Unit 4 Interdependent Relationships in Ecosystems

Content Area: **Science**
Course(s): **Marine Environmental Science**
Time Period: **February**
Length: **6 weeks**
Status: **Published**

Transfer Skills

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?

Content

Learning Activities:

[Your learning activities must be designed so that students will directly use the practices as a means of learning the DCI's]

The following acronym can be used to help guide instruction:

G. oal the goal (within the scenario) is:

R. ole You are...:

A. udience the target audience is:

S. ituation you need to:

P. roduct / performance and purpose

S. tandards and criteria for success

Skills

Performance Expectations: (Established Goals/Content Standards)

● **HSLS21 Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.** [Clarification Statement: Emphasis is on quantitative analysis and comparison of the relationships among interdependent factors including boundaries, resources, climate, and competition. Examples of mathematical comparisons could include graphs, charts, histograms,
and population changes gathered from simulations or historical data sets.] [Assessment Boundary: Assessment does not include deriving mathematical equations to make comparisons.] (LS2.A)

● **HSLS22 Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.** [Clarification Statement: Examples of mathematical representations include finding the average, determining trends, and using graphical comparisons of multiple sets of data.] [Assessment Boundary: Assessment is limited to provided data.]
(LS2.A) (LS2.C)

● **HSLS26 Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.** [Clarification Statement: Examples of changes in ecosystem conditions could include modest biological or physical changes, such as moderate hunting or a seasonal flood; and extreme changes, such as volcanic eruption or sea level rise.] (LS2.C)

Science & Engineering Practices

Using Mathematics and Computational Thinking

Building on K8 experiences, in this course progresses to use algebraic thinking and computational tools for statistical analysis to analyze, represent, and model data. Simple conceptual simulations are created and used based on mathematical models of basic assumptions.

● Use mathematical and/or computational representations of phenomena or design solutions to support explanations. (HS-LS2-1)

● Use mathematical representations of phenomena or design solutions to support and revise explanations. (HS-LS2-2)

Engaging in Argument from

Engaging in argument from evidence in 912 builds on K8 Experience is in progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.

● Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to

determine the merits of arguments. (HS-LS2-6)

Connections to Nature of Science Scientific Knowledge is Open to Revision in Light of New

● Most scientific knowledge is quite durable, but is, in principle, subject to change based on new evidence and/or reinterpretation of existing evidence. (HS-LS2-2)

● Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation. (HS-LS2-6)

Disciplinary Core Ideas

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) (HS-LS2-6)

Cross Cuttingconcepts

Scale, Proportion, and Quantity

● The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (HS-LS2-1)

● Using the concept of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale. (HS-LS2-2)

Stability and Change

● Much of science deals with constructing explanations of how things change and how they remain stable. (HS-LS2-6)

Resources

Standards

SCI.HS-LS2-6	Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
SCI.HS-LS2-2	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
SCI.HS-LS2-1	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.