Unit 3 Population Ecology

Content Area: **Science**
Course(s): **Environmental Science CP**
Time Period: **November**
Length: **10 Blocks**
Status: **Published**

Transfer Skills

Enduring Understandings

Each population has specific properties, including size, density, and pattern of dispersion

Interactions between species are categorized based on the relative benefit or harm that one species causes the other

Essential Questions

How do changes in population size relate to environmental conditions?

How do organisms affect one another's survival and environment?

Content

Vocab

population size, population density, age structure, survivorship curve, immigration, emigration, migration, exponential growth, limiting factor, density dependent factor, density independent factor, natural selection, adaptation, artificial selection, niche, tolerance, predation, parasitism, symbiosis, herbivory, mutualism, commensalism, chemosynthesis, detritivore, decomposer, trophic level, biomass, keystone species, pioneer species, invasive species

Skills

Explain the difference between biotic and abiotic factors

Discuss how an organism's habitat relates to its survival

Define population density

Explain what age structure diagrams tell you about a population

Describe the factors that influence a population's growth rate

Explain how limiting factors and biotic potential affect population growth

Describe how speciation and extinction affect the diversity of life on Earth

Discuss the factors that influence an organism's niche

Compare and contrast predation, parasitism, and herbivory

Explain the effect of inefficient energy transfer on community structure

Describe how feeding relationships can have both direct and indirect effects on community members

Explain the conditions necessary for a species to become invasive

Resources

Standards

SCI.9-12.5.1.12	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.
SCI.9-12.5.1.12.A	Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world.
SCI.9-12.5.1.12.A.1	Refine interrelationships among concepts and patterns of evidence found in different central scientific explanations.
SCI.9-12.5.1.12.B	Students master the conceptual, mathematical, physical, and computational tools that need to be applied when constructing and evaluating claims.
SCI.9-12.5.1.12.B.1	Design investigations, collect evidence, analyze data, and evaluate evidence to determine measures of central tendencies, causal/correlational relationships, and anomalous data.
SCI.9-12.5.1.12.B.a	Logically designed investigations are needed in order to generate the evidence required to build and refine models and explanations.
SCI.9-12.5.1.12.C	Scientific knowledge builds on itself over time.
SCI.9-12.5.1.12.C.1	Reflect on and revise understandings as new evidence emerges.
SCI.9-12.5.1.12.C.a	Refinement of understandings, explanations, and models occurs as new evidence is

	incorporated.
SCI.9-12.5.3.12	All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.
SCI.9-12.5.3.12.B	Food is required for energy and building cellular materials. Organisms in an ecosystem have different ways of obtaining food, and some organisms obtain their food directly from other organisms.
SCI.9-12.5.3.12.B.1	Cite evidence that the transfer and transformation of matter and energy links organisms to one another and to their physical setting.
SCI.9-12.5.3.12.B.3	Predict what would happen to an ecosystem if an energy source was removed.
SCI.9-12.5.3.12.B.a	As matter cycles and energy flows through different levels of organization within living systems (cells, organs, organisms, communities), and between living systems and the physical environment, chemical elements are recombined into different products.
SCI.9-12.5.3.12.C	All animals and most plants depend on both other organisms and their environment to meet their basic needs.
SCI.9-12.5.3.12.C.1	Analyze the interrelationships and interdependencies among different organisms, and explain how these relationships contribute to the stability of the ecosystem.
SCI.9-12.5.3.12.C.2	Model how natural and human-made changes in the environment will affect individual organisms and the dynamics of populations.
SCI.9-12.5.3.12.D	Organisms reproduce, develop, and have predictable life cycles. Organisms contain genetic information that influences their traits, and they pass this on to their offspring during reproduction.
SCI.9-12.5.3.12.D.2	Predict the potential impact on an organism (no impact, significant impact) given a change in a specific DNA code, and provide specific real world examples of conditions caused by mutations.