

# RCSD Marine&Aquatic Science I/II\*Quick Reference Pacing Guide

## 2024-2025

Marine and Aquatic Science I is a ½ credit course, and Marine and Aquatic Science II is a ½ credit course. Marine and Aquatic Science I must be taken before Marine and Aquatic Science II.

**This document serves as a suggested sequence of topics for Marine and Aquatic Science.**

**For a complete description of the course, standards, and detailed performance objectives, see the [MS College and Career Readiness Standards for Science](#)**

<i><u>Marine and Aquatic Science I</u></i>	
<i><u>1st Nine Weeks of the Semester</u></i>	<i><u>Second Nine Weeks of the Semester</u></i>
<p><i>Classroom Expectations</i>  <i>Lab Safety; Tools of Science</i>  <i>Science and Engineering Practices</i></p> <p><b><u>Water Properties and Quality</u></b></p> <p><b>MAQ.1 Students will develop an understanding of the unique physical and chemical properties of water and how those properties shape life on earth.</b></p> <p><i>MAQ.1.1 Properties of Water</i>  <i>MAQ.1.2 Role of Water</i>  <i>MAQ.1.3 Water Cycle</i>  <i>MAQ.1.4 Water Chemistry/Water Quality</i>  <i>MAQ.1.5 Current Technology and Careers related to Water Quality and Water Testing</i>  <i>MAQ.1.6 Design a proposed solution to reduce the effects of pollution in aquatic ecosystems.</i></p> <p><b><u>Fluid Dynamics</u></b></p> <p><b>MAQ.2 Students will develop an understanding of the principles of fluid dynamics as it relates to both salt and freshwater systems.</b></p> <p><i>MAQ.2.1 Wave Features, Wave Properties, Impact of Waves</i>  <i>MAQ.2.2 Tidal Patterns</i>  <i>MAQ.2.3 Currents</i>  <i>MAQ.2.4 Climate models that predict how global and regional climate change can affect Earth's systems</i>  <i>MAQ.2.5 Lentic and Lotic Water Systems</i></p>	<p><b><u>Geological Features</u></b></p> <p><b>MAQ.3 Students will understand the principles of plate tectonics, sea floor spreading, and physical features of oceanic zones.</b></p> <p><i>MAQ.3.1 Major geological features of specific aquatic ecosystems</i>  <i>MAQ.3.2 Plate Tectonics</i>  <i>MAQ.3.3 Ocean Zones</i>  <i>MAQ.3.4 Classify zones of freshwater sources</i></p> <p><b><u>Flora and Fauna</u></b></p> <p><b><u>MAQ.4 Students will examine characteristics of specific aquatic ecosystems and the effects of human and natural phenomena on those ecosystems.</u></b></p> <p><i>MAQ.4.1 Unique biotic and abiotic characteristics of aquatic ecosystems</i>  <i>MAQ.4.2 Plants and animals specifically adapted to aquatic ecosystems</i>  <i>MAQ.4.3 Trophic Levels, Food Chains/Webs, Symbiotic Relationships</i>  <i>MAQ.4.4 Human Impacts on Aquatic Systems</i>  <i>MAQ.4.5 Importance of species diversity to the biological resources needed by human populations</i>  <i>MAQ.4.6 Effects of natural phenomena on the aquatic ecosystems.</i>  <i>MAQ.4.7 Regulatory Agencies and Policies</i>  <i>MAQ.4.8 Choose an environmental issue that currently exists in one of the aquatic ecosystems and use an engineering design process to propose and develop a possible solution.</i></p>

## Marine and Aquatic Science II

### 1st Nine Weeks of the Semester

*Classroom Expectations  
Lab Safety; Tools of Science  
Science and Engineering Practices*

#### **Primary Producers**

**MAQ.5 Students will explore the biodiversity and interactions among aquatic life.**

*MAQ.5.1 Common primary producers and their roles in various aquatic ecosystems.*

*MAQ.5.2 Common autotrophs that may be found in particular aquatic ecosystems*

*MAQ.5.3 Primary-producer evolution*

*MAQ.5.4 Use dichotomous keys to identify sample producers within an aquatic ecosystem.*

*MAQ.5.5 Photosynthesis and Chemosynthesis*

*MAQ.5.6 Use an engineering design process to design and develop improvements to measure primary productivity (e.g., the light and dark bottle method and satellite data).\**

#### **Invertebrate Consumers**

**MAQ.6 Students will investigate characteristics of aquatic invertebrates.**

*MAQ.6.1 Characterize aquatic representatives of the following taxa: Protozoa, Porifera, Cnidaria, Platyhelminthes, Nematoda, Annelida, Rotifera, Mollusca, Arthropoda, Bryozoa, Brachiopoda, and Echinodermata.*

*MAQ.6.2 Shared and Derived Characteristics; Cladograms and Phylogenetic Trees*

*MAQ.6.3 Develop a dichotomous classification key to be used in the identification of sample aquatic invertebrates.*

*MAQ.6.4 Compare and contrast major body plans of aquatic invertebrates*

*MAQ.6.5 Life Cycles*

*MAQ.6.6 Dissect representative taxa*

*MAQ.6.7 Animal Interactions and Roles*

*MAQ.6.8 Given a niche in a specific environment, design and describe an animal that is adapted morphologically and physiologically for its specific role in its specific environment.*

### Second Nine Weeks of the Semester

#### **Vertebrate Consumers**

**MAQ.7 Students will investigate characteristics of aquatic invertebrates.**

*MAQ.7.1 Characterize aquatic representatives of the following taxa: Hemichordata, Urochordata, Cephalochordata, and Vertebrata (including Agnatha, Chondrichthyes, Osteichthyes, Amphibia, Reptilia, Aves, and Mammalia)*

*MAQ.7.2 Shared and Derived Characteristics; Cladograms and Phylogenetic Trees*

*MAQ.7.3 Utilize a dichotomous key to identify select aquatic vertebrates.*

*MAQ.7.4 Life Cycles*

*MAQ.7.5 Dissect representative taxa (e.g., shark, fish); collect data; compare their internal and external anatomy; and analyze, explain, and communicate results.*

*MAQ.7.6 Animal Interactions and Roles*

*MAQ.7.7 Enrichment: Given a niche in a specific environment, design an animal, listing characteristics based on your knowledge of shared and derived characteristics, internal and external anatomy, and how the animal would adapt morphologically and physiologically relative to its ecological role and specific environment.\**