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Elementary school agriculture education pilot program: Curriculum development and assessing success

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Elementary School Agriculture Education Pilot Program: Curriculum Development and
Assessing Success

by

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MASTER OF SCIENCE

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Chapter 1. Introduction

Traditionally, an Agricultural Education program has only incorporated Middle and High School programs as well as adult programs. However, for the first time in the United States, Elementary School Agriculture Education programs are being piloted in the state of Georgia. Agricultural Education programs in the United States and U.S. territories currently enroll more than 800,000 students (National FFA Organization, 2019). Based on the 2018-2019 Georgia Agriculture Education Annual Report, more than 74,549 students are enrolled in Agricultural Education Programs throughout Georgia (Georgia Agricultural Education, 2019).

During the 2018 Georgia Legislative Session, SB 330 proposed the creation of a pilot program to develop and implement Agricultural Education programs in Georgia elementary schools. The pilot programs would be used to gauge the interest and effectiveness of potentially expanding the scope of agriculture education in the state of Georgia (Georgia Agricultural Education Act, 2018). Currently, there are 19 pilot elementary school agriculture education programs in 17 different counties in the state of Georgia that are creating curriculum and gathering data to scope the success and need for Elementary School Agriculture Education Programs in the state (Georgia Agricultural Education, 2019).

Middle School programs have shown to be an excellent feeder program for high schools and have helped in making high school programs successful within Agriculture Education and the FFA. In this regard, the hope is that these elementary agriculture programs can continue to strengthen the overall agriculture education program in the state of Georgia, by being another feeder program to strengthen the middle school agriculture programs, which should carry over into the high school Agriculture Education programs. Georgia State School Superintendent,

Richard Woods, stated, “At the upper levels, our kids have a chance to learn the business and practice of agriculture, but now we can begin to build that understanding for our younger students in an age-appropriate way” (AllOnGeorgia, 2019, para. 3).

Purpose and Objectives

The purpose of this project was to help develop an agriculture curriculum for agricultural educators who are currently teaching the Elementary School Agriculture Education Curriculum, based on the already developed elementary school agriculture education standards. These standards were developed in 2018 and 2019 by a committee of agriculture teachers, industry professionals, and elementary school teachers. This committee was overseen by Curriculum & Technology Director for Georgia Agricultural Education, Mrs. Christa Steinkamp. These standards can be found on the Georgia Agriculture Education website under Curriculum and SAE Resources. These pilot programs are one of a kind and uncharted territory, so it is important to have curriculum and instruction that will help with the potential success of the programs and students that it will impact. This project will also look at the most efficient way of assessing the success of these programs. The purpose of the pilot program is to gauge the interest and effectiveness of potentially expanding the scope of agriculture education statewide. The following objectives were developed to provide direction to the project:

Assist in the creation of agricultural education curriculum geared toward K-5 students. Collaborate with Elementary School Agriculture Education Teachers and Curriculum developers to assist in creating lesson plans for a 5th grade Agriculture unit. Develop a plan to help determine the success of the elementary Agriculture Education programs to be presented to the Legislature & the Georgia DOE.

Need

With the elementary school agriculture education pilot programs being the first within the United States, there is a need that should be focused on curriculum for grades K-5, as well as the need to help assess and determine the success of the pilot programs within the state. With that being said, and little to no information readily available for elementary school agriculture education teachers besides school gardens, farm days and Agriculture in the Classroom (AITC), there is the need for lesson plans and resources that are simple, direct, and easy to follow for elementary school agricultural education educators.

Chapter 2: Literature Review

The success of these pilot programs will not only lie within the teaching and learning that will be taking place through the plethora of activities. According to Nelson and Owings (1974), the future of education in agriculture is dependent upon a steady supply of young people interested in agriculture and natural resource occupations (p. 16). It is safe to say that these Agricultural Education pilot programs within elementary schools can help to strengthen agriculture and allow students to become interested in agriculture at an early age if they so choose. Georgia curriculum and technology director for Agriculture Education, Mrs. Christa Steinkamp, stated, “In its purest sense, agricultural education is the foundation to a stronger economy. Even if you’re not a farmer, the agriculture umbrella covers so many other opportunities. We want to make sure kids understand that” (Walker, 2019, para. 5).

Agricultural literacy and knowing where your food comes from has become something of interest to many in our nation. According to Pense, Leising, Portillo, and Igo (2005), Agricultural literacy can be defined as possessing knowledge and understanding of the food and fiber system. These pilot programs will allow students to gain agricultural knowledge as early as kindergarten to help start the process of understanding our food and fiber system. This in itself can be huge for the success of Georgia's Agricultural Education programs for years to come.

According to Hess and Trexler (2011), Agricultural literacy of K–12 students is a national priority for both scientific and agricultural education professional organizations. If agricultural literacy is a national priority for many in the agricultural education and scientific community, it makes perfect sense to start students out early, to help mold those skills from the time they step into school, until they graduate. Georgia State Senator, John Wilkinson, stated,

“Food doesn’t come from the grocery store. Four or five generations removed from the farm makes it hard for students to understand where their food really comes from. This new program will help kids understand the powerful impact of agriculture on the prosperity of our state” (AllOnGeorgia, 2019, para. 5).

