Marine Science: Life & Ecosystems

Course Description: Marine Science (Grade 6 – NGSS Aligned)

This Grade 6 Marine Science course is aligned with the California Next Generation Science Standards (NGSS) for Middle School and integrates Earth science, life science, and physical science concepts through the unifying context of ocean systems. Students investigate how marine ecosystems function, how organisms interact with one another and their environment, and how the oceans influence Earth's systems.

Students explore marine ecosystems and biodiversity, including ocean habitats, food webs, and energy flow; adaptations and natural selection in marine organisms; and human impacts on marine environments, such as pollution, climate change, and resource use. The course also emphasizes the role of the oceans in Earth's systems, including ocean currents, the water cycle, weather and climate regulation, and interactions between the hydrosphere, atmosphere, geosphere, and biosphere.

Instruction is grounded in the NGSS Science and Engineering Practices, with students developing and using models, planning and carrying out investigations, analyzing and interpreting data, and constructing evidence-based explanations. Learning experiences include hands-on laboratory investigations, simulations, data analysis activities, research projects, and real-world problem-solving tasks related to marine conservation and sustainability.

Crosscutting Concepts—such as cause and effect, systems and system models, energy and matter, and stability and change—are embedded throughout the course to help students connect ideas across scientific disciplines. By the end of the course, students will have a strong foundational understanding of marine science while meeting California's Grade 6 NGSS expectations and building skills essential for future science coursework.

Standards Alignment (California NGSS – Middle School)

This course addresses the following NGSS Middle School Performance Expectations, including but not limited to:

Ecosystems and Interactions

MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations in marine ecosystems

MS-LS2-2: Construct explanations that predict patterns of interactions among marine organisms (competition, predation, mutualism)

MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy in marine food webs

MS-LS2-4: Construct an argument supported by evidence that changes to physical or biological components of marine ecosystems affect populations

MS-LS2-5: Evaluate competing design solutions for maintaining biodiversity and ecosystem services in marine environments

Adaptations, Biodiversity, and Evolution

MS-LS4-4: Construct explanations based on evidence that natural selection leads to adaptations of marine organisms

MS-LS4-6: Use mathematical representations to support explanations of how natural selection may lead to increases or decreases of specific traits in marine populations

Earth Systems and Ocean Science

MS-ESS2-4: Develop a model to describe the cycling of water through Earth’s systems, including the role of the oceans

MS-ESS2-5: Collect data to provide evidence for how ocean currents and atmospheric interactions influence weather and climate

MS-ESS3-3: Apply scientific principles to design methods for monitoring and minimizing human impact on marine environments

Instruction integrates Disciplinary Core Ideas from LS2 (Ecosystems), LS4 (Biological Evolution), ESS2 (Earth’s Systems), and ESS3 (Human Impacts on Earth Systems), along with the NGSS Science and Engineering Practices and Crosscutting Concepts.