

Why Agriculture?

Teaching about agriculture in Iowa is an ideal way for students to learn what their state is all about and provide 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 we 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 *Iowa Ag Today* series is all about.

About Iowa Ag Today

Iowa 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:

Issue 1: Agriculture is Everywhere

- What is agriculture?
- Iowa agriculture crops, livestock, & products
- Agricultural careers

Issue 2: Food, Health & Lifestyle

- Nutrition
- Food safety

Issue 3: Agriculture and the Environment

- Natural resource management
- Agriculture in global ecosystems

Issue 4: Culture, Society, Economy & Geography

- Agriculture and the development of civilizations
- Iowa's agriculture innovators
- Geography, financial literacy, economics, and history

Issue 5: Science, Technology, Engineering & Math

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

Issue 6: Plants & Animals for Food, Fiber & Energy

- Domestication of plants and animals
- Renewable and non-renewable resources
- Plant and animal needs
- Biotechnology

Integration Ideas

- As a class, discuss the effects of water on bare soil and discuss the effects cover crops and no-till can have on soil: <https://tinyurl.com/bde3479x>.
- Ask students to interview farmers or conduct research about soil and water conservation practices on their farm. Write a paragraph describing specifically what the conservation practice does (cause) and what effect the practice is having.
- Create a model of a watershed using a crumpled piece of paper and washable markers. Ask students to identify the best places for agriculture, recreation, industry, and housing in the watershed and explain their reasoning. Visit <https://tinyurl.com/4bynmuze> for instructions.
- Connect with social issues by discussing food deserts and access to food. Then explore ways to grow food using limited resources indoors. Use this activity to help: <https://tinyurl.com/ycy7dmbx>
- Ask students to list reasons and evidence to support the statement, "Technology helps farmers protect the environment."
- Ask students to annotate or make "thinking tracks" in the margins as they read *Iowa Ag Today*, jotting down thoughts and questions. Then discuss their thinking tracks in small groups.
- Explore other resources and extend the learning using the virtual version of the issue: <https://tinyurl.com/yav3ufvz>

Please leave this resource a review by scanning the QR code or going to: <https://form.jotform.com/220475488808164>



Alignment with Standards and Lexile

Subject	Code	Lexile Measure = 800L
		Essential Concept and Skill
Science	4-ESS1-1	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
Science	4-ESS2-1	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
Science	4-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features.
Science	4-ESS3-2	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
Social Studies	SS.4.17	Create a geographic representation to illustrate how the natural resources in an area affect the decisions people make.
Social Studies	SS.4.25	Analyze the impact of technological changes in Iowa, across time and place.
Social Studies	SS.4.26	Explain how Iowa's agriculture has changed over time.

Glossary

Some words in *Iowa 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: **climate** (pg. 1), **irrigation**, **watershed**, **erosion** (pg. 2), **sediment**, **glacial till**, **fertile** (pg. 3), **cover crops**, **no-till**, **terraces**, **buffer strip**, **drainageways**, **grazing systems** (pgs. 4-5), **autonomous tractor**, **drone** (pg. 6), **urban farming**, **vertical farming**, **aquaponics** (pg. 7).

Discussion Prompters

Cover (Iowa's Invaluable Natural Resources)

1. Can you describe the climate of Iowa? How does climate affect what crops can be grown? (*Iowa's prime growing season is from April to October, which is long enough and warm enough for corn and soybeans. There is also plenty of rain, so farmers don't need to irrigate their fields.*)
2. Iowans are starting to grow new and different crops. Why do you think this is? (*Farmers are looking into different crops that can not only help the soil, but also can be sold in different markets. Farmers are also trying new crops to increase their businesses' chance for sustainability in a changing climate.*)
3. How could Iowa farmers growing new crops affect you? (*Answers will vary, but may include new foods to try, different jobs, changes in the market, etc.*)
4. Sun, Soil, Water and Air are four important natural resources. Can you name others? (*Other natural resources might include forests, prairie, wildlife, etc.*)

Student Page 2 (A Special Watershed)

1. What happens if a plant doesn't have enough water? (*Nutrients can't be transported through from the roots to the leaves. The plant can wilt and die.*)
2. What watershed(s) affect you? How do you affect the watershed? (*Answers will vary. Any creek, river, lake, or other body of water will have its own watershed and be part of a larger watershed.*)
3. Have students draw a geographical diagram of how rivers in their area affect the decisions people make.

