

**Plant Profits: An Instructional Manual to Hosting a School Plant Sale and Funding
Agricultural Education Programs from the Profits**

By

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The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this creative component. The Graduate College will ensure this creative component is globally accessible and will not permit alterations after a degree is conferred.

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ABSTRACT

Through personal experience and research, the need for this type of manual arose. The purpose of the manual is to be a quick-guide that includes useful information related to plant sales and opportunities to profit from plants. This manual is to be used by all agricultural educators that need help with conducting a plant sale or using a plant sale as a means of program funding. Found within the manual are basic plant sale principles and tips as well as resources that can be used to find quality plants, seeds, greenhouse supplies, and grant money, if needed. In addition to resources for the plants, there are various resources related to classroom instruction and how plant sales can be used to enhance learning for students in agricultural education programs. Finally, there is a section that covers material related to supervised agricultural experiences (SAE) as they relate to horticulture courses and how plants can provide opportunities for classroom-based SAE projects.

CHAPTER 1. INTRODUCTION

Introduction

This resource was developed to provide agricultural educators with basic plant sale principles, tips, and marketing tools. Funding for agricultural education programs can be scarce so it is important for teachers to have options that offer substantial funding for basic program needs. These could include classroom needs or these could include FFA chapter meeting costs, officer trip supplies, or career development event t-shirts. Whatever the case might be, plant sales can be the solution to an agricultural education program's monetary problem.

Purpose & Objectives

The purpose of this project was to develop an informational guide for agricultural educators regarding the development and implementation of plant sales. The following objectives served as a means to carry out this creative component project:

- a. Provide agricultural educators with information and resources useful in planning, conducting, and profiting from a plant sale.
- b. Provide examples of how these plant sales can fit into any type of agricultural education program.
- c. Develop a plan for a plant sale that is useful for all agricultural programs, regardless of the type(s) of horticultural facilities (e.g., greenhouse) a given school currently has.
- d. Provide tips for marketing and profiting from the plant sale.

Need for the project

As a young educator in Georgia, I realized that there was a need for a plant sale guide when I had questions with my first plant sale three years ago. I had to turn to local growers,

nursery managers and veteran teachers for help with the basic principles of conducting a plant sale. Questions such as: How do I align this with my course curriculum? How do I get the community to engage and support? What are the best places to buy healthy plants? Where do I purchase greenhouse supplies? What should the profit margins be? Each time I had simple questions I would spend hours talking to different individuals to find the answers, so I determined that if there was a quick guide, especially for teachers that are new to agricultural education or teachers that are new to teaching plant science, it would be helpful. I developed the idea for this project from my own struggles as a young educator that was thrown into teaching a plant science class each semester for an entire two years, and being expected to hold two full plant sales a year. In my review of previous literature and through my experience hosting plant sales, I have found / developed useful resources and activities which help tie the plant sale in with multiple course curriculums. This guide was developed in hopes that other educators might benefit from the information and resources provided.

Definition of terms

Annual Plants – “Plants that perform their entire life cycle from seed to flower to seed within a single growing season. All roots, stems and leaves of the plant die annually” (Aggie Horticulture, n.d., p. 1).

Aquaponics – “Aquaponics is a form of agriculture that combines raising fish in tanks” (recirculating aquaculture) with soilless plant culture (hydroponics) (Nelson & Pade Aquaponics, n.d. p. 1).

Biennial Plants – “Plants which require two years to complete their life cycle. First season growth results in a small rosette of leaves near the soil surface. During the second season's

growth stem elongation, flowering and seed formation occur followed by the entire plant's death” (Aggie Horticulture, n.d., p. 1).

Headhouse – “an addition or section of your greenhouse that serves as the “work center”” (Solar Innovations, n.d., p. 1).

Hydroponics – “a method of growing plants in a water based, nutrient rich solution” (Fullbloom Hydroponics, n.d., p. 1).

Perennial Plants – “Plants that persist for many growing seasons. Generally, the top portion of the plant dies back each winter and regrows the following spring from the same root system” (Aggie Horticulture, n.d., p. 1).

CHAPTER 2. LITERATURE REVIEW

Studies have shown that when you provide students with real-world experiences, achievement gains are equal to or greater than that of traditional educational methods (Rothenberger, 1995). These real-world experiences can occur in agricultural education laboratories found inside and outside of the day to day classroom. Agricultural laboratories, which can include mechanics laboratories, greenhouses, livestock facilities, land laboratories, and aquaculture laboratories, among others, are currently understood as a means for providing students practice in application of theories taught in the classroom (McCormick, 1994; Shoulders & Myers, 2012). When greenhouse laboratory activities are used in agricultural education, the learning opportunity for the students is enhanced. Furthermore, if teachers can design learning activities based on problem-solving and scientific skills, students will be prepared to work in scientific-based agriculture careers (Shoulders & Myers, 2012). Research on school-based laboratory facilities is scarce and is typically region-based, but one study based in Arizona found that 76% had a greenhouse facility and 28.8% had a plant nursery (Franklin, 2008). Both facility types can be used in conjunction with state and national standards to create a learning environment conducive to a quality agricultural education program.

