Lesson Number: MS.AST.2.1

Who Helps Agriculture?

Middle School Food and Agricultural Literacy Curriculum

Precepts

A. Action

A5. Communicate effectively with others.

National Standards

BS.01.01.02.a. Investigate current applications of biotechnology in agriculture.

NL-ENG.K-12.4 – Communication Skills

NL-ENG.K-12.12 – Applying Language Skills

NM-CONN.PK-12.3 – Recognize and Apply Mathematics in Contexts Outside of Mathematics

NS.5-8.2 – Physical Science

NS.5-8.3 – Life Science

NS.5-8.7 – History and Nature of Science

Student Learning Objectives

As a result of this **unit** the students will…

Discuss agricultural research.

As a result of this **lesson** the students will …

Identify science, math and language applications in agriculture.

Content Outline

I. **Identify science, math, and language applications in agriculture.**

A. Discuss how agriculturists know what to do.

B. In groups reason through agriculture jobs and responsibilities and decide to which core subject relates.

C. Reflect on agriculture advances and predict future correlations to core subjects.

Interest Approach

Before class begins hang four large blank posters around the room with one of the following titles on each: math, writing, biology, and physical science. Divide each poster into four quadrants labeling in the corner of each quadrant group **A**, **B**, **C**, or **D**. Print and cut out idea cards, **MS.AST.2.1.AS.A**.

Time

Instruction time for this lesson: 60 minutes

Resources

National FFA Organization. (2009). LifeKnowledge Online. Retrieved July 9, 2009, from http://agedlearning.org
National FFA Organization. (2003). LifeKnowledge Precepts and Signs of Success.

Tools, Equipment, and Supplies

Large blank posters/tear sheets – 4 posters
Overhead projector/transparencies
MS.AST.2.1.TM.A – one per teacher
MS.AST.2.1.AS.A – one per student group
MS.AST.2.1.AS.B – one per teacher
MS.AST.2.1.AS.C – one per teacher
MS.AST.2.1.AS.D – one per teacher
MS.AST.2.1.ASSESS.A – one per student

Key Terms

Communication

Relationships

It's good to see you all this morning/afternoon! We have learned a great deal of information so far this year, not only in this class but in all of your classes, so that you can be highly educated students. Today, let's look at how what we learn in other classes fits into what we're learning about agriculture.

Algebra, poetry, these are things that I thought would be a waste of time when I was in school. Have you ever thought that something you were learning in school was a complete waste of time and something you would never use again? Who will give me an example of something they have learned that they don't believe they will ever need to know?

Allow students to share their responses and list answers on the board. Their answers will vary, but allow them to share all that they want. Possible answers will include algebra, creative writing, the scientific method, etc. Discuss how students actually use core academic content in all areas of agriculture.

Great answers. Some of us may not realize it, but we actually use all of these things in some way in agriculture. Let's look at a few that you might not have thought you could use.

Display transparency **MS.AST.2.1.TM.A** and use these guiding questions to facilitate a discussion.

How do plants grow? How do we know this?

Elicit student responses.

How do we know how much food and what kind to feed to animals? Where did we learn this? Think about how agriculture relates to other subjects.

Allow 30 seconds for thinking

Summary of Content and Teaching Strategies

Objective 1. Identify science, math, and language applications in agriculture.

Students will engage in a carousel activity that will make connections between four academic core subjects and agriculture. To prepare for this activity, hang four large blank posters around the room with one of the following titles on each: math, writing, biology, and physical science. Divide each poster into four quadrants labeling in the corner of each quadrant group **A**, **B**, **C**, or **D**. Print and cut out ideas cards, **MS.AST.2.1.AS.A**. Split the class into four groups and write the group members' names on a blank transparency or on the writing surface. Provide each group with a set of idea cards. Student groups will have four idea cards each and will need to decipher which card connects with the correct academic core subject poster. Remind student groups to match their group number with the quadrant that has the coordinating number on the poster board. Provide four minutes for this activity and have students return to their seats when they are finished.

Thanks for pondering this question. So what is agriculture really about? How do we make agriculture happen? Let's see if we can find a ***relationship*** between agriculture and other subjects.

You may have noticed the posters hanging around the room when you came in. Each poster is titled with a core subject and then split into four numbered quadrants. When I say GO, read and analyze the idea cards that will be given to you in a group (that will be revealed in a moment) and connect what core subject area each idea card relates to. When you decide where each card fits, stand up and tape it on to the poster in the quadrant with the group letter that relates to your cards. When I reveal your groups, please send one representative to the front of the class to get your idea cards. You will have four minutes to complete this task. At four minutes, the bell will ring and you will need to return to your seats. If you understand the directions, give me thumbs up.

