

Establishing a math credit for the Agriscience CTE Program at Perry High School

by

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Abstract

Often students struggle with connecting course content to the real world which can lead to a lack of motivation during learning. Math is a tool used daily within the agriculture industry. Providing applied instruction connecting math concepts with typical agricultural careers can help bridge the gap between content in the classroom and real world applications.

Career and Technical Education programs provide hands on learning for students to prepare them for a career in a focused industry. Student enrollment can be a struggle for many programs while students balance the necessary graduation requirements. Aligning program instruction with additional course credits would create another avenue for students to choose and can in turn increase program enrollment.

The purpose of this project was to create a course curriculum within the agriscience program that would provide the students at Perry High School an option to count the agribusiness courses as their fourth-year math credit.

Chapter 1 - Introduction

How many of us remember questioning the importance of learning the Pythagorean theorem in algebra class? Or maybe struggling to get through statistics and wondering when we were ever going to use that concept after the final exam? You are not the only ones.

We hear all too often that many students struggle with connecting content from the classroom to components of the real world, especially with a subject like math. Students may find themselves lost when trying to comprehend a new idea and when they try to imagine a time when they might utilize that specific difficult concept, they come up empty handed and may be deterred away from working to master the topic. In order to overcome this battle between students and difficult subjects, it is important to build those connections between content and the real world within the classroom lessons. Notably, this is where Career and Technical Education (CTE) courses shine their spotlight.

CTE courses offer hands-on learning focused on a specific trade or industry that may be of interest to students in high school (Michigan Department of Education, 2020). Students enrolled in a CTE course may already have a foundation and strong interest in pursuing a career within that industry or may be trying something new to find a passion of theirs. Content in a CTE program covers all aspects of the focus industry and often includes exploration opportunities such as work-based learning experiences, guest speakers, and industry field trips. These courses allow students in their high school career to explore a potential future career industry before committing to a post-secondary educational institute.

CTE programs are divided into seventeen different career clusters, focusing mostly on high-demand industries (Michigan Department of Education, 2019). Agriculture, Food and Natural Resources (AFNR) is one of the cluster opportunities and is offered in all 50 states.

Much of the general public, and potential CTE students, view agriculture classes as just plant/animal based farming courses. This narrow-minded view of the agriculture industry acts as a difficult barrier for AFNR educators as they try to recruit students to join their courses. In reality, the agriculture industry, and AFNR CTE courses, offer a much broader spectrum of topics including: marketing, communications, commodity trading, business, sales, biosecurity, food safety, and more. Often students with no agriculture background who choose to take AFNR CTE courses find a passion within the industry. The challenge becomes encouraging students to take a chance on a course they may have no immediate interest in with hopes that the opportunity opens new doors for them.

This challenge is no different at Perry Public Schools. Perry, Michigan is a small, rural town with a population just over 2,000 people. The average graduating class is roughly 100 students and 46% of the student body qualifies for free and reduced lunch (MI School Data, 2019). Our town has little racial diversity, with 91% of our students Caucasian (MI School Data, 2019). The agriscience program is currently the only CTE program Perry offers as finding qualified applicants for new CTE teaching positions has proven difficult.

When students select their ideal class schedule as an eighth grader at Perry, they have two options for the required science credit: Biology or ANR Biology. Both courses successfully fill the science credit needed as freshmen, however ANR Biology serves as the first course in the AFNR CTE sequence. The CTE courses offered are intentionally sequenced as stepping stones through the agriculture industry, similar to a math sequence of Algebra before Precalculus. Therefore, the choice eighth grade students make plays a significant role in the courses that are available to them throughout their high school career. The Introduction to Agriculture elective course taught in eighth grade helps to broaden the views students have of the agriculture

industry, hopefully finding a segment of the industry that might be of interest to them. This semester long rotating class reaches a majority of the eighth-grade students and helps to increase the number of students who choose ANR Biology as their freshmen science.

Currently, the AFNR CTE sequence provides credit for the freshmen science course but all other classes offered are electives students must fit into their schedule. This offers another roadblock as many students are interested in furthering their AFNR education but might not have enough room in their course schedule to add those electives. One way to combat this issue is to meet more required credits within the AFNR course sequence.