When looking at national standards, there are multiple found within the agriculture, food, and natural resource pathways that align directly with that of plant science. In fact, there is an entire pathway dedicated to plant science, floriculture production, and nursery landscape. The Plant Systems Career Pathway “encompasses the study of plant life cycles, classifications, functions, structures, reproduction, media, and nutrients, as well as growth and cultural practices through the study of crops, turf grass, trees, shrubs, and/or ornamental plants” (The National

Council for Agricultural Education, 2015, p. 107). This career pathway is broken down into four main standards, with 159 sub-standards that encompass all aspects of plant science. In addition to the Plant Systems Career Pathway, the Biotechnology Career Pathway offers opportunities for students to use plants to develop their knowledge further. National standard BS.03.01.02.c. says “students should transform plant or animal cells by performing a cellular transformation” (The National Council for Agricultural Education, 2015, p. 68). Even though some states do not list state specific standards related to agricultural education, there is an entire booklet created by The National Council for Agricultural Education that offers educators a guideline for classroom and laboratory activities.

In the state of Georgia, there are eight career pathways that students could take in relation to plant systems and very specific state standards that align with each of those pathways. Found within the Agriculture Leadership in Plant Science Pathway, standard AFNR-AML-6, in summary, states that students should be able to “develop a business plan for an agribusiness” and “determine the steps and factors involved in the process” (GDOE, n.d., p. 5). This standard when combined with the plant science course sets up the perfect opportunity to implement different types of plant sales or plant-based businesses in the classroom.

Rhine and Zimmerman (2017) noted “[m]ath, science, writing, and reading lessons can be incorporated in the school gardens as being a part of the outdoor classroom education” (p. 2). Not only do students get to enhance the skills learned in academics, but school gardens can also expand to become community projects, increasing the support for the local program and providing beneficial activities for community members of all ages. There are many benefits to having a community garden such as improving local food supply and increasing opportunity for

open space and recreational activities (Ohmer et al., 2009). Overall, when combined with education, plants can make a positive impact on students as well as local communities.

Agricultural educators can easily align plant sale activities with local and national standards and the opportunity to collaborate with other areas of academia are ever-present. In addition to those benefits, plants also offer an opportunity for local school programs to make money. The U.S. environmental horticulture industry, also known as the Green Industry, is one of the fastest growing industries in the country with an economic value of over \$147.8 billion in the year 2002 (Hall & Haydu, 2006). With the industry's ever-growing capacities, school plant sales can become a major fundraising opportunity for local agricultural education programs. Basham (2012) indicated "there are many opportunities for the horticulture department to make profits as well. Plant sales are a common way that schools make funds" (p. 20). With community support and proper marketing, plant sales can become a profitable piece of any agricultural education program, while providing quality educational experiences for students throughout the planning of the sale. Therefore, there is great value in having plant sales to help educate agricultural education students, give them access to real-world laboratory settings and the community benefits from the products of the sale. In addition, the profits from plant sales can be used as a fundraising unit for local FFA programs adding to the unique quality of such sales. Based on the value these sales have to programs and communities, this project sought to provide an informational guide for teachers to use to plan and implement these sales.

CHAPTER 3. METHODS AND PROCEDURES

Purpose & Objectives

The purpose of this project was to develop an informational guide for agricultural educators regarding the development and implementation of plant sales. The following objectives served as a means to carry out this creative component project:

- e. Provide agricultural educators with information and resources useful in planning, conducting, and profiting from a plant sale.
- f. Provide examples of how these plant sales can fit into any type of agricultural education program.
- g. Develop a plan for a plant sale that is useful for all agricultural programs, regardless of the type(s) of horticultural facilities (e.g., greenhouse) a given school currently has.
- h. Provide tips for marketing and profiting from the plant sale.

This project was put together to serve as a reference guide for educators looking to start selling plants for profit in their local agricultural education programs. Through personal experience and a review of previous literature, the project was put together using resources that have been useful in planning, conducting, and profiting from successful plant sales. In addition to my own thoughts and experiences, there was much discussion with other Georgia agricultural education teachers when I first developed the idea for the project. I wanted to develop a better idea of what informational needs there were. Discussion with veteran teachers was useful to understand how different programs structure their plant sales and greenhouse operations.

Discussion among younger teachers helped solidify the information used in the final project based on their concerns with starting or running their own plant sales.

Through Microsoft Word, I have compiled thoughts and materials from previous years to fit the needs of my project. I used several pieces of student classwork and pieces of lessons from my own classroom. In addition to Microsoft Word, I used the CyBox application to back-up the project and share the project with my professor. These applications have made the process of building this project simple. Combined with these two applications, the national agriculture, food and natural resource standards developed by The National Council for Agricultural Education have proved to be useful in addition to the standards listed by the Georgia Department of Education in regards to agricultural education. These state and national standards were used in this project to serve as a foundation for teachers to tie curriculum to laboratory activities.

The manual is structured to give teachers a brief overview of different aspects of not only running a greenhouse, but using that greenhouse, or other plant growth system, to fund their programs. It is not meant to be a project with strict guidelines on how to run things, but rather a guide with resources for agricultural educators with diverse needs. Sections such as pricing and choosing plants were added based on teacher concerns with those areas. Teachers, especially those that had just started developing ideas for a plant sale felt overwhelmed when picking plants to sell. Often, programs do not have the extra funds to spend on plants as a trial run, so teachers were concerned about buying varieties that would be a quick sell. On top of choosing the best-sellers, teachers were concerned on how to price their plants based on wholesale and soil costs. There are recommendations in the pricing section for how to base the prices, but overall I found that proper marketing of different plant sales is the key to success, so I added marketing tips and the explanation for the CheddarUp application in the final parts of the project. Finally, the most

important section that I felt had to be included was related to greenhouse and non-greenhouse structures. I understood when I first developed the idea for the project that not all teachers were blessed to have great facilities. Some teachers make-do with the few supplies / resources given to them. The section on growing structures was included to give tips for those that have greenhouses, but it was mainly included to encourage teachers that do not have fancy facilities. Plant sales can be profitable when the teacher has determination and drive to put together the right pieces.