There is not a lot of research in the area of Elementary Agriculture Education in public schools or within curriculum development, except for the areas of Ag in the Classroom (AITC) and elementary garden programs. Pense et al. (2005) stated research has shown Agriculture in the Classroom programs have made positive differences in student knowledge about agriculture and that teachers at lower elementary school grades (K-3) were able to make more agricultural connections during their lessons teaching based on general knowledge scores. However, Pense et al. (2005) went on to summarize that AITC programs developed instructional materials and hosted training workshops, but few very few conducted assessments to determine what students may or may not be learning. Without this data or any relating to what was learned, it is hard to assess what students were actually learning and if it was benefiting the students. This data would allow teachers to be better equipped to develop instruction and also guide training for teachers.

School gardens have also helped to teach elementary students about agriculture, while also integrating the core curriculum as well. According to Graves, Hughes, and Balgopal (2016), schools are ideal places to increase students’ agricultural literacy especially when teachers use school gardens that are integrated into the curricula and can help students make personal decisions about diet and nutrition.

The lesson design for Elementary School Agricultural Education was based off of the lesson plan template from the Georgia Department of Education and developmentally

appropriate practices and standards. As previously stated, the standards for Elementary School Agricultural Education were previously established by a committee and approved by the Georgia DOE. This template would be the basis and starting point for what would be covered in each lesson. According to Darling-Hammond et al. (2019) effective learning happens when they are not anxious, fearful, or distracted, learning is linked to prior knowledge and experiences, when they are engaged, and when they care about the content they are learning. Building upon this, the lessons were created to make sure each of these factors were considered. A bell ringer and recall were used to, not only be an interest approach, but also to set a positive mood for the class, help students to not be anxious or fearful, and to build upon previous knowledge. The new knowledge and the hands-on practice is there to allow students to be actively engaged in their learning throughout the class. Helping students have a buy-in to their learning helps them feel empowered and benefits the entire classroom. This can also help the students care about what they are learning and what they are being taught.

Chapter 3: Methods and Procedures

To develop the new curriculum, several other curriculum resources were utilized including: The National FFA Food and Agriculture Literacy curriculum, Georgia Agricultural Education Middle School curriculum, Georgia Foundation For Agriculture, UGA Extension, My American Farm, and National Agriculture in the Classroom. The program standards were previously developed by a committee of agriculture teachers from Georgia, prior to the pilot year from elementary school agriculture in Georgia. Discussions and conversations were had among pilot school agriculture teachers, Georgia curriculum and technology director for Agriculture Education, Mrs. Christa Steinkamp, and other agriculture education instructors within the state of Georgia. The discussions and conversations were focused on developing curriculum, sharing ideas and resources, and recommendations on how to access success within the pilot programs. The curriculum is focused on the three-circle model of agriculture education; classroom/lab, FFA, and SAE. However, the one question that still needs to be answered, is how each circle looks at the elementary school level. The curriculum should involve hands-on learning where students can start to develop foundational agriculture knowledge. According to Graves et al. (2016) hands-on activities help with student questioning and problem solving. Waliczek and Zajicek (1999) also stated, "...students tend to learn better when they are actively involved and hands-on activities help to improve their acquisition of new knowledge, skills, and attitudes" (p. 180). In the elementary classroom, staying active is a critical component to keep students engaged in their learning.

I did not have a specific set of standards to write lesson plans for, but was given standards to address based on what standards still needed to be finished and/or worked on for the

elementary agriculture education curriculum. The lesson plans I worked on were geared towards the 3rd and 5th-grade level. My point person was Georgia curriculum and technology director for Agriculture Education, Mrs. Christa Steinkamp. I talked with her throughout the process of my creative component to determine what standards needed to be addressed. Mrs. Steinkamp was also my point person to discuss how we will determine the success of the elementary Ag Ed program. We discussed what type of information that would be helpful in presenting to the Legislature & the Georgia DOE how these pilot programs are successful. It was also determined a possible template could be the Indicators for Maintaining Charter Program of Work Report. We both agreed this could be a great starting point and something we could easily develop to mirror and match the indicators that we would like the elementary agriculture education programs to accomplish.

The three units that were covered in the curriculum development were 3rd-grade Foundations of Agriculture and 5th-grade Foundations of Agriculture, Agriculture Systems, and Leadership. Curriculum and learning are student-driven instruction and hands-on learning activities, to mirror the three-circle model of agriculture education, and the importance of hands-on experience. In this curriculum, each lesson contains information that can be taught in a whole class period or can be extended for more in-depth activities, which gives instructors flexibility over each lesson. This can also help instructors tailor their instruction to fit the needs of each individual program. However, some lessons should be taught first to give a firm understanding of certain ideas/ concepts. These activities can range from small-group projects, experiments, and/ or creation of an item, notebook, etc. All curriculum that is developed will be reviewed by a committee to fine tailor each individual lesson.

Chapter 4: Product

The curriculum is developed as individual lesson plans from the recently developed standards for Elementary Agriculture Education. Lesson plans are completed based on a need basis as described in earlier sections. The last document is the Program Performance Indicators for Maintaining an Elementary Agriculture Program. This document is created to be used to help determine the success of the Elementary Agriculture Education programs and to be presented to the Legislature & the Georgia DOE. This will act as a guide to help put standards in place across the state for all teachers and administrators. The standards will guide teachers and programs by mapping out what is required to be completed for each program. The documents are included below, starting with the standards, lesson plans, and Program Performance Indicators.

Agriculture, Food & Natural Resources Exploring Agricultural Education (Third Grade)

Foundations of Agriculture

Foundations of Agriculture

AFNR-FA: Explore and communicate the importance of agriculture and its impact on daily life.

3FA1. Describe how agriculture impacts your daily life.

3FA2. Use a map to locate the geographic regions of Georgia; locate and compare the geographic regions such as crops/fruit production, livestock/poultry, native trees and plants, wildlife, fall line, and forestry.

3FA3. Identify commodities based on the different geographic regions of Georgia and determine how environmental factors affect agriculture production in each region.

3FA4. Connect the need for Georgia grown commodities to be exported to other regions and the need for imports of products from other places. (Make a historical connection to explorers and how people have been trading commodities since the beginning of time)

3FA5. Categorize the entities that influence Georgia Agriculture (local, state, and national government entities as well as private citizens). (Georgia Department of Education, 2019).

3FA1- Agricultural Impact

Unit: Foundations of Ag	Lesson Objectives: Define and describe the importance of agriculture
Essential Question: How does agriculture impact your daily life?	
AFNR Standard: 3FA1. Describe how agriculture impacts your daily life.	
Connection to GSE: ELAGSE3W8, ELAGSE3SL6, ELAGSE3SL1, ELAGSE3L4.d	
Lesson Essential Questions: How does agriculture impact your daily life?	Key Words/Vocabulary: Agriculture, fabric, farming, forestry, flowers, food
<p>Lesson Plan</p> <p>Bell Ringer: Provide students with a dictionary and have them look up the definition of agriculture and write it on an index card. On the back of the index card have them think of a list of things they use every day they would not have without agriculture.</p> <p>New Learning: Create a list on chart paper of the student’s everyday things from the bell ringer. Ask students where these things come from (most will say factories, grocery stores, etc.)</p> <p>-Have students complete the scavenger hunt around the room with the food origin flashcards. Each student will need the familiar item card (cow, corn, ketchup, etc) and they will need to search for the matching card (cow=milk, tomato=ketchup, etc). Come back to the meeting spot and lead a discussion about each product's origin after having students read their matching cards.</p> <p>Hands-On/Practice: Complete the Farm Web Activity</p> <p>-Discuss the different types of farms: cattle, dairy, orchards, poultry, crop, etc.</p> <p>-Place the farm picture in the middle of the designated “web” area. Give each student some web cards. The students with the things most directly related to the farm need to go first (for example: animals, plants, etc.)</p> <p>-Students will then link the pictures of items made from plants and animals. Have students use linking words as they place their items. For example: dairy cows make milk.</p>	

Assessment: Read aloud the book *How did that get in my Lunchbox?* By Chris Butterworth (or any book about agriculture products) and have students draw their own web of where the ag products came from.

Challenge/closing: Challenge students to create their own farm/food web at home using items they have in their home.

3FA2- Regions of Georgia

Unit: Foundations of Ag	Lesson Objectives: Explore the connection between geography, climate, and the type of agriculture in an area
Essential Question: What are the different regions of Georgia?	
AFNR Standard: 3FA2. Use a map to locate the geographic regions of Georgia; locate and compare the geographic regions such as crops/fruit production, livestock/poultry, native trees and plants, wildlife, fall line, and forestry.	
Connection to GSE: S3L1. Obtain, evaluate, and communicate information about the similarities and differences between plants, animals, and habitats found within geographic regions (Blue Ridge Mountains, Piedmont, Coastal Plains, Valley and Ridge, and Appalachian Plateau) of Georgia.	
Lesson Essential Questions: <ul style="list-style-type: none"> ● What are the different regions of Georgia? ● What are the different crops, animals, trees, plants, and wildlife that grow or are raised in each region? 	Key Words/Vocabulary: Commodity Fall Line Products By-products End Product
Lesson Plan Bell Ringer: Show the video “ Without Farmers, Georgia can't grow ”. Give students the Farm Bureau- Without Farmers Georgia Can't Grow worksheet and have them follow along with the Georgia Map, by writing in or drawing the commodities from each region as they watch/listen. (This can be differentiated for high achieving students to use the first page to gather information, in addition to the map). Recall: Recall of the previous lesson or use this time to go over the video and the worksheet that goes along with it. Pull the worksheet up on the board and either have students volunteer to write their commodity on the big board or go over each region with the proper commodities that the video discussed. New Learning/Hands-On/Practice: Use the lesson plan from Georgia Farm Bureau Foundation for Agriculture “ Where does it come from ”. Gather the essential materials and documents from the lesson plan. Use the Background Agricultural Connections, Interest	

Approach and Procedures. Allow them to play the My American Farm interactive games [Where in the World?](#) and [Ag Across America](#).

Assessment: Have students look at the school menu for the week of what foods are served in the cafeteria. Have them research to find out what commodity ingredients are used in the foods and if they are grown in Georgia

Challenge/closing: Turn in school menu assessment.