Michigan Department of Education (MDE) requires students to complete four years of math and English curriculum, three years of science and history curriculum, and a variety of other course options (MDE, 2017). Students at Perry High School have six class periods per day with four hours restricted by the core class requirements. This only leaves two class periods to add in all the other course options. Choosing ANR Biology as a freshman allows them to enter the AFNR sequence while meeting their science requirement for the year. However, after their freshman year the rest of the AFNR sequence serves as electives, making it difficult for students to carve out time in their class schedule to dedicate to AFNR. By shifting the focus of the courses taught in the AFNR sequence and including an additional credit requirement throughout the course, students may be more interested in continuing their education through AFNR. An Agriculture Business course would not only meet their 4th-year math requirement but also aid in the content-to-real-life struggle many students face with math. Providing this option for students offers an additional incentive to choose the AFNR path as they enter high school.

Chapter 2 - Literature Review

According to the National Center for Education Statistics (NCES) (2019), only 44% of high school graduates enrolled in a 4-year post secondary institute in 2017. With less than a majority of high school students entering a 4-year program, offering a wider variety of courses to meet the educational requirements set by the Department of Education would ensure students are offered the most beneficial curriculum experience to prepare them for their future. Many students will enter the workforce immediately after high school, an especially common practice for those in the agriculture industry. Making content-industry connections, like using math within agriculture, while in high school will better prepare students for success in their jobs.

The NCES also provides data about math course completion among high school students. In 2009, 76% of students completed the Algebra II course while only 35% of students went on to complete Precalculus, the next course in the math sequence (NCES, 2016). While Michigan students are required to take four years of math curriculum and a small percentage are completing Precalculus, other applied math courses would assist them in becoming proficient in using math within an industry of their interest. Anderson and Anderson (2012) emphasized “Infusing academic learning standards into CTE will help strengthen the entire academic curriculum” for students. Providing agribusiness curriculum to students to reinforce math concepts in an applied manner will strengthen the academic curriculum and help mold more well-rounded individuals as they complete the program.

Despite the opportunities CTE programs provide, many programs are struggling to keep enrollment numbers high. According to a study by the US Department of Education (2019), 77% of high school students were CTE participants in 2013, completing at least one course in a CTE program area of study. However, only 37% were classified as CTE concentrators, completing

two courses in the program. Such a major drop in participation indicates many students are not finding a benefit of continuing the program of study. The higher graduation rate, employment rate, and annual earnings among CTE concentrators compared to non-CTE concentrators shows the value in completing a CTE program and finding a career within the industry (U.S. Department of Education, 2019). This clear data does not always catch the attention of high school freshmen or sophomores who are trying to decide which courses to take throughout their schooling. Creating further incentives for continued participation such as developing their industry related math skills would provide encouragement for more students to choose the continued CTE path and prepare them for a successful future.

The Michigan Department of Education (MDE) set guidelines for integrating graduation requirement credits into CTE program courses. The plan highlights the availability for CTE courses to cover math content within the instruction to count towards a student's fourth math credit. These options are created to offer math instruction within the final year of a student's high school career while allowing them to apply it within an industry of interest. These district-approved opportunities could be presented in a variety of course offerings as long as they are covering math content to satisfy the 4th-year math requirement.

The purpose of this project was to create a course curriculum within the agriscience program that would provide the students at Perry High School an option to count the agribusiness courses as their fourth-year math credit.

Chapter 3 - Methods & Procedures

Throughout the past couple years, the agriscience program advisory committee, consisting of a variety of agriculture industry professionals, has been brainstorming efforts that could benefit the students in our program. One recurring topic the committee continues to discuss is the course offerings we have within our program and how to better focus the classes to prepare more qualified agriculturalists to enter the industry. Their recommendation was to incorporate skills used in an everyday setting within the agriculture industry into the curriculum. Some suggestions included balancing feed rations, calculating fertilizer applications, and selling strategies. It was this recommendation that highlighted the role math concepts play in the agriculture industry and led me to develop the plan to create a curriculum that would count as a senior math credit. I first brought this idea to my principal in December 2018 and he shared MDE resources with me that outlined procedures for counting CTE courses for other credits. Throughout the next year I worked with other local ag teachers who taught some variation of agribusiness as a math credit within their programs. They pointed me to a variety of resources which helped me create the draft curriculum. In December 2019 I met with my principal and counselor to share my ideas and discuss our options. They were both on board with the proposal and outlined the next steps: work with the current senior math course teachers to ensure the curriculum would include adequate math content and bring the proposal to the school board for approval.