Overall, through my own experience of hosting multiple plant sales in a community where they are expected, and talk with many mentors across the state of Georgia, I developed the idea for the project. In the planning stages I put aside student work, as well as pieces of horticulture lessons or greenhouse plans that I felt could be useful. I started work on organizing the different sections that would be included and wrote down resources that I have found useful in my own horticulture operations. Finally, I linked those pieces of work with state and national standards to tie the sales piece back to education and student development. In my final stages of creating the project, I organized my thoughts in Microsoft Word and further developed the project in the CyBox application.

CHAPTER 4. THE PRODUCT

Plant Profits: An Instructional Manual to Hosting a School Plant Sale and Funding Agricultural Education Programs from the Profits

By

Cassidy Byess

Introduction

As an agricultural education teacher in Georgia, I have seen first-hand how difficult it can be to maintain substantial funding for activities and events that our FFA students plan throughout the school year. Whether money is needed for large FFA meetings, food for afterschool events, chapter t-shirts, Career Development Event (CDE) registrations, or officer trips, there is plenty of monetary needs for an agricultural education program and FFA chapter. At Pickens County High School, we are lucky enough to have an exemplary alumni group that provides monetary funds for a lot of our events. Based on my conversations with other agricultural education teachers across the state, this is a luxury which many programs do not have. In addition to the support we receive from our alumni group, I have been entrepreneurial in securing funding through plant sales. Our agricultural education program host two plant sales, one in the fall and one in the spring, which are organized by the students in my horticulture and floriculture courses. Based on my past experience with these plant sales at Pickens County High School, I truly believe plant sales are a viable option to supplement funding for agricultural education programs. While some agricultural education programs do not currently have a greenhouse as part of their agricultural education learning facilities, there are many alternative options for growing plants to sell.

The process of growing plants for profit can also offer many educational opportunities for students enrolled in agricultural education courses. For example, students involved in

horticulture and floriculture get to learn through hands-on experiences and gain a better understanding of plant science. For students in agricultural business classes, the process of marketing and selling plants can prove to be beneficial in understanding basic business principles (e.g., development of a business plan, etc.). Overall, there are many options and opportunities involved in plant sales and my goal is to help teachers that need extra funds realize that those funds can be generated through year-long and seasonal plant sales. This guide provides information and resources for agricultural education teachers which are attempting to start plant sales in their local programs. Moreover, this guide encompasses information related to marketing and selling plants.

Planning

The implementation of a proper planning process will ensure the success of an agricultural education program's plant sale. There are several steps involved in the planning process for a successful sale which are important, regardless of the growing structure you plan to use or the plants you intend to sale.

Plant Sale Planning Checklist

This checklist should be used as a guide for agricultural educators that are just starting a program, or have little experience with hosting plant sales for profit. This checklist can also be a guide for students in the classroom to help navigate through the process of what must take place before a successful plant sale can happen.

- Determine the space that will be used to grow the plants (e.g., greenhouse, cold frame, school garden, etc.).
- Prepare the space where you will grow your plants, whether that be a greenhouse, cold frame area, raised beds, or aquaponics system

- Determine your overall budget for the plant sale and consider possible funding sources (e.g., school budget, alumni funds, booster club funds, school garden –related grants) which could be used to initiate the growing process.
 - Research local nurseries or plant companies that might offer discounts to your school.
 - Research local greenhouse supply companies that will deliver the supplies / hardware (e.g., variety of growing pots, blank labels, hoses, hose extensions, fertilizer, potting soil, and pesticides) needed for establishing the plants, in a given growing season.
 - Develop a draft list of plants which will be sold at your sale – have students get involved with this process.
 - Research which plants on your list are easier to start from seed versus buying them as plants – this can save money.
 - Set a tentative date for your sale to ensure that plants you buy will be ready by this date.
- Also, be sure to look at the area's grow zone and grow calendar dates as well.

Growing Structures

As previously discussed, there are many options when it comes to the structure / structures which you can use to grow your plants. While it is advantageous to have advanced structures (e.g., greenhouse) to grow your plants, you might have to adapt your growing plans based on the horticultural structures which are available at your school. This following section will provide insight on various growing structures (e.g., greenhouse, cold frames, garden towers) which could be used to grow your plants for your program's plant sale.

Greenhouse.

The optimal growing structure for a premium plant sale is that of a school greenhouse. Greenhouses offer an ample amount of room and the climate can be controlled year-round,

making it easier to plan multiple sales. A greenhouse structure also provides a lab environment for students to get involved in the growing process. Students begin to understand temperature requirements for plants as well as watering schedules. If a school greenhouse is an option, make the most of the space by having students draw out a map to determine where plants should be placed for optimal growth. Annuals such as geraniums can be hung in the tops of greenhouse because of their great need for sun and warm temperatures. On the other hand, annuals such as zinnias should be placed near the cool cell of the greenhouse to prevent stretching.

An example of a student-drawn greenhouse plan is provided below. This plan is an activity that students complete at the beginning of the semester to learn the different pieces of a proper greenhouse. It is important for them to understand where certain pieces of the greenhouse are located such as the water cut-on valve, the breaker box, as well as the exit doors. As the semester progresses, students fill in their sketch with plants so they can better understand the growth requirements for each variety. Perennials such as lantana and verbena are placed near the outer walls of the greenhouse because they thrive in warmer environments. In our situation, the greenhouse is a Quonset style, meaning that the greenhouse has a curved dome shape. While this provides long amounts of sunlight, it also creates hot spots within the greenhouse, usually found along the outer edges where the cool air does not get pulled through. Annuals such as begonias and celosia do well directly in front of the cool cell because of their tendency to thrive in cooler temperatures without direct sunlight. Although the plan shown is empty from plants, the work areas of the greenhouse are shown and one can get a better understanding of the space.

