

SCIENCE & AGRICULTURE

Lessons and resources for grades 6-8



Iowa Agriculture
Literacy Foundation



Agriculture is a topic that students can easily connect to because they encounter it often. Nearly everything we eat, wear, use -- even the fuel that powers the cars and buses we ride in -- comes from plants and animals grown on farms. Agriculture provides perfect real-world connections and makes learning relevant to students.

Agriculture connections in science are abundant! Agriculture relates to **physical science** (How energy from plants can be converted to fuel?), **life science** (How is selective breeding used to improve crops and livestock?), **earth science** (How do farmers monitor and improve soil erosion and water quality?), and **engineering design** (How can science and technology improve food production?).

FEATURED 6-8 LESSONS

Energy & Matter

- [Tassel to Tank](#) (conversion of matter through chemical processes)
- [Where Does a Soybean Get Its Mass From](#) (conservation of mass)
- [Algaculture and Biofuel](#) (growing algae for fuel)
- [Food Master: Cheese](#) (conservation of mass)

Plants: Structures, Processes & Genetics

- [A Recipe for Genetics: Selective Breeding and Transgenics](#)
- [Apple Genetics: A Tasty Phenomena](#) (genetic variations)
- [Flower Power](#) (structures of flowers)
- [Inherited Traits in the Living Corn Necklaces](#) (traits)
- [Plant-Soil Interactions](#) (movement of nutrients & cycling of matter in ecosystems)
- [Desktop Greenhouses](#) (photosynthesis)

Animals: Structures, Processes, Genetics & Ecosystems

- [Create Your Own Herd](#) (inherited traits)
- [Sheep See, Sheep Do](#) (inherited and acquired traits)
- [The Remarkable Ruminant](#) (food is rearranged through chemical reactions)
- [Overfishing and Aquaculture](#) (ecosystems)

Earth's Systems & Human Activity

- [Agricultural Land Use](#) (algae growth, soil erosion, and conservation practices)
- [Climate Change Phenomena: Bananas in our Breadbasket?](#) (carbon cycle & climate phenomena)
- [Overfishing and Aquaculture](#) (natural and managed ecosystems)
- [Journey 2050](#) (Sustainability as it relates to plant health, water and more. Seven lesson unit.)

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Engineering Design

- [Aeroponic Engineering and Vertical Farming](#) (designing innovative production methods)
- [Cruisin' for a Bruisin' Food Packaging Specialist](#) (fruit shipping engineering)
- [Increasing Food Production with Precision Agriculture](#) (variable rate irrigation systems)
- [Think in Pictures: Like Dr. Grandin](#) (livestock chute design considering animal behavior)

WHERE DOES AGRICULTURE FIT INTO THE IOWA CORE STANDARDS?

6th Grade:

- MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
- MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
- MS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
- MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

7th Grade:

- MS-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
- MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
- 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.

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FEATURED RESOURCE

Iowa Ag Today, middle school series



The middle school Iowa Ag Today series currently has three issues: Culture and Society (social studies focus), Science in Agriculture, and Food and Agriculture (Family and Consumer Science focus). Magazines are written at a 7th grade reading level and come in packs of 25 with a teacher guide included. Email info@iowaagliteracy.org to request packs.

- 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.
- MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

8th Grade

- MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.
- MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
- MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
- MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.
- MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
- MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

FEATURED RESOURCE

Journey 2050, online gaming program and curriculum



Journey 2050 is a seven lesson unit that teaches sustainability through a three-pronged approach. Students learn about farms in Kenya, India, and Canada, and how sustainable practices must meet social, economic, and environmental needs.

The Iowa Agriculture Literacy Foundation serves as a central resource for educators and volunteers who want to teach Iowa's students about agriculture. Information about additional resources, including grants, professional development, and outreach opportunities is available at: www.iowaagliteracy.org.