

FREEHOLD REGIONAL HIGH SCHOOL DISTRICT

OFFICE OF CURRICULUM AND INSTRUCTION

SCIENCE DEPARTMENT

LAB MARINE SCIENCE

Grade Level: 11-12

Credits: 2.5

BOARD OF EDUCATION ADOPTION DATE:

AUGUST 30, 2010

[SUPPORTING RESOURCES AVAILABLE IN DISTRICT RESOURCE SHARING](#)

APPENDIX A: ACCOMMODATIONS AND MODIFICATIONS

APPENDIX B: ASSESSMENT EVIDENCE

APPENDIX C: INTERDISCIPLINARY CONNECTIONS

Course Philosophy

The philosophy of Marine Science is to engage students in experiences and observations that promote an awareness of the diverse marine community. It is to assist the student with their natural curiosity, with our unique local marine ecosystems, and to serve as a stepping stone for further study of other global marine environments. Marine Science assumes an increasingly important role in our shrinking world. In the 21st century, an understanding of Marine Science leads to a greater understanding in an ever changing world.

Course Description

Marine Science is a half year elective course for 11th and 12th grade students. It is an exciting introduction to the diverse, and demanding world we call the sea. This course is for the student with an interest in the many aspects of the marine environment, and in developing the ability to identify the problems and possible solutions of our ocean habitat. Areas for consideration will be how humans are impacting oceans on a global scale, knowing the ocean world, marine organisms and their habitats, tides, waves, coasts, marine resources and concerns. The course includes lectures, projects, movies, discussions, case studies, experiments and if time and money permits field trips. This will be the beginning of a life-long interest with our marvelous yet daunting world we call the ocean.

**Freehold Regional High School District
Curriculum Map**

Lab Marine Science

Relevant Standards ¹	Enduring Understandings	Essential Questions	Assessments		
			Diagnostic (before)	Formative (during)	Summative (after)
NJCCCS: 5.1 A,C, 5.1 12.C.1, D1, 5.4.12.G.5, 5.4.12.G.6	Marine science encompasses many different areas of scientific study, exploration and careers.	What are the different areas that encompass the marine science field and what do they consist of? How have scientific contributions from various cultures throughout history affected our understanding of the oceans? Why does it benefit you to understand the marine environment?	Pretest Student Survey Oral Questions/ Discussions	Journals Quizzes Written Assignments Oral Presentations	Chapter Test Portfolios Projects Final Exam
NJCCCS: 5.1A, 5.1.12.A1,2,3; B.1-4; C.1-3; D1-3; 5.4.G	The scientific method is a tool used to develop problem solving, decision-making, and inquiry skills to be utilized in laboratory and field studies.	How/Why is the scientific method used in the marine science field? How is data gathered, analyzed, and applied in the field and classroom environment? What skills, strategies and equipment is used to gather, analyze and interpret data in the marine science field?	Anticipatory Set Questions	Observations Participatory Rubrics Role Play	Lab Write ups and Activities Alternative assessments
NJCCCS: 5.1.12.D.1,2 5.1.B; C.1,2,3 5.4.F, G.1-7	Human activities have drastic effects on the ocean and its inhabitants.	What are the effects of human activities on marine ecosystems and marine resources? What can you personally do to help or remedy this situation?		Research Assignments Interviews	
NJCCCS: 5.1.A, C, D.1-3	Personal safety and health of others in the classroom, laboratory and field is necessary at all times.	What is proper conduct in the field, lab or classroom setting? What are proper safety procedures that are to be followed at all times as well as during emergency situations?		Lab Activities	
NJCCCS: 5.1.A; C; D 5.3.B3-6; C.1,2	The ocean is full of plant and animal diversity, which is interconnected within marine ecosystems.	What types of organisms are responsible for photosynthesis and primary production in the marine environment? What is the relationship of organisms and available energy to each other within food chains and food webs?			
NJCCCS: 5.1.A, C, D; 5.2.D.1, E, F.1,2,3, 5.4.G.1,2,3,7	The world's oceans are in constant motion and impact the climate, weather patterns and biological activity within the oceans as well as on land.	How are the oceans set into motion and what determines variations in the ocean cycles? What effects does ocean circulation have on climate and weather patterns on land? What effects does ocean circulation have on marine and terrestrial ecosystems?			
NJCCCS: 5.1.A, C, 5.3.C.1,2, E, 5.4.D.1, F.2	Plants, animals, topography and resource availability vary in different marine environments.	What resources are available for human use from marine ecosystems? What are the characteristics and adaptations of the flora and fauna specific to their marine environment? What different life zones exist at different depths and coastal formations? What does the seafloor look like and how does it change?			