Without Farmers, Georgia Can't Grow

Name: _____ Class Period: _____

1. Georgia has more than _____ acres dedicated to _____.
2. Agriculture contributes more than _____ ANNUALLY to Georgia's _____ economic output.
3. North/Mountain Region: Appalachian Plateau, Valley & Ridge, and Blue Ridge Regions
 - a. Commodities grown in this region
 - i. _____
 - ii. Grapes _____
 - iii. _____
4. Piedmont Region
 - a. Commodities grown in this region
 - i. _____
 - ii. _____
 - iii. _____
 - iv. _____
 - v. _____
5. Coastal Region
 - a. Commodities grown in this region
 - i. _____
 - ii. _____
 - iii. _____
 - iv. _____
 - v. _____
6. _____ % of Georgia is covered in trees.
7. _____ in _____ Georgians work in agriculture or ag-related fields.
8. Almost _____ of the state's manufacturing jobs are in _____.
9. Georgia ranks in the top 5 in the NATION in several commodities including:
 - a. _____

- b. _____
c. _____
d. _____

10. Georgia grows enough _____ each year to make
_____ pairs of blue jeans or
_____ men's t-shirts.



(Georgia Department of Education, 2019)

3FA4- Georgia Commodities

<p>Unit: Foundations of Ag</p>	<p>Lesson Objectives: Students will be able to explain why it is important for commodities to be exported and imported and how that plays a part in the world of agriculture.</p>
<p>Essential Question: Why is it important for Georgia grown commodities to be exported to other regions and other products imported?</p>	
<p>AFNR Standard: 3FA4. Connect the need for Georgia grown commodities to be exported to other regions and the need for imports of products from other places. (Make a historical connection to explorers and how people have been trading commodities since the beginning of time)</p>	
<p>Connection to GSE: SS3H2, ELAGSE3W7, ELAGSE3SL1, ELAGSE3SL4</p>	
<p>Lesson Essential Questions: Why is it important for Georgia grown commodities to be exported to other regions and other products imported?</p>	<p>Key Words/Vocabulary: -import -export -climate</p>
<p>Lesson Plan</p> <p>Bell Ringer: Recall the items that early explorers traded and why they had to trade them? (Spices, coffee, etc.-- they needed to find these items and trade them for other crops and spices they did not have available in their geographic regions of the world)</p> <p>Recall: Have students recall some of the crops they have learned about and the Georgia region that they are grown in.</p> <p>New Learning: Share with students the list of the crops grown in Georgia and review which region of Georgia they are grown in.</p> <ul style="list-style-type: none"> -apples -basil -lima beans -beets -blackberries -blueberries -cucumbers -broccoli -cabbage -cantaloupe -carrots -corn <p>(the full list of crops can be found on the Georgia Grown website)</p>	

Hands On/Practice: Divide students into groups of 3-4. Give each student a recipe card that has a list of needed ingredients. Students will need to identify the ingredients that can be grown in Georgia, and then identify the list of ingredients that can't be grown in Georgia. Have students identify the types of land/climate needed for the non-Georgia crops/ingredients.

Once all students have identified the ingredients not grown in Georgia prompt them with the following question:

-Why is it important that we import ag products? (Because our state is not suitable to grow all crops/ag products. Therefore, we must import different products/crops)

-Why is it important for Georgia to export ag products? (It is crucial for Georgia to export crops/products to other states/countries based on need. Georgia is suitable to grow some crops and products that others can't)

Assessment: Provide students with a variety of grocery sales papers. Have students choose three to five different products and research their country/state of origin.

Challenge/closing: Allow students to create a google slide/PowerPoint about one of the chosen fruits or vegetables and the country/state that it is grown in and how it is imported.

Agriculture, Food & Natural Resources Exploring Agricultural Education (Fifth Grade)

Agricultural Systems

Agricultural Systems

AFNR-AS: Investigate and develop an understanding of agricultural systems such as Agricultural Mechanics; Plant Systems; Animal Systems; and/or Food Systems.

5AS1. Classify and differentiate between different breeds of livestock.

5AS2. Compare and contrast instinct and learned animal behaviors.

5AS3. Compare and contrast inherited and acquired physical traits in companion animals and livestock.

5AS4. Examine the role of organisms in agriculture to soil and animals.

5AS5. Connect the role of pollinators in agriculture.

5AS5. Classify different types of trees in your area.

5AS6. Differentiate and understand parts of plants and how they are utilized in agriculture.

5AS7. Investigate how agricultural biotechnology is used in Georgia agriculture. (Georgia Department of Education, 2019).

Foundations of Agriculture

Foundations of Agriculture

AFNR-FA: Explore and communicate the importance of agriculture and its impact on daily life.

5FA1. Construct a model of the supply chain from origination to end product of commodities/ fiber/ natural resources.

5FA2. Explore and cite examples of agricultural history, economics, and inventions.

5FA3. Assess the role of research in the agriculture industry. (Georgia Department of Education, 2019).

Leadership and Career Readiness

Leadership and Career Readiness

AFNR-LCR: Develop an understanding of leadership skills and characteristics for career readiness while exploring youth leadership opportunities and careers in agriculture as indicated by the National FFA Organization.