The current math class for most seniors, who are not on the advanced route, is Consumers Math which focuses on topics such as gross/net pay, banking and loans, taxes, insurance, and investing. Covering these, or similar topics, in the junior/senior agriscience courses would provide students with a math curriculum while aligning it to the agriculture industry - a possible

future career for many of these students. This new content would allow students to utilize the agriscience program to meet their math credit, opening another hour in their schedule.

In addition to meeting with our school principal, counselor, and math teachers, I also worked with our new superintendent who recently served as a curriculum director at a neighboring school. Her insight about content to cover and opportunities to provide the students within this course helped me shape the plan I created.

After approval by the school board in the fall, the course will be added to the high school course catalog for student selection. Highlighting the math credit availability within the course catalog will allow all students to recognize what the agriscience program has to offer and hopefully encourage more students to continue through all the courses offered within the program.

In order to continue to provide the most beneficial option for our students, an end of course survey will be provided to gain insight for improvements. Feedback from the students about career preparedness and the major projects/opportunities within the course will help reshape the curriculum for the future. Student surveys paired with content assessments throughout the course will provide adequate feedback about the impact of the course on student outcomes and the usefulness of earning the math credit.

Chapter 4 - Product

The number of students at Perry High School who enroll in the Agriscience CTE courses throughout all four years of high school only permits one junior/senior rotating course offering per year. Currently the sequence includes: ANR Biology for first year CTE students, Zoology for second year students to become completers, and Advanced Zoology or Advanced Botany offered every other year for junior and senior students together. To create a math integrated curriculum for seniors to take, the most cohesive option is to offer two different semesters of Agriculture Business: one during each of the rotating elective courses. The two semesters will be embedded into the current Advanced courses to ensure students will complete both semesters of the curriculum and will obtain a math curriculum during their fourth year of high school.

Eighth grade students sign up for their high school courses during the winter after meeting with the counselor and principal during a “Surviving High School” parent meeting. Students and parents hear about the variety of course options while at the meeting and have time to ask questions about the classes their students should take. In order to create a better understanding of the opportunities within the AFNR CTE program, I attend the parent meeting and outline our course offerings. This meeting gives me an opportunity to explain the credits students will earn within the program and highlight the benefits of joining our agriculture classes. Importantly, after approval of this agribusiness curriculum, the 8th grade parent meeting will be the perfect time to highlight the new curriculum and explain the credits we have to offer.

Course Descriptions:

Advanced Zoology and Agribusiness Management - This course offers the foundations of managing a business in the agriculture industry and a focus on advanced animal science. The first semester will include topics such as veterinary science skills and major systems of livestock (circulatory, skeletal, reproductive, etc.). The second semester will include the basics of budgeting, record keeping, and career preparedness while also covering sales and marketing techniques, savings and investment opportunities, and agriculture commodities. Completing this course during your senior year will count as a 4th year math credit.

Advanced Botany and Agriculture Economics - This course highlights different segments of economics in agriculture in addition to advanced plant science topics. Semester 1 will focus on topics such as forestry, landscape design, and greenhouse management. Instruction during semester 2 will highlight the basics of economics, types of businesses, ethics in business management, US/International trade, insurance, and risk management. Completing this course during your senior year will count as a 4th year math credit.

AFNRE Standards to be taught in addition to Advanced Botany/Zoology Standards:

Agribusiness Management:

- Technical IV.A.2 (Agriculture Business & Marketing): Utilize record keeping to accomplish AFNR business objectives while complying with laws and regulations.
- Technical IV.A.3 (Agriculture Business & Marketing): Demonstrate knowledge of principles in marketing within an AFNR business.
- Career Cluster I.B.3 (Agriculture Business & Marketing): Explain the types of industries, organizations, and activities part of AFNR.
- Career Cluster I.B.4 (Agriculture Business & Marketing): Explain the influence of AFNR on society.