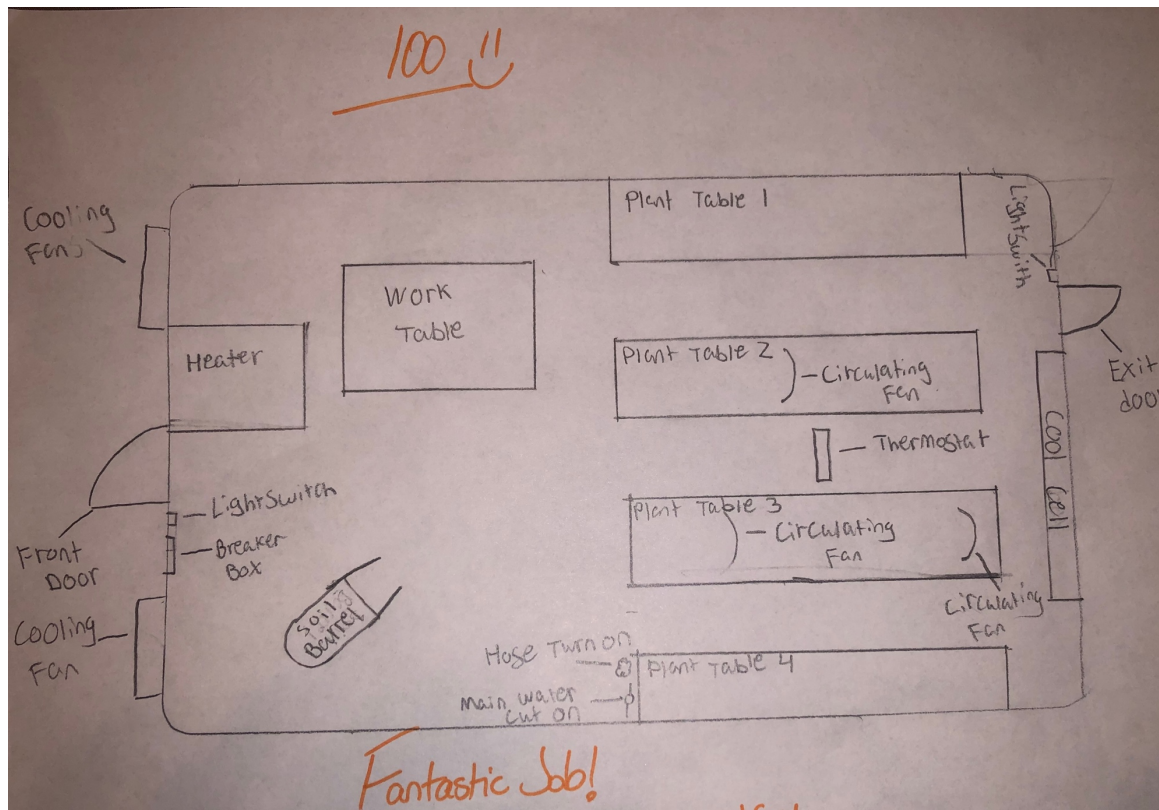


Figure 1. Student sketch of greenhouse layout.

While it is important to have a greenhouse layout that is conducive to having students work inside, it is also important to have equipment in the greenhouse that will last for years. Spending money on proper equipment on the front end will help ensure that it lasts longer and withstands years of wear and tear. Metal tables are an easy option to find and allow you to maximize growing space. Typically made of galvanized steel and aluminum, these greenhouse benches last for years and provide an efficient space for students to work and plants to grow. They come in many different sizes to fit the space available and can be customized to fill larger spaces if needed. Check out growersupply.com under the “Greenhouse Supplies” section for more information regarding these tables.

Cold frames.

If a school greenhouse is not an option, a cold frame is a great alternative. Cold frames are designated areas where plants can be grown and a shade cloth or plastic might be draped over top to keep extreme weather elements, such as sun exposure or snow, from affecting plants. Cold frames are an inexpensive option compared to a greenhouse because there are not many supplies involved in the structure. One of the shortcomings of a cold frame system is there is no sort of climate control—subjecting the plants to the given outside temperatures and weather conditions. Cold frames can help extend the grow season and offer opportunities for student experiments. For a plant sale, cold frames can offer a chance for vegetables to be grown in the colder months and an opportunity for the fresh produce to be sold, rather than the plants themselves. On the other hand, in early spring, students can place germination trays under the cold frames to begin the process of growing plants to resale. Even without a school greenhouse, the opportunities are there to make a profit from plants.



Figure 2. Cold frame showing small raised garden beds with snow on the ground

Classroom Systems.

Finally, if there is no option for plants to be raised in a greenhouse or cold frame, an agricultural education classroom is the next best option. Whether you start with some simple germination mats and grow vegetable plants to be sold, or the opportunity becomes available to grab a garden tower, technology allows for plants to grow indoors. There are also vast options in the realm of hydroponic and aquaponics systems. These systems, while expensive on the front end, can help create a useful environment for students to develop their own classroom gardens and herb stations.