**Freehold Regional High School District
Course Proficiencies and Pacing**

Lab Marine Science

Unit Title	Unit Understandings and Goals	Recommended Duration
Unit #1: Introduction to Marine Science	<p>Marine science encompasses many different areas of scientific study, exploration and careers. The scientific method is a tool used to develop problem solving, decision-making, and inquiry skills to be utilized in laboratory and field studies. Human activities have drastic effects on the ocean and its inhabitants. Personal safety and health of others in the classroom, laboratory and field is necessary at all times.</p> <ul style="list-style-type: none"> • The students will be able to explore various marine science disciplines and areas of study. • The students will be able to apply the scientific method in hands-on activities. • The students will be able to understand human impact on the ocean. • The students will be able to demonstrate safety in the classroom. 	2 weeks
Unit #2: Interdependence in the Oceans	<p>Human activities have drastic effects on the ocean and its inhabitants. The ocean is full of plant and animal diversity, which is interconnected within marine ecosystems.</p> <ul style="list-style-type: none"> • The students will be able to understand human impact on the ocean. • The students will be able to understand how plants and animals are interconnected within the marine ecosystem. 	2 weeks
Unit #3: Waves, Currents and Tides	<p>The ocean is full of plant and animal diversity, which is interconnected within marine ecosystems. The world's oceans are in constant motion and impact the climate, weather patterns and biological activity within the oceans and on land.</p> <ul style="list-style-type: none"> • The students will be able to understand how plants and animals are interconnected within the marine ecosystem. • The students will be able to understand how the oceans are set into motion and what effects this had on marine and terrestrial ecosystems. 	3 weeks
Unit #4: Marine Ecosystems	<p>Human activities have drastic effects on the ocean and its inhabitants. The ocean is full of plant and animal diversity, which is interconnected within marine ecosystems. The world's oceans are in constant motion and impact the climate, weather patterns and biological activity within the oceans and on land. Plants, animals, topography and resource availability vary in different marine environments.</p> <ul style="list-style-type: none"> • The students will be able to understand human impact on the ocean. • The students will be able to understand how plants and animals are interconnected within the marine ecosystem. • The students will be able to understand how the oceans are set into motion and what effects this had on marine and terrestrial ecosystems. • The students will be able to describe the different characteristics, flora and fauna of different marine ecosystems. 	4 weeks
Unit #5: Creatures	<p>Human activities have drastic effects on the ocean and its inhabitants. The ocean is full of plant and animal diversity, which is interconnected within marine ecosystems. Plants, animals, topography and resource availability vary in different marine environments.</p> <ul style="list-style-type: none"> • The students will be able to understand human impact on the ocean. • The students will be able to understand how plants and animals are interconnected within the marine ecosystem. • The students will be able to describe the different characteristics, flora and fauna of different marine ecosystems. 	4 weeks
Unit #6: Pollution	<p>Human activities have drastic effects on the ocean and its inhabitants.</p> <ul style="list-style-type: none"> • The students will be able to understand human impacts on the ocean. 	2 weeks

**Freehold Regional High School District
Lab Marine Science**

Unit #1: Introduction to Marine Science

Enduring Understandings: Marine science encompasses many different areas of scientific study, exploration and careers.
The scientific method is a tool used to develop problem solving, decision-making, and inquiry skills to be utilized in laboratory and field studies.
Personal safety and health of others in the classroom, laboratory and field is necessary for understanding of this course.

