*Unit 3 Human Impacts on the Ocean

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

Performance Expectations (Transfer Skills)

LS2-7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environ
LS4-6	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on bio
ESS3-4	Evaluate or refine a technological solution that reduces impacts of human activities on natural syst

Enduring Understandings

-Humans can drastically alter marine ecosystems as a whole, which in turn affects global climate.
-Humans have a responsibility to help protect the Earth and its living things.

Essential Questions

-What societal challenges do humans face that prevent us from addressing global human impacts?
-How can we engineer solutions to manage and or reverse the effects of our impact thus far?
-Does climate change affect the oceans? If so then how, if not then why not?

Disciplinary Core Ideas (Content)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- Moreover, anthropogenic changes (induced by human activity) in the environment—including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change—can disrupt an ecosystem and threaten the survival of some species. (HS-LS2-7)

LS4.D: Biodiversity and Humans

- Biodiversity is increased by the formation of new species (speciation) and decreased by the loss of species (extinction). (HS-LS2-7)

- Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving

landscapes of recreational or inspirational value. (HS-LS2-7)(HS-LS4-6)

ETS1.B: Developing Possible Solutions

- When evaluating solutions it is important to take into account a range of constraints including cost, safety, reliability and aesthetics and to consider social, cultural and environmental impacts. (HS-LS2-7)(HS-LS4-6)

- Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (HS-LS4-6)

LS4.C: Adaptation

- Changes in the physical environment, whether naturally occurring or human induced, have thus contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the decline–and sometimes the extinction–of some species. (HS-LS4-6)

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)

Stability and Change

- Feedback (negative or positive) can stabilize or destabilize a system.

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Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World

- Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks.

Resources

Pearson Text

Lesson 1. Diving into Ocean Ecosystems (LS2-4, LS2-1, LS2-2)

Lesson 5. Migrations in the Sea (LS4-2)

Standards

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.
SEP.5.b	Use mathematical, computational, and/or algorithmic representations of phenomena or design solutions to describe and/or support claims and/or explanations.
SEP.7.d	Construct, use, and/or present an oral and written argument or counter-arguments based on data and evidence.
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.HS-ESS2-7	Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.