Local Ecosystem Dynamics

Background Information

Humans make an impact on our local parks and natural habitats. These impacts may be small scale, such as hunting or fishing, or may be much larger, such as fragmentation from farming or development of buildings. Describing what ecosystems look like and how they change based on the type and level of human impact will give students a broader understanding of how ecosystems change and what is needed to maintain stable populations.

.Teaching Strategies

- Before beginning, select a nearby natural environment or park and brainstorm with students what type of ecosystem it is, how it has changed over time, and how humans use it.

Resources

- Contact a local park manager to come speak to your class.

Process

1. Answers will vary depending on ecosystem selected. Possible answers: plants, fish, birds, deer, etc. Resources that are needed may include water, plants, trees, sunlight etc.
2. Answers will vary depending on ecosystem selected and how much change the community/region has seen. Possible large floods or droughts may have caused changes in vegetation or loss of habitat for organisms. Biological changes may be the result of the introduction of invasive species or loss/addition of a water resource.
3. Answers will vary depending on ecosystem selected. In 10 years, development patterns may change/fragment the habitat, or restoration efforts may take off and stabilize the community. In 100 years, sea levels may be higher or climate may be shifted, leading to a different population of organisms.
4. Answers will vary but may include seasonal regulations on fishing/hunting, need for building permits, etc. Without regulation or if the regulations are not followed, the ecosystem might be changed dramatically through changes in habitat or resource availability, leading to reduction in certain populations and, ultimately, ecosystem instability. However, regulation may also allow organisms to rebound faster from natural disasters.

NEXT GENERATION SCIENCE STANDARDS*

This project supports the following items in the Next Generation Science Standards:

Performance Expectation:

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. *[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.]*

Disciplinary Core Ideas:

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)

*Next Generation Science Standard is a registered trademark of Achieve. Neither Achieve nor the lead states and partners that developed the Next Generation Science Standards was involved in the production of, and does not endorse, this product.

Science and Engineering Practices:

Engaging in Argument from Evidence

Engaging in argument from evidence in 9–12 builds on K–8 experiences and 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 Evidence

- 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), (HS-LS2-8)

Crosscutting Concepts:

Stability and Change

- Much of science deals with constructing explanations of how things change and how they remain stable. (HS-LS2-6), (HS-LS2-7)

Common Core State Standards Connections:

ELA/Literacy

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-LS2-1), (HS-LS2-2)*, (HS-LS2-3), (HS-LS2-6), (HS-LS2-8)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. *(HS-LS2-6), (HS-LS2-7), (HS-LS2-8)*

RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. *(HS-LS2-6), (HS-LS2-7), (HS-LS2-8)*

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-LS2-6), (HS-LS2-7), (HS-LS2-8)

Mathematics

MP.2 Reason abstractly and quantitatively. (HSLS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-6), *(HS-LS2-7)*

HSS-ID.A.1 Represent data with plots on the real number line. *(HS-LS2-6)*

HSS-IC.A.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population. *(HS-LS2-6)*

HSS-IC.B.6 Evaluate reports based on data. *(HS-LS2-6)*