Classroom germination mats are a great choice for a program that has a tight budget. They can serve several purposes including checking off germination standards, such as standard AFNR-BAS-13 in the Basic Agricultural Science Curriculum for Georgia. This standards states that students should be able to outline germination steps and list conditions under which germination occurs (GDOE, n.d.). Germination mats can also help kick-start seeds for growing plants which will eventually be transplanted into bigger planting containers. Germination mats can also be paired with garden towers to make a successful year-round classroom business. Start a variety of lettuce, strawberry, and tomato seeds in a germination tray, then transplant the seedlings to the garden tower when they reach appropriate size. The plants can then prosper in the garden tower and students can pick the produce to sell at lunch to teachers in the building.



Figure 3. Garden towers in classroom.

In addition to germination mats and garden towers, and rather than selling produce, succulents and house plants are a fantastic option. House plants can be raised in the classroom and varieties such as the snake plant are easy to propagate, making them a target for plant sales. Students can then create educational labels to go along with each variety so that homeowners know how to properly care for the plants once they receive them. Succulents are also on the rise as a hot trend and they can be ordered from many different plant companies, even Amazon offers a variety box of succulents at a great price. Keep a wide variety of succulents in the classroom and propagate new ones from those. Order decorative pots and planters for the succulents to go in and they quickly turn into a thriving plant business.

In the end, it does not matter what type of resources are available, but rather, what one chooses to do with them. Be creative and find ways for students to get involved in the process. Help market your plants or produce to teachers, parents, and community members and grow your chapter's sales each year as more funds become available.

Choosing Plants to Sell

Choosing plants can be one of the more difficult parts of preparing for a plant sale. It is important to pick plants that are different from those that customers can buy from the local hardware store, or the local Walmart, but it is also important to have a good variety of plants and color variations. You should also consider the growing region, or zone, in which your school is located and the season that you plan on having your plant sale. The better prepared you are and the more planned out your plant sale is, the more appreciative customers are that support your program.

A quick way to assess the grow zone for your area is to enter your local zip code into the Burpee website. Burpee is a well-known seed company and they offer a simple platform for finding your grow zone as well as matching your zone to a grow calendar to help set dates for planting (Burpee, n.d.). The USDA creates many of the grow zone maps found online and while they can be overwhelming to look at, they are quite easy to read. It is also important to remember that grow zones typically relate to perennials, trees and shrubs more so than annual bedding plants. Annuals are only offered during the late spring and summer months due to the plants' lack of hardiness. Below is an example of a grow zone map for the state of Georgia. The different color variations represent different zones and can help people determine the appropriate species to plant in their yards or gardens as well as the appropriate time to plant.

After determining the zone that you live in, match that zone with plants, trees, and shrubs that can survive the low temperatures of the area. Most plant labels will list the grow zones in which they can survive or they might even list the minimum temperatures for that species. Either way, match the grow zone listed on the plant label to the area in which you live to ensure that plants will survive through long winters. For example, if you live in the area shaded yellow (zone 8a),

the key states that the minimum temperatures for that area range from 10 – 15 degrees Farenheit. Therefore, you should only plant species that can survive those low temperatures. Understanding these maps can be beneficial to you as a homeowner, but it can amp up your plant sale by providing customers with plants that will thrive in the local environment.