Reveal the groups on the board or overhead .

Your groups are…

GO!

When groups are finished attaching their idea cards to the poster, have students return to their seats. Discuss with them each relationship of core subjects to agriculture.

Answers to Activity:

Each idea card is in the following order, Top left – Physical Science, Top right – Biological Science, Bottom left – Math, and Bottom right – Writing.

Fantastic job! Each group did very well. Now we can see how there is a ***relationship*** between agriculture and every core subject area. Let's discuss how each of these has a connection.

Lead a discussion with the students as to how the idea cards relate to the core subject areas. After a discussion that draws a connection between core subjects and agriculture, lead into a LifeKnowledge integration discussion.

Now we definitely know there is a connection between agriculture and other core subject areas, but how easy was it to figure out? Why did some of you in the group see it more easily than others?

Responses may include that some students led the group because of prior knowledge while others just listened.

What did you have to do to complete this task successfully?

Responses may include, talking, communicating, working together, etc.

If talking and sharing ideas helped you be more successful, please raise your hand. If you are willing to share another time and communicating this way has helped you, please raise your hand.

Elicit responses such as when playing sports, working on projects, or working at home.

That's good. Agriculture is the same way. Agriculture works with all the other core curriculum areas to be successful. Without the help of scientists, mathematicians, writers, and many others, we would not have been able to reach the high level of success we are at today.

Utilize the *Bob the Weather Guy e-Moment®*.

Students stay in their groups and will participate in a Bob the Weather Guy e-Moment. Assign each group one of the core subject areas and instruct them to create a 30-second weather report that includes all members of the group. Recommend to groups that one or two students be weather persons while the remaining members are the interviewees, each receiving a question. Instruct students to include how agriculture makes a connection to core subject areas. Provide groups 10 minutes to prepare the report and then share with the class.

So we said that ***communication*** is a key for agriculture to be successful when working with other core subject areas, right? ***Communication*** is a major factor in the agriculture industry. We know that agriculture works with so many other areas that if they don't communicate, agriculture would not work. Let's work on our ***communication*** by putting ourselves in the position of today's weather people.

In our groups, we will communicate what we have learned about how core academics have a major ***relationship*** with the agriculture industry. When I say GO, each group will create a 30-second weather report about the information we have learned today. Some characteristics of a weather report might be highs, lows, fronts, low pressure, high pressure, winds, temperature, humidity, rain, snow, regions, etc. Use these terms to help write your report.

Each person should have a part either as a weather reporter or as an interviewee. We have 10 minutes to create the report and when time is up each group will present to the class. If you understand, please give me thumbs up. GO!

After the ten-minute time limit is up student groups will present their weather reports to the class.

Time's up! Group number one, please stand at your table and present your weather report to the class. Complete this activity for the remaining groups.

Review/Summary

Distribute index cards, one to each student, and ask them to write what they think the big idea is that we covered today and briefly summarize it. On the back of the index cards have them write one thing they do not fully understand and have them word it as a question. Collect the cards when time is up.

Today we talked about core subjects outside of agriculture. We worked on making connections and communicating with others. When I say REFLECT, write on one side of the index card what the "big idea" is that we learned today, and briefly summarize it in two to three sentences. On the back side of your index card, write one thing that you did not fully understand in the form of a question. We will have three minutes to complete this task. What questions do you have?

Answer any questions they may have.

REFLECT!

Application

Extended Classroom Activity:

Schedule a field trip to a veterinarian's office and have him speak with students about the biological science basis required to become a veterinarian.

FFA Activity:

Students will create an agriculture literacy project that identifies how agriculture is a cross-curricular subject that integrates various areas of core subject matter. Students will accomplish this task by creating a presentation and presenting for community groups.

SAE Activity:

Students may start an exploratory agriculture literacy project by researching and presenting to the public about agriculture's cross curricular teaching and learning.

