

# ***Oceanography***

	<b>Course Outline</b>	
<b><i>Unit One</i></b>	<i>Introduction to Oceanography</i>	<i>7 days</i>
<b><i>Unit Two</i></b>	<i>Structure of the Earth &amp; Modern Navigational Techniques</i>	<i>7 days</i>
<b><i>Unit Three</i></b>	<i>Plate Tectonics</i>	<i>7 days</i>
<b><i>Unit Four</i></b>	<i>The Sea Floor and Its Sediments</i>	<i>9 days</i>
<b><i>Unit Five</i></b>	<i>Physical and Chemical Properties of Water</i>	<i>7 days</i>
<b><i>Unit Six</i></b>	<i>The Atmosphere and Circulation</i>	<i>5 days</i>
<b><i>Unit Seven</i></b>	<i>Ocean Structure and Currents</i>	<i>7 days</i>
<b><i>Unit Eight</i></b>	<i>Waves</i>	<i>5 days</i>
<b><i>Unit Nine</i></b>	<i>Tides</i>	<i>5 days</i>
<b><i>Unit Ten</i></b>	<i>Coasts, Beaches &amp; Estuaries</i>	<i>12 days</i>
<b><i>Unit Eleven</i></b>	<i>Marine Biology</i>	<i>14 days</i>

School-wide Academic Expectations Addressed in Oceanography:

- Problem Solving
- Critical Thinking
- Collaboration
- Writing Skills

School-wide Social and Civic Expectations Addressed in Oceanography:

- Honesty
- Responsibility
- Respect
- Safety

Common Core Standards Addressed in Oceanography:

- *Reading Standard for Science Literacy (RST): 2, 3, 4, 7, 8, 9*
- *Writing Standards for Science Literacy (WHST): 1, 2, 4, 9*

NGSS Standards Addressed in Oceanography:

- *TBD*

## Unit 1: Introduction to Oceanography

**Introduction:** Oceanography is a multidisciplinary field in which geology, chemistry, physics, and biology are incorporated. This unit focuses on the historical perspective - the contributions of various individuals/groups and the advancement of technology in the development of our understanding of the oceans.

**CT State Standard(s): Energy in the Earth System.**

**Common Core Standard(s):**

- Reading Standard for Science Literacy (RST): 2, 3, 4, 7, 8, 9
- Writing Standards for Science Literacy (WHST): 1, 2, 4, 9

**School-wide Academic Expectations Addresses in this Unit:** Writing, Think Critically, and Problem-Solving

**School-wide Social and Civic Expectations Addresses in this Unit:** Honesty, Responsibility, Respect, and Safety

**Essential Question(s):**

- Why study the ocean?
- How has the understanding of the ocean developed over time?

**Key Terms/Concepts:**

Advances in the study of oceanography (18<sup>th</sup>-21<sup>st</sup> centuries), Explorers and their contributions to understanding of oceans, Ocean/Sea locations & names

STANDARD	LEARNING OBJECTIVES (Content and Skill)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
<b>Energy in the Earth System</b>	1. Describe the impact oceans have on our planet.	<ul style="list-style-type: none"> <li>• Class Discussion</li> <li>• Assessment of Previous Knowledge</li> </ul>	Oral Response
	2. Identify various fields of science and describe how they impact our understanding of the ocean	<ul style="list-style-type: none"> <li>• Power Point &amp; Class Discussion</li> </ul>	Oral Response
<b>Energy in the Earth System</b>	3. Describe the resources we obtain from the ocean.	<ul style="list-style-type: none"> <li>• Class Discussion</li> <li>• Identification of 3 personal uses of the ocean or ocean products</li> </ul>	Oral Response
	4. Classify the contributions of various groups in the development of our understanding of the ocean	<ul style="list-style-type: none"> <li>• Power Point &amp; Class Discussion</li> <li>• Activity – Informational Brochure</li> <li>• Activity – Matching Game</li> </ul>	Oral Response Summative Assessment
	5. Interpret maps	<ul style="list-style-type: none"> <li>• Activity – locate and label the major oceans and seas of the planet</li> </ul>	Performance Task  Summative Assessment

**Suggested Resources:** An Introduction to the World’s Oceans (9<sup>th</sup> edition) – Sverdrup & Armbrust

**Suggested Technology:** DVD player, Computer, Projector



## Unit 2: Structure of the Earth & Modern Navigational Techniques

**Introduction:** The planet Earth is unique in respect to it being the only planet, known to date, to be covered with water. Different types of maps have been developed to show Earth's features and various navigational techniques are used to continually update these maps.

**CT State Standard(s):** Earth's Place in the Universe.

**Common Core Standard(s):**

- Reading Standard for Science Literacy (RST): 2, 3, 4, 7, 8, 9
- Writing Standards for Science Literacy (WHST): 1, 2, 4, 9

**School-wide Academic Expectations Addresses in this Unit:** Writing, Collaboration, Think Critically, and Problem-Solving

**School-wide Social and Civic Expectations Addresses in this Unit:** Honesty, Responsibility, Respect, and Safety

**Essential Question(s):**

- How was the Earth formed?
- What is structure of the planet and how do we know the structure?
- How do we locate and graphically represent location and special features of Earth?

**Key Terms/Concepts:** Contour Map, Greenwich Mean Time, GPS, Latitude, Light-year, Longitude, Meridians, Nautical Maps, Navigation, Topography

STANDARD	LEARNING OBJECTIVES (Content and Skill)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
Earth's Place in the Universe	1. Describe the physical and chemical processes that led to the formation of the solar system.	<ul style="list-style-type: none"><li>• Power Point &amp; Class Discussion</li></ul>	Oral Response
	2. Differentiate among time, deep time and geological time.	<ul style="list-style-type: none"><li>• Power Point &amp; Class Discussion</li></ul>	Oral Response
Earth's Place in the Universe	3. Describe the shape and size of Earth.	<ul style="list-style-type: none"><li>• Power Point &amp; Class Discussion</li><li>• Activity – Rocher Chocolate Analogy</li><li>• Activity – Draw and label diagram of Earth's Layers</li></ul>	Oral Response

	<p>4. Describe how navigational technology has changed over time. Use technology to determine location.</p>	<ul style="list-style-type: none"> <li>Activity – NOVA “Where in the World Am I?” <a href="http://www.pbs.org/wgbh/nova/longitude/find.html">http://www.pbs.org/wgbh/nova/longitude/find.html</a></li> <li>Video – Lost at Sea: The Search for Longitude</li> <li>Activity – Voyage around the World <a href="http://www.pbs.org/wgbh/nova/education/activities/2511_longitude.html">http://www.pbs.org/wgbh/nova/education/activities/2511_longitude.html</a></li> </ul>	<p>Performance Task</p> <p>Performance Task</p> <p>Summative Assessment</p>
	<p>5. Interpret navigational charts and explain the use of various navigational instruments</p>	<ul style="list-style-type: none"> <li>Activity – Interpret signs &amp; symbols of a nautical chart.</li> <li>Activity – map a trip from Florida to Watch Hill Harbor.</li> </ul>	<p>Performance Task</p> <p>Summative Assessment</p>

**Suggested Resources:** An Introduction to the World’s Oceans (9<sup>th</sup> edition) – Sverdrup & Armbrust

**Suggested Technology:** DVD player, Computer, Projector

### Unit 3: Plate Tectonics

**Introduction:** The Earth is a dynamic planet. Remains of rare water coral reefs are found off the coast of the British Isles, marine fossils are found high in the Himalayas and coal deposits that were formed in warm tropic areas are found in Siberia, how can this be? This unit explores the every changing planet and the effects on plate tectonics on the various oceans of the world.

**CT State Standard(s):** Dynamic Earth Processes

**Common Core Standard(s):**

- Reading Standard for Science Literacy (RST): 2, 3, 4, 7, 8, 9
- Writing Standards for Science Literacy (WHST): 1, 2, 4, 9

**School-wide Academic Expectations Addresses in this Unit:** Writing, Think Critically, and Problem-Solving

**School-wide Social and Civic Expectations Addresses in this Unit:** Honesty, Responsibility, Respect, and Safety

**Essential Question(s):**

- How have plate tectonics affected the formation of various geological features on the Earth surface?
- What are tsunamis and what is the impact of tsunamis on the planet?
- How do scientists prove that the planet has changed over time?

**Key Terms/Concepts:** Asthenosphere, Continental drift, Convection cells, Convergent plate, Divergent plate, Epicenter, Hot spots, Hydrothermal vents, Isostasy, Lithosphere, Rift valley, Subduction, Transform fault, Trenches

Standard	LEARNING OBJECTIVES (Content and Skill)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
<b>Dynamic Earth Processes</b>	1. Define and describe the gross internal structure of Earth	<ul style="list-style-type: none"> <li>• Power Point &amp; Class Discussion</li> <li>• Activity - Label diagram of Earth's inner layers.</li> <li>• Apply proper vocabulary to describe the Earth's Structure</li> </ul>	Oral Response Performance Task
<b>Dynamic Earth Processes</b>	2. Classify the various types of tectonic plate locations and motions. 3. Interpret clues/evidence	<ul style="list-style-type: none"> <li>• Power Point &amp; Class Discussion</li> <li>• Activity – A Plate Tectonic Puzzle (<a href="http://www.amnh">www.amnh</a>)</li> <li>• Pangaea Puzzle</li> </ul>	Oral Response Performance Task
<b>Dynamic Earth Processes</b>	4. Determine the formations of various planetary features based on plate motion 5. Describe the formation and impact of tsunamis.	<ul style="list-style-type: none"> <li>• Activity – Mapping Plate Boundaries</li> <li>• Simulation – <a href="http://www.mhhe.com/sverdrup9e">Great Earthquake and Tsunami of 26 December 2004</a> (<a href="http://www.mhhe.com/sverdrup9e">www.mhhe.com/sverdrup9e</a>)</li> </ul>	Performance Task Oral Response  Summative Assessment

**Suggested Resources:** An Introduction to the World's Oceans (ninth edition) – Sverdrup & Armbrust

**Suggested Technology:** DVD player, Computer, Projector

## Unit 4: The Sea Floor and Its Sediments

**Introduction:** Early mariners and scholars believed that the oceans were large basins or depressions in Earth's crust, but they did not conceive that these basins had features that were as magnificent as the mountain chains, deep valleys and the great canyons of the land (Sverdrup). This unit explores those features as well as the advancement in technologies that help us better understand and utilize the ocean bottom features.

**CT State Standard(s):** Dynamic Earth Processes, Biogeochemical Cycles, and Content Standard 9.8.

**Common Core Standard(s):**

- Reading Standard for Science Literacy (RST): 2, 3, 4, 7, 8, 9
- Writing Standards for Science Literacy (WHST): 1, 2, 4, 9

**School-wide Academic Expectations Addresses in this Unit:** Collaboration, Think Critically, and Problem-Solving

**School-wide Social and Civic Expectations Addresses in this Unit:** Honesty, Responsibility, Respect, and Safety

**Essential Question(s):**

- What are some common topographic features of the sea floor and how where they formed?
- How do scientists know what the bottom of the ocean looks like?
- What resources exist in the world oceans and how can we recover them?

**Key Terms/Concepts:**

Abyssal plain, Biogenous, Continental margin, Continental shelf, Continental slope, Cosmogenous, Hydrogenous, Island arcs, Lithogenous, Reefs, Seamounts, Submarine canyons, Trenches, Turbidity currents

Standard	LEARNING OBJECTIVES (Content and Skill)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
<b>Dynamic Earth Processes</b>	1. Describe various topographic features of the sea floor	<ul style="list-style-type: none"> <li>• Power Point &amp; Class Discussion</li> </ul>	Oral Response
	2. Interpret data and mapping topographic features.	<ul style="list-style-type: none"> <li>• Activity – Mapping the Ocean Bottom</li> <li>• Simulation – Determine Oceanic Features – Mapping the Unknown Sea Floor</li> </ul>	Performance Task
<b>Biogeo-chemical Cycles</b>	3. Compare & contrast various sediment types and discover clues to explain the distribution and abundance of these sediments	<ul style="list-style-type: none"> <li>• Power Point &amp; Class Discussion</li> <li>• Video – Coral Reefs</li> <li>• Lab – Investigating Density Currents</li> <li>• Activity – Chapter 4 Vocabulary Puzzle</li> </ul>	Performance Task
<b>Content Standard 9.8</b>	4. Discuss resources that exist in the world’s oceans and ways to recover them.	<ul style="list-style-type: none"> <li>• Power Point &amp; Class Discussion</li> </ul>	Performance Task  Summative Assessment

**Suggested Resources:** An Introduction to the World’s Oceans (9<sup>th</sup> edition) – Sverdrup & Armbrust

**Suggested Technology:** DVD player, Computer, Projector



## Unit 5: Physical and Chemical Properties of Water

**Introduction:** Water is a substance unique to our planet, controlling overall planet temperature and making life, as we know it, possible. To understand oceans, one must understand the structure of water and explore its unique properties.

**CT State Standard(s):** Chemical Bonds, Energy in the Earth System, and Content Standard 9.7.

### Common Core Standard(s):

- Reading Standard for Science Literacy (RST): 2, 3, 4, 7, 8, 9
- Writing Standards for Science Literacy (WHST): 1, 2, 4, 9

**School-wide Academic Expectations Addresses in this Unit:** Writing, Collaboration, Think Critically, and Problem-Solving

**School-wide Social and Civic Expectations Addresses in this Unit:** Honesty, Responsibility, Respect, and Safety

### Essential Question(s):

- What chemical and physical properties make water such a unique substance?
- Due to its unique properties, what impact does the ocean have on the atmosphere and the temperature of the planet?
- What impact does a change in salinity, temperature and pressure have on seawater density and the ultimately the planet?
- What biological processes regulate the composition of seawater?

### Key Terms/Concepts:

Attenuation, Compensation depth, Conduction, Convection, Desalination, Density, Euphotic zone, Heat capacity, Radiation, Refraction, Salinity, Secchi disk, Sofar channel, Solubility

Standard	LEARNING OBJECTIVES (Content and Skill)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
<b>Chemical Bonds</b>	1. Introduce the unique properties of water.	<ul style="list-style-type: none"><li>• Power Point &amp; Class Discussion</li></ul>	Performance Task and Constructed Response
<b>Energy in the Earth System</b>	2. Identify the dissolved, particulate and gaseous components in seawater	<ul style="list-style-type: none"><li>• Lab – Sea Water Versus Fresh Water</li><li>• Lab – Salinity of Water (FLINN Scientific)</li></ul>	Embedded Assessment
<b>Content Standard 9.7</b>	3. Describe the complex physical, chemical, and biological feedback systems that regulate concentrations. 4. Describe the interactions of these components in the world's oceans over time.	<ul style="list-style-type: none"><li>• Lab – Water Density &amp; Stability</li><li>• Power Point &amp; Class Discussion</li><li>• Activity – Layers of Ocean Water, graph &amp; interpret data</li></ul>	Oral Assessment Performance Task Oral Assessment  Summative Assessment

**Suggested Resources:** An Introduction to the World's Oceans (9<sup>th</sup> edition) – Sverdrup & Armbrust

**Suggested Technology:** DVD player, Computer, Projector

## Unit 6: The Atmosphere and Circulation

**Introduction:** Processes that occur in the atmosphere are closely related to the processes that occur in the oceans. Together, the oceans and atmosphere influence weather and climate. Understanding these interactions and processes can be used to predict weather patterns, influence governmental decisions, and land-use policies.

