WAKE COUNTY PUBLIC SCHOOL SYSTEM

Middle School Programs
Building Healthy Core Learning
8th Grade Science

Populations and Ecosystems

Unit Outcomes At the end of this unit, your student should be able to:	**Key Vocabulary** Terms to deepen the student's understanding
✓ Discuss ecosystems as complex, interactive systems that include both biological communities (biotic) and physical (abiotic) components of the environment ✓ Describe the dynamic nature of ecosystems and the variability of their characteristics over time ✓ Conclude that a population is a group of organisms belonging to the same species living in a particular area ✓ Determine that population density measures the number of individual organisms living in a defined space ✓ Determine that organisms in an ecosystem constantly interact ✓ Define an ecosystem as a community (all the organisms in a given area) and the abiotic factors (water, soil or climate) that affect them ✓ Conclude that in any ecosystem, organisms and populations with similar requirements for food, water, oxygen or other resources may compete for limited resources ✓ Deduce that the sun is the ultimate source of energy ✓ Determine that food provides molecules that serve as fuel and building material for all organisms ✓ Conclude that over a long time, matter is transferred from one organism to another repeatedly and between organisms and their physical environment ✓ Conclude that the flow of energy through ecosystems can be described and illustrated in food chains, food webs, and pyramids (energy, number and biomass) ✓ Realize that the flow of energy is interconnected with the cycling of matter	✓ Populations ✓ Ecosystems ✓ Community ✓ Population density ✓ Abiotic ✓ Biotic ✓ Coexistence ✓ Competition ✓ Parasitism ✓ Mutualism ✓ Cycling of matter ✓ Biomass ✓ Food chains ✓ Food pyramid ✓ Food web ✓ Producers ✓ Decomposers ✓ Consumers ✓ Biodiversity ✓ Limiting factors ✓ Density dependent factors ✓ Density independent factors ✓ Prey ✓ Predators ✓ Symbiotic relationship ✓ Niche ✓ Herbivores ✓ Carnivores ✓ Omnivores ✓ Energy pyramid ✓ Number pyramid ✓ Biomass pyramid ✓ Ecological pyramid
Key Standards Addressed Connections to Common Core/NC Essential Standards	**Where This Unit Fits** Connections to prior and future learning
8.L.3.1 Explain how factors such as food, water, shelter and space affect populations in an ecosystem 8.L.3.2 Summarize the relationship among producers, consumers and decomposers including the positive and negative consequences of such interactions including: • Coexistence and cooperation • Competition • Parasitism	**Coming into this unit, students should have a strong foundation in:** ✓ Recognizing that plants and animals need air, water, light (plants only), space, food and shelter and that these may be found in their environment ✓ Explaining how environmental conditions determine how well plants survive and grow ✓ Giving examples of changes in an organism's environment that are beneficial to it and some that

• Mutualism 8.L.3.3 Explain how the flow of energy within food webs is interconnected with the cycling of matter (including water, nitrogen, carbon dioxide and oxygen)	are harmful ✓ Classifying the organisms within an ecosystem according to the function they serve: producers, consumers or decomposers (biotic factors) ✓ Inferring the effects that may result from the interconnected relationship of plants and animals to their ecosystem ✓ Explaining how environmental conditions determine how well plants survive and grow ✓ Summarizing how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within food chains and food webs (terrestrial and aquatic) from producers to consumers to decomposers **This unit builds to the following future skills and concepts:** ✓ Explaining why ecosystems can relatively stable over hundreds or thousands of years, even though populations may fluctuate (emphasizing availability of food, availability of shelter, number of predators and disease) ✓ Explaining various ways organisms interact with each other (including predation, competition, parasitism, mutualism) and with their environments resulting in stability within ecosystems ✓ Analyzing the flow of energy and cycling of matter, such as water, carbon, nitrogen and oxygen, through ecosystems relating the significance of each to maintaining the health and sustainability of an ecosystem
Additional Resources Materials to support understanding and enrichment	**"Learning Checks"** Questions Parents Can Use to Assess Understanding
• CK12.org textbook: Ecosystems • CK12.org textbook: Energy pyramids • CK12.org online textbook: Food chains and food webs • Sheppard software.com: website with information and interactive activities about food chains, producers, consumers and decomposers http://www.sheppardsoftware.com/content/animals/kidscorner/foodchain/foodchain.htm • Kidsgeo.com: information on ecosystems and nitrogen, oxygen, energy and carbon cycles http://www.kidsgeo.com/geography-for-kids/0164-ecosystems.php	✓ How do factors such as food, water, shelter and space affect populations in an ecosystem? ✓ How do these factors interact to affect populations in an ecosystem? ✓ Explain what is meant by the "health of a population" ✓ What affects the health of a population? ✓ How and why do organisms interact with one another? ✓ How do food webs model the distribution of energy in an ecosystem? ✓ In what ways do matter and energy connect?