

Curriculum Unit  
Title

The Transformation of Energy and Matter in Ecosystems

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**KEY LEARNING, ENDURING UNDERSTANDING, ETC.**

Photosynthesis and cellular respiration provide most of the energy for key processes. HS-LS2-3  
At each link upward in a food web, only a small fraction of the matter consumed at the lower level is transferred upward, to produce growth and release energy in cellular respiration at the higher level. HS-LS2-4  
Energy drives the cycling of matter in ecosystems. HS-LS2-3

**ESSENTIAL QUESTION(S) for the UNIT**

How does matter cycle and energy flow through ecosystems?  
How are photosynthesis and cellular respiration interdependent in terms of matter and energy?  
How do factors such as temperature and pH affect the rates of photosynthesis and cellular respiration?

**CONCEPT A**

Flow of Energy and Matter in Ecosystems

**CONCEPT B**

Photosynthesis and Cellular Respiration

**CONCEPT C**

Factors Affecting Photosynthesis and Cellular Respiration

**ESSENTIAL QUESTIONS A**

How does matter cycle and energy flow through ecosystems?

**ESSENTIAL QUESTIONS B**

How are photosynthesis and cellular respiration interdependent in terms of matter and energy?

**ESSENTIAL QUESTIONS C**

How do factors such as temperature and pH affect the rates of photosynthesis and cellular respiration?

**VOCABULARY A**

ecosystem, biotic, abiotic, food web, trophic level, producer, consumer, decomposer, biosphere, reservoir

**VOCABULARY A**

photosynthesis, cellular respiration, chloroplast, mitochondria, exothermic, endothermic, energy diagram, reactant, product, calorie, bond energy

**VOCABULARY A**

temperature, pH, biomass, spectrophotometer

**ADDITIONAL INFORMATION/MATERIAL/TEXT/FILM/RESOURCES**

This unit includes activities from SEPUP's Science and Global Issues: Ecology Activities 7, 8, 9, Cell Biology Activity 12  
Worksheet samples as well as models of student work are included in this unit.