

*Corn and Grain Sorghum Promotion Board
2014 Annual Report*

Title: Development of an On-Line Course – Introduction to Biotechnology Crops.

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Objectives:

1. To develop a high quality on-line course that teaches the history, principles, benefits and risks of biotechnology as pertaining to modern crop production, using corn as the model crop.
2. To implement the course to a pilot test audience, collect feedback, amend as necessary, and launch the course to the general public.

Objective 1:

Methods: Factual content was provided by our science cooperators, based on current biotechnology principles and facts taught at the University of Arkansas. The content provided was modified for the general public and adult learner understanding. An online course was developed with a three module structure. The course is hosted on the University of Arkansas Cooperative Extension Service Moodle platform and is accessible via the Internet.

Results and Discussion: Each module consists of three interactive lessons, which were developed using Articulate Storyline software. The three modules consist of: Module 1: History of Food Production and Biotechnology includes three lessons titled History, Dolly the Lamb and Other Genetic Breakthroughs, and Biotechnology Research on the Farm. Module 2: Defining Biotechnology and Its Principles includes three lessons titled Defining Biotechnology, The Scientific Method, and Safeguards for Biotechnology Crops. Module 3: Benefits and Risks in Crop Production, Consumption, and Food Purchasing Decisions include three lessons titled Benefits and Risks of Biotechnology Crop Production, Benefits and Risks of Biotechnology Crop Consumption, and Making Food Purchasing Decisions for Your Home.


Objective 2:

Methods: Once the course was built, a Peer Review was conducted. Two experts in the field of biotechnology and agronomic crops reviewed the course for content accuracy and course functionality. Peer reviewers made recommendations, and once changes were made to the course based on the Peer Review, a Pilot/Beta test was conducted. A group of 17 Pilot/Beta testers were recruited and enrolled in the course. A review rubric was also distributed to Pilot Testers, and reviewers were given two weeks to complete the course. The rubric asks Pilot Testers to evaluate course content, functionality, and navigability. When the Pilot Test concludes, evaluation rubrics will be reviewed. Recommended changes or issues identified by Pilot Testers will be addressed and edits will be made. The course will undergo a final technical review to confirm that any changes made based on the Peer Review and Pilot Test work properly. Feedback will be used to modify the course as needed then a final version will be launched on the Extension COURSES website. A certificate will be issued upon successful completion of the course. As part of the course completion requirements, learners must complete a course evaluation. The evaluation will ask them about the functionality and navigability of the

course, as well as their interest in the content and their perceived knowledge gain. Data from the evaluations and other course analytics will be collected and analyzed periodically after launch for at least two years and reported to the Board.

Results and Discussion: Peer Reviewers recommended changes regarding content, videos, and formatting. Interactions were edited based on Peer Review responses and one video was added. Peer Reviewers all recommended that the course be launched pending changes. Previously identified Pilot Testers were manually enrolled in the course and contacted via email with instructions to access the course. Pilot Testing is currently underway, and four testers have completed their review of the course. All completed reviews recommend launching the course after changes have been made. The Pilot Test has revealed visibility issues while using different devices. Course developers are currently investigating the solution to these issues and awaiting the remainder of the Pilot Test responses.

Figure 1. Screen shots of online course by module.

<p>Welcome!</p>  <p>Introduction to Biotechnology</p> <p>Sponsored by:</p>  	<p>Module 1: History of Food Production and Biotechnology</p> <p>Objectives</p> <ol style="list-style-type: none"> 1) Explain the history of food production in the United States 2) Recall the history of biotechnology research in corn <p>First, we will watch a cool video discussing how agriculture has changed over the years, use a timeline to view important dates in agricultural production, and learn a little more about corn, the foundation crop for future lessons. Click on "History of Food Production" below to begin.</p> <p>Second, we will discuss Dolly the lamb and a few other biotechnology breakthroughs. Then we will take a tip down memory lane with a news broadcast from Dolly's discovery as well as learn why we need biotechnology, using water quality as a specific example. Click on "Hello Dolly" below to begin.</p> <p>Third, we will watch a video of two dedicated farmers discussing the impact biotechnology has had on agriculture, as well as view images to help paint a clearer image of what biotechnology looks like in the field. Click on "Biotechnology, Research on the Farm" below to begin.</p> <ol style="list-style-type: none"> 1 "History of Food Production" Interactive Lesson 2 "Hello Dolly" Interactive Lesson 3 "Biotechnology, Research on the Farm" Interactive Lesson 
<p>Module 2: Defining Biotechnology and its Principles</p> <p>Objectives</p> <ol style="list-style-type: none"> 1) Define biotechnology and other related terms 2) Summarize the basic principles, safeguards, and the scientific method used in developing biotechnology crops <p>First, we will head to the grocery store and consider items that may or may not be developed using biotechnology. Then, we'll hear from an Iowa farmer who talks us her own perspective of biotechnology. When you're ready, click on "Defining Biotechnology" below to begin.</p> <p>Second, we will enter the lab and explore the scientific method. Then you will try your hand at placing the steps of the scientific method in order. "Expert tip: Use the Scientific Method infographic below for assistance. Working through the scientific method will help you understand the process scientists go through before beginning the regulatory process for biotechnology, which we will discuss in the final activity of this module. When you're ready, click on "The Scientific Method" below to begin.</p> <p>Finally, we will learn about the regulatory process scientists go through when introducing genetically engineered crops to the food system. We will hear from two ladies discussing the regulatory process, and then learn about the different agencies involved and the process itself in more detail. When you're ready, click on "Safeguards for Biotechnology" below to begin.</p>  <ol style="list-style-type: none"> 1 "Defining Biotechnology" Interactive Lesson 2 "The Scientific Method" Interactive Lesson 3 The Scientific Method Infographic 4 "Safeguards for Biotechnology" Interactive Lesson 5 "USDA Biotechnology Regulatory Process" Video <p>Check out this video from the USDA APHIS to learn more about the regulatory process.</p>	<p>Module 3: Benefits and Risks in Crop Production, Consumption, and Food Purchasing Decisions</p> <p>Objectives</p> <ol style="list-style-type: none"> 1) Compare the benefits and risks associated with biotechnology crop production and consumption 2) Discuss the effects of biotechnology on food purchasing decisions <p>First, we will hear from a farmer and a scientist discussing environmental impacts of biotechnology crop production. Then we'll explore benefits to the environment, farmers, and crops protected through biotechnology innovations. When you're ready, click on "Biotech Crop Production Benefits" below to begin.</p> <p>Second, we will take a look at biotechnology benefits a biotech crop consumption. This will allow us to see how consuming biotech crops can benefit us and the growing population. When you're ready, click on "Biotech Crop Consumption Benefits" below to begin.</p> <p>Finally, we will bring it all together and discuss how to confidently make food purchasing decisions for you home. We will also work together to confer to find a few biotechnology myths in a fun round of "Biotech Myths". When you're ready, click on "Making Food Purchasing Decisions for Your Home" below to begin.</p> <ol style="list-style-type: none"> 1 "Biotech Crop Production Benefits" Interactive Lesson 2 "Biotech Crop Consumption Benefits" Interactive Lesson 3 "The Benefits of Biotechnology" <p>Check out this PDF from the United Soybean Board on the Benefits of biotechnology.</p> <ol style="list-style-type: none"> 1 "Making Food Purchasing Decisions for Your Home" Interactive Lesson 