# Unit 3 Function of Marine Ecosystems

Content Area: **Science**
Course(s): **Marine Biology**
Time Period: **Semester 1**
Length: **2 weeks**
Status: **Published**

## Standards

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| HS-LS2-3 | Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. |
| HS-LS2-4 | Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. |
| HS-LS2-5 | Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. |
| HS-ESS2-2 | Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. |
| HS-ESS2-5 | Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. |
| HS-ESS2-6 | Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. |
| HS-ESS3-4 | Evaluate or refine a technological solution that reduces impacts of human activities on climate change and other natural systems. |
| HS-ESS3-6 | Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity (i.e., climate change). |
| HS-ETS1-2 | Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. |

## Enduring Understandings

Living and nonliving components of the environment are in constant interaction with each other.

Energy and materials flow through an ecosystem through a food webs and biogeochemical cycles, respectively.

Ecological and systematic classification systems can be used to identify and describe marine life.

The ocean and marine life play an essential role in the carbon cycle.

## Essential Questions

What is the structure and function of the marine ecosystem?

Why is primary production the most important essential process in the marine environment?

How does an organisms' lifestyle relate to its habitat?

## Knowledge and Skills

Knowledge:

Food chains and biogeochemical cycles are moving energy and recycling materials through the ecosystem.

Abiotic and biotic interactions are key to the structure and function of ecosystems.

Marine food web structure is different from terrestrial food webs due to the limitations of nutrients and sunlight for photosynthesis.

Oceans are a major sink and source for the carbon cycle.

The biological pump is a key process of the carbon cycle in the oceans.

Ocean acidification is a threat to marine food webs and the ocean's ability to store carbon.

Classification of marine life can be used to identify species or ecological roles of an organism.

Biomagnification is the result of human activities and a threat to the quality of top predators in marine food chains.

Skills:

Developing and interpreting models like food chains and food webs.

Communicating and explaining data summarized in tables and charts.

Explaining positive and negative feedback effects from various cycles that occur in the ocean.

Identify how human activities impact the stability of marine ecosystem services.

## Assessments

https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9_BiAmONWbTcI/edit?usp=sharing

## Modifications

https://docs.google.com/document/d/1ODqaPP69YkcFiyG72fIT8XsUIe3K1VSG7nxuc4CpCec/edit?usp=sharing