



Extra! Extra! Biotechnology in Agriculture

Middle School Food and Agricultural Literacy Curriculum

Precepts

- J. Mental Growth
- J5. Commit to lifelong learning

National Standards

- BS.01.01.02.b. Research and report on current work being done in agricultural biotechnology.
- BS.01.01.03.a. Examine potential future applications of biotechnology in agriculture and compare them with alternative approaches to improving agriculture.
- NL-ENG.K-12.12 – Applying Language Skills
- NS.5-8.3 – Life Science
- NS.5-8.5 – Science and Technology
- NS.5-8.6 – Science in Personal and Social Perspectives
- NT.K-12.2 – Social, Ethical, and Human Issues

Student Learning Objectives

- As a result of this **unit** the students will...
- Discuss concepts and issues related to biotechnology.
- As a result of this **lesson** the students will...
- Investigate current applications of biotechnology in agriculture.

Content Outline

- I. **Investigate current applications of biotechnology in agriculture.**
 - A. Discuss biotechnology's goal to improve products.
 - B. Read and analyze current issues in biotechnology in agriculture.

Time

Instruction time for this lesson: 45 minutes.

Resources

Monsanto Company. (2009). Conversations about Plant Biotechnology. Retrieved December 29, 2009 from http://www.monsanto.com/biotech-gmo/asp/biotech_news.asp — National FFA Organization. (2009). LifeKnowledge Online. Retrieved July 9, 2009, from <http://agedlearning.org> — National FFA Organization. (2003). LifeKnowledge Precepts and Signs of Success. — The Pennsylvania State University. (2009). Biotechnology Food and Agriculture. Retrieved December 2009 from http://biotech.cas.psu.edu/in_the_news.htm

Tools, Equipment, and Supplies

Styrofoam cup – one per group
Pipe cleaners
Tape
String
Popsicle sticks
Note cards – one per student
Overhead projector/transparencies
MS.AST.3.3.TM.A – one per teacher
MS.AST.3.3.AS.A – one per student
MS.AST.3.3.AS.B – one per student
MS.AST.3.3.ASSESS.A – one per student
Several Biotech Articles – see objective 1

Key Terms

The following terms are presented in this lesson and appear in **bold italics**:

Biotechnology

Interest Approach

Each group of students will be getting a Styrofoam cup, pipe cleaners, tape, string, Popsicle sticks and any other supplies you deem appropriate. To start class, students will be given the task of improving their cups. Organize these supplies before students arrive to save time and confusion when they pick up their supplies.

It's great to see everyone today! We have a very important task to accomplish. See this Styrofoam cup? We need to make it better. There are many things for us to use to try to improve our cup and you can find those things on our supply table. There are no rules on how we can improve our cup.

When you hear the word STYROFOAM, your table group will have five minutes to turn your cups into a new and improved version. Use any supplies on this table. Questions? STYROFOAM!



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Mingle with students and give them frequent time updates. At the one-minute mark, instruct them to start cleaning up their area and to be prepared to share their improved cup.

Let's take a look at some of our new and improved cups! Who will be the first to share?

Student examples will vary. Some possible cup improvements could be a string tied to the cup to create a cup necklace, a cup that acts as a thermos without the bulk, a self-stirring cup, etc.

Next, help form the connection of improving their cups to how we improve things in agriculture using biotechnology.

Why did we want to improve our cups?

Possible responses: To make it easier to use, to keep things colder, etc.

What are some examples in life of things humans have improved?

Possible responses: Automobiles, houses, food.

What are some things in agriculture that humans have improved?

Possible responses: Tractors, more food options, shelf-life, etc.

Lead this last response into how we use biotechnology in agriculture.

We wanted to improve this simple cup to make life a little better for us. That is exactly what **biotechnology** is doing for agriculture. We are using **biotechnology** to improve on what we already have and to find new and better ways to produce our food. Today we will take a look at some specific examples of **biotechnology** in agriculture.

Summary of Content and Teaching Strategies

Objective 1. Investigate current applications of biotechnology in agriculture.

This objective requires that the teacher find and print biotechnology articles from the Internet and post them around the room.

Some helpful websites include:

- http://www.monsanto.com/biotech-gmo/asp/biotech_news.asp
- http://biotech.cas.psu.edu/in_the_news.htm

Another option would be to go to a search engine and type in "biotechnology in agriculture."

There should be enough articles that no more than two students have the same article. The students will perform the Go-Get-It e-Moment® to retrieve their articles.

How many of us learned something new today?
How many have read a book in the past month?
How many have watched the news on TV? How many of us enjoy learning?

Hopefully we raised our hands for at least one of those questions. It is very important for us to be lifelong learners! Imagine what it would be like if today was the last day we ever learned anything new. Let's hear some thoughts. How do you think life would be if we stopped learning today? How does learning benefit us?

Thanks for your responses. Let's remember how important learning is not only to life in general but to this class as we explore more **biotechnology** in agriculture.

Around the room we have a tremendous amount of information all about how **biotechnology** is working in agriculture. When you hear the word EXPLORE, we will have two minutes to do a gallery walk around the room. Stop and look at the articles that look most interesting to you. Do not take the article down. Try to look at as many different articles as you can. Questions? EXPLORE!

After approximately two minutes, instruct students to choose an article and stand by the article that looks most interesting to them. Inform them there should be only one person per article at the end of two minutes.

Now that we have all had the chance to explore some of the newspaper headlines around the room, it is time to pick one of those headlines! Indicate your choice by standing beside the article of your choice. Only one person can be at an article.

Have students read their article to themselves. Encourage them to use a highlighter or writing utensil to mark important parts in their article.



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Take those articles down. We will have seven minutes to read and scan over our articles. Feel free to use a writing utensil to mark important information as you read it.