Student Page 3 (Where'd That Soil Come From)

1. How did glacial till help develop Iowa's fertile soil? (*glacial till was left by glaciers and is one part of the parent materials that created Iowa's soils.*)
2. In what ways do farmers use soil? (*to create structures, plant into, feed their livestock, transport goods, etc.*)
3. How do the landforms discussed on this page relate to the map on page 8? (*Loess Hills was created by windblown sediment from the Missouri River creating fertile land and hills, Des Moines Lobe was carved out by glaciers causing it to be flat making it good for growing crops, Paleozoic Plateau is a cliff region in Iowa making a good place to raise livestock rather than crops.*)
4. What do fossil beds and rock formations have to tell us about the history of Iowa's landforms? (*Fossil beds show that sea creatures used to live in Iowa providing evidence that Iowa was once covered in water. Soil layers can help us determine how the land has changed.*)

Student Pages 4 and 5 (Soil and Water Quality Solutions)

1. What are two of the biggest problems that farmers face with soil? (*water erosion and wind erosion*)

2. What do you notice about the different management techniques? How might each one affect erosion? (*Answers will vary*)
3. What types of crops are typically planted as cover crops? (*Farmers want to use fast-growing plants that establish easily. Often rye, radishes, or clover are used.*)
4. Can you describe a terrace? (*It is a man-made landform that separates areas of different elevation. By reducing the slope of a hillside with a terrace, a farmer can reduce the speed water runs off.*)
5. Can grazing rotations help improve plants? (*In many cases, rotational grazing systems do improve plant health.*)

Student Page 6 (Technology in Agriculture)

1. How does GPS help farmers? How has this changed the way farmers interact with the land? (*GPS uses satellites to triangulate a position on the Earth. Maps of fields tell farmers where to apply fertilizer and spray crop protectants. GPS can help drive tractors automatically.*)
2. When would a drone be useful to a farmer? (*When checking crops, doing spot planting/fertilizing/pest management, monitoring crops, etc.*)
3. Why do you think autonomous tractors are beneficial to farmers? How could they be harmful? (*Beneficial: save time, more precise, reduce erosion, reduction of input cost; Harmful: fewer jobs, less human interaction, culture shift*)
4. Extend the learning by having students write code to treat a field. Follow this link to learn more: <https://tinyurl.com/2mt76k9s>

Student Page 7 (Urban Farming)

1. Why do you think it's important for agriculture to expand into urban areas? (*Answers will vary*)
2. What would be the benefit of using solar panels? (*This is a renewable energy and can decrease atmospheric carbon.*)
3. What do you think would be the benefits of growing food inside? What are the cons? (*Answers will vary*)

Student Page 8 (Using Iowa's Land)

1. How do farmers use Iowa's natural resources? (*Plant cover crops, raise livestock, water plants, etc.*)
2. In what ways could Iowa's landforms affect crop production and decisions people make? (*Hilly areas are good for raising livestock while flat areas are better for crops. This is why dairy cows are found in NE Iowa and crops in central Iowa. Distance from water also affects what practices farmers implement.*)

Show what you know - Key

1. Watershed
2. Rich soil, frequent rain, long and warm enough growing season
3. Animals/humans = oxygen, plants = carbon dioxide
4. Both, C
5. Design tools (equipment, computer software, etc.) to help farmers.
6. Answers can vary based on student coding experience, but an example is: N, N, N, X, E, X, E, S, X, S, W, X, S, E, X, S
7. Answers may vary but should be similar to: Planting seeds directly into unbroken soil (not tilling or plowing)
8. Answers may vary but could include: flowerpot, shipping crate, abandoned building
9. Global Positioning System

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.

What is the area of land that water drains off of and into a lake or stream called?

2.

Explain in your own words why Iowa is ideal for farming.

3.

What gas in the atmosphere do humans breathe in? _____ Which gas do plants take in? _____

4.

What parent material has caused Iowa's land to have good soil for growing crops?

A. Glacial till B. Riverbed sediment C. Both

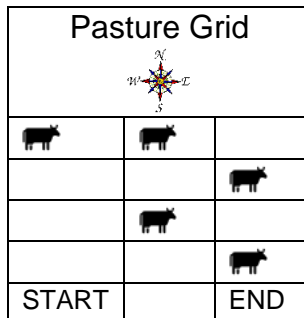
5.

Explain the difference between a watershed coordinator and a district conservationist.

6.

A farmer in Iowa is working to program a drone to check on their cattle. They need pictures of each cow. The farmer has asked for your help. Write a code that can help the farmer gather pictures of their cattle with the fewest steps.

Code	Meaning
N	North
S	South
E	East
W	West
X	Take picture



My Code			
1.	6.	11.	16.
2.	7.	12.	17.
3.	8.	13.	18.
4.	9.	14.	19.
5.	10.	15.	20.