Evaluation

MS.AST.2.1.ASSESS.A

Answers to Evaluation

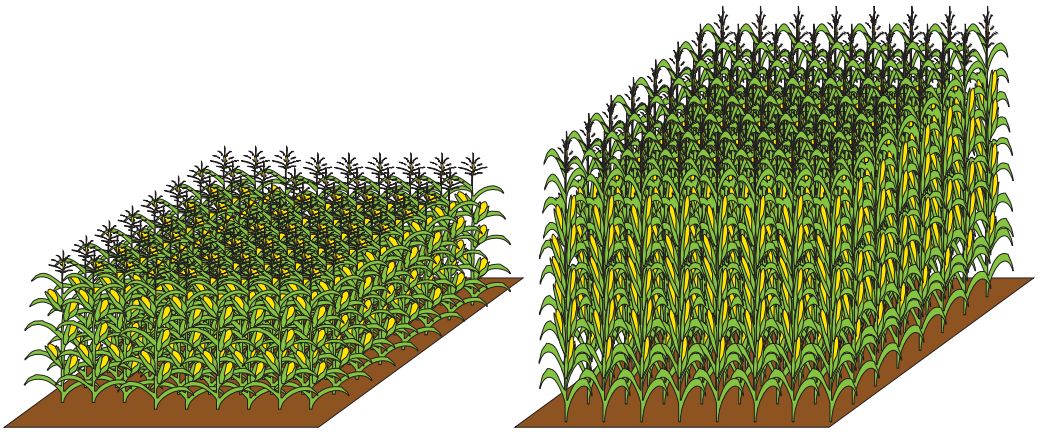
1. B
2. A
3. B
4. D
5. B

Academics and Agriculture

SCIENCE

Fertilizer applications – To produce food and products more efficiently, scientists discovered how elements make plants grow. This agriculture technology allowed us to produce more products in less time and space.

Example: Today, we produce more corn per acre than in the early 1900s because the plant grows taller with more ears of corn rather than outward which would require more space.



1900s: produce per 1 square acre

Today: produce per 1 square acre

MATH

Feed Calculations – To determine how much feed a market hog needs, you must use basic algebra.

Example:

Days till Show	X	ADG (Average Daily Gain)	=	Weight to Gain	+	Current Wt.	= Final Wt.
70 days	X	1.7 lbs. (pig)	=	120 lbs.	+	150 lbs.	= 270 lbs.

LANGUAGE

Magazines, journals, and newspapers – To write for an agricultural magazine or journalism entity, you must have strong writing and language skills.

Example: Capital Press – Northwest National Agriculture Newspaper
Range Magazine
Journal: The Science of Food and Agriculture

Idea Cards – Group A

• A technician who performs nutritional, chemical, and physical analyses of dairy samples	• Reproductive technology in livestock
• Construction of structures/buildings for agricultural or non-agricultural purposes	• Scientific research reporting

Idea Cards – Group B

• **Working with electrical systems in production systems throughout all areas of agriculture**	• **Biotechnology in plants and animals**
• **Organizing and determining project needs for agriculture mechanics projects**	• **Agriculture journalists and newspaper editors**

Idea Cards – Group C

• **Studying the chemical components of soil and how it affects plant growth**	• **Reproduction of bacteria for the discovery of vaccines and antibiotics**
• **Application of appropriate amounts of fertilizer and chemicals to fields**	• **Assist political officials in agricultural issues**

Idea Cards – Group D

• Environmental engineers who consult with construction companies on the impacts to soil and land use	• Plant scientists who genetically breed plants
• Agriculture loan officers working with financing	• Communicate information and solution on agriculturally based problems.

Agriculture and Core Subject Quiz

Name: _____

Circle the correct answer.

1. **What is agriculture really about?**
   a. Cows, plows, and sows
   b. Relationships with other core curriculums
   c. Writing only
   d. Science only

2. **Which answer best represents a connection between the subjects of agriculture and mathematics?**
   a. Determining feeding rations for animals
   b. Building an engine run
   c. Communicating agriculture topics through media
   d. Creation of high-quality medicines for livestock

3. **Which answer best represents a connection between the subjects of agriculture and writing?**
   a. Constructing a barn
   b. Communicating about animal health via magazines or journals
   c. Developing vaccines for animals through the scientific method
   d. Creating a feed program for animals

4. **Which answer best represents a connection between the subjects of agriculture and science?**
   a. Writing for an agriculture magazine
   b. Using the scientific method to create more efficient breeding techniques
   c. Determining how to make equipment engines run smoother and more efficiently
   d. Both b and c

5. **Agriculture has successful relationships with other core curriculums because of its strong ability to_____.**
   a. Work hard
   b. Communicate
   c. Be friendly
   d. Feed the world