Essential Questions: What are the different areas that encompass the marine science field?
What skills, strategies and equipment are used to gather, analyze and interpret data in the marine science field?
What is proper conduct in the field, lab or classroom setting?
How is the scientific method used in the marine science field?
How is data gathered, analyzed, and applied in the field and classroom environment?
How have scientific contributions from various cultures throughout history affected our understanding of the ocean?
Why does it benefit you to understand the marine environment?

Unit Goals: The students will be able to explore various marine science disciplines and areas of study
The students will be able to apply the scientific method in hands on activity.
The students will be able to understand human impacts on the ocean.
The students will be able to demonstrate safety in the classroom.

Duration of Unit: 2-3 weeks

NJCCCS: 5.1 A1-3; B.1-4; C.12.C.1-3, D, D.1-3, 5.4.12.G.5, G.6

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
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Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>What is marine science and why do we study the oceans?</p> <p>Why does it benefit you to understand the marine environment?</p> <p>How do scientists explore the oceans?</p>	<p><u>Content:</u> <u>Key Terms:</u> marine biology, oceanography, submersibles, SCUBA</p> <p>Major scientists involved in scientific discoveries</p> <p>Different areas that encompass the marine science field</p> <p>Skills, strategies and equipment that is used to gather, analyze and interpret data in the marine science field</p> <p>Various ways scientists explore the ocean.</p> <p>Advantages and disadvantages of varying ocean exploration methods</p> <p>Identify key scientific voyages that led to the modern marine sciences</p> <p>Differentiate between marine Biology and Physical Oceanography</p>	<p>Current Textbook</p> <p>Supplementary text books</p> <p>Internet</p> <p>Articles</p> <p>Websites</p> <p>Multimedia Video clips</p>	<p>Work on Projects and/or Labs</p> <p>Various Classroom Activities</p> <p>Power Point Presentation</p> <p>Technology</p> <p>Study guides and worksheets</p> <p>Do Now</p> <p>Closures</p> <p>Jigsaw game using marine scientists from student textbook.</p> <p>Latitude longitude mapping activity</p> <p>Project on marine science careers</p> <p>Rutgers C.O.O.L room classroom http://www.coolclassroom.org/home.html</p>	<p>Written Tests and Quizzes</p> <p>Worksheets</p> <p>Project Assessments</p> <p>Lab Activities /Reports</p>

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>What is the world's water budget?</p> <p>What is the Water cycle?</p> <p>What are the major oceans of the world?</p>	<p><u>Content:</u> <u>Key Terms:</u> water budget, precipitation, evaporation, condensation, salinity, water cycle</p> <p>The water budget of earth</p> <p>The major ocean basins of the world</p> <p>How water cycles through the water cycle</p> <p><u>Skills:</u></p> <p>Demonstrate how water molecules travel through the water cycle.</p> <p>Locate the major oceans of the world on a map.</p>	<p>Current Textbook</p> <p>Supplementary text books</p> <p>Internet</p> <p>Articles</p> <p>Websites</p> <p>Multimedia Video clips</p>	<p>Work on Projects and/or Labs</p> <p>Various Hands-On Classroom Activities</p> <p>Power Point Presentation</p> <p>Technology Integration</p> <p>Do Now</p> <p>Closures</p> <p>Maps</p> <p><u>Possible Activities:</u></p> <p>Sample water cycle game: http://response.restoration.noaa.gov/ Under the Serving communities picture click on "Inspiring Students and Teachers" Then scroll down to Water Cycle Game and click on link for downloadable documents</p>	<p>Written Tests and Quizzes</p> <p>Worksheets</p> <p>Project Assessments</p> <p>Lab Activities /Reports</p>
<p>What is proper conduct in the field, lab or classroom setting?</p> <p>What are proper safety procedures that are to be followed at all times as well as during emergency situations?</p>	<p><u>Content:</u> <u>Key Terms:</u> Eyewash, fire extinguisher, fire blanket, safety shower</p> <p>Proper conduct in the field, lab or classroom setting</p> <p>Proper safety procedures that are to be followed at all times as well as during emergency situations</p> <p><u>Skills:</u></p> <p>Demonstrate through hands on activities the proper conduct in the field, lab or classroom setting.</p> <p>Demonstrate through hands on activities proper safety procedures that are to be followed at all times as well as during emergency situations in the classroom.</p>	<p>Current Textbook</p> <p>Supplementary text books</p> <p>Internet</p> <p>Articles</p> <p>Websites</p> <p>Multimedia Video clips</p>	<p>Work on Projects and/or Labs</p> <p>Various Classroom Activities</p> <p>Power Point Presentation</p> <p>Technology</p> <p>Do Now</p> <p>Closures</p> <p><u>Possible Activities:</u></p> <p>Link for designing: Underwater habitat, Autonomous Underwater Vehicles, or Scientific project http://www.uncw.edu/aquarius/education/lessons.html</p>	<p>FRHSD Safety Quiz</p> <p>Worksheets</p> <p>Project Assessments</p> <p>Lab Activities /Reports</p>