7.

In your own words describe no-till farming.

8.

Urban farming is the production of food in city areas. List three places you could grow food in a city.

A. B. C.

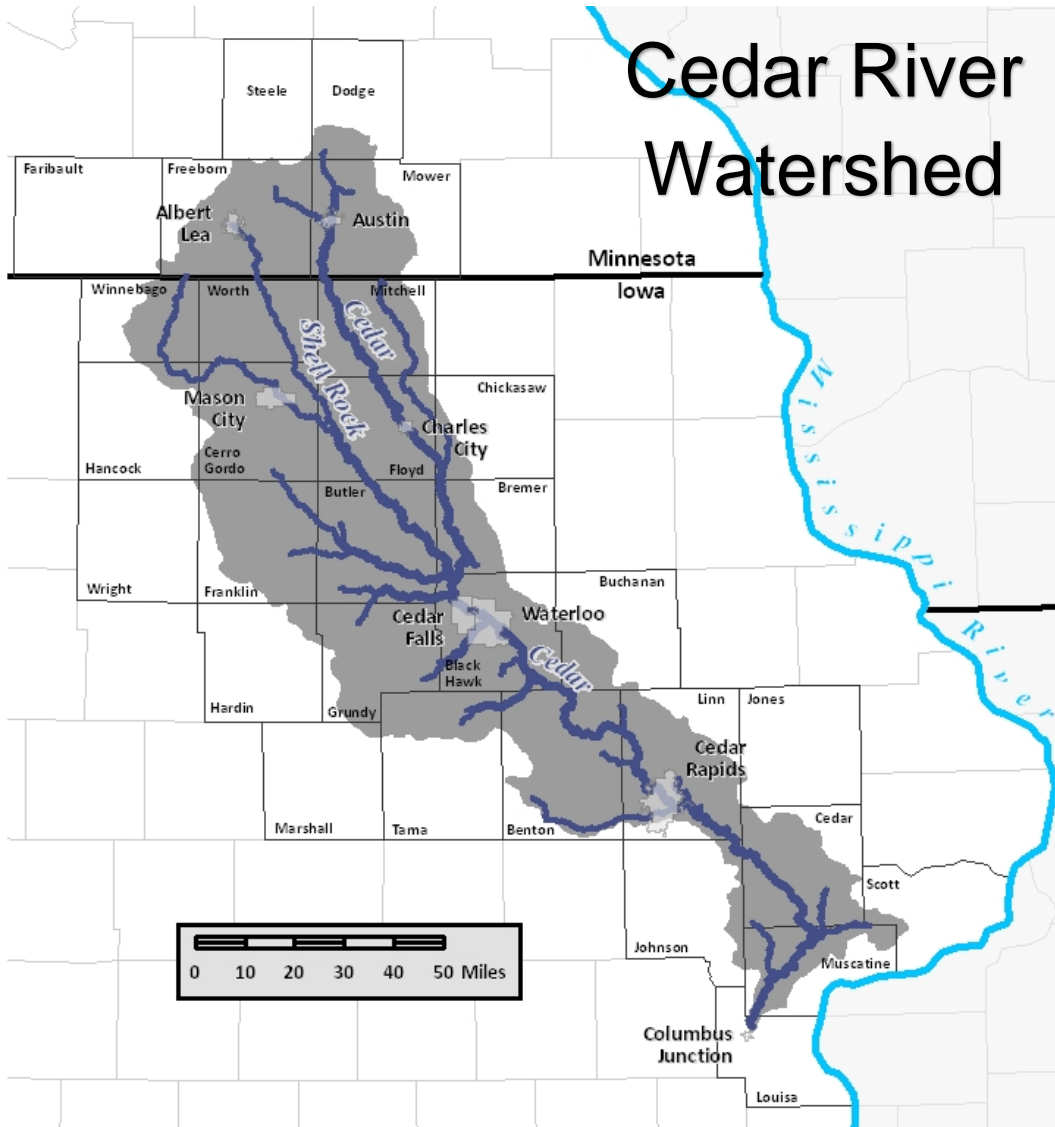
9.

What does the acronym GPS stand for? _____

Name: _____

Watershed Uses

Conduct research to identify at least one specific example of agricultural, industrial, residential, and recreational land uses. Use an X to mark them on the map below. Label the business, recreation area, city, or farm.



Pretend you are the owner of a new business and want to build near the Cedar River. On a separate sheet of paper write a persuasive letter to the watershed board describing why your business should be granted permission to build. Include how you will use water and outline your plans to conserve and protect soil and water in the watershed.

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