



GREAT NECK PUBLIC SCHOOLS

"Where Discovery Leads to Greatness"

#DiscoverGreatness

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Course Profile- Marine Science

<u>Department</u>	Science		
<u>Course Name</u>	Marine Science		
<u>Course Length</u>	1 Year		
<u>High School Credits</u>	1.5 Units of Credit		
<u>Description</u>	This course will provide students with an overview of marine science and oceanography. Students will gain an understanding of the physical and chemical properties of water, aquaria, bony fish, cartilaginous fish, marine mammals, resources from the sea, aquaculture, ocean and freshwater conservation, marine birds, reptiles and amphibians and oceanography. This course will involve many hands-on lab activities, experiments, and virtual activities that will further knowledge, understanding of marine science, and problem-solving techniques. In addition, this course will emphasize a discovery approach in which the student will learn to interpret laboratory observations in the manner of a real world scientist. Students will understand and apply scientific concepts, principles, and theories pertaining to biology, chemistry, physics and earth science and recognize the development of ideas in science and their real-world connections. Students will learn about the evolution of aquatic organisms, oceanography and the interactions between humans and the environment.		
<u>Target/eligible students</u>	11th and 12th gradeHigh School Students		
<u>State Learning Standards Link(s)</u>	HS. Structure and Properties of Matter HS. Chemical Reactions HS. Interdependent Relationships in Ecosystems HS. Inheritance and Variation of Traits HS. Natural Selection and Evolution HS. History of the Earth HS. Earth's Systems HS. Human Sustainability HS. Engineering Design		pg 54 pg 56 pg 67 pg 69 pg 71 pg 75 pg 77 pg 81 pg 83
<u>Primary texts and materials</u>	-Explore Learning, Gizmos, Breakout.edu		
<u>Scope/Sequence</u>	Standards	Key Ideas, Terms, Concepts	
Unit 1: Aquaria	HS-PS1-9 HS-PS1-5	Define biotic and abiotic factors. Relate these factors to aquatic environments. Study the chemical factors affecting a saltwater aquarium and freshwater aquarium. Understand the nitrogen cycle. Learn how to properly set up an aquarium. Research fish that are appropriate for your new aquarium environment and their ability to live in a community habitat. Describe how to set up a filtration system and monitor the water quality. Perform regular water changes. Maintain a healthy aquarium for your fish and care for it throughout the year.	pg 54 pg 56
Unit 2: Bony Fish	HS-LS2-1 HS-LS2-2 HS-LS2-6 HS-LS2-8 HS-LS4-1 HS-LS4-2 HS-LS4-3 HS-LS4-4 HS-LS4-5	Study the evolution of bony fish. Learn the basic anatomy of all bony fish. Compare and contrast different types of bony fish. Understand their biology and how they survive in an aquatic habitat. Compare and contrast saltwater, brackish and freshwater fish. Understand the different functions of their fins. Learn how different bony fish are adapted for their specific habitats. Study fish that have gone extinct and what caused their extinction. Learn about the fish in the aquarium that they are taking care of and study their anatomy and swimming habits based on what you have learned about bony fish.	pg 67 pg 67 pg 67 pg 67 pg 68 pg 71 pg 71