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>Suggestions on how to differentiate in this unit:</p> <ul style="list-style-type: none"> • Students with individual learning styles can be assisted through adjustments in assessment standards, teacher grouping, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods • A wide variety of assessments and strategies complement the individual learning experience. • Utilize technology in all of its forms, such as computers, movies, etc. • Recognize and use appropriate context 				

**Freehold Regional High School District
Lab Marine Science**

Unit #2: Interdependence in the Oceans

Enduring Understandings: Human activities have drastic effects on the ocean and its inhabitants.

The ocean is full of plant and animal diversity, which is interconnected within marine ecosystems.

Essential Questions: What are the effects of human activities on the marine ecosystem?

What types of organisms are responsible for photosynthesis and primary production in the marine environment?

What is the relationship of organisms and available energy within a trophic pyramid with relationship to food chains, webs and ecosystems?

Unit Goals: The students will be able to understand human impact on the ocean.

The students will be able to understand how plants and animals are interconnected within the marine ecosystem.

Duration of Unit: 2 to 3 weeks

NJCCCS: 5.1.12.A; B; D.1, 2; C.1-3; 5.4.F, 5.4.G.1-7; B.3-6, 5.3.C1, 2

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>What are the components of an oceanic food web?</p> <p>What happens to available energy at each level of a trophic pyramid?</p> <p>What is the difference between a food chain and a food web?</p> <p>What is symbiosis?</p>	<p><u>Content:</u> <u>Key Terms:</u> food chain, food web, mutualism, commensalisms, parasitism, trophic levels, keystone species</p> <p>The plants and animals create oceanic food webs and ecosystems.</p> <p>The relationship of organisms and available energy from trophic level to trophic level.</p> <p>The different types of marine symbiosis and examples of each.</p> <p><u>Skills:</u> Differentiate between food webs and chains Construct a food chain and food webs and track the available energy at each trophic level. Differentiate and identify different types of marine symbiosis</p>	<p>Current Textbook</p> <p>Supplementary text books</p> <p>Internet</p> <p>Articles</p> <p>Websites</p> <p>Multimedia Video clips</p>	<p>Work on Projects and/or Labs</p> <p>Various Hands-On Classroom Activities</p> <p>Power Point Presentation</p> <p>Technology Integration</p> <p>Maps</p> <p><u>Possible Activities:</u> Creating a marine</p>	<p>Written Tests and Quizzes</p> <p>Worksheets</p> <p>Project Assessments</p> <p>Lab Activities /Reports</p>

<p>What important role does plankton play in the marine ecosystem?</p> <p>What is the difference between phytoplankton and zooplankton?</p> <p>How does the abundance of marine plankton impact humans and the oceanic ecosystem?</p>	<p><u>Content:</u> <u>Key Terms:</u> holoplankton, meroplankton, planktonic, benthic, nektonic, red tide</p> <p>The importance of marine plankton to humans and the marine ecosystems.</p> <p>Plankton are responsible for most of the primary production in the ocean and most of the oxygen production in the world.</p> <p>The difference between phytoplankton and zooplankton and examples of each.</p> <p><u>Skills:</u> Identify several microscopic and macroscopic plankton. Differentiate between zooplankton and phytoplankton. Understand the important roles plankton play in the marine ecosystem</p>			
<p><u>Suggestions on how to differentiate in this unit:</u></p> <ul style="list-style-type: none"> • Students with individual learning styles can be assisted through adjustments in assessment standards, teacher grouping, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods • A wide variety of assessments and strategies complement the individual learning experience. • Utilize technology in all of its forms, such as computers, movies, etc. • Recognize and use appropriate context 				

