Nutrient Cycling

Part 1: Nutrient Cycling Fundamentals
Explore the Gulf of Mexico's Dead Zone and nutrient pollution. Nutrients are biological building blocks. Nutrient cycles are defined by pools and fluxes and may be open or closed. Carbon and phosphorus cycle in terrestrial systems. Bioassays identify limiting nutrients.

- The Gulf of Mexico's Dead Zone
- Why are Nutrients so Important?
- Nutrients Cycle within Ecosystems
- Nutrient Limitation and Bioassays
- Nutrient Pollution
- The Phosphorus Cycle
- Fluxes Determine Storage Rate
- Open vs. Closed Cycles
- Cycles for Different Nutrients are Linked
- Nutrients Cycle While Energy Flows
- Summary of Part 1
- Quiz Questions
- Ask Your Instructor

Part 2: Ecosystem-Level Nutrient Cycles
The nitrogen cycle is complex with many biologically mediated fluxes. Small-watershed experiments at Hubbard Brook investigate disturbances like deforestation and acid rain. Nutrients cycle in aquatic environments too.

- The Nitrogen Cycle is Biologically Mediated
- The Terrestrial Nitrogen Cycle
- Disturbance, Cycling, and the Small Watershed Approach
- Hubbard Brook
- Nutrient Cycles in Aquatic Environments
- Summary of Part 2
- Quiz Questions
- Ask Your Instructor

Part 3: Nutrient Budgets
Nutrient budgets track inputs and outputs, and illuminate ecosystem function, such as retention and storage. Use and compare nitrogen and phosphorus budgets in urban systems. Mitigating nutrient pollution is a challenge.

- Budgets Offer Insights Into Ecosystem Function
- Nutrient Budgets in an Urban System
- Nutrient Retention: A Critical Ecosystem Service
- Nutrient Mitigation

- Calculating Retention with a Modified Budget
- Nitrogen Retention in a Baltimore Watershed
- Summary of Part 3
- Quiz Questions
- Ask Your Instructor

Part 4: Global Biogeochemical Cycles

Global biogeochemical cycles are closed and balanced. Fertilizer use increases nitrogen and phosphorus availability. Fossil fuel combustion increases carbon and nitrogen availability. Feedbacks affect nutrient flow. Acid rain and the Gulf's dead zone are addressed.

- What Distinguishes Global Biogeochemical Cycles?
- The Global Phosphorus Cycle
- Humans Impact Global Cycling
- Global Carbon Cycling
- Climate Change
- Comparing Future Carbon Scenarios
- Feedbacks Can Dampen or Amplify Cycles
- The Global Nitrogen Cycle
- Acid Rain: A Success Story
- Revisiting the Gulf of Mexico
- Summary of Part 4
- Quiz Questions
- Ask Your Instructor