5LCR1. Identify and apply concepts related to the National FFA mission (premier leadership, personal growth, and career success).

5LCR2. Explore careers related to the animal science industry such as livestock producers, veterinarians, small animal trainers, animal science researchers, meat inspectors, livestock buyers, livestock marketing, and animal pharmaceuticals representatives.

5LCR3. Understand the leadership opportunities and officer roles in youth organizations at the local,

area & state levels.

5LCR4. Compare the various school and community organizations that encourage leadership and personal growth. (Georgia Department of Education, 2019).

5AS6- Trees

<p>Unit: Ag Systems</p>	<p>Lesson Objectives: Students will be able to differentiate various native trees</p>
<p>Essential Question: How are food, fiber, and natural resources produced?</p>	
<p>AFNR Standard: 5AS5. Classify different types of trees in your area.</p>	
<p>Connection to GSE: S5L1.</p>	
<p>Lesson Essential Questions: How can you tell the difference between different trees in Georgia?</p>	<p>Key Words/Vocabulary: Roots Trunk Crown Deciduous Evergreen Simple Compound Alternate Opposite Whorled Smooth Serrated Conifer Leaf Venation Margin Lobed Bark Biodiversity</p>
<p>Lesson Plan</p> <p>Bell Ringer: Supply different samples (5) of leaves, cones, fruits, etc. and ask the students to look at each and try to determine what trees they come from. Once they come up with answers, ask them how they determined this? If time allows, let as many students answer as possible to get a feel for prior knowledge before this lesson.</p>	

Recall: After the students answer the bell ringer, start talking about the different ways of classifying trees. Let this be a segue into the new learning of forestry terms.

New Learning: Supply students with the **Forest Dendrology** fill in the blank notes as you talk about how to classify trees and differentiate them from other trees.

Hands On/Practice: Students will take a nature walk around the school campus and collect 10 specimens (more or less if time and resources allow) from 10 different trees. They will then use the **Dendrology notebook and handouts** to try and identify the tree based on the characteristics of the leaf, cone, fruit, etc.

Assessment: Completion of the dendrology notebook and fill in the blank notes; accurate and complete.

Challenge/closing: Have students turn in a ticket out of the door. Students can do this on their own sheet of paper or you can supply each student with a sticky note. Have them state what stuck with them (what they really understand) and what they are stuck on (what they still do not understand).

5AS7- Parts of a Plant

Unit: Ag Systems	Lesson Objectives: Identify plant parts and functions Identify plant parts that we eat
Essential Question: <ul style="list-style-type: none"> ● What are the different plants and their functions? 	
AFNR Standard: 5AS7 Differentiate and understand parts of plants and how they are utilized in agriculture.	
Connection to GSE: S5L3	
Lesson Essential Questions: <ul style="list-style-type: none"> ● How does the plant use its different parts to function and grow? ● What plant parts do we use and eat? 	Key Words/Vocabulary: Flower Stems Leaves Roots Seeds
<p>Lesson Plan</p> <p>Bell Ringer: Supply students with the handout “Label the plant parts we eat”. Ask students if they know where certain foods we eat come from on a plant. You can make this into a competition with a small prize for the student(s) who get the most right etc.</p> <p>Recall: Go over the “Label the plant parts we eat” and talk about the different foods and where they come from on a plant. As you talk about each food and the plant part that it comes from, supply the students with information about what each plant does.</p> <p>New Learning: Students will put together and complete the “Parts of a Plant Interactive Notebook”</p> <p>Hands On/Practice: Gather the necessary materials and guide the students to complete the “What Do the Parts of the Plant Do? Lab” for further hands/on practice. This lab will require students to check their projects over multiple days.</p> <p>Assessment: Completion of both “Parts of a Plant Interactive Notebook” and “What do the Parts of the Plant Do? Lab” that shows understanding of the parts of the plant.</p> <p>Challenge/closing: Make a list of foods you eat over the next two days that come from plants and label where each part comes from.</p>	

Label The Plant Parts We Eat



Observations

In the days column, write the number days since planting on your observation day. In the activity column, make observations about any activity you see taking place in the cup or growth after cutting its “hair”.

Days	Activity/Amount of Growth	Amount Cut Off	Amount Regrown

(One Less Thing, 2020)

5AS8- Agriculture Biotechnology

Unit: Ag Systems	Lesson Objectives: Students will study wheat and the importance of genetically modifying the DNA of crops to benefit our farmers and food production.
Essential Question: What is biotechnology?	
AFNR Standard: 5AS8 - Investigate how agricultural biotechnology is used in Georgia agriculture.	
Connection to GSE: ELAGSE5RI3, ELAGSE5RI9, S5L2	
Lesson Essential Questions: Why do we need to use genetically modified organisms in agriculture?	Key Words/Vocabulary: GMO Non-GMO
<p>Lesson Plan</p> <p>Bell Ringer: Display pictures (<i>slide 19</i>) on the board of what foods would look like without GMOs. Do not tell students that this is what non GMO foods would look like for us today. Ask students to make a prediction about what went wrong with the production of these crops.</p> <p>Recall: Agricultural biotechnology is an advanced technology that allows plant breeders to identify the specific genes responsible for individual traits and transfer only the desired traits between plants.</p> <p>New Learning: <i>How can biotechnology help us grow more food?</i> Apple model- pages 6-7. Model for students how little land we have on Earth that is suitable for farming.</p> <p>The Boy Who Changed the World-<u>Activity 4</u></p> <p>-complete the read aloud of the book and discuss the contribution Norman Borlaug made to the worldwide efforts against hunger. Use the following questions to guide the discussion:</p> <ul style="list-style-type: none"> ● How did Norman Borlaug change the world? (<i>He created special seeds that grew into super plants that could feed more people around the world.</i>) ● How many people did the work of Norman Borlaug save from starvation? (<i>two billion people</i>) ● Why was it important for Norman Borlaug to learn everything he could about plants and the genetic traits of crops? (<i>Norman Borlaug needed to know about</i> 	