**Freehold Regional High School District
Lab Marine Science**

Unit #3: Waves, Currents and Tides

Enduring Understandings: Human activities have drastic effects on the ocean and its inhabitants.

The world's oceans are in constant motion and impact the climate, weather patterns and biological activity within the oceans and on land.

Essential Questions: What are the effects of human activities on the ecosystem and marine resources?

How are the oceans set into motion and what determines variations in the ocean cycles?

What effects does ocean circulation have on climate and weather patterns on land?

What effects does ocean circulation have on marine and terrestrial ecosystems?

Unit Goal: The students will be able to understand human impact on the ocean.

The students will be able to understand how plants and animals are interconnected within the marine ecosystem.

Duration of Unit: 3 to 4 weeks

NJCCCS: 5.1.12.D.1,2; B; C.1-3; 5.4.F; G.1-7; 5.1.A, 5.1.C, 5.1.D, 5.2.D.1, 5.2.E, 5.4.F.1,2,3, 5.4.G.1,2,3,7

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>What forces are responsible for the major ocean currents?</p> <p>What influences the nature and direction of these currents?</p> <p>How do currents affect climate and weather?</p> <p>What biological effects do currents have?</p> <p>What is El Nino, and what effects does El Nino have on the world?</p>	<p><u>Content:</u> <u>Key Terms:</u> Coriolis effects, global ocean conveyor belt, gyre, Gulf Stream, El Nino, upwelling</p> <p>The general flow patterns of currents throughout the world's oceans.</p> <p>The forces are responsible for causing ocean currents.</p> <p>How major ocean currents circulate around the world and affect climate and weather of certain regions.</p> <p><u>Skills:</u> Identify the major ocean circulation patterns.</p> <p>Predict how a climate will be affected by the change in an ocean current</p> <p>Understand the far reaching effects of El Nino</p>	<p>Current Textbook</p> <p>Supplementary text books</p> <p>Internet</p> <p>Articles</p> <p>Websites</p> <p>Multimedia Video clips</p>	<p>Work on Projects and/or Labs</p> <p>Various Hands-On Classroom Activities</p> <p>Power Point Presentation</p> <p>Technology Integration</p> <p>Do Now</p> <p>Closures</p> <p>Maps</p> <p><u>Possible Activities:</u> El Nino Case Study</p> <p>Density and Salinity Demo/Lab http://www.navmetocom.navy.mil/educate/neptune/lesson/science/density.htm</p> <p>Great Pacific Garbage Patch clip from United Streaming</p>	<p>Written Tests and Quizzes</p> <p>Worksheets</p> <p>Project Assessments</p> <p>Lab Activities /Reports</p>

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>Tides What forces cause tides? How regular are the tides? What conditions create spring and neap tides and what are the effects of each? What animals are affected by different tides and moon phases?</p>	<p><u>Content:</u> <u>Key Terms:</u> diurnal, semidiurnal, spring tide, neap tide</p> <p>The forces that cause tides</p> <p>The different types of tides and how regular those tides occur.</p> <p><u>Skills:</u> Identify conditions that create Spring and neap tides.</p> <p>Identify different animals that are affected by the rise and fall of tides</p>	<p>Current Textbook</p> <p>Supplementary text books</p> <p>Internet</p> <p>Articles</p> <p>Websites</p> <p>Multimedia Video clips</p>	<p>Work on Projects and/or Labs</p> <p>Various Hands-On Classroom Activities</p> <p>Power Point Presentation</p> <p>Technology Integration</p> <p>Do Now</p> <p>Closures</p> <p>Maps</p> <p><u>Possible Activities:</u> Case studies on marine animals affected by the tides (Horse shoe crabs, grunion, Christmas Island Crabs)</p>	<p>Written Tests and Quizzes</p> <p>Worksheets</p> <p>Project Assessments</p> <p>Lab Activities /Reports</p>
<p>What forces cause waves? What effects do waves have on shorelines?</p>	<p><u>Content:</u> <u>Key Terms:</u> wave height, period, spilling waves, plunging waves, surging waves, rogue waves</p> <p>The types of waves and their causes</p> <p>How waves shape the shoreline</p> <p><u>Skills:</u> Identify wave anatomy</p> <p>Determine the type of wave that will form based on the shoreline</p>		<p><u>Possible Activities:</u> Step Into Liquid Surf Video to Identify beach topography and types of waves</p> <p>Live feed identification of waves http://njsurfer.com/ http://magicseaweed.com/</p>	

