

# Unit 2: Matter & Energy in Organisms & Ecosystems

Content Area: **Science**  
Course(s): **Science 7**  
Time Period: **October**  
Length: **5 weeks**  
Status: **Published**

## **Transfer**

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Matter and Energy in Organisms and Ecosystems

“How do organisms obtain and use matter and energy? How do matter and energy move through an ecosystem?”

## **Enduring Understandings**

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A cell is made up of structures that provide support and movement, process energy, and transport material into, within, and out of a cell.

Living things depend on both abiotic and biotic resources to ensure survival.

Living organisms interact and compete in various habitats.

Living organisms interact with each other in a variety of ways that can be either beneficial or harmful.

Changes in an ecosystem will impact a populations size and growth.

## **Essential Questions**

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How are plant and animal cells the same and different?

How do cells obtain energy?

How do plants perform photosynthesis?

What is cellular respiration?

How do unicellular and multicellular organisms differ?

How does cell differentiation lead to the organization within a multicellular organism?

What is an ecosystem?

What are biotic and abiotic factors?

How do various organisms obtain the energy they need to sustain life?

How is energy flow modeled in an ecosystem? ?

How does an energy pyramid show energy transfer in an ecosystem?

How is matter transferred in an ecosystem?

What happens when environments change?

How do individuals and groups of organisms interact?

What is symbiosis?

How does biodiversity influence a size of a population and/or a community?

How does competition exist in an ecosystem?

## **Content**

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## **Vocabulary**

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Photosynthesis, Cell respiration, Abiotic, Biotic, Population, Community

Producer, Consumer, Decomposer, Herbivore, Omnivore, Carnivore

Food chain, Food web, Energy pyramid, Limiting factors, Carrying capacity

Symbiosis, Mutualism, Parasitism, Commensalism

## **Learning Objectives**

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**Compare and contrast** active and passive transport.

**Construct a scientific investigation** showing how energy is transferred in and out of a cell.

**Differentiate between** photosynthesis and cell respiration.

**Create a model** to show how food releases energy.

**Differentiate between** ecosystem, community and population.

**Differentiate between** consumer, producer and decomposer. (2015 review)

**Identify** the needs of living things and determine the method of obtaining these needs.

**Model** energy flow through a food chain. (2015 review)

**Create a model** of a food web and explain how energy moves through an ecosystem. (2015 review)

**Compare** food web, food chain and energy pyramid.

**Model** an energy pyramid and explain how energy is transferred.

**Model and analyze** a disruption in food web and explain its potential influence.

**Explain** how matter cycles influence energy flow in an ecosystem.

**Identify** ways an ecosystem can change.

**Identify** limiting factors in an ecosystem.

**Explain** how limiting factors relate to carrying capacity.

**Compare and contrast** a habitat and a niche.

**Explain** what factors influence a population size and density.

**Compare and contrast** types of symbiosis.

**Identify** ways that organisms compete for their needs.

## **Resources**

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### **Resources**

**iScience Integrated Course 2** <https://connected.mcgraw-hill.com/connected/login.do>

Chapters 9 Science Notebook and Reading Essentials

**Page Keeley- Interactions of Living Things**

**NEWSELA- Learn the Photosynthesis Formula**

**Brainpop quizzes and concept maps- CPhotosynthesis, Cell Respiration**

**Processes foldable -**

**Quizlet-** <https://quizlet.com/347062800/photosynthesis-and-cellular-respiration-flash-cards/?new>

**Photosynthesis virtual lab animation-** <http://www.kscience.co.uk/animations/photolab.htm>  
[http://www.glencoe.com/sites/common\\_assets/science/virtual\\_labs/LS12/LS12.html](http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS12/LS12.html)

**Energy transfer** <https://biomanbio.com/HTML5GamesandLabs/PhotoRespgames/photoresphtml5page.html>  
<http://www.interactive-biology.com/401/the-energy-game/>

✖ <https://www.khanacademy.org/science/biology>

**Illuminating Photosynthesis**

✖ <http://nj.pbslearningmedia.org/resource/tdc02.sci.life.stru.methusweb/illuminating-photosynthesis/>

## **Standards**

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6-8.MS-LS1

From Molecules to Organisms: Structures and Processes

6-8.MS-LS1-6

Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

6-8.MS-LS1-7	Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
6-8.MS-LS2	Ecosystems: Interactions, Energy, and Dynamics
6-8.MS-LS2-2	Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
6-8.MS-LS2-3	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
6-8.MS-LS2-4	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
6-8.MS-LS2-5	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
6-8.MS-LS2-1	Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.