IOWA ag TODAY

ISSUE 6

EXPLORING THE CONNECTION BETWEEN AGRICULTURE AND YOU!

PLANTS & ANIMALS... FUELING INNOVATION

Your classroom is like a mini science lab. Many of the materials found in a classroom started on a farm. Paper, pencils, cotton T-shirts, and leather shoes all come from plants and animals. Even high-tech products use farm connections. **Corn starch** from corn can be used to make **biodegradable plastics.** Soybeans can be processed into biodiesel fuel. Animal parts that aren't used for food can be made into medicines. Scientists, manufacturers, and others turn these agricultural materials into new products. This helps recycle products and create new inventions.

RENEWABLE & NON-RENEWABLE

Every resource has a story. Renewable resources like crops, trees, wind, and solar can be replaced over short periods of time. Non-renewable resources like oil, coal, and certain metals take thousands or even millions of years to form. Agriculture plays such an important role: farmers provide renewable materials every year that can be turned into food, fuel, fiber, and even new technologies.

THINK & DISCUSS

How do farmers and scientists work together to create renewable solutions? What new product could you design using materials that come from plants or animals?

ialf Iowa Agriculture Literacy Foundation

Curriculum Guide

About Iowa Ag Today

The *Iowa Ag Today* elementary series is a colorful, cross-curricular magazine written at a fourth-grade reading level. 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.

Iowa Agriculture Literacy Foundation

About IALF

The Iowa Agriculture Literacy Foundation mission is to educate Iowans with a focus on youth regarding the breadth and global significance of agriculture.

IALF serves as a central resource for all pre-K-12 educators to inspire teaching through the lens of agriculture. As the leading producer of agricultural products, it is important for all Iowans to understand the essential role agriculture has in their lives.

How to Use This Guide

This guide is designed to help *you* make authentic cross-curricular connections. It meets Iowa Core Standards in ELA and Science and National Agriculture Literacy Outcomes. The average Lexile Level for the issue is 785. This guide provides suggestions for helping students engage with the magazine page by page during short periods of time. The magazine works well as a bell ringer, center, independent reading, and early finisher assignment. Shared resources were intentionally chosen to support research-based high quality instruction. You will find:

- Phenomena examples that invite students to notice and wonder
- Real-word data to analyze and interpret
- Text recommendations to extend and enrich learning
- Comprehension questions to help students think deeply about their reading
- Activities to encourage cross-curricular connections between science, ELA, engineering, and art

Plants & Animals... Fueling Innovation

Before Reading

Build background knowledge. Ask students to walk around the room write down items they believe are made from plants and animals. Next, have them choose their top five ideas and write each on a post-it note.

Divide a piece of chart paper into two columns: plant and animal. Gather as a class and discuss student ideas. After each note is discussed, have students place it into the column they believe is used to make that product. Are there any products in your classroom they believe are not made from plants and animals? What do they think they are made from?

After Reading

Think like an engineer. Challenge your students to consider the structure and function of materials and invent eight new ways to use a plastic milk jug made from non-renewable materials. (Printable on page 18.)

Write to reflect.

- What can you infer is the reason using renewable resources is increasingly important as our world's population continues to grow?
- Are there any products that are not made from plants (in some way)? Why or why not?
- Why are renewable resources helpful for farmers and the environment? If that's the case, why do we still use non-renewable resources?

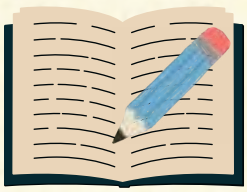
How Plants and Animals Power Up!

Before Reading

Activate background knowledge. Notice and wonder about these photographs of cattle and pig living environments. How are they similar? How are they different? Why do you think they are similar and different? How do you think they help keep animals healthy?

After Reading

Connect art and science. Create a diagram that shows how energy is passed through a farm. What parts of the system will you show? How will you represent those parts in a visually appealing way?



Read a related text. Read *From Bam! to Burp!* by Melissa Stewart. Create your own version of the story with words and/or illustrations that traces a carbon atom through a farm setting.

Write to reflect.

- What example does the text share of farmers making change to a system to bring it back to stability?
- Using information from the text, support the claim that plants and animals *help* one another survive.
- Do plants *need* animals to survive? Do animals *need* plants to survive? Make a claim and support it with evidence.

Fiber From Farms

Before Reading

Establish a reason to read. Notice and wonder about this photograph of a sheep. Then, read and discuss this related article.

After Reading

Explore multimedia resources. Watch this video to learn the science and engineering involved in turning corn husks into fibers for clothing.

Learn more about corn and soybean processing and products with this Ag in the Classroom lesson.