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p><u>HURRICANES (optional Unit)</u> How does a hurricane form? How are hurricanes classified? What are the main structural components of a hurricane? What effect do hurricanes have on coastal ecosystems? What are social, economic and environmental impacts of hurricanes?</p>	<p><u>Content:</u> <u>Key Terms:</u> eye, eye wall, rain bands, Saffir-Simpson, storm surge</p> <p>The factors needed to form a hurricane and how hurricanes are classified</p> <p>Main structural components of a hurricane</p> <p>The effects hurricanes have on ecosystems and humans.</p> <p><u>Skills:</u> Classify a hurricane based on its current intensity</p> <p>Track a hurricane using latitude and longitudinal data</p>	<p>Current Textbook</p> <p>Supplementary text books</p> <p>Internet</p> <p>Articles</p> <p>Websites</p> <p>Multimedia Video clips</p>	<p><u>Possible Activities:</u> Tracking Hurricanes http://www.ncsec.org/cadre2/team19_2/MWhurricanetrackinglesson.htm http://www.stormpulse.com/atlantic</p> <p>Storm that drowned a city (NOVA) http://www.pbs.org/wgbh/nova/orleans/</p>	<p>Written Tests and Quizzes</p> <p>Worksheets</p> <p>Project Assessments</p> <p>Lab Activities /Reports</p>
<p><u>Suggestions on how to differentiate in this unit:</u></p> <ul style="list-style-type: none"> • Students with individual learning styles can be assisted through adjustments in assessment standards, teacher grouping, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods • A wide variety of assessments and strategies complement the individual learning experience. • Utilize technology in all of its forms, such as computers, movies, etc. • Recognize and use appropriate context 				

**Freehold Regional High School District
Lab Marine Science**

Unit #4: Marine Ecosystems

Enduring Understandings: The ocean is full of plant and animal diversity, which is interconnected within marine ecosystems.
 The world's oceans are in constant motion and impact the climate, weather patterns and biological activity within the oceans and on land.
 Plants, animals, topography and resource availability vary in different marine environments.
 Human activities have drastic effects on the ocean and its inhabitants.

Essential Questions: What different life zones exist at different depths and coastal formations?
 What does the seafloor look like and how does it change?
 What are the effects of human activities on marine ecosystems and marine resources?
 What are the characteristics and adaptations of flora and fauna in marine environments?
 What resources are available for human use from marine ecosystems?

Unit Goal: The students will be able to understand human impact on the ocean.
 The students will be able to understand how plants and animals are interconnected within the marine ecosystem.
 The students will be able to understand how the oceans are set into motion and what effects this had on marine and terrestrial ecosystems.
 The students will be able to describe the different characteristics, flora and fauna of different marine ecosystems.