**CT State Standard(s):** Structure and Composition of the Atmosphere, Energy in the Earth System, and Dynamic Earth Processes.

**Common Core Standard(s):**

- Reading Standard for Science Literacy (RST): 2, 3, 4, 7, 8, 9
- Writing Standards for Science Literacy (WHST): 1, 2, 4, 9

**School-wide Academic Expectations Addresses in this Unit:** Writing, Think Critically, and Problem-Solving

**School-wide Social and Civic Expectations Addresses in this Unit:** Honesty, Responsibility, Respect, and Safety

**Essential Question(s):**

- How does the atmosphere affect weather?
- How does the ocean influence weather?

**Key Terms/Concepts:**

Coriolis Effect, El Niño, Jet Stream, Monsoon, Trade Winds, Turn-over, Typhoon

Standard	LEARNING OBJECTIVES (Content and Skill)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
Structure and Composition of the Atmosphere	1. Describe the structure of the atmosphere and its composition.	<ul style="list-style-type: none"><li>• Power Point &amp; Class Discussion</li></ul>	Oral Response Performance Task
Energy in the Earth System	2. Determine the causes and patterns of air movement in the atmosphere.	<ul style="list-style-type: none"><li>• Power Point &amp; Class Discussion</li><li>• Activity – Global Wind Patterns</li></ul>	Performance Task
Energy in the Earth System	3. Describe the Coriolis Effect and predict its effect on air and water circulation.	<ul style="list-style-type: none"><li>• Power Point &amp; Class Discussion</li></ul>	Embedded Task
Energy in the Earth System	4. Predict changes in weather conditions due to the presence of El Niño	<ul style="list-style-type: none"><li>• Project – Create an informational pamphlet describing global climate changes due to El Niño</li></ul>	Performance Task



<b>Dynamic Earth Processes</b>	5. Research the effects of hurricanes on coastal areas.	<ul style="list-style-type: none"> <li>• Map and analyze the changes of the local coastline due to hurricanes. (Project O)</li> <li>• Video – Hurricane of ‘38</li> </ul>	Embedded Task Summative Assessment
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**Suggested Resources:** An Introduction to the World’s Oceans (9<sup>th</sup> edition) – Sverdrup & Armbrust

**Suggested Technology:** DVD player, Computer, Projector



## Unit 7: Ocean Structure and Currents

**Introduction:** How were ancient people able to settle the island of Hawaii? How did refuse from Japan’s tsunami end up on American shores? These are other questions are explored in this unit. Hidden below the surface of the ocean are invisible layers affecting water motion, the food industry and energy production.

**CT State Standard(s):** Dynamic Earth Processes and Motion and Forces

**Common Core Standard(s):**

- Reading Standard for Science Literacy (RST): 2, 3, 4, 7, 8, 9
- Writing Standards for Science Literacy (WHST): 1, 2, 4, 9

**School-wide Academic Expectations Addresses in this Unit:** Collaboration, Think Critically, and Problem-Solving

**School-wide Social and Civic Expectations Addresses in this Unit:** Honesty, Responsibility, Respect, and Safety

**Essential Question(s):**

- What is the role that oceans play in the thermal / heat budget of our planet?
- How do temperature and salinity affect the structure of the ocean?
- What are some of the best –proposed ways to tap the heat energy of the atmosphere and hydrosphere?
- What are the major ocean currents and how do they influence humans and the planet?

