

Why Agriculture?

Teaching about agriculture in is an ideal way for students to learn and provides real-life connections to science, math, and social studies concepts. Agriculture is a topic that students can easily connect to because they encounter it often. Who doesn't enjoy talking about food? Nearly everything we eat, wear, use -- even the fuel that powers the cars and buses they ride in -- comes from plants and animals grown on farms. Agriculture provides perfect real-world connections to STEM and makes learning relevant to students.

Helping students understand the farm-to-table connection is important in our consumer-driven society. Teaching students to be agriculturally literate connects their learning to everyday life. That is what the *Ag Today* series is all about.

About Ag Today

Ag Today is a great supplement to your science, social studies, and language arts curriculum. Each issue is chock-full of discussion topics, new vocabulary, and other materials that you can easily integrate into lessons. Major highlights of each issue include:

Theme: Agriculture is Everywhere

- Overview of Agriculture
- Major agriculture crops and livestock
- Agriculture products
- Agricultural careers

Theme: Food, Health & Lifestyle

- Carbohydrates, proteins, fats, minerals, vitamins, and water
- USDA My Plate
- Safe food handling

Theme: Agriculture and the Environment

- Natural resource management
- Agriculture in global ecosystems

Theme: Culture, Society, Economy & Geography

- Agriculture and the development of civilizations
- Geography determines what things will grow
- Religion and customs dictate culture
- Global trade and economics

Theme: Plants & Animals for Food, Fiber & Energy

- Domestication of plants and animals
- What plants and animals need to grow
- Biotechnology

Theme: Science, Technology, Engineering & Math

- Science and technology to increase food production
- Safe, healthy, abundant food
- Sustainable systems for a growing population

Integration Ideas

- Pick an article from the issue and ask students to identify non-fiction text features (pictures, illustrations, headings, etc.), and think about how they help them better understand the text.
- Practice close reading with "From Mustard to Broccoli" on page 6 by reading the article multiple times. Make "thinking tracks" in the margin and discuss the text with others.
- Ask students to construct an explanation of how natural resources are used and how they affect our economy. Remind them to use evidence from the text and to consider food, fiber and energy uses.
- Compare the map on pages 4 & 5 with maps that provide information about topography, elevation and climate. Discuss how these features and factors contribute to what is grown where.
- Ask students to keep a list of the things they use or need before they get to school in the morning. Compare lists, and group them into food, fiber, and energy uses and/or renewable and non-renewable resources. As a class, determine what type of graph or chart would be best to compare the number of items in each category.

Alignment with Standards and Lexile

Subject	Code	Standard Lexile Measure = 760L
		Essential Concept or Skill/Standard
Science	4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
Science	4-LS1-1	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
Science	4-ESS3-1	Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
Science	4-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features.
Science	3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
Social Studies	Economics: 15	Investment in factories, machinery, new technology, and in the health, education, and training of people stimulates economic growth and can raise future standards of living.
Social Studies	NCSS: GC9	Global connections of many types (social, political, economic, cultural, and environmental) have increased at the personal, local, national, and international levels. New global connections have created opportunities and challenges.
Social Studies	Economics: 14	Entrepreneurs take on the calculated risk of starting new businesses, either by embarking on new ventures similar to existing ones or by introducing new innovations. Entrepreneurial innovation is an important source of economic growth.

Glossary

Some words in *Ag Today* may be unfamiliar to your students. These words often appear in bold type. Many are defined in the articles. Words you might wish to review with your students after reading the magazine are:

byproducts, renewable resources, non-renewable resources (pg. 1); **pastures, overgrazed, erosion, rotate, paddocks, feed ration, predators, veterinarians, antibiotics, vaccinate, nutrients, macronutrients, fertilizer** (pg. 2); **sheared, fleece, bolls, irrigate, synthetic** (pg. 3); **domesticated, Fertile Crescent, civilization, culture** (pg. 4); **hybrid vigor, selective breeding, teosinte, aurochs, biotechnology** (pg. 6); **biofuel, ethanol, biodiesel, hydropower** (pg. 7); **milk, veggies, fruit, wheat, meat** (pg. 8).

Discussion Prompters

Cover (By-Products)

1. How many different things in your classroom are made from plants or animal by-products? How many things in your home are made from plants or animal by-products? How do the two compare?
2. What are some alternatives to using plants for fiber or using animal by-products? Is one better than the other? *(Alternatives may include synthetic fibers and plastics. Many synthetic fibers and plastics are derived from petroleum. In general, a renewable resource will provide more sustainable products.)*
3. What is the difference between renewable and non-renewable resources? *(Renewables can be replenished quickly. Non-renewables may take thousands of years to be replenished.)*

Student Page 2 (beef, pork, and plants)

1. What do cattle eat? *(Mostly grass on pastures. Diets can be supplemented with hay, silage, corn, and soybeans.)*
2. What problem can overgrazing cause? *(erosion of the soil and weeds)*
3. What happens when a pig gets sick? *(Veterinarians may treat the pig with antibiotics to help it fight the disease.)*
4. How do we try to prevent pigs from getting sick? *(Veterinarians may give pigs vaccinations to prevent diseases.)*
5. What are three macronutrients that plants need? *(N-P-K)*

Student Page 3 (Fiber)

1. What types of cloth or clothing do we make from wool? *(scarfs, hats, rugs, gloves, carpets, blankets, coats, socks, etc.)*
2. Where in the U.S. is cotton grown? *(southern states with warm dry climates)* Where in the world is cotton grown? *(China, Egypt, Kazakhstan, other places with warm, dry climates)*
3. What other plants can be used to make fibers? *(hemp, flax, jute, coir, ramie, sisal)*

Student Pages 4 and 5 (Tools of the Trade)

1. Why were so many plants and animals domesticated in the Middle East? *(The area known as the Fertile Crescent had plants that could easily be experimented with – hard seeds that could be stored well and transported. They had a lot of herd animals that were*

relatively docile and could be tamed.)

2. Why do people in different parts of the world eat different types of food? *(They ate what they were able to grow or raise in their local region.)*
3. Why does North and South America have so few agriculture crops that originated there? *(Most plants and animals are adapted to a specific latitude. Because the Americas are not wide compared to Eurasia and Africa, species couldn't travel as far without evolving.)*

Student Page 6 (GMOs)

1. How could one mustard plant evolve into many different vegetables we eat today like broccoli, Brussels sprouts, kohlrabi, kale and cabbage? *(farmers selected for terminal bud to get cabbage. They selected for stems and flowers to get broccoli. They selected for flowers to get cauliflower. They selected for leaves to get kale. They selected for stem to get kohlrabi. They selected for lateral buds to get Brussels sprouts.)*
2. How has cross breeding changed crops like corn? *(Corn evolved from an ancient plant called teosinte. Teosinte had 8 to 14 kernels. Modern corn has 400 to 800 kernels per ear.)*

Student Page 7 (Energy)

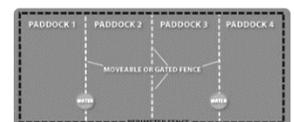
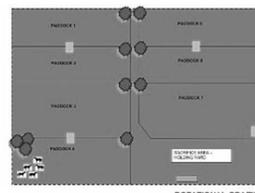
1. How are renewable energy sources better for the environment? *(Fuel from plants doesn't put carbon from fossil fuels into the atmosphere. Wind energy and hydropower are 'clean' in that they don't produce carbon byproduct waste.)*
2. Where in the U.S. are most biorefineries located? Why? *(Most biorefineries that produce ethanol and/or biodiesel are located in states like Iowa, Minnesota, and Illinois. Usually corn is used to produce ethanol and soybeans are used to produce biodiesel. Corn and soybeans are primarily grown in Midwest states.)*

Student Page 8 (School Lunch Tray)

1. Can you identify where all of the food on your lunch tray or in your lunch box came from? *(milk from cows, meat from animals, fruits and vegetables from plants, etc.)*

Show what you know - Key

1. Renewable resources are replenished over a short amount of time, whereas nonrenewable resources take much longer. Ethanol and soy biodiesel are renewable. Coal and oil aren't.
2. Corn, beans, chilies and peppers, cocoa beans; long growing seasons, warm weather, etc.
3. To keep them clean, protect from insects, and keep them cool.
4. Life. Biosphere, biodegradable, biodiversity, biography, etc.
5. True. Page 7, third paragraph
6. Good food, shelter, medicines, water, etc.
7. When offspring perform better than either parent
8. Bread is made from wheat flour, and wheat is an agricultural product.
9. $700 \times 5 = 3500$ lbs. of cotton per 5 acres
- 10.



Rotational grazing paddock layout example

Name: _____

Check one:

Pretest

Post-test

Show what you know!

Take this short quiz before you read Ag Today, then again after reading the magazine. See the improvement!

1.

Describe the difference between renewable resources and non-renewable resources. What are some examples?

2.

What agricultural commodities were domesticated in Central America and Mexico? What characteristics about these environments make it suitable for these?

- 1.
- 2.
- 3.
- 4.

3.

Explain some reasons why sheep need to have their wool sheared?

4.

What does the prefix bio mean? What other word do you know that starts with bio?

5.

True or False: Ethanol is a type of fuel made from corn. Where is your evidence in the text?

6.

If you were a pig farmer, describe what your pigs would need to be healthy.

7.

What does the term hybrid vigor mean? Cite your evidence from the text.

8.

Describe how a bun on a sandwich is linked to agriculture.

9.

One acre of land is the size of a football field. If one acre of cotton can produce 700 pounds of cotton then how many pounds of cotton can 5 acres produce? Show your thinking.

10.

You are a cattle farmer with 100 cattle to graze on pasture. Draw a design of how you would rotate your cattle in smaller areas, or paddocks. What would it look like? Refer to the text or research paddock rotation.

Name: _____



Where is STEM?

Farm to Fork

Think about the farm-to-fork process and identify science, technology, engineering, or math that takes place during each step. Choose one product below to follow:

corn soybeans wheat beef pork chickens