Agriculture Economics:

- Technical IV.A.1 (Agriculture Business & Marketing): Describe AFNR businesses and identify global opportunities in agribusiness.
- Technical IV.A.4 (Agriculture Business & Marketing): Demonstrate knowledge of an AFNR business plan.
- Career Cluster I.B.1 (Agriculture Business & Marketing): Examine company performance and goals within AFNR organizations and the AFNR industry.
- Career Cluster I.B.2 (Agriculture Business & Marketing): Examine the role of AFNR in global, national, and regional economies.
- Career Ready Practice I.A.5 (Agriculture Business & Marketing): Consider the environmental, social and economic impacts of decisions.

Curriculum Outline:

Unit Outline for Agribusiness Management Semester (paired with Advanced Botany)

Unit	Objectives
Budgeting	<ul style="list-style-type: none">● Discuss accounting principles and procedures used in business management and tax planning● Explain the importance of budgeting in agribusiness● Create and implement a budget
Sales & Marketing	<ul style="list-style-type: none">● Analyze agriculture marketing systems● Evaluate various pricing strategies● Describe the laws of supply and demand● Complete the steps in the sales process● Demonstrate effective sales principles and techniques● Create a SWOT analysis of businesses
Saving & Investing	<ul style="list-style-type: none">● Explain the role of credit in agribusiness and agricultural production● Differentiate types, sources, and uses of savings in agribusiness● Discuss investing in agribusiness
Commodities & Contracts	<ul style="list-style-type: none">● Demonstrate how trades take place in futures exchange● Become knowledgeable on aspects concerning futures markets
Career Preparedness	<ul style="list-style-type: none">● Stimulate interest in career development● Enhance employability skills● Explain the realistic expectations of a working environment● Demonstrate proper interview skills
Record Keeping	<ul style="list-style-type: none">● Properly maintain financial records● Learn to construct a balance sheet● Explain the importance of keeping accurate records of a business

Unit Outline for Agriculture Economics Semester (paired with Advanced Zoology)

Unit	Objectives
Business Types	<ul style="list-style-type: none"> ● Role and value of agricultural organizations ● Explain the interdependence of business activities ● Identify various types of agriculture businesses ● Compare different forms of business organization and ownership ● Formulate a business plan
US & International Trade	<ul style="list-style-type: none"> ● Evaluate domestic and world trades in agriculture ● Compare local, national, and international agricultural markets and how trade affects the economy
Ethics in Business	<ul style="list-style-type: none"> ● Evaluate decision-making processes within the American free enterprise system ● Explore management styles and functions ● Distinguish between ethical/unethical and legal/illegal business practices ● Relate ethical decision making processes to business situations
Basics of Economics	<ul style="list-style-type: none"> ● Fundamental economic principles of agribusiness and agricultural production ● Analyze how supply and demand impact price ● Explore factors affecting business risk and profit
Agriculture Insurance	<ul style="list-style-type: none"> ● Compare the different types of insurance needed for an agriculture business ● Be able to determine the needs of an individual agribusiness ● Learn the various insurance options and the companies that provide them
Risk Management	<ul style="list-style-type: none"> ● Evaluate sources of risk and risk strategies ● Explain basic risk management principles and their impact on economic viability ● Assess the potential consequences associated with business risks

Assignment Examples:

The final curriculum was developed using a variety of resources including course outlines from local ag programs, the Farm and Ranch Business Management book from John Deere (2004), Agribusiness Decisions and Dollars by Jack Elliot (2009), and contest outlines from Michigan FFA. I also utilized three online resources: an Agribusiness Management online course offered through iCEV Multimedia, business management projects from CTE Online, and the Agribusiness & Marketing Curriculum from a fellow agriculture educator, Craig Kohn. Throughout my first year teaching this curriculum I will lean on these resources as guides. Course surveys, assessments, and feedback from students will allow me to adapt this curriculum over time and adjust it to create a more personalized curriculum. These are some examples of assignments from the variety of resources I will be using.

Unit: Ethics in Business; Lesson: Unethical Case Study Source: iCEV Multimedia

Directions:

- Research a contemporary agribusiness case of unethical conduct.
- Create a presentation based on the information found. Answer the following questions:
 - A. What is the name of the organization
 - B. What was the unethical conduct which the organization was involved in?
 - C. What did the organization do wrong under the circumstance?
 - D. How did the unethical conduct affect the affiliated parties
 - E. How could the unethical conduct be prevented?
- Include a citation sheet listing all sources used.