**Key Terms/Concepts:**

Eddies, Ekman Spiral, El Nino, Gulf Stream, Hydrosphere, Upwelling

Standard	LEARNING OBJECTIVES (Content and Skill)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
<b>Dynamic Earth Processes</b>	1. Describe the various layers within the ocean. Describe how temperature and salinity affect these layers.	<ul style="list-style-type: none"> <li>Power Point &amp; Discussion</li> <li>Lab – Ocean in a Test Tube</li> </ul>	Oral Response
<b>Motion and Forces</b>	2. Identify and describe the characteristics of various oceanic currents.	<ul style="list-style-type: none"> <li>Activity – Predicting the Patterns and Characteristics of Surface Ocean Currents (Maury Project)</li> </ul>	Embedded Task
<b>Motion and Forces</b>	3. Predict locations of floating items based on oceanic surface currents	<ul style="list-style-type: none"> <li>Activity – Rubber Ducks, Nikes and the Pacific</li> </ul>	Performance Task with Constructed Response Summative Assessment

**Suggested Resources:** An Introduction to the World’s Oceans (9<sup>th</sup> edition) – Sverdrup & Armbrust

**Suggested Technology:** DVD player, Computer, Projector

## Unit 8: Waves

**Introduction:** Surfers are always on the lookout for the perfect wave. Tsunamis can wipe out an entire community. Waves are among the ocean’s most complex phenomena. This unit explores the different kinds of waves, investigating their origin, behavior, and impact on coastal stability.

### CT State Standard(s):

Enrichment Content Standards: Waves and Dynamic Earth Processes

### Common Core Standard(s):

- Reading Standard for Science Literacy (RST): 2, 3, 4, 7, 8, 9
- Writing Standards for Science Literacy (WHST): 1, 2, 4, 9

**School-wide Academic Expectations Addresses in this Unit:** Collaboration, Think Critically, and Problem-Solving

**School-wide Social and Civic Expectations Addresses in this Unit:** Honesty, Responsibility, Respect, and Safety

### Essential Question(s):

- What conditions cause the formation of waves?
- What factors influence the size and shape, wave motion and velocity of various waves?
- What specific impact do waves have on physical barriers and the coastline?

### Key Terms/Concepts:

Breaking waves, Capillary waves, Diffraction, Gravity waves, Refraction, Superposition

Standard	LEARNING OBJECTIVES (Content and Skill)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
Waves	1. Describe the structure, formation, size and shape, wave motion and velocity of various waves.	<ul style="list-style-type: none"> <li>• Power Point &amp; Notes</li> <li>• Vocabulary Crossword</li> <li>• Wave Lab</li> </ul>	Oral Response
Dynamic Earth Processes	2. Predict the impact of waves on various physical barriers and the sea floor.	<ul style="list-style-type: none"> <li>• Wave Stations Lab</li> </ul>	Embedded Task
Dynamic Earth Processes	3. Describe the interactions of waves and the shoreline, in the surf zone.	<ul style="list-style-type: none"> <li>• Wave Stations Lab</li> <li>• Power Point</li> </ul>	Embedded Task Oral Response Summative Assessment

**Suggested Resources:** An Introduction to the World's Oceans (9<sup>th</sup> edition) – Sverdrup & Armbrust

**Suggested Technology:** DVD player, Computer, Projector



## Unit 9: Tides

**Introduction:** The periodic rise and fall of sea level, known as the tide, is caused by the gravitational interactions of the Moon and Sun on the oceans of the Earth. This unit explores these interactions as well as other factors that influence the tides around the planet.

**CT State Standard(s):** Earth's Place in the Universe, Motion and Forces, and Content Standard 9.9

### Common Core Standard(s):

- Reading Standard for Science Literacy (RST): 2, 3, 4, 7, 8, 9
- Writing Standards for Science Literacy (WHST): 1, 2, 4, 9

**School-wide Academic Expectations Addresses in this Unit:** Writing, Collaboration, Think Critically, and Problem-Solving

**School-wide Social and Civic Expectations Addresses in this Unit:** Honesty, Responsibility, Respect, and Safety

### Essential Question(s):

- What causes the regular rise and fall of tides?
- Why are tides different in various locations?