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Unit 3: Cartilaginous Fish	HS-LS2-1 HS-LS2-2 HS-LS2-6 HS-LS2-8 HS-LS4-1 HS-LS4-2 HS-LS4-3 HS-LS4-4 HS-LS4-5	Study the evolution of cartilaginous fish. Compare and contrast cartilaginous fish to bony fish. Compare the different types of cartilaginous fish and their anatomy. Understand their biology and how they are adapted to survive in aquatic environments. Understand how sharks, skates, rays and chimera evolved and their evolutionary changes. Study the different functions of their fins, and how different species have adapted to their environments. Learn about the specialized adaptations of cartilaginous fish and how humans are applying them to society. Study biomimicry technologies. Learn about the demise of cartilaginous fish and the role of humans.	pg 67 pg 67 pg 67 pg 67 pg 68 pg 71 pg 71 pg 71
Unit 4: Properties of Water	HS-PS1-9 HS-PS1-5 HS-ESS2-3 HS-ESS2-5 HS-ESS2-6	Discover the chemical structure of water. Study the unique properties of water. Compare water with other substances and solvents. Understand what makes water so unique and integral to life. Perform lab experiments to better understand the different physical and chemical properties of water.	pg 54 pg 56 pg 77 pg 77 pg 77
Unit 5: Oceanography	HS-ESS1-5 HS-ESS2-3 HS-ESS2-5 HS-ESS2-6 HS-ESS2-7	Learn about the different zones of the Ocean. Study the organisms that live and occupy each zone of the Ocean. Understand the role that the oceans play in regulating climate, temperature and weather. Study climate changes. Understand how minor changes in sea surface temperatures impacts weather. Study the relationship between sea surface temperatures, salinity, precipitation and evaporation. Learn about tides and currents. Study underwater topography and events occurring in the deep sea.	pg 75 pg 77 pg 77 pg 77 pg 78
Unit 6: Resources from the Sea	HS-LS2-1 HS-LS2-2 HS-LS2-6 HS-LS2-7 HS-LS2-8 HS-ESS3-1 HS-ESS3-2 HS-ESS3-3 HS-ESS3-4 HS-ESS3-6	Understand how humans rely on the world's oceans, rivers, lakes for survival. Study the relationship between humans and the Ocean. Study the process of fishing and how it has evolved in recent years. Research the population of fish and how their populations have changed over time. Study correlation between fish populations, fishing and climate change. Understand the relationship between sea surface temperatures, salinity and fish populations. Learn about carrying capacity and maximum sustainable yield. Perform lab simulations to demonstrate the concepts of maximum sustainable yield and tragedy of the commons.	pg 67 pg 67 pg 67 pg 67 pg 68 pg 81 pg 81 pg 82 pg 82
Unit 7: Marine Mammals	HS-LS2-1 HS-LS2-2 HS-LS2-6 HS-LS2-8 HS-LS4-1 HS-LS4-2 HS-LS4-3 HS-LS4-4 HS-LS4-5	Study the evolution of marine mammals. Compare and contrast marine mammals to fish. Explain why marine mammals are not fish. Compare the different types of marine mammals and their anatomy. Understand their biology and how they are adapted to survive in aquatic environments. Understand how different whale species evolved and their evolutionary changes. Learn about the different types of marine mammals: cetaceans, pinnipeds, sirenians, mustelids, polar bears. Research one type of marine mammal and present to the class. Study how their bodies have evolved and adapted to survive in aquatic environments. Compare and contrast marine mammals to humans. Learn about the demise of marine mammals and the role of humans. Study what is being done to preserve the populations of marine mammals. Learn about the hunting of whales and the realities of marine theme parks, aquariums and zoos; such as Sea World. Study and debate the pros and cons of such attractions.	pg 67 pg 67 pg 67 pg 67 pg 67 pg 68 pg 71 pg 71 pg 71
Unit 8: Human Interactions with the Environment	HS-LS2-1 HS-LS2-7 HS-ESS3-1 HS-ETS1-1 HS-ETS1-2 HS-ETS1-3 HS-ETS1-4	Study how humans interact with aquatic environments throughout history. Research examples of water extraction, pollution, drinking water and fishing and how it is impacting society. Learn about fishing techniques and aquaculture. Study new technologies designed to protect the marine ecosystem and organisms. Learn about aquaculture, mariculture and fish farms on Long Island. Research alternatives to fishing wild populations.	pg 67 pg 67 pg 68 pg 82 pg 82 pg 83 pg 83

		Research methods of restoring the aquatic ecosystems and what has been done that has been successful, as well as what has not been successful.	pg 83
Additional Notes			