



Grade 5 Science - Unit 3 - Matter & Energy in Organisms and Ecosystems

Unit Focus

Through four interconnected concepts—Roles in an Ecosystem, Plants and Photosynthesis, Energy Flow in Ecosystems, and Matter Cycling in Ecosystems—students develop a deeper understanding of how organisms depend on each other and their environment to survive. Early in the unit, students learn how producers, consumers, and decomposers each play unique roles in sustaining ecosystems. Using videos, vocabulary exercises, and interactive activities such as building food chains and webs, students construct models to visualize how energy moves from the sun through various organisms. A nature walk reinforces these roles through real-world observation and data collection.

The second concept centers on photosynthesis, guiding students through hands-on labs that simulate how different factors affect plant growth. Students apply scientific inquiry skills to design and conduct experiments, analyze data, and communicate findings, all while deepening their understanding of how plants use air, water, and sunlight to produce food and oxygen. Students also build a model of the carbon-oxygen cycle to explain how matter is conserved during photosynthesis. As the unit progresses, students dissect owl pellets to trace energy transfer through trophic levels and create food webs from familiar meals, connecting ecosystems to everyday human choices.

In the final concept, students investigate how matter cycles through ecosystems, emphasizing the roles of the water, carbon-oxygen, and nitrogen cycles. A creative poster project allows students to model these processes visually. To wrap up the unit, students monitor decomposition firsthand, using a banana peel investigation and outdoor scavenger hunts to identify real decomposers and their function. The unit culminates in a performance-based assessment where students apply their knowledge to a real-world scenario—evaluating a proposed ecosystem for growing food on Mars. By the end of the unit, students can explain how energy and matter cycle through ecosystems and how human actions can support or disrupt this balance.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Next Generation Science Standards Cross Cutting Concepts: 5 - A system can be described in terms of its components and their interactions. (5-LS2-1) (5.MEOE.CC.1.1) - Matter is transported into, out of, and within systems. (5-LS1-1) (5.MEOE.CC.2.1) - Energy can be transferred in various ways and between objects. (5-PS3-1) (5.MEOE.CC. 2.2) Disciplinary Core Ideas: 5 - The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1) (5.PS3.D.1) - Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary to 5-PS3-1) (5.LS1.C.1)	<i>Students will be able to independently use their learning to...</i> T1 Analyze qualitative and quantitative data to interpret patterns, draw conclusions, and/or make predictions.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 The energy animals use originates from the sun and is transferred through the food chain. U2 Plants obtain the materials they need to grow primarily from air and water, not soil. U3 Matter cycles through ecosystems, moving between plants, animals, decomposers, and the environment.	<i>Students will keep considering...</i> Q1 How does energy from the sun become energy that animals use? Q2 Where do plants get the materials they need to grow? Q3 How does matter move through an ecosystem?

Stage 1: Desired Results - Key Understandings

- Plants acquire their material for growth chiefly from air and water. (5-LS1-1) (5.LS1.C. 2)
- The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1) (5.LS2.A. 1)
- Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1) (5.LS2.B.1)

Performance Expectations: 5

- Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. (5-PS3-1)
- Support an argument that plants get the materials they need for growth chiefly from air and water. (5-LS1-1)
- Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. (5-LS2-1)

Science and Engineering Practices: 5

- Use models to describe phenomena. (5- PS3-1) (5.MEOE.SEP.1.1)
- Develop a model to describe phenomena. (5-LS2-1) (5.MEOE.SEP.1.2)
- Support an argument with evidence, data, or a model. (5-LS1-1) (5.MEOE.SEP.2.1)
- Science explanations describe the mechanisms for natural events. (5-LS2-1) (5.MEOE.SEP.3.1)

Madison Public Schools Profile of a Graduate

- Analyzing: Examining information/data/ evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2)

Acquisition of Knowledge and Skill

Knowledge

Students will know...

K1 The sun is the primary source of energy for life on Earth.

K2 Plants convert sunlight, carbon dioxide, and water into food through photosynthesis.

K3 Energy moves through ecosystems via food chains and food webs.

K4 Decomposers play a crucial role in recycling matter back into the environment.

K5 Living organisms rely on energy and matter cycling through ecosystems.

K6 Vocabulary: Producer, Consumer, Herbivore, Carnivore, Omnivore, Scavenger, Decomposer, Ecosystem, Food Chain, Food Web, Energy Flow, Biotic, Abiotic, Photosynthesis, Glucose, Carbon Dioxide, Oxygen, Water Cycle, Carbon Cycle, Nitrogen Cycle, Energy Pyramid, Trophic Levels, Matter, Respiration, Owl Pellet, Solar Energy.

Skill(s)

Students will be skilled at...

S1 Develop and use models to show how energy flows from the sun to plants and then to animals.

S2 Construct an argument using evidence to explain that plants get their growth materials from air and water.

S3 Create a model to illustrate how matter moves among plants, animals, decomposers, and the environment.

S4 Explain the role of producers, consumers, and decomposers in an ecosystem.