Duration of Unit: 3 to 4 weeks

NJCCCS: 5.1.12.D.1, 2; B, C.1-3; 5.4.F, G.1-7; 5.1.A, C, D, 5.3.B.3-6, C.1, 2; 5.2.D.1, E, F.1-3

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>How do scientists map the ocean floor?</p> <p>What does the seafloor look like and how does it change?</p>	<p><u>Content:</u> <u>Key Terms:</u> Plate tectonics, sea floor spreading, abyssal plain, island, continental shelf, continental slope, trench, sea mount, seduction, ring of fire, cartographer, sonar.</p> <p>The three types of tectonic plate boundaries and the tectonic activity at each.</p> <p><u>Skills:</u> Locate plate boundaries around the world</p> <p>Demonstrate tectonic plate boundary movement</p>	<p>Current Textbook</p> <p>Supplementary text books</p> <p>Internet</p> <p>Websites</p> <p>Multimedia Video clips</p>	<p>Work on Projects and/or Labs</p> <p>Various Hands-On Classroom Activities</p> <p>Power Point Presentation</p> <p>Technology Integration</p> <p>Maps</p> <p><u>Possible Activities:</u> Shoebox topography</p>	<p>Written Tests and Quizzes</p> <p>Worksheets</p> <p>Project Assessments</p> <p>Lab Activities /Reports</p>

<p>What are the major oceanic life zones/marine environments?</p> <p>What are the characteristics and adaptations of the flora and fauna in various marine environments?</p> <p>What resources are available for human use from marine ecosystems?</p> <p>What are the effects of human activities on marine ecosystems and marine resources?</p>	<p><u>Content:</u> <u>Key Terms:</u> intertidal zone, pelagic zone, oceanic zone, salt marsh, mangroves, mud flats, coral reefs, wetlands, barrier islands, coral reefs, mangroves, beaches, deep sea</p> <p>The different oceanic life zone and the depths and coastal formations responsible for them.</p> <p>Characteristics and adaptations of flora and fauna in marine environments</p> <p><u>Skills:</u> Identify various marine ecosystems around the world</p>		<p><u>Possible Activities:</u> Creation of marine ecosystems</p> <p>Wetland in a pan (adapted from Wonders of Wetlands) http://www.catskillcenter.org/programs/edu/csp/H20/Lesson3/wetlan~1.htm</p> <p>Deep Sea Creature Creation Project</p>	
<p><u>Suggestions on how to differentiate in this unit:</u></p> <ul style="list-style-type: none"> • Students with individual learning styles can be assisted through adjustments in assessment standards, teacher grouping, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods • A wide variety of assessments and strategies complement the individual learning experience. • Utilize technology in all of its forms, such as computers, movies, etc. • Recognize and use appropriate context 				

**Freehold Regional High School District
Lab Marine Science**

Unit #5: Creatures!

Enduring Understandings: Human activities have drastic effects on the ocean and its inhabitants.

Plants, animals, topography and resource availability vary in different marine environments.

Essential Questions: What are the effects of human activities on the ecosystem and interdependence of organisms within the marine ecosystem?

What can you personally do to help or remedy this situation?

What are the characteristics and adaptations of the flora and fauna specific to their marine environment?

Unit Goal: The students will be able to understand human impact on the ocean.

The students will be able to understand how plants and animals are interconnected within the marine ecosystem.

The students will be able to describe the different characteristics, flora and fauna of different marine ecosystems.

