*Unit 1 Marine Ecosystems

Content Area: **Science**
Course(s): **Marine Environmental Science**
Time Period: **January**
Length: **22 blocks**
Status: **Published**

Performance Expectations (Transfer Skills)

LS2-1 Use mathematical and/or computational representations to support explanations of factors that affect c

LS2-2 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surfa

LS4-4 Construct an explanation based on evidence for how natural selection leads to adaptation of populatio

Enduring Understandings

Biological communities in ecosystems are based on stable interrelationships and interdependence of organisms.

Biodiversity is important to the livelihood of animals and humans alike.

Stability in an ecosystem can be disrupted by natural and human interactions.

Essential Questions

How do humans have an impact on the diversity and stability of ecosystems?

How do ecosystems respond to negative and positive inputs?

Disciplinary Core Ideas (Content)

LS2.A: Interdependent Relationships in Ecosystems

- Ecosystems have carrying capacities, which are limits to the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem. (HS-LS2-1),(HS-LS2-2)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability. (HS-LS2-2)

LS4.C: Adaptation

- Natural selection leads to adaptation, that is, to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive and reproduce in a specific environment. That is, the differential survival and reproduction of organisms in a population that have an advantageous heritable trait leads to an increase in the proportion of individuals in future generations that have the trait and to a decrease in the proportion of individuals that do not. (HS-LS4-4)

Science & Engineering Practices (Skills)

The eight science and engineering practices should be integrated in to learning opportunities where appropriate.

1. Asking questions (for science) and defining problems (for engineering)

2. Developing and using models

3. Planning and carrying out investigations

4. Analyzing and interpreting data

5. Using mathematics and computational thinking

6. Constructing explanations (for science) and designing solutions (for engineering)

7. Engaging in argument from evidence

8. Obtaining, evaluating, and communicating information

Crosscutting Concepts (Themes that transcend all Science)

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.

Energy and Matter

- Energy cannot be created or destroyed—it only moves between one place and another place, between

objects and/or fields, or between systems. (HS-LS2-4)

Stability and Change

- Much of science deals with constructing explanations of how things change and how they remain stable. (HS-ESS2-7)

Resources

Pearson Text

Lesson 14. Biodiversity in the ocean: (HS-LS2-2, HS-LS2-1)

Lesson 15. Marine populations: (HS-LS2-1, HS-LS2-2)

Lesson 22. Relationships in the sea: (HS-LS2-1, HS-LS2-2, HS-LS4-4)

Assessments

Formative Evidence:

- Knowledge acquisition will be assessed for via
    - Pre-assessment
    - Informal discussion
    - Quizzes with reflections
    - Conferences with summary sheets
- Feedback on skills, practices, & progress toward attaining the level of mastery needed to complete the performance task will be provided via
    - Conferences with summary sheets
    - Peer feedback forms
    - Self assessments and reflections

Standards

SCI.9-12.5.3	Energy cannot be created or destroyed—only moves between one place and another place, between objects and/or fields, or between systems.
SCI.9-12.CCC.7.1	students understand much of science deals with constructing explanations of how things change and how they remain stable. They quantify and model changes in systems over very short or very long periods of time. They see some changes are irreversible, and negative feedback can stabilize a system, while positive feedback can destabilize it. They recognize systems can be designed for greater or lesser stability.
SCI.9-12.SEP.5.b	Use mathematical, computational, and/or algorithmic representations of phenomena or design solutions to describe and/or support claims and/or explanations.
SCI.9-12.SEP.7.d	Construct, use, and/or present an oral and written argument or counter-arguments based on data and evidence.
SCI.HS-ESS2-7	Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.
SCI.HS-LS2-4	Use a mathematical representation to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.