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| **BIOLOGY** | **GRADE: H.S.** | **UNIT #: 2** |

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## SCOPE AND SEQUENCE UNIT 1

| Lesson | **Interdependent Relationships in Ecosystems** | PE's and DCI's | Suggested Pacing Year (Blocks) |
|---|---|---|---|
| 1 | • Habitat and Niche | HS-LS2-8 | 1 |
| 2 | • Community and Interactions | HS-LS2-8 | 1 |
| 3 | • Population Density and Distribution | HS-LS2-1, LS2-2 | 2 |
| 4 | • Population Growth Patterns | HS-LS2-1, LS2-2 | 2 |
| 5 | • Ecological Succession | HS-LS2-6 | 1 |
| 7 | • Climate | HS-LS2-6 | 1 |
| 8 | • Biomes and Aquatic Ecosystems | HS-LS2-6 | 2 |
| 9 | • Human Population Growth and Natural resources | HS-LS2-7 | 2 |
| 10 | • Air and Water Quality | HS-LS2-7 | 3 |
| 11 | • Threats to Biodiversity | HS-LS4-6 | 3 |
| 12 | • Conservation | HS-LS2-7 | 3 |

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| November-December | | | | |
|---|---|---|---|---|
| Mon | Tue | Wed | Thu | Fri |
| 14 Habitat and Niche | 15 Habitat and Niche | 16 Community and Interactions | 17 Community and Interactions | 18 Population Density and Distribution |
| 21 Population Density and Distribution | 22 Population Density and Distribution | 23 Population Density and Distribution | 24<br>Thanksgiving Recess | 25<br>Thanksgiving Recess |
| 28 Population Growth Patterns | 29 Population Growth Patterns | 30 Population Growth Patterns | | |

| Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|
| | | | 1 Population Growth Patterns | 2 Ecological Succession |
| 5 Ecological Succession | 6 Climate | 7 Climate | 8 Biomes and Aquatic Ecosystems | 9 Biomes and Aquatic Ecosystems |
| 12 Biomes and Aquatic Ecosystems | 13 Biomes and Aquatic Ecosystems | 14 Human Population Growth and Natural resources | 15 Human Population Growth and Natural resources | 16 Human Population Growth and Natural resources |
| 19 Human Population Growth and Natural resources | 20 Air and Water Quality | 21 Air and Water Quality | 22 Air and Water Quality | 23 Air and Water Quality |

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| January 2107 | | | | |
|---|---|---|---|---|
| Mon | Tue | Wed | Thu | Fri |
| 2 | 3 Air and Water Quality | 4 Air and Water Quality | 5 | 6 Threats to Biodiversity |
| 9 Threats to Biodiversity | 10 Threats to Biodiversity | 11 Threats to Biodiversity | 12 Threats to Biodiversity | 13 Threats to Biodiversity |
| 16 Dr. MLK Jr. Observed | 17 Conservation | 18 Conservation | 19 Conservation | 20 Conservation |
| 23 Conservation | 24 Conservation | 25 PD | 26 PD | 27 |

**UNIT DESCRIPTION**

***How and why do organisms interact with their environment and what are the effects of these interactions?***
***How do organisms interact with the living and nonliving environments to obtain matter and energy?***
***What happens to ecosystems when environments change?***
***How do organisms interact in groups so as to benefit individuals?***

The performance expectations in LS2**: Ecosystems: Interactions, Energy, and Dynamics** help students formulate an answer to the question, "How and why do organisms interact with their environment, and what are the effects of these interactions?" The LS2 Disciplinary Core Idea includes four sub-ideas: Interdependent Relationships in Ecosystems, Cycles of Matter and Energy Transfer in Ecosystems, Ecosystem Dynamics, Functioning, and Resilience, and Social Interactions and Group Behavior. High school students can use mathematical reasoning to demonstrate understanding of fundamental concepts of carrying capacity, factors affecting biodiversity and populations, and the cycling of matter and flow of energy among organisms in an ecosystem. These mathematical models provide support of students' conceptual understanding of systems and their ability to develop design solutions for reducing the impact of human activities on the environment and maintaining biodiversity. Crosscutting concepts of systems and system models play a central role in students' understanding of science and engineering practices and core ideas of ecosystems.

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| # Blocks | STUDENT LEARNING OBJECTIVES | CORRESPONDING DCIs | DISCOVERY EDUCATION RESOURCES | ASSESSMENT |
|---|---|---|---|---|
| | a. Determine the relationship among given organisms.<br>b. Give examples of abiotic and biotic factors and how they may impact an ecosystem.<br>c. Define the major roles of organisms in an ecosystem:<br>• Producer, consumer (primary and secondary), decomposer<br>• Omnivore, herbivore, carnivore.<br>• Characterize several biomes by comparing abiotic and biotic factors (deciduous forest, desert, grassland, savanna, taiga, tropical rainforest, and tundra). | **HS-LS2-1.**<br>Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.<br>**HS-LS2-2.**<br>Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. | **Discovery Education Model Lessons**<br>**5E Model**<br>Engage<br>Explore | **Assessment 1:**<br>Unit Pre-Assessment<br>**Assessment 2**<br>Constructed responses (Discovery Education)<br>**Assessment 3:**<br>Evaluate |

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| # Blocks | STUDENT LEARNING OBJECTIVES | CORRESPONDING DCIs | DISCOVERY EDUCATION RESOURCES | ASSESSMENT |
|---|---|---|---|---|
| | a. Classify and organize organisms within the biosphere into communities and populations.<br><br>b. Analyze ecosystems to determine factors that contribute to stability.<br><br>c. Explain how an ecosystem returns to a state of stability after a catastrophic disaster:<br>• Primary succession<br>• Secondary succession.<br><br>a. Predict the effect of naturally occurring environmental events on ecosystems.<br><br>b. Discuss the impact of natural changes and human activity on given ecosystems.<br><br>c. Propose solutions for the negative consequences of natural changes and human activity on given ecosystems (i.e., pollution by nitrates | **HS-LS2-2**<br>Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.<br><br>**HS-LS2-6**<br>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.<br><br>**HS-LS2-7**<br>Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. | **Discovery Education Model Lessons**<br>**5E Model**<br>Explain<br><br>Elaborate | **Assessment 1**<br>Constructed responses (Discovery Education)<br><br>**Assessment 2**<br>Hands on Labs<br><br>**Assessment 3**<br>**Lab**<br>Human Impact on Ecosystems |

| # Blocks | STUDENT LEARNING OBJECTIVES | CORRESPONDING DCIs | DISCOVERY EDUCATION | ASSESSMENT |
|---|---|---|---|---|

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| | | | **RESOURCES** | |
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| | a. Design and construct a graphical representation of population change due to either environmental changes or human impact.<br><br>b. Assess the impact of human activities on the population as well as the carrying capacity of different species in an ecosystem. | **HS-LS2-8**<br>Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce. | **Activity 3:**<br><br>https://tools.discoveryeducation.com/assignment/viewAssignment.cfm?guidAssetId=44f8207e-370f-448e-b2a1-cc8e6c928317&&blnPopup=1&strEditCopy=Copy&blnPlayer=1 | **Assessment 1**: Constructed response<br><br>**Assessment 2:** Quiz<br><br>**Assessment 3:** Concept based Unit Assessment (DE and textbook<br>Evaluate |
| **Modifications** | | | | |

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*(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: All Standards, All Students/Case Studies for vignettes and explanations of the modifications.)*

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA).