li>• Properties and changes of properties in matter</li> </ul> <p><i>Standard C: Life Science</i></p> <ul style="list-style-type: none"> <li>• Populations and ecosystems</li> </ul> <p><i>Standard D: Earth and Space Science</i></p> <ul style="list-style-type: none"> <li>• Structure of the Earth system</li> </ul>	<p><i>Essential Principle 1: Ocean Features</i></p> <p>e: Properties of salt water</p> <p><i>Essential Principle 2: Ocean Shapes the Features of Earth</i></p> <p>a: Earth materials and geochemical cycles that originate in the ocean</p> <p><i>Essential Principle 5: Diversity of Life in the Ocean</i></p> <p>d: Life cycles, adaptations, and relationships among ocean organisms f: Influence of environmental factors on ocean life</p> <p><i>Essential Principle 7: Ocean Exploration</i></p> <p>b: Exploration, inquiry, and study of ocean systems and processes d: Technologies, sensors, and tools used in ocean exploration</p>
7: Undersea Archaeology	<p><i>Standard A: Science as Inquiry</i></p> <ul style="list-style-type: none"> <li>• Abilities necessary to do scientific inquiry</li> <li>• Understandings about scientific inquiry</li> </ul> <p><i>Standard D: Earth and Space Science</i></p> <ul style="list-style-type: none"> <li>• Structure of the Earth system</li> </ul> <p><i>Standard E: Science and Technology</i></p> <ul style="list-style-type: none"> <li>• Understandings about science and technology</li> </ul> <p><i>Standard G: History and Nature of Science</i></p> <ul style="list-style-type: none"> <li>• Nature of science</li> </ul>	<p><i>Essential Principle 2: Ocean Shapes the Features of Earth</i></p> <p>b: Sea level changes over time</p> <p><i>Essential Principle 6: Connections Between the Ocean and Humans</i></p> <p>b: Food, energy, mineral, and transportation resources from the ocean</p> <p><i>Essential Principle 7: Ocean Exploration</i></p> <p>a: The ocean as the last and largest unexplored place on Earth d: Technologies, sensors, and tools used in ocean exploration</p>
8: All Aboard!	<p><i>Standard A: Science as Inquiry</i></p> <ul style="list-style-type: none"> <li>• Understandings about scientific inquiry</li> </ul> <p><i>Standard E: Science and Technology</i></p> <ul style="list-style-type: none"> <li>• Understandings about science and technology</li> </ul> <p><i>Standard F: Science in Personal and Social Perspectives</i></p> <ul style="list-style-type: none"> <li>• Science and technology in society</li> </ul> <p><i>Standard G: History and Nature of Science</i></p> <ul style="list-style-type: none"> <li>• Science as a human endeavor</li> <li>• Nature of science</li> </ul>	<p><i>Essential Principle 7: Ocean Exploration</i></p> <p>b: Exploration, inquiry, and study of ocean systems and processes d: Technologies, sensors, and tools used in ocean exploration f: Interdisciplinary nature of ocean exploration</p>

\* For a complete listing of the National Science Education Standards (Grades 5–8), visit [www.nap.edu/readingroom/books/nse/html/6d.html](http://www.nap.edu/readingroom/books/nse/html/6d.html).

\*\* Ocean Literacy Essential Principles and Fundamental Concepts are paraphrased for brevity. For a complete listing of the principles and concepts, visit [www.coexploration.org/oceanliteracy](http://www.coexploration.org/oceanliteracy).