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 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 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: Culture & Society
• Economics
• Trade & global impact
• Agriculture through history
• Innovation in agriculture
• Careers

Issue 2: Science
• Science and technology
• Sustainable systems for a growing population
• Renewable & non-renewable energy sources
• Careers

Issue 3: Food & Nutrition
• Nutrition
• Food safety
• Food processing
• Careers

Extension Ideas
• Using the Question Formulation Technique™ (QFT), display the phrase “Science and technology can reduce the impact that the growing human population has on the Earth” and have students generate questions about this topic. This process can be used to kick off a unit, prepare for a debate, or as starting point for additional research. An overview of the QFT is found at: https://goo.gl/zj9gVb
• Ask students to create a drawing or other model to show how matter is cycled within a pasture ecosystem.
• Create a list of agriculture businesses in your community and across Iowa. What science-related jobs do they provide?
• Invite a farmer to your classroom to discuss science and technology on their farm (conservation practices, automated systems in animal barns, genetically-modified and hybrid seed, precision agriculture, etc.)
• Use the student page to have students decode the DNA of a turkey. Does the turkey have white or brown feathers?

Alignment with Standards and Lexile

<table>
<thead>
<tr>
<th>Code</th>
<th>Standard Lexile Measure = 940L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7th Grade Iowa Core Science Standards</td>
</tr>
<tr>
<td>MS-PS3-2</td>
<td>Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.</td>
</tr>
<tr>
<td>MS-LS1-4</td>
<td>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.</td>
</tr>
<tr>
<td>MS-LS1-5</td>
<td>Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.</td>
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<tr>
<td>MS-LS2-3</td>
<td>Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem</td>
</tr>
<tr>
<td>MS-LS2-4</td>
<td>Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.</td>
</tr>
<tr>
<td>MS-LS3-1</td>
<td>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.</td>
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</tbody>
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Additional Science Standards
6th Grade: MS-ESS2-2, MS-LS1-1;  8th Grade: MS-PS1-3; MS-ESS-4; MS-ESS3-4;
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: sustainability, heredity, genetics, legumes, nitrogen fixation, ethanol, fermentation, distillers grains, ruminant digestive systems, (pg. 1); matter, pasture, fertilizers, germinate, ruminant (pg. 2); genetics, mutagenesis (page 3); eroding, terraces, antibiotics (pgs. 4-5); field corn, grain bins, enzymes, starch molecules, distilled, renewable resource (pg. 6); pollination, self-pollinated, cross-pollinated (pg. 7); natural selection, artificial selection, dressed, melanin pigments, myoglobin, selective breeding (pg. 8).
Show what you know!

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

1. What human needs does the agriculture industry help meet and provide for?

2. Define sustainability. What are the three components of sustainability that farmers must consider?

3. Name one way that science and technology has improved the agriculture.

4. Give an example of how matter is changed and redistributed in a pasture.

5. Iowa usually ranks number one in the production of 5 agricultural products. Name 3 of them.

6. Name and describe a science-related career in agriculture.

7. Define and describe ethanol.

8. True or False: Corn and soybean flowers are pollinated by insects.

9. Why are brown feathers beneficial to wild turkeys? Why do most turkeys raised domestically for meat have white feathers?
Decoding DNA

You have a short DNA sequence of a turkey. Using this information, find out if it has white feathers or brown feathers.

Each group of three nitrogenous bases is a codon. It codes for one amino acid. Match the codons up with the amino acid and compare the amino acid sequence to the key below to determine the color of your turkey.

A turkey with white feathers has the amino acid sequence arginine, threonine, leucine, STOP.

A turkey with brown feathers has the amino acid sequence arginine, threonine, phenylalanine, STOP.

Your turkey: CGC ACC CTT TAG

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Possible DNA Codons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leucine</td>
<td>CTT, CTC, CTA, CTG, TTA, TTG</td>
</tr>
<tr>
<td>Phenylalanine</td>
<td>TTT, TTC</td>
</tr>
<tr>
<td>Alanine</td>
<td>GCT, GCC, GCA, GCG</td>
</tr>
<tr>
<td>Threonine</td>
<td>ACT, ACC, ACA, ACG</td>
</tr>
<tr>
<td>Arginine</td>
<td>CGT, CGC, CGA, CGG, AGA, AGG</td>
</tr>
<tr>
<td>Glutamine</td>
<td>CAA, CAG</td>
</tr>
<tr>
<td>STOP</td>
<td>TAA, TAG, TGA</td>
</tr>
</tbody>
</table>

1. What is the amino acid sequence of your turkey?

2. Does your turkey have white or brown feathers?

3. Design a sequence of DNA different from the one above. Give your designer turkey white feathers.