Unit: Career Preparedness; Lesson: Interview Preparations

Directions:

- Create an “Interview Guide” highlighting common interview questions and strategies to use when participating in an interview. Use sources like Forbes, or Harvard Business Review to find helpful information.
- Choose a potential job opening you could apply for in the future.
- Share your Interview Guide with a partner and take turns interviewing each other for your selected job. Each interview should last approximately 10 minutes.
- Complete the Interview Reflection page to provide feedback for your partner.


Interview Reflection
Interviewer Name: Interviewee Name: Job Title:
Questions answered thoroughly and included personal detail: - - -
Questions with room for improvement. What personal details could have been included? - -
Soft skills displayed appropriately during interview: - - -
Additional qualities that could have been emphasized more: - -

Unit: Sales & Marketing; Lesson: SWOT Analysis

Directions:

1. After reviewing the definition and examples of a SWOT Analysis as a class, use the template to complete your own SWOT Analysis for two competing companies (Example: TSC vs Family Farm and Home).

Example:

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none">• Excellent, well-trafficked location• Good reputation among local community• Seasonal menu, locally sourced	<ul style="list-style-type: none">• Higher costs than comparable chain restaurants• Single location means limited reach• Modest advertising budget• Not currently using food delivery apps/technology
OPPORTUNITIES	THREATS
<ul style="list-style-type: none">• Growing interest in/support for locally sourced ingredients• Seasonal menu keeps things fresh and interesting• Potential for growth via food delivery apps/technology	<ul style="list-style-type: none">• Intensifying competition from established chain restaurants• Uncertain economic environment• Rising costs of ingredients 

Company	Strengths	Weaknesses
Company	Opportunities	Threats

Unit: Business Types; Lesson: Create Your Own Business Plan

Source: CTE Online, A. Welsh-Treglia

Purpose: To create a basic business plan that would be used for a startup company.

1. Cover Page (10 points)

- a. Company Name
- b. Your Name
- c. Company Address
- d. Company Phone Number

2. Executive Summary (20 points)

- a. What products or services will your company provide?
- b. What is your customer profile? (Specific target customer profile)
- c. What are your company's goals and future plans?

3. Company Description (30 points)

- a. What is your company's mission statement?
- b. What is your company's motto/mission statement?
- c. Company logo (Hand drawn or computer produced)
- d. Who are the main members of your company?

These should be people or job position that the company could not operate without

- e. What is the legal structure of the company? *see page 2 for options and descriptions*
- f. What are the marketplace needs that you are trying to satisfy?
- g. Facility

1. Supplies and Equipment

- a. Create a chart for 10 items that you will need to operate your business
 - a) Equipment name
 - b) What it will be used for
 - c) Where you will be perching the item
 - d) The cost of the item
 - e) How many will be purchased

2. How will you design the space?

- a. Hand drawn/computer produced

- b. The layout should be clearly labeled and include the at least the following
 - i. Entry door
 - ii. Bathrooms
 - iii. Employee break room
 - iv. Where the supplies and equipment from above will be placed

4. Market Analysis (20 points)

- a. Who is your target customer (Specific target customer profile)?
- b. Describe the industry you will be working in. (outlook, size, growth rate, life cycle, etc.)
- c. Who is your competition?
- d. What are your advantages over your competition?
- e. What is your pricing structure? (see page 3)
- f. What types of discounts do you plan to use? (see page 3)

5. Product or Service Line (5 points)

- a. Describe in depth the products or services that your company will be providing.
Give at least 5 specific examples
- b. What 2 pricing structures will your company utilize (see page 3 for names and definitions) How will they be applied?

6. Marketing and Sales (15 points)

Marketing Mix	Primary Issue	Strategy
Product	What are the primary features of my product that make it special? (Why is it unique from others?)	
Promotion	What should the promotional message be? (your slogan can go here)	
Place	Where should I sell my product? (justify the location you have chosen for your business)	
Price	How do I price my product? (Be sure to be competitive with pricing)	

Projects: Agricultural Sales or Marketing CDE; Source: Michigan FFA

Preparing for and participating in the Agricultural Sales or Marketing CDE will be a major class project each spring. Students will work in teams to prepare for the contest and their final presentation in class will determine which teams will be chosen to represent the chapter at the state contest. Outlines of the contests are included here.

Agricultural Sales CDE

PURPOSE

The selling of agricultural products is a key to profitability in today's competitive economy. Through this event, students will have the opportunity to prepare for careers in sales by participating in a wide range of activities oriented around the total sales process.

OBJECTIVES

The agricultural sales career development event provides the opportunity for the participant to:

- Develop verbal, written and interactive communication skills.
- Demonstrate skills to build rapport with customers.
- Discuss features and benefits of a product.
- Identify potential customer objections.
- Introduce the product to prospective customers.
- Develop a sales call that determines, and addresses customers' needs and objections.
- Attempt to close the sale by asking for a customer's buying decision.
- Identify and demonstrate the use of questions throughout the sales process.
- Develop active listening skills.

EVENT FORMAT

The model agricultural sales event will consist of four parts: an oral sales presentation, written test, pre-call planning team activity and practicums. The event will be a team event consisting of four students. All team members will participate in the sales presentation components of the event individually. Using the team approach, each team competes as a group in the written test and pre-call planning team activity. Two practicums (Customer Relations, and Telephone Skills, with 2 members competing in each category individually) make up the remainder of the contest. The event will consist of 150 total possible points per team member (sales presentation - 100 points, and practicum - 50 points), a written team test – 50 points, and a team practicum of a pre-call planning activity - 50 points, for a total team score of 700 points.

Marketing CDE

PURPOSE

To assist students to gain an understanding of the marketing process through the development and presentation of a marketing plan.

OBJECTIVES

- To develop an understanding of the marketing plan process.
- To provide an activity to focus student and community attention on the agrimarketing curriculum.
- To allow students to explore and prepare for possible careers in agrimarketing.
- To help develop partnerships and improve relations with agricultural industries, local FFA chapters and the general public.

EVENT FORMAT

Marketing plan is designed to help students with developing practical skills in the marketing process through the development and presentation of a marketing plan. Students research and present a marketing plan for an agricultural product, supply or service. It is intended as a competitive activity involving a team of three persons working for a local community agribusiness to support the FFA's outreach mission. Local chapters may involve the entire chapter, a specific agriculture class or a three-person team. The intent is to have a three-person team present the results of primary research involving the local community that provides a reasonable and logical solution to the marketing problem. Understanding of the marketing process is manifested in the marketing plan, which is presented in a five to eight page document and in a live presentation before qualified judges. Though only three individuals are on a team, any number of students may assist with the primary and secondary research.

Chapter 5 - Reflection

Redesigning the curriculum to offer new credits for my students has been a goal of mine since I started teaching three years ago. When I took over the program, I immediately recognized the low numbers of upperclassmen who were deciding to stay enrolled in the program throughout all four years of school. The low student interest was caused by many barriers and was creating a less impactful program. Creating new incentives and providing additional course credit will help more students see the benefit of the agriculture program in its entirety and will ultimately build the program.

The time I've spent in this masters program has helped me shape my plans for this curriculum redesign. I appreciated my first course focusing on the breadth of agriculture education as that course content helped me broaden my understanding of agriculture education and what I could be offering as opportunities for my students. All too often my students think that to enter a career in agriculture they have to become a farmer, seed dealer, or machine operator. Diving into what agriculture education encompasses helped me shape "agriculture" differently for my students and allowed me to think through this new curriculum with a broader view. The instructional methods course encouraged some self-reflection as an educator which helped me become more aware of my teaching style and the strategies I am most comfortable with. Exploring different teaching techniques throughout this course allowed me not only to incorporate new ideas into my current teaching but also include those ideas within this curriculum design project. The learning theory course made me more aware and reflective of my students and their abilities. I appreciated exploring how students learn and how I can tailor my instruction to create the most effective learning opportunities for my whole class. The research course not only helped me understand educational research strategies but it encouraged me to

consider the benefits of utilizing research within my program. Adapting the components of my program based on the needs, wants, and interests of my students will create a more desired and effective program. Overall, this project has allowed me to bring all of the experiences together to reach one of the goals I set for myself when I started teaching.