Think like an engineer. Challenge your students to consider structure and function to decide if they would rather use THIS or THAT. (Printable on page 19.)

Write to reflect.

- If you were to choose which type of fiber to raise, which would you choose and why? Use evidence from the text to support your answer.
- If you were to tell a friend what this page was about, what would you say in just a few sentences?
- What are at least two reasons it is helpful for farmers to find new uses for their products, like using corn for gasoline, fibers, and plastics?

Where in the World?

Before Reading

Establish a reason to read. Notice and wonder about this animated map of the spread of agriculture.

After Reading

Consider food miles. Use this lesson from the Iowa Ag Literacy Foundation to explore the economic and environmental benefits of buying locally grown food.

Think globally. Browse these images of what 25 children from around the world eat in a week. What ingredients do you recognize? According to the article, why do you think some meals may use specific ingredients? What meal would you share with someone from another country if they asked about a dish served often in your home? Does the meal use ingredients available locally? Why or why not?

Write to reflect.

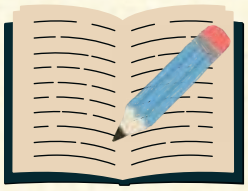
- Think about plant and animals needs. Why do you think certain crops and livestock are raised in certain locations?
- Some places in the world - even in the United States - are a long way from a grocery store. How might people in those places have to plan their food supplies differently? How might seasons of the year affect how people plan their meals?
- How does where you live affect what you eat? Give two reasons why shared in the article.

Corn Hybrids

Before Reading

Establish a reason to read. Look at these ancient cobs of maize (corn). What do you notice and wonder?

After Reading



Read related texts. Read *Gregor Mendel: The Friar Who Grew Peas* by Cheryl Bardoe and *Hero for the Hungry: The Life and Work of Norman Borlaug* by Peggy Thomas. Discuss how their scientific work was similar. How did Norman's work build on Gregor's discoveries?

Connect art and science. Create a diagram with images and text that explains how humans created Angus and Hereford breeds and/or Holstein and Jersey breeds from the wild aurochs of Europe.

Write to reflect.

- Explain what ***biotechnology*** means in your own words.
- How has biotechnology helped people in the past, and how might it help in the future?
- Why are the photographs on this page especially important to help the reader understand the text?

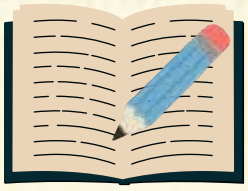
Farmers as Energy Producers

Before Reading

Establish a reason to read. Notice and wonder about this graph of sources of energy in Iowa.

After Reading

Identify Real World STEM. Brainstorm how STEM is used by scientists and engineers to help farmers in each of the real world situations on page 20.



Read related texts. Read books in the *Green Power* series by Allan Drummond. You can explore renewable energy more in depth with this Iowa Ag in the Classroom lesson.

Write to reflect.

- What do you believe is the author's purpose for writing this article? Who might benefit from reading it?
- Think about all of the information you have read in this publication. Explain how farmers can produce different types of energy using evidence from the articles. How are those types of energy similar and different?

Look in Your Fridge

Before Reading

Establish a reason to read. Notice and wonder about vegetable planting and harvesting times in Iowa.

- When is the best time of year to serve fresh vegetables for dinner in Iowa? Why?

After Reading

Explore food origins. Ask students to keep a food journal for a day. Then trace back where the foods may have come from. You can go back to the specific plant or animal and/or you can try and trace to a location with this interactive map.

Because some students live with food insecurity, you may want to investigate a few days of school lunches as a class. Alternatively, you could use this lesson plan from the Iowa Ag Literacy Foundation.

Write to reflect.

- What are two reasons it may be important to understand where our food comes from?
- When would be the best time to serve locally grown produce in Iowa? Why?
- How does this article support the claim that all of our food comes from plants and animals?

IOWA CORE STANDARDS CONNECTIONS

ELA	• Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. • Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific details from the text. • Explain how an author uses reasons and evidence to support particular points in a text. • Determine the main idea of a text and explain how it is supported by key details; summarize the text. • Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to comprehension of the text.
SCIENCE	• Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. • Observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. • Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

