Changing Communities and Populations

Context: Due to human actions, both intentional and accidental, ecosystems around the world are changing rapidly. Some ecosystems respond with remarkable resilience, while others hang in a delicate balance. This unit considers the complexities of patterns in populations of organisms within a community. Students will investigate factors that determine whether populations grow or decline, as well as when these changes become an environmental concern. They will explore the essential question: **"How do populations change over time and what are the impacts?"** Students will identify a local organism whose population is currently changing and develop a plan for dealing with the situation. By studying shifting communities and populations, students will come to understand how the fragility and elasticity of ecosystems relates to their own actions, their communities, and organisms in their own backyard.

Project: Students identify and research a local organism of their choice—perhaps an endangered, threatened, or invasive species—and create a remediation plan to share to a larger audience.

Approach: Students use digital tools and engage in research, mathematical modeling, projects, and activities that connect them to the scientific practices to help them understand shifting communities and populations.

Expert Involvement: At the beginning of the unit, experts and students become acquainted through a forum discussion. Experts review and provide feedback to students on their remediation plan. Students revise their work in response to expert feedback. Local experts can be "beamed in" to speak to students about invasive and endangered species—or other changing populations—at any point in the unit.

Digital Tools: online simulations, national databases, species identification tools, GIS mapping, monitoring, using predictive tools for invasive and rare species

Primary Standards: Oklahoma Science Standards
HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.
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.
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.
HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*
HS-ESS3-1 Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.