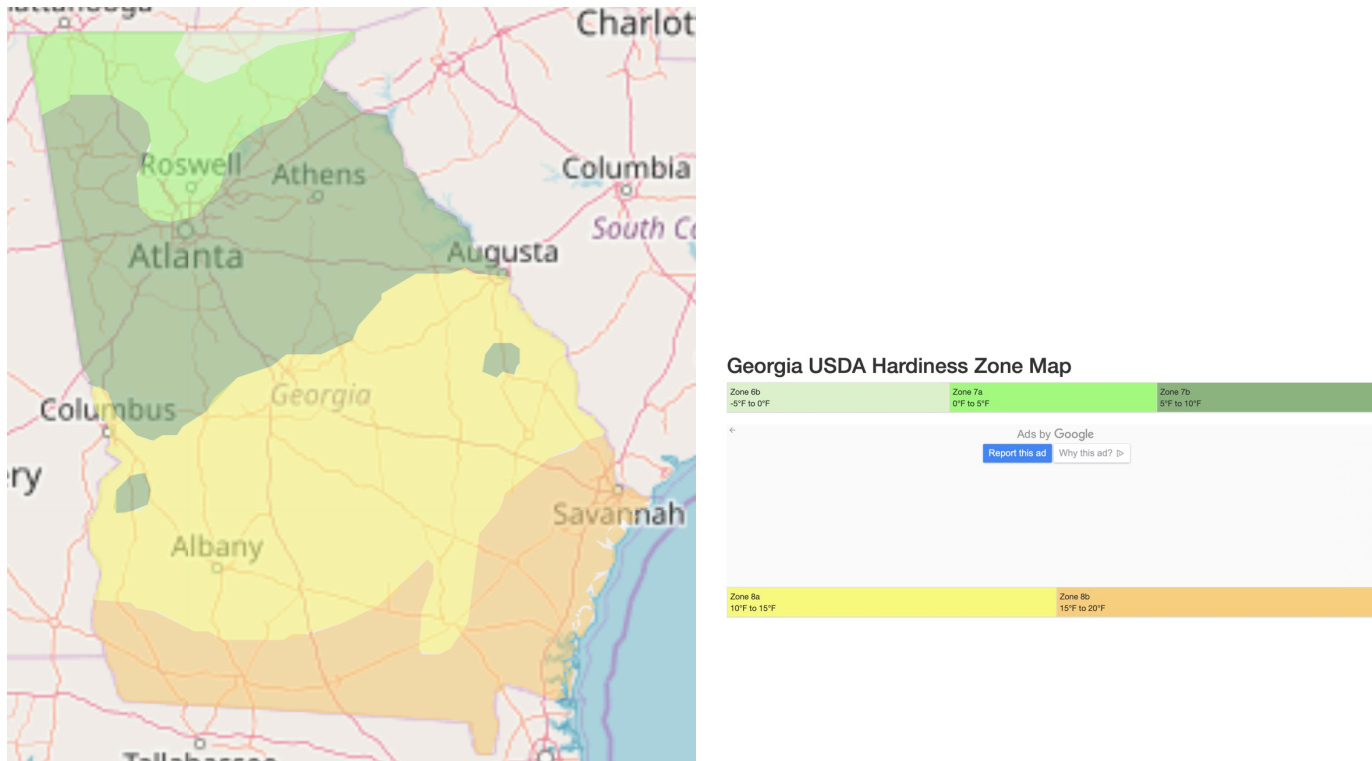


Figure 4. Georgia Grow Zone Map and Key

It is important to remember that not all plant sale customers are experts with growing plants. Many community members that support agricultural education will often buy plants from a sale just to have the chapter benefit from the profits. Therefore, it is a good idea to offer grow zone calendar hand-outs and growing tips to all customers that buy from your sale. These informational hand-outs can help educate community members and it gives your students an opportunity to research the information for themselves to make the hand-outs. There is an example of a student-made handout in the appendices.

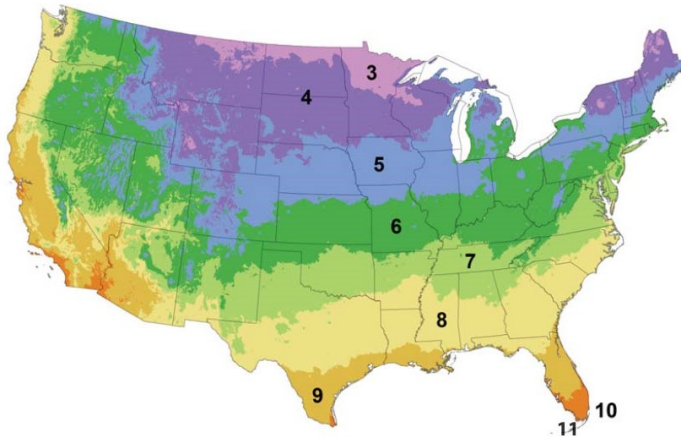


Figure 5. Grow Zone Map for the United States

Once you have determined the season and dates appropriate for planting, you can then start to choose your plants. As discussed earlier, it is important to consider available space. For fall plant sales, bedding plant such as pansies and violas are great options, as well as flowering cabbage. In addition, poinsettias hold a great re-sale value and community members, even community organizations, are more willing to pay extra to get poinsettias from a school, than the local Walmart or Home Depot. For spring sales, it is important to look for growing trends from previous years. Scout out the local department store's garden center during the spring months to determine what sells well in the area and plants that have a hard time getting off the shelf. Often, the garden center managers are willing to discuss those issues with you, especially if agricultural education is a valued piece of education in the community.

Determining flowers can be one thing, but customers are always looking for vegetables in addition to their typical bedding plants. Since the year 2008, home gardening and community gardens have increased by over 200 percent in the United States. An average of 35 percent of American families either grow their own gardens or they are involved with community gardens

(Lissy, 2017). Based on these facts, it is important to offer a variety of vegetable and fruit plants to customers so they can grow their tastes each year. Not only does it help improve your plant sale ratings, but growing vegetable plants can be relatively cheap compared to other options, increasing the profit margin for your sales.

Overall, choosing plants can be overwhelming, but if you consider the region you live, the current growth trends, and the needs of your local supporters, then you will be successful.

Pricing

This can be part of the planning process that is difficult for some. The most important factors to include when pricing your products is to consider the money that you put in them and the profit margin that you want to get out. When you look at those two numbers, you can develop a plan on what to price your items at. Figure 5 provides examples of the estimated profit margins on a plant sale held in 2019. These profit margins are estimated because soil price varies slightly throughout the season and pots are often left over from previous years or re-used from previous customers. Another factor to consider is the competitor's prices. Depending on the area that your school is located, there may be several competitors that sell seasonal bedding plants, vegetables, or succulents. Research those prices and raise your price just a tad from theirs. Even though your prices will be higher, local supporters will buy from you, knowing that the profits from the sale benefit the chapter.

An Example of a Pricing List for School Plant Sale (Spring 2019)

Plants	Retail Price (\$)	Approximate Profit Margin (\$)
Ferns (10" basket)	12.00	6.00
Wave Petunia Hanging Basket (10" basket)	12.00	7.50
Geranium Hanging Basket (10" basket)	12.00	5.50
Wave Petunia Trays (3x5)	25.00	14.00
Marigold Trays (6x6)	15.00	11.00
Begonia Trays (6x6)	15.00	8.50
Celosia Trays (6x6)	12.00	5.50
Coleus Trays (6x6)	15.00	6.00
SunPatiens (3x5)	28.00	12.00
Tomatoes (1 gal. pots)	3.00	0.75
Peppers (1 gal. pots)	3.00	0.75

Figure 6. Table made by students in horticulture class to determine approximate profit margins based on retail price.