NATIONAL AGRICULTURE LITERACY OUTCOMES

- Distinguish between renewable and non-renewable resources used in the production of food, feed, fuel, fiber (fabric or clothing) and shelter. (T2.3-5.b)
- Provide examples of specific ways farmers/ranchers meet the needs of animals. (T2.3-5.d)
- Recognize the natural resources used in agricultural practices to produce food, feed, clothing, landscaping plants, and fuel (e.g., soil, water, air, plants, animals, and minerals). (T1.3-5.e)
- Discuss similarities and differences in food, clothing, shelter, and fuel sources among world cultures. (T2.3-5.a)
- Identify examples of how the knowledge of inherited traits is applied to farmed plants and animals in order to meet specific objectives (i.e., increased yields, better nutrition, etc.). (T4.3-5.c)
- Provide examples of science being applied in farming for food, clothing, and shelter products. (T4.3-5.d)
- Describe the necessary food components of a healthy diet using the current dietary guidelines. (T3.3-5.a)

Iowa Agriculture Today is a publication of the Iowa Agriculture Literacy Foundation (IALF). IALF serves as a central resource for all pre-K-12 educators to inspire teaching through the lens of agriculture. IALF's statewide initiatives are supported by agricultural stakeholders, including the Iowa Farm Bureau Federation, Iowa Corn Growers Association, Iowa Pork Producers Association, Iowa Soybean Association, Iowa Beef Industry Council, Iowa Turkey Federation, GROWMARK, Corteva Agriscience, Iowa Department of Agriculture and Land Stewardship, National Agriculture in the Classroom, and others dedicated to strengthening agriculture literacy among Iowa's educators and students.

NAME_____

PLANTS & ANIMALS. . .
FUELING INNOVATION

WHAT CAN YOU INFER IS THE REASON USING RENEWABLE RESEOURCES IS INCREASINGLY IMPORTANT AS OUR WORLD'S POPULATION CONTINUES TO GROW?

ARE THERE ANY PRODUCTS THAT ARE NOT MADE FROM PLANTS (IN SOME WAY)? WHY OR WHY NOT?

WHY ARE RENEWABLE RESOURCES HELPFUL FOR FARMERS AND THE ENVIRONMENT? IF THAT'S THE CASE, WHY DO WE STILL USE NON-RENEWABLE RESOURCES?

NAME_____

HOW PLANTS AND ANIMALS POWER UP!

WHAT EXAMPLE DOES THE TEXT SHARE OF FARMERS MAKING CHANGE TO A SYSTEM TO BRING IT BACK TO STABILITY?

USING INFORMATION FROM THE TEXT, SUPPORT THE CLAIM THAT PLANTS AND ANIMALS HELP ONE ANOTHER SURVIVE.

DO PLANTS NEED ANIMALS TO SURVIVE? DO ANIMALS NEED PLANTS TO SURVIVE? MAKE A CLAIM AND SUPPORT IT WITH EVIDENCE.

NAME_____

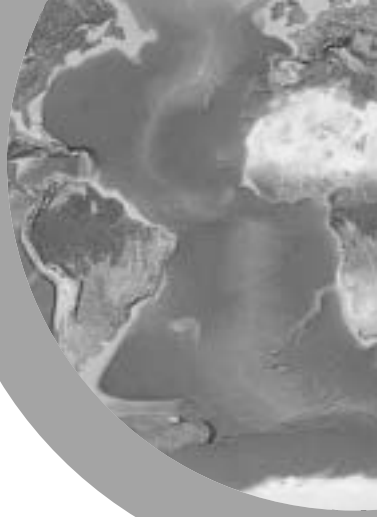
FIBER FROM FARMS

IF YOU WERE TO CHOOSE WHICH TYPE OF FIBER TO RAISE, WHICH WOULD YOU CHOOSE AND WHY? USE EVIDENCE FROM THE TEXT TO SUPPORT YOUR ANSWER.

IF YOU WERE TO TELL A FRIEND WHAT THIS PAGE WAS ABOUT, WHAT WOULD YOU SAY IN JUST A FEW SENTENCES?

WHAT ARE AT LEAST TWO REASONS IT IS HELPFUL FOR FARMERS TO FIND NEW USES FOR THEIR PRODUCTS, LIKE USING CORN FOR GASOLINE, FIBERS, AND PLASTICS?

NAME_____



WHERE IN THE WORLD?

THINK ABOUT PLANT AND ANIMALS NEEDS. WHY DO YOU THINK CERTAIN CROPS AND LIVESTOCK ARE RAISED IN CERTAIN LOCATIONS?

SOME PLACES IN THE WORLD - EVEN IN THE UNITED STATES - ARE A LONG WAY FROM A GROCERY STORE. HOW MIGHT PEOPLE IN THOSE PLACES HAVE TO PLAN THEIR FOOD SUPPLIES DIFFERENTLY? HOW MIGHT SEASONS OF THE YEAR AFFECT HOW PEOPLE PLAN THEIR MEALS?

HOW DOES WHERE YOU LIVE AFFECT WHAT YOU EAT? GIVE TWO REASONS WHY SHARED IN THE ARTICLE.

