

TEKS

- 10C** Analyze the levels of organization in biological systems and relate the levels to each other and the whole system
- 11B** Investigate and analyze how organisms, populations, and communities respond to external factors
- 11C** Summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems
- 12C** Analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids
- 12E** Describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles

instructional content:

- ✦ Differentiate abiotic and biotic factors
- ✦ Levels of organization in the biosphere
 - Species
 - Populations
 - Communities
 - Ecosystems
 - Biomes
- ✦ Energy Flow
 - Food chains and food webs
 - Energy transfer between trophic levels
 - Ecological pyramids – energy, biomass, numbers
- ✦ Cycling of Matter
 - Nutrient cycle
 - Carbon cycle
 - Nitrogen cycle

learning outcomes students will:

- Use all content and scientific process skills learned earlier in the course
- Categorize abiotic and biotic factors
- Identify and define the levels of organization in ecology that include: species, populations, communities, ecosystems, and biomes
- Recognize that ecosystems need energy
- Differentiate autotrophs, heterotrophs, and chemoautotrophs
- Differentiate a food chain from a food web
- Describe how energy is transferred between different trophic levels in food chains and food webs
- Construct a food web for a named community
- Construct and interpret pyramids of energy, numbers, and biomass for different communities
- Use arrows to show the direction of nutrient flow and labels to identify the role of producers, consumers, decomposers, detritivores, and saprophytes
- Using a diagram, explain the stages of the carbon cycle
- Identify factors that disrupt the carbon cycle
- Using a diagram, explain the stages of the nitrogen cycle
- Identify the role of nitrifying bacteria, nitrogen-fixing bacteria, and denitrifying bacteria
- Identify factors that disrupt the nitrogen cycle



Incorporate scientific process skills during the instruction of all Biology concepts. Look for this icon at wardsci.com/TEKS for more information on scientific process skills.

Recommended Ward's Science products with item numbers for easy online searching:

science tools:

- [Ward's Owl Pellets 693392](#)
- [Ward's DataHub: Environmental Science 9200501](#)
- [Ward's DataHub Dissolved Oxygen Sensor 9200515](#)
- [Ward's DataHub Universal Sensor Adapter 9200514](#)
- [Replacement Parts for Ward's DataHub 9200517](#)
- [Ward's DataHub Carrying Case 9200513](#)
- [Vernier CO₂ Gas Sensor 175275](#)
- [Vernier Oxygen Sensor 175284](#)
- [Vernier pH Sensor 145109](#)

instructional resources:

- [Silent Spring, 40th Anniversary Edition 324076](#)
- [Biology is Outdoors! A Comprehensive Resource for Studying School Environments 328054](#)
- [Interactive Whiteboard Science Lesson CD: Food Chains & Food Webs 745178](#)
- [Food Chains and Trophic Levels Magnetic Board Manipulatives 4683501](#)
- [Predator: The Food Chain Game 360010](#)
- [Into the Forest: Nature's Food Chain Game 360012](#)
- [Ward's Introduction to Owl Pellets Lab Activity 365487](#)
- [Deluxe Owl Pellet Kit 6983105](#)
- [Resource Manual for Owl Pellets 320800](#)
- [Curriculum Mastery Science Flip Charts: Owls & Owl Pellets Set 330474](#)
- [Nitrogen Cycle Poster 331600](#)
- [Carbon Cycle Poster 331601](#)
- [Ward's Nitrogen Fixation: A Case of Symbiosis in Action 366055](#)
- [Ward's Detergents and Fertilizers as Pollutants: Studying an Algal Bloom Lab Activity 361221](#)
- [Ward's Composting Investigation Lab Activity 870004](#)