Read at our normal seats or you take a seat where you are standing right now. Seven minutes start now.

After five to seven students are ready to move on to the next task, explain to them their task of creating their own front page of a newspaper. Some students will need more time to finish marking their articles.

Each student will get **MS.AST.3.3.AS.A**. Review the directions with the students. Because there is a lot of information to give students, utilize MS.AST.3.3.TM.A when giving the directions. Involve the students by having them read the directions aloud and by pointing to the requirements.

In my hands you see the front page of a newspaper; however, it has not been filled out yet. Using the article we just read, each of us will create the front page of a newspaper and include the following items. If you forget them, take a look at the board as a reminder.

Let's take a look at what we need to include on our newspapers! Point to the first requirement. Let's read it in unison as a class.

Do this for the remainder of the six requirements.

Items to Include on Newspaper

1. Name your Newspaper: Example: The Agricultural Times, The Biotech Gazette, The Ag Ed Journal.
2. Headline: Create an eye-catching headline based on your article. Example: Cloned Meat Safe to Eat.
3. Summary: A five-sentence summary of your article.
4. Facts: Under your summary include three interesting facts/statistics you found.
5. Picture: Create a picture in the photo box.
6. Extra Stuff: Complete the three boxes on the bottom to include typical newspaper items such as advertisements, sneak peaks at the sports or weather sections, etc.

Please use markers to add creativity and color to your newspaper! What questions do you have about making your paper?

Give your students plenty of time to create their newspapers. Typically, this will take about 15-20 minutes. After students have completed their newspapers, have them share by doing a gallery walk or by simply asking for volunteers.

At this point we should be adding the finishing touches to our newspapers and be ready to share it in two minutes!

Get ready to ask for volunteers. Pass out **MS.AST.3.3.AS.B** for students to use as they listen to their peers explain their paper. This sheet allows them to capture two key pieces of information from that person's newspaper.

Thanks for working so hard these past few minutes. We are going to find out all about everyone's **biotechnology** news stories in a few moments. As we are listening to our classmates, we will be capturing two facts from their newspaper that we feel are most important. I am passing out the sheets that we will need to write down our two facts. What questions are there?

Who will be the first to share their newspaper?

Depending on how you sorted their articles, you may have two students with the same article. If this is the case, allow those two students to present together. Allow the class to ask questions at the end of the presentations.

Thanks for tuning in for all those newspaper headlines!

Review/Summary

Have students reflect on what they just learned through a journal entry. Have them answer one of these questions:

1. Imagine a newspaper headline 50 years from now that is about biotechnology in agriculture. What do think that headline would be? Be sure to explain your headline.
2. Out of all the headlines you heard about today, which headline was most surprising? Why was it so surprising to you?
3. Out of all the headlines you heard about today, which headline do you want to find out more about? Why do you want to know more about it?



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Application

Extended classroom activity:

Instead of doing the newspaper activity, have students do a group poster on their article and present it to the class. Then do the newspaper activity but have them do the front cover of a newspaper in the year 2050. Still make it pertain to biotechnology in agriculture.

FFA activity:

Since the cloning of plants is very easy to accomplish through asexual propagation, have FFA students do a cuttings lesson with PALS. Students could also have a workshop and invite parents to bring their small children to take a free cutting from your school greenhouse.

SAE activity:

Invite a local producer in your area to give a demonstration on how to artificially inseminate cattle.

Evaluation

MS.AST.3.3.ASSESS.A.

Answers to Evaluation

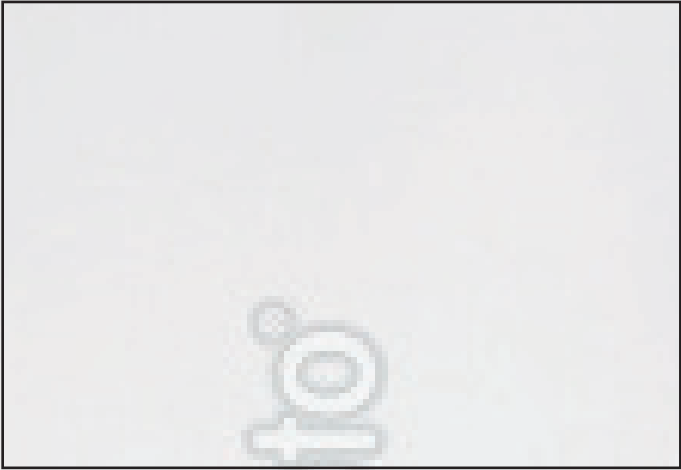
Answers will vary.



www.dailynews.com

The World's Favorite New Paper

MS.AST.3.3.AS.A



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Agriculture Science and Technology: Research
continued on next page...



Items to include on your newspaper:

- 1. Name your Newspaper: Example:** The Agricultural Times, The Biotech Gazette, The Ag Ed Journal.
- 2. Headline:** Create an eye-catching headline based on your article. Example: Cloned Meat Safe to Eat.
- 3. Summary:** A five-sentence summary of your article.
- 4. Facts:** Under your summary include three interesting facts/statistics you found.
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- 6. Extra Stuff:** Complete the three boxes on the bottom to include typical newspaper items such as advertisements, sneak peaks at the sports or weather sections, etc.



Name: _____

Directions: Recall the newspaper headlines that your classmates created. These headlines were all about **biotechnology** in agriculture. In your opinion, what were the three most important uses of **biotechnology** that you heard? Write these headlines below and two facts you learned about that headline.

Headline 1: _____

Fact 1: _____

Fact 2: _____

Headline 2: _____

Fact 1: _____

Fact 2: _____

Headline 3: _____

Fact 1: _____

Fact 2: _____



Student Name	Headline	Two Interesting Facts