plants and genetic traits so that he could create seeds that had specific traits to grow fast, avoid disease, and grow in different areas of the world.

Hands On/Practice: [Activity 3](#): Wheat Germ DNA Extraction

Complete the wheat germ lab activity and discuss the following-

- What does DNA look like? Did it match your prediction?
- Why is it useful for scientists to be able to extract DNA from an organism?
- Why is it important for farmers to understand the genetic traits of the crops they grow and the animals they raise?

Assessment: Identify the states that produce the most wheat and then find where your state ranks for wheat production on the [interactive map](#)

Challenge/closing: Complete the [“What Stuck”](#) activity for students to record three things they learned during this lesson.

5FA2- Agricultural History

<p>Unit: Foundations of Ag</p>	<p>Lesson Objectives: Describe how important events, inventions, and technologies have changed agriculture practices over time.</p>
<p>Essential Question: How have different events, inventions, and technologies have changed agriculture practices over time?</p>	
<p>AFNR Standard: 5FA2. Explore and cite examples of agricultural history, economics, and inventions.</p>	
<p>Connection to GSE:</p>	
<p>Lesson Essential Questions: How have different events, inventions, and technologies changed agriculture practices over time?</p>	<p>Key Words/Vocabulary:</p> <ul style="list-style-type: none"> ● King Cotton ● Eli Whitney ● Cotton Gin ● Cattle Drives ● Refrigerated Railroad Cars ● Steele Plow ● John Deere ● Cyrus McCormick ● Mechanical Reaper ● Internal Combustion Engine ● Combine ● Land Grant Act ● Experiment Stations ● Scientific Research ● Trial and Error
<p>Lesson Plan</p> <p>Bell Ringer: As students arrive in class, have a class starter (question) on the board. The question should state, “Think of something agriculture-related that you use every day. How do you think the process of getting that item to you has changed over time?”</p> <p>Recall: Previous lesson</p> <p>New Learning: From My American Farm</p> <ul style="list-style-type: none"> ● Ask students to raise their hands in response to the following probing questions (These questions can change based on what you would like to ask): “How many of you have ever churned butter? Plowed a field by hand? Ridden a horse to town? How many of 	

you have ever used a cell phone? Gone on the internet? Played a video game? Used a remote control?"

- Connect student responses to the change in technology over time. Many of our grandparents and great-grandparents had to do things very differently than we do today. Technology and changed, and as a result, so has the use of animals and manual labor in agriculture
- Provide information on the following (You can add/ take out information as you see fit and for what you would like your students to know):
 - How Agriculture began, what was the first type of agriculture and who were the first to start
 - King Cotton, Eli Whitney, and the Cotton Gin
 - Cattle, Cattle Drives, & Refrigerated Railroad Cars
 - Steele Plow, John Deere, & importance
 - Cyrus McCormick Mechanical Reaper, Internal Combustion Engine, & Combine
 - Land Grant Act, Experiment Stations, & Scientific Research

Hands-On/Practice:

- Create (or use the one from [My American Farm](#)) and hand out role-play cards. Break students into teams of 4-5. Use the information above for the role-play cards. Each team will receive a Historical Card, which includes important information about agriculture during a specific time period in history.
- Each team will select one member to act as a reporter, reporting live from their time-period in history. The rest of the team will act as characters in the news report, depicting the important facts listed on the Historical Scene Card.
- Give each team approximately 10 minutes to prepare their short skit. Have teams present their "reports" in order, while you act as the anchor and facilitate the transition between reports.
- Make sure students not reporting are writing down the vital information for the next part of the lesson.

* More historical information can be added or taken out based on the class.

**<https://growingnation.org/> can also be utilized during this lesson to help with information

Assessment: With a partner, students will take their notes and create an informational agriculture timeline with key people, inventions, and technologies based on the new learning and practice that took place during class (This can be done as a poster or on a Google Slide/ PowerPoint). Computers, books, and other resources can be used by the students.

Challenge/closing: Have students pull out a sheet of paper for a ticket out the door. Have students write one thing that stuck with them and one thing they are still stuck on. Collect as students leave and challenge students to look for ways that different agriculture inventions and technologies have changed the way their family lives life.