Duration of Unit: 3 to 4 weeks

NJCCCS: 5.1.12.D.1, 2 B, C.1-3; 5.4.F, G.1-7; 5.1.A, C, 5.3.C.1, 2, 5.3.E, 5.4.D, D.1, .F, F.2

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>What are the defining characteristics of marine invertebrates?</p> <p>What roles do marine invertebrates play in the ecosystem?</p>	<p><u>Content:</u> <u>Key Terms:</u> poriferans, cnidarians, mollusk, bivalve, gastropod, cephalopod, arthropod, echinoderm, crustacean</p> <p>General characteristics of marine invertebrates.</p> <p>Roles of invertebrates in the marine ecosystem.</p> <p><u>Skills:</u> Identify various marine invertebrates</p>	<p>Current Textbook</p> <p>Supplementary text books</p> <p>Internet</p> <p>Articles</p> <p>Websites</p> <p>Multimedia Video clips</p>	<p>Work on Projects and/or Labs</p> <p>Various Hands-On Classroom Activities</p> <p>Power Point Presentation</p> <p>Technology Integration</p> <p>Do Now</p> <p>Closures</p> <p>Maps</p>	<p>Written Tests and Quizzes</p> <p>Worksheets</p> <p>Project Assessments</p> <p>Lab Activities /Reports</p>
<p>What are the defining characteristics of vertebrates?</p> <p>What roles do vertebrates play in the ecosystem?</p> <p>What is the value of marine vertebrates to humans?</p> <p>How have humans depleted our marine resources in respect to marine vertebrates?</p> <p>How have humans impacted marine vertebrates?</p>	<p><u>Content:</u> <u>Key Terms:</u> tragedy of the commons, over fishing, marine birds, marine mammals, marine turtles.</p> <p>Characteristics of marine vertebrates</p> <p>Value of marine vertebrates to humans</p> <p>How humans have impacted or depleted these marine vertebrates</p> <p><u>Skills:</u> Identify general marine vertebrate structures and characteristics</p>		<p><u>Possible Activities:</u></p> <p>Tragedy of the commons overfishing activity (fun to do with straws and m&ms)</p> <p>http://www.scienceteacherprogram.org/biology/szerlip03.html</p>	

Suggestions on how to differentiate in this unit:

- Students with individual learning styles can be assisted through adjustments in assessment standards, teacher grouping, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods
- A wide variety of assessments and strategies complement the individual learning experience.
- Utilize technology in all of its forms, such as computers, movies, etc.
- Recognize and use appropriate context

**Freehold Regional High School District
Lab Marine Science**

Unit #6: Pollution

Enduring Understandings: Human activities have drastic effects on the ocean and its inhabitants.

Essential Questions: What are the effects of human activities on the ecosystem and interdependence of organisms within the marine ecosystems?
What can you personally do to help or remedy this situation?

Unit Goal: The students will be able to understand human impacts on the ocean.

Duration of Unit: 1 to 2 weeks

NJCCCS: 5.1.12.D.1,2 5.1.B, 5.1.C.1,2,3 5.4.F, 5.4.G.1,2,3,4, 5,6,7

Guiding / Topical Questions	Content, Themes, Concepts, and Skills	Instructional Resources and Materials	Teaching Strategies	Assessment Strategies
<p>What is marine pollution?</p> <p>What are some sources of marine pollution?</p> <p>What is point and non point pollution and what are examples of each?</p> <p>How does marine pollution affect the flora and fauna in marine ecosystems?</p>	<p><u>Content:</u> <u>Key Terms:</u> biomagnification, heavy metals, non biodegradable, non point source pollution, point source pollution, sludge</p> <p>Various types and causes of marine pollution</p> <p>How marine pollution affects humans both directly and indirectly</p> <p>How marine pollution affects the marine ecosystem</p>	<p>Current Textbook</p> <p>Supplementary text books</p> <p>Internet</p> <p>Articles</p> <p>Websites</p> <p>Multimedia Video clips</p>	<p>Work on Projects and/or Labs</p> <p>Various Hands-On Classroom Activities</p> <p>Power Point Presentation</p> <p>Technology Integration</p> <p>Do Now</p> <p>Closures</p> <p>Maps</p>	<p>Written Tests and Quizzes</p> <p>Worksheets</p> <p>Project Assessments</p> <p>Lab Activities /Reports</p>
<p>What organizations are trying to help protect our marine ecosystems?</p> <p>What are ways that you as an individual can help preserve our world's oceans?</p>	<p><u>Content:</u> Local, State and National organizations responsible for marine protection.</p> <p>What can students do personally to help these organizations?</p> <p>What students can do to help protect their marine environments?</p>		<p><u>Possible Activities:</u> Letter writing campaign</p> <p>Petition Signing</p> <p>Beach Cleanups</p>	

Suggestions on how to differentiate in this unit:

- Students with individual learning styles can be assisted through adjustments in assessment standards, teacher grouping, one-to-one teacher support, additional testing time, and use of visual and auditory teaching methods
- A wide variety of assessments and strategies complement the individual learning experience.
- Utilize technology in all of its forms, such as computers, movies, etc.
- Recognize and use appropriate context