In addition to the courses within this program, the curriculum redesign project allowed me to work closely with and utilize resources from other educators. I appreciated working with the local agriculture teachers in my county to gain insight of their programs and the courses they teach. They are daily role models for me as a new educator and learning from them about their curriculum sparked a variety of ideas for this project. Additionally, I utilized the widely used Ag Education Discussion Lab group on Facebook to gather ideas from educators across the country. As many states structure their curriculum differently, I was able to find a variety of content examples that were different from the more local sources.

My overall desire is for this curriculum redesign to offer a new avenue for my students to explore with agriculture. I hope by providing additional course credits they will decide to continue their education within my program and in turn be exposed to a part of the industry they may have never thought of before. Some of my students have a talent within math but never imagined utilizing that interest within the agriculture industry while other students have a strong passion for agriculture but do not excel with common math. This curriculum is meant to benefit both groups of students. One group may learn how they can implement their love for math in a meaningful agriculture career while others may develop and better understand useful, real world math skills they can use on a daily basis. The growth of my students and their discovery of new opportunities will always be at the forefront of my educational goals.

References

- Anderson, D.R. and Anderson, D.S., 2012. Emerging Themes in Integrating Mathematics into Agricultural Education: A Qualitative Study of Star Teachers in Virginia. *Journal of Career and Technical Education*, 27(2). DOI: <http://doi.org/10.21061/jcte.v27i2.556>
- CEV Multimedia. (2020). *Introduction to Agribusiness*.
<https://www.icevonline.com/curriculum/agricultural-science/courses/introduction-agribusiness>
- Elliot, Jack. (2009). *Agribusiness: Decisions and Dollars* (2nd ed.). Delmar, Cengage Learning.
- John Deere. (2017). *Farm and Ranch Business Management* (8th ed.). Deere & Company.
- Kohn, C. (n.d.). *Agribusiness and Marketing Semester Curriculum*.
<http://wuhsag.weebly.com/agribusiness-and-marketing2.html>
- MI School Data. (2019). *Our Schools - At a Glance. Perry Public Schools*.
<https://www.mischooldata.org/Legislative2/LegislativeDashboard4.aspx>
- Michigan Department of Education. (2017, September). *Michigan Merit Curriculum: High School Graduation Requirements*.
https://www.michigan.gov/documents/mde/Complete MMC FAQ August 2014_467323_7.pdf
- Michigan Department of Education. (2019, July). *State-Recognized CTSOs by Career Cluster and CIP Code 2019-2020*. [https://www.michigan.gov/documents/mde/19-20_State-Recognized CTSOs by Cluster and CIP 667728 7.pdf](https://www.michigan.gov/documents/mde/19-20_State-Recognized_CTSOs_by_Cluster_and_CIP_667728_7.pdf)
- Michigan Department of Education. (2020). *Career and Technical Education*.
<https://www.michigan.gov/mde/0,4615,7-140-2629---,00.html>
- Michigan FFA Association. (2020, January). *Agriculture Sales Career Development Event*.
<https://michiganffa.com/wp-content/uploads/2020/03/Agricultural-Sales-Contest-Rules.pdf>
- National Center for Education Statistics. (2016). *Percentage of high school graduates who completed selected mathematics and science courses in high school: 1990 and 2009*.
https://nces.ed.gov/programs/coe/indicator_cod.asp
- National Center for Education Statistics. (2019). *Immediate college enrollment rate of high school completers, by level of institution: 2000 through 2017*.
https://nces.ed.gov/programs/coe/indicator_cpa.asp

U.S. Department of Education. (2019, September). *Bridging the Skills Gap: Career and Technical Education in High School*.
<https://www2.ed.gov/datastory/cte/index.html#WHATISCTE>

Welsh-Treglia, A. (2018). *Business Plans Made Easy PBL Project*. CTE Online.
<https://www.cteonline.org/curriculum/project/business-plans-made-easy-pbl-project/FchVkM#home>

White, D. (2018). *Agricultural Marketing From Farm to Table PBL Project*. CTE Online.
<https://www.cteonline.org/curriculum/project/agricultural-marketing-from-farm-to-table-pbl-project/uKGGHc#home>