### Key Terms/Concepts:

Diurnal Tide, Flood Tide, Neap Tide, Semidiurnal Mixed Tide, Semidiurnal Tides, Spring Tide, Tidal Bore, Tidal Currents, Tsunami

<b>Standard</b>	<b>LEARNING OBJECTIVES (Content and Skill)</b>	<b>INSTRUCTIONAL STRATEGIES</b>	<b>ASSESSMENT EVIDENCE</b>
<b>Earth's Place in the Universe</b>	1. Describe, graph, and analyze the rise and fall of tides.	<ul style="list-style-type: none"> <li>• Power Point &amp; Discussion</li> <li>• Activity – Graphing Tide Data</li> <li>• Activity – Plotting Tidal Curves (Project Earth Science)</li> </ul>	Oral Response Embedded Task
<b>Motion and Forces</b>	2. Describe general interaction of the moon and the Earth in the formation of tides.	<ul style="list-style-type: none"> <li>• Lab – Timing the Tides (Maury Project)</li> </ul>	Embedded Task
<b>Earth's Place in the Universe</b>	3. Describe the various types of tides and influencing factors.	<ul style="list-style-type: none"> <li>• Activity – Data Analysis</li> </ul>	Embedded Task Summative Assessment
<b>Motion and Forces</b>  <b>Content Standard 9.9</b>	4. Identify structures built to control wave damage. Research local methods for wave damage and assess their efficiency	<ul style="list-style-type: none"> <li>• Activity – Map Analysis &amp; Research</li> </ul>	Embedded Task  Summative Assessment

**Suggested Resources:** An Introduction to the World's Oceans (9<sup>th</sup> edition) – Sverdrup & Armbrust

**Suggested Technology:** DVD player, Computer, Projector

## Unit 10: Coasts, Beaches & Estuaries

**Introduction:** Coastal environments are arguably the most important and intensely used of all areas settled by humans. The coastline changes, not only over the centuries or decades but also in a matter of hours and minutes. This rapid development applies both to the form of the coastline and to coastal processes. (Masselink & Hughes) This unit is an introduction to the environments and the processes that occur along the world's coastline.

### **CT State Standard(s):**

Enrichment Content Standards: Dynamic Earth Processes and Content Standard 9.8

### **Common Core Standard(s):**

- Reading Standard for Science Literacy (RST): 2, 3, 4, 7, 8, 9
- Writing Standards for Science Literacy (WHST): 1, 2, 4, 9

**School-wide Academic Expectations Addresses in this Unit:** Writing, Collaboration, Think Critically, and Problem-Solving

**School-wide Social and Civic Expectations Addresses in this Unit:** Honesty, Responsibility, Respect, and Safety

**Essential Question(s):**

- How are coastal areas classified?
- What and how have, geological, marine and weather processes impacted the formation of coastal zone?
- How are beach areas created and protected?
- What is an estuary? How is one estuary different from another? What scientific and economic impact do estuaries provide?

**Key Terms/Concepts:** Beach, Breakwater, Currents, Deltas, Estuary, Fjord, Groins, Intertidal Zone, Jetties

Standard	LEARNING OBJECTIVES (Content and Skill)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
	1. To identify the different types, locations and styles of coasts.	<ul style="list-style-type: none"> <li>• Power Point &amp; Discussion</li> </ul>	Oral Response
<b>Dynamic Earth Processes</b>	2. Classify coastal types based on formation processes and geomorphic features.	<ul style="list-style-type: none"> <li>• Activity – Identifying geomorphic features from around the world</li> <li>• Activity – On-line Activity Coastal Geology &amp; Geomorphology</li> </ul>	Embedded Task  Embedded Task w/ constructed response
<b>Dynamic Earth Processes</b>	3. Describe the formation and components of an active beach. 4. Differentiate beach types and the dynamic processes that occur daily and seasonally	<ul style="list-style-type: none"> <li>• Activity – Who Moved the Beach (oceanservice.noaa.gov/education)</li> </ul>	Performance Task and Constructed Response
<b>Content Standard 9.8</b>	5. Identify locations and types of estuarine systems. 6. Describe the dynamics of estuarine systems in terms of water movement, temperature zones and marine biology	<ul style="list-style-type: none"> <li>• Power Point &amp; Discussion</li> </ul>	Oral Response   Summative Assessment

**Suggested Resources:** An Introduction to the World’s Oceans (9<sup>th</sup> edition) – Sverdrup & Armbrust

**Suggested Technology:** DVD player, Computer, Projector



## Unit 11: Marine Biology

**Introduction:** The science of marine biology is the study of marine organisms. It includes nearly all the sub-disciplines of biology as they apply to marine. This definition is very broad, and in practice marine biologists typically specialize in one or very few of the sub-disciplines. This unit will focus on the taxonomy, physiology, and ecology of marine organisms.

**CT State Standard(s):**

Enrichment Content Standards: Cell Biology and Ecology

**Common Core Standard(s):**

- Reading Standard for Science Literacy (RST): 2, 3, 4, 7, 8, 9
- Writing Standards for Science Literacy (WHST): 1, 2, 4, 9

**School-wide Academic Expectations Addresses in this Unit:** Writing, Think Critically, and Problem-Solving

**School-wide Social and Civic Expectations Addresses in this Unit:** Honesty, Responsibility, Respect, and Safety

**Essential Question(s):**

- What is marine biology?
- How are organisms classified?
- How do the various organisms influence the environment or economy?
- How does human activity impact the ocean environment?

**Key Terms/Concepts:**

Algae, Benthos, Chemosynthesis, Nekton, Phytoplankton, Polyps, Zooplankton

Standard	LEARNING OBJECTIVES (Content and Skill)	INSTRUCTIONAL STRATEGIES	ASSESSMENT EVIDENCE
Cell Biology	1. Identify various types of plankton, describe various sampling methods and ways in which plankton can have a particularly large impact on the environment	<ul style="list-style-type: none"> <li>• Power Point &amp; Discussion</li> <li>• Lab – Plankton Observation</li> </ul>	Oral Discussion Performance Task
Ecology	2. Describe the distributions of organisms based on depth and energy zones.	<ul style="list-style-type: none"> <li>• Power Point &amp; Discussion</li> <li>• Life Zones Project Part 1</li> </ul>	Embedded Task
Ecology	3. Observe and describe the diversity and life styles of the marine organisms that swim freely in the oceans.	<ul style="list-style-type: none"> <li>• Power Point &amp; Discussion</li> <li>• Life Zones Project Part 2</li> </ul>	Embedded Task
Ecology	4. Identify and classify the animals and algae that live either in, or on, the sea floor.	<ul style="list-style-type: none"> <li>• Lab – Algae Identification</li> <li>• Activity – Taxonomy Slide Show</li> <li>• Field Trip – Bluff Point</li> </ul>	Performance Task and Constructed Response
Cell Biology	5. Observe and describe the formation and diversity of coral reefs.	<ul style="list-style-type: none"> <li>• Video – Coral reefs: Their Health, Our Wealth</li> </ul>	Oral Responses
Ecology	6. Discuss the impact of human activity on coral reefs and the ocean in general.	<ul style="list-style-type: none"> <li>• Video – Treasures of the Great Barrier Reef</li> <li>• Create You Tube advertisement to promote coral reef awareness.</li> </ul>	Summative Assessment

**Suggested Resources:** An Introduction to the World's Oceans (9<sup>th</sup> edition) – Sverdrup & Armbrust

**Suggested Technology:** DVD player, Computer, Projector, Microscopes

**UPDATED: 4/2017**