5FA3- Agricultural Research

Unit: Foundations of Ag	Lesson Objectives: Determine how agricultural research had impacted the agriculture industry
Essential Question: What is the role of research in the agriculture industry?	
AFNR Standard: 5FA3. Assess the role of research in the agriculture industry	
Connection to GSE:	
Lesson Essential Questions: What is the role of research in the agriculture industry?	Key Words/Vocabulary: Research Industry
<p>Lesson Plan</p> <p>Bell Ringer: Question: What would it be like if we still had to plow fields with horses and mules? How different would the agriculture industry look or would it? Be prepared to discuss this as a class.</p> <p>Recall: Previous lesson: Inventions, Inventors, and Technologies.</p> <p>New Learning: Read How can agricultural drones help farmers make decisions? As a class and discuss or you can use this as individual reading time and individual response. You could also play See & Spray - Blue River Technology's precision weed control machine (2:21) or a longer video with a lot more in-depth advances in technology due to research The Future of Farming (12:28). These two videos talk about new emerging technologies that are due to research in the field of agriculture. Have students lead discussions about research in agriculture.</p> <p>Hands On/Practice: Provide students with a variety of resources and materials related to new and emerging technologies. Break students into groups of 2-3 and have students choose one new patented technology and create a google slide for their peers.</p> <p>Assessment: Turning in the group research projects</p>	

Challenge/closing: Have students take out a sheet of paper and write down what they know and what else they would like to know more about in regards to agriculture research.

5LCR4- Community Organizations

<p>Unit: Leadership</p>	<p>Lesson Objectives: Identity different school and community organizations that encourage leadership and personal growth?</p>
<p>Essential Question: What school and community organizations encourage leadership and personal growth?</p>	
<p>AFNR Standard: 5LCR4. Compare various school and community organizations that encourage leadership and personal growth.</p>	
<p>Connection to GSE:</p>	
<p>Lesson Essential Questions: What school and community organizations encourage leadership and personal growth?</p>	<p>Key Words/Vocabulary: Leadership Personal Growth 4H FFA FCCLA FBLA DECA HOSA TSA</p>
<p>Lesson Plan</p> <p>Bell Ringer: What is leadership? Is it learned or are you born with it? How can you develop personal growth and leadership?</p> <p>Recall: Previous lesson</p> <p>New Learning: How can you develop personal growth and leadership right now? Have information ready to talk about the different organizations that students could get involved in, in middle school and high school that help encourage leadership and personal growth. Some of these organizations can consist of 4H, FFA, FCCLA, FBLA, DECA, HOSA, & TSA. Provide pictures, videos, etc. of opportunities that each organization offers students and ways for students to develop leadership and personal growth.</p> <p>Hands-On/Practice: Community Organizations Shoe Box. Create a shoebox (you can decorate it however you see fit for your class) and inside have slips of paper with each</p>	

community organization. Have students work in groups of 2-3 and research their given community organization that they pick. Depending on class size, some groups may have the same organization. The main point is to research each organization, find information about the organizations, discover opportunities, and how each develops leadership and personal growth.

Assessment: Completion of the Community Organizations Shoebox and/or presentation to the class.

Challenge/closing: Ticket out of the door. Have students write down which of the organizations is of interest to them and how it will develop leadership and personal growth.

Program Performance Indicators (PPI) for Maintaining an Elementary Agriculture Program

Beginning Date:

End Date:

Program of Work

Teacher Meets Standards:

Program Meets Standards:

Evaluation

Teacher Meets Standards:

Program Meets Standards:

PPI	Item	PPI Professional Accomplishments/Requirements	Evaluation
	1	Each teacher holds a valid teaching certificate in Agricultural Education or a provisional certificate in agricultural education	
	2	The school will offer a minimum of one course in agricultural education each semester to maintain the program as an integral part of the instructional program.	
	3	The program will submit at least one Georgia Elementary SAE record book award application per teacher for regional consideration by the assigned due date.**	
	4	The teacher will submit a Program of Activities (POA) and budget to the Regional Director in their respective region by October 15	
	5	The program representatives will participate in a Leadership Training workshop offered by the program/club, teacher/advisor, or the Georgia FFA Association.**	
	6	The program will submit an Elementary Program of Excellence Award Application (Form I) and one of the following chapter applications to the Region Office by the due date.**	
		Elementary Program of Excellence Award Application (Form II)**	
		National/Georgia Ag Week Observance Award Application**	
		Program Gardening Project**	
	7	Each teacher will serve as an advisor of the Agriculture Club.	
		Each agriculture club will have no more than 5 representatives. (Advisors discretion on one per grade or 5 representatives from any grade 1st-5th)	
	8	The program will hold a minimum of five (5) agriculture club meetings during the year.	
	9	The program will conduct a program awards night or equivalent award program	
	10	The program will conduct activities in recognition of National/ Georgia Ag Week.	
	11	The program will conduct a Community Service Project and submit a Community Service "Helping Hands" Application.**	
	12	Each teacher will have a participant in one or more of the following leadership designated Career/Leadership Development Events at the local OR above the local level. (one required)**	

		Prepared Public Speaking	
		Parliamentary Procedure (Modified)	
		Knowledge Bowl	
		FFA Creed LDE	
		Agriscience Fair	
	13	Each program will have students conduct an individual SAE in-class project OR a class SAE project and keep records in the approved Georgia Elementary SAE Record Book**	
	14	Each teacher will prepare teams or individuals to compete in a minimum of two Career Development Events (CDEs) conducted at the local OR above the local level. **	
		Livestock Evaluation	
		Nursery/Landscape ID	
		Poultry Evaluation	
		Environmental and Natural Resources	
		Floriculture ID	
		Floral Design	
		Forestry ID	
		Forestry Field Day	
		Wildlife Management ID	
		Agricultural Technology Equipment ID	
		Veterinary Science Breed ID	
	15	Each teacher will comply with Affiliation standards by including each student enrolled in their Agricultural Education classes on their Georgia Agriculture Education roster.	
	16	The chapter's Fall Agriculture Club roster will be submitted by October 15 and the chapter's Spring FFA roster will be submitted by March 15.	
	17	The chapter will participate in one or more of the following FFA leadership activities. Please indicate the projected number in attendance.	
		FFA Day at the Fair	
		Area Award Banquet	
		Elementary School Agriculture Rally*	
		Exploration Conference*	

**Indicates applications, activities, or conferences that have not yet been created.
(Georgia Agricultural Education, 2019).

Chapter 5: Reflection

This creative component has allowed me to step outside of my comfort zone, into grade levels and audiences that I am not familiar with, to use my perspective and knowledge of the agriculture curriculum to create curriculum and help assess success. This has been beneficial to my professional work by allowing me to broaden my horizon within agriculture education, forced me to think outside the box, and allowed me to extend my knowledge to different areas of learning. This is especially true, since most curriculum and activities for this area had to be created from scratch. I have also been able to reach out and build relationships with our state curriculum director in agriculture education, different elementary pilot school teachers, and regular education elementary school teachers. Relationships such as these will continue to help me in my professional career.

Relationships with professors, colleagues, and other agricultural education teachers during my master's journey have also been a valuable asset in helping me get to where I am now and helping me continue my education. These relationships have served as building blocks during my time at Iowa State and will have a lasting impact on me as an individual and throughout my professional career. I strive to be a life-long learner and each of these individuals have played a part in helping me continue my learning and helping me to continue to advance my professional career.

This project has been an exciting journey, yet a difficult one as well. It was exciting in the fact that I was able to be a part of something that has yet to be completed, something that will help our industry and our profession for years to come, and I was able to be a part of curriculum development. I believe elementary level agriculture education programs will continue to

strengthen agriculture education in the state of Georgia and produce students that are ready for the field of agriculture once they graduate.

As a middle school teacher, it was extremely difficult for me to turn my middle school teaching brain into an elementary school teaching brain. I noticed this was hard for me and some items I had to re-evaluate if it was academically suitable for 3rd or 5th-grade students. Another struggle was this issue of limited literature and research for this area, being that it is fairly new to the state and the nation. As stated in previous chapters, there was little to no information readily available for elementary school agriculture education teachers to create curriculum besides school gardens, farm days and Agriculture in the Classroom (AIRC). I was able to find The National FFA Food and Agriculture Literacy curriculum, Georgia Agricultural Education Middle School curriculum, Georgia Foundation For Agriculture, UGA Extension, My American Farm, and National Agriculture in the Classroom were excellent resources for curriculum development and should be utilized in the future.

Since completing this project, there are a couple things I wish I would have done prior to its completion. I wish I would have become more familiar with the Georgia Standards of Excellence, so I would be more familiar with how to tie those in with each lesson plan that was created. I also wish I would have met face-to-face with some of the pilot program teachers to talk more about curriculum and challenges that they may be facing currently with the pilot programs. I could then use that valuable input to be able to plan lessons with those items in mind to be able to alleviate some of the pressures and challenges they are currently facing in the classroom. I would also add a survey to pilot program teachers to assess the needs of the

diversity of schools, students, and areas may be needed to help better assist each teacher with the individual needs of each school and to gain different perspectives.

In conclusion, this experience has been exciting, yet difficult at the same time. This has allowed me to become a better student, teacher, FFA advisor, and role model for teachers and students alike. With the relationships, resources, and knowledge I have been able to gain through this creative component, my personal and professional career will continue to grow and thrive.

Recommendations/ Extensions

Recommendations and extensions for this creative component and curriculum are as followed. Due to the diversity of students, schools, and agriculture across the state, it is recommended that a survey be sent out to help better assist each teacher with the individual needs of each school and to gain different perspectives of challenges. Lessons can then be modified to fit the needs of individual programs. I also recommend teachers and curriculum developers continue to utilize and work with The National FFA Food and Agriculture Literacy curriculum, Georgia Agricultural Education Middle School curriculum, Georgia Foundation For Agriculture, UGA Extension, My American Farm, and National Agriculture in the Classroom to help strengthen elementary lessons.

It is obvious this curriculum for elementary school will continue to grow and evolve over time. With that being said, with more development of curriculum and research within the area of Elementary School Agriculture Education, we will continue to learn more overtime and improve curriculum development. Within the curriculum itself, teachers should be prepared ahead of time, but flexibility of curriculum and time are up to the teacher's discretion and based on the individual needs of each class. I would also recommend teachers report back any complications

or improvements they would like to see made to the curriculum to the state curriculum director.

Lastly, I would recommend digital learning assignments be created for the elementary agriculture lessons.

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