NAME_____

CORN HYBRIDS

EXPLAIN WHAT "BIOTECHNOLOGY" MEANS IN YOUR OWN WORDS.

HOW HAS BIOTECHNOLOGY HELPED PEOPLE IN THE PAST, AND HOW MIGHT IT HELP IN THE FUTURE?

WHY ARE THE PHOTOGRAPHS ON THIS PAGE ESPECIALLY IMPORTANT TO HELP THE READER UNDERSTAND THE TEXT?

NAME_____

FARMERS AS ENERGY PRODUCERS

WHAT DO YOU BELIEVE IS THE AUTHOR'S PURPOSE FOR WRITING THIS ARTICLE? WHO MIGHT BENEFIT FROM READING IT?

THINK ABOUT ALL OF THE INFORMATION YOU HAVE READ IN THIS PUBLICATION. EXPLAIN HOW FARMERS CAN PRODUCE DIFFERENT TYPES OF ENERGY USING EVIDENCE FROM THE ARTICLES. HOW ARE THOSE TYPES OF ENERGY SIMILAR AND DIFFERENT?

NAME_____

LOOK IN YOUR FRIDGE

WHAT ARE TWO REASONS IT MAY BE IMPORTANT TO UNDERSTAND WHERE OUR FOOD COMES FROM?

WHEN WOULD BE THE BEST TIME TO SERVE LOCALLY GROWN PRODUCE IN IOWA? WHY?

HOW DOES THIS ARTICLE SUPPORT THE CLAIM THAT ALL OF OUR FOOD COMES FROM PLANTS AND ANIMALS?

NAME_____

EIGHT NEW WAYS

ALTHOUGH PLASTIC MILK JUGS CAN OFTEN BE RECYCLED, THAT TAKES ADDITIONAL ENERGY. THINK LIKE AN ENGINEER. WHAT ARE <u>EIGHT DIFFERENT WAYS</u> YOU COULD USE A PLASTIC MILK JUG OTHER THAN TO HOLD LIQUIDS? DRAW A PICTURE OF YOUR FAVORITE WAY

1

2

3

4

5

6

7

8

NAME_____

THIS OR THAT?

THINK ABOUT HOW THESE OBJECTS ARE USED, COST, THEIR MATERIALS, SIZE, SHAPE, AND ENVIRONMENTAL IMPACT.

Umbrella made from plastic

Rain poncho made from biodegradable plant material

WHAT PROBLEM CAN BE SOLVED BY BOTH DESIGNS?

WHAT ARE THE STRENGTHS AND WEAKNESSES OF THE UMBRELLA?

WHAT ARE THE STRENGTHS AND WEAKNESSES OF THE PONCHO?

ON ANOTHER PIECE OF PAPER:

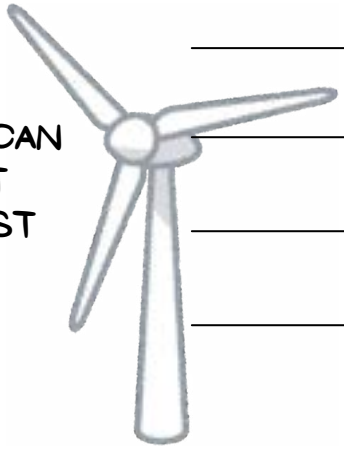
- DESCRIBE WHICH DESIGN YOU WOULD CHOOSE AND WHY.
- PLAN AND SKETCH A NEW HYBRID DESIGN THAT COMBINES THE STRENGTHS OF BOTH DESIGNS.
- LIST ANY QUESTIONS THAT CAME TO MIND WHEN YOU WERE ANALYZING THE DESIGNS.

NAME_____

STEM ON THE FARM

PREDICT HOW STEM IS USED BY SCIENTISTS AND ENGINEERS TO HELP FARMERS IN EACH OF THESE SITUATIONS.

HOW DO YOU THINK MATH CAN HELP ENGINEERS FIGURE OUT HOW TO PRODUCE THE MOST ENERGY FROM WIND IN DIFFERENT LOCATIONS?



HOW DO YOU THINK SCIENCE CAN HELP CHEMISTS TURN CORN INTO ENERGY?

HOW DO YOU THINK SCIENCE CAN HELP ENGINEERS PROTECT PEOPLE AND ANIMALS AROUND WIND TURBINES?

HOW DO YOU THINK MATH AND SCIENCE CAN HELP SCIENTISTS TRANSFORM SUNLIGHT INTO ELECTRICITY AT DIFFERENT TIMES OF THE YEAR?