Make it Educational

The primary purpose of an agricultural education program is to help students learn about agriculture by providing hands-on experiences and proper classroom instruction. This is the foundation of the program that can then be built upon through the incorporation of FFA activities and supervised agricultural experiences (SAE). When planning and implementing a chapter plant

sale, it is important to keep the foundation of the program in mind. School administration and staff are more likely to support plant sale ventures when those ventures encourage student learning.

Classroom incorporation.

Agricultural education programs are unique because of the way instructors can offer a wide variety of hands-on learning experiences and laboratory-based activities. Laboratory-based activities and projects associated with plant propagation and marketing serve as a means of enriching the learning of agricultural education students. There are endless opportunities for students to learn through activities conducted using plants for the chapter plant sale. Not only do they gain a better understanding of plant science, but they can also polish their leadership skills as well as develop quality team skills as they work together to accomplish a goal.

As with many items in education, it is important to align activities and events directly with state and national standards. This helps strengthen administrative support and develops a strong foundation for community members to invest in the program. In Georgia, there are many state-specific standards that align directly with plant sales and the process of growing plants for plant sales, including standards within the basic agriculture science courses. Standard 13 determines that students should be able to identify the basic parts of a plant, understand the germination process, as well as identify important floriculture and nursery/landscape plants used in Georgia (GDOE, n.d.). Each part of this standard can be developed through student help in the school greenhouse or in the classroom with germination mats and hydroponic systems.

In addition to the Basic Agriculture Science course, there are specific courses dedicated to plant science within the state of Georgia. Those courses include General Horticulture and Plant Science, Floriculture Production and Management, Plant Science and Biotechnology,

Floral Design and Management, and Nursery Landscape. Standards within each of those courses give educators a guideline for what knowledge students should gain through taking the course, and within those standards there are many sub-standards that specifically relate to plant sales and greenhouse activities. For example, within the Floriculture Management and Production course, substandard 8.5 relates to heat loss within a greenhouse and states that students should be able to identify those areas. Standard 7 in the course curriculum gives guidelines related to greenhouse setup and states that students should be able to diagram common greenhouse layouts and work bench arrangements (GDOE, n.d.). Each of these standards fall in line with the process of growing plants for a program plant sale.

Finally, when looking at standard 19 in the Floriculture Management and Production course, you can see that it states students should practice good salesmanship techniques. Students should also be able to calculate wholesale and production costs as well as determine profit margins (GDOE, n.d.). This standard alone can easily be covered when allowing students to prepare and run the plant sale. Not only does a plant sale provide a learning opportunity throughout the growing season, but the sale can help students develop their plant knowledge and combine that knowledge with other skills such as math, business, and marketing skills. Overall, plant sales provide a unique opportunity to help students understand diverse concepts within agriculture and business courses.

While the state of Georgia offers specific course standards that help guide educators through their classes, some states choose to follow the national set of standards. The national standards for agriculture, food, and natural resource classes are developed by The National Council for Agricultural Education. Even within the national standards, there are many that correlate with producing plants for a sale or marketing plants for sale. National standard

PS.03.02.05.c. summarizes that students should be able to prepare a plant production schedule based on the time that it takes the plant to reach optimal growth. This schedule can easily be prepared in alignment with a plant sale so that plants are at an appropriate growth stage when the sale is conducted. National standard PS.01.01.03.a. states that students can evaluate the effect of water quality on plant growth such as dissolved solids and pH levels. This standard can easily be covered through the use of hydroponic and aquaponics systems in the classroom. Students could investigate the effect that pH levels have on different plants, but still grow herbs or basic vegetables to be sold within the school.

Whether your state has specific standards, or you follow the guidelines of the standards set by The National Council of Agricultural Education, it is easy to justify the educational values of hosting a school plant sale. Not only does it help justify the sale in your classroom, but it helps community members justify their support and it encourages administration to support your program.

Supervised agricultural experience.

When planning for any piece of an agricultural education program, it is important to consider the three-circle model (Phipps et al., 2008). This model is the foundation for all agricultural education programs that shows the uniqueness to the program by providing students with opportunities through classroom instruction, FFA, and supervised agricultural experiences (SAE) programs. As the leaders of agricultural education programs, agricultural education teachers are tasked with the responsibility of facilitating effective classroom instruction, supervising SAE programs, and serving as an advisor for the local FFA chapters.

However, the piece of the model that often feels left behind by most is that of supervised agricultural experiences. Many educators fail to see how SAEs can fit in with some students'

situations and even though it is listed as a top piece of agricultural education's model, it is the piece of the puzzle that many educators do not implement within their classrooms (Retallick, 2010). In a study conducted on the implementation of SAEs, research showed that fewer agricultural education students participated in SAE and questioned why agriculture teachers fail to fully integrate the SAE portion into their agricultural education program (Retallick, 2010). Greenhouses, classroom plant production systems, and plant sales all offer a unique opportunity to turn that theory around and provide appropriate situations for students to get involved.

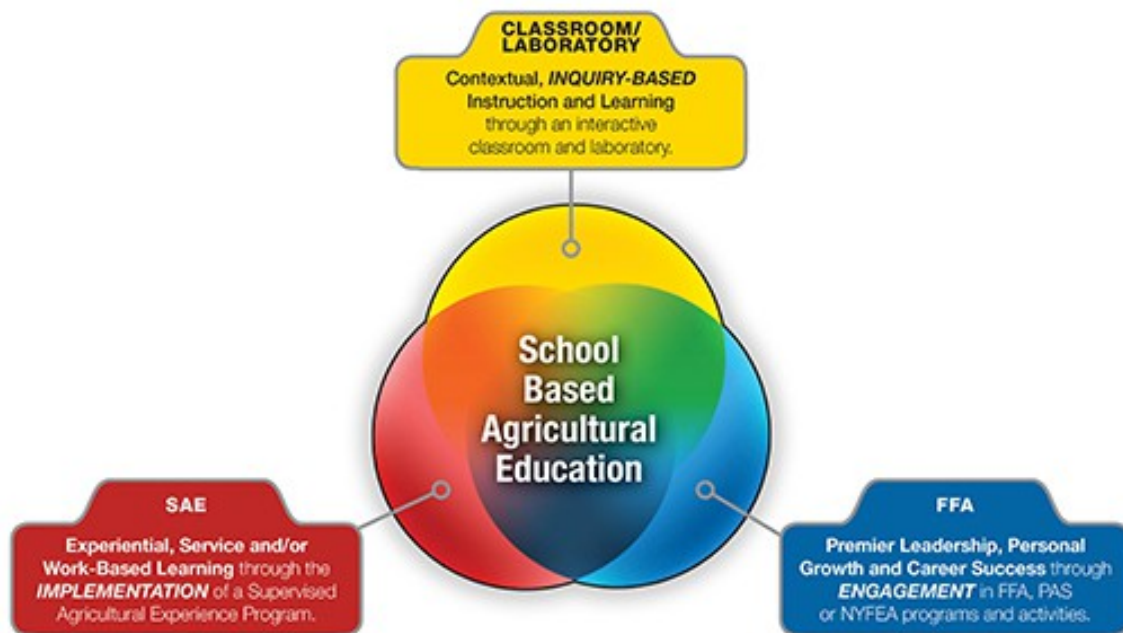


Figure 6. Three-Circle Model for Agricultural Education

This unique piece of agricultural education is meant to set students up for success by offering them a chance to use the knowledge they learn in the classroom and the skills they develop through FFA to apply them in real-life experiences. For most students, that experience ends up being their after-school job, but the experience is related to agriculture and their agricultural education teacher supervises them by offering advice, helping with record keeping,

and time spent with the student outside of normal classroom activities. The objectives behind SAE programs are supreme, but they are often difficult for all students to carry out. That is where a proper plant sale can be beneficial for all programs.

Whether there is a plant sale twice a semester or once a year, there are numerous jobs students can work after-school to help the chapter prepare for a plant sale. Students can spend time after school cleaning different areas of the school greenhouse or head house, or students could spend time before school preparing plant labels for customers to pick up with their plants.

For schools without a greenhouse, students could help by preparing vegetables to be sold to teachers from the classroom garden tower or pick weeds from the school garden outside. Regardless of the agricultural education learning facilities at a given school, the propagation and selling of plants have the propensity to provide students with numerous opportunities to get involved outside of classroom time so they can log their SAE hours each semester.

Resources

Plant shopping.

The following resources are examples of companies that are known to have a great selection of annuals, perennials, vegetables, and succulents. Most offer plants to customers in the form of plugs or liners, but there are a few that are direct seed companies as well.

- <https://www.jollyfarmer.com> - offers a wide variety of annuals, perennials, succulents, and vegetables; can be ordered in the form of seeds, plugs, or liners
- <https://parkseed.com> - offers seeds of all varieties and provides great information related to appropriate planting techniques, harvest dates, and grow zones
- <https://casaflora.com> - offers annuals, perennials, house plants, and landscape plants

- <https://www.burpee.com> - seed company that offers a great selection of vegetable and annual seeds; provides information related to planting, harvest dates, and grow zones

Greenhouse supplies.

Whether ordering new greenhouse parts or potting soil, the following resources give options with the agriculture teacher in mind. They offer quotes on new greenhouses and equipment, and most deliver to schools with a lowered shipping rate. They also offer options for tax-exemptions for school organizations.

- <https://www.griffins.com> - provides basic greenhouse supplies such as growing media, pots, hoses, and fertilizer; can purchase items from Griffin for retail sales as well such as decorative pots, yard art, etc.
- <https://www.greenhousemegastore.com/supplies/> - offers a variety of small greenhouse supplies as well as supplies to build a full-size greenhouse
- <https://www.growerssupply.com/farm/supplies/home> - offers basic greenhouse supplies as well as supplies for hydroponic and aquaponics systems

Grants.

The initial cost of plants, greenhouse supplies, and garden tools can be expensive. If there is a limited amount of resources and funds available, it can be a good idea to check out opportunities for school equipment and school garden grants. While some grant opportunities are state-specific, the links provided below serve as examples of funding opportunities which could be exploited to secure funding for a plant sale program:

- <https://www.annies.com/grants-for-gardens/>
- http://gardeningsolutions.ifas.ufl.edu/schoolgardens/resources/financial_assistance.shtml

- <https://www.usda.gov/media/blog/2017/06/15/farm-school-grows-usda-grants>

Classroom activities.

Linking learning between plant sale ventures and classroom instruction is imperative. It not only encourages support from your administration and staff, but it helps community members justify their support as well. If an agricultural education program can show off the products that students are planting and caring for, then it helps improve the overall rating for the program. The link between learning and plant sale ventures can be made by incorporating fun lab activities as well as leadership opportunities through greenhouse and garden tower duty stations. The following links provide some resources and ideas for horticulture-based activities for agricultural education programs:

- <http://www.gaaged.org/curriculum2/topic.aspx?TID=29> - provides the state standards as well as numerous lab activities for horticulture and floriculture
- <https://gardentowerproject.com/welcome-to-growing-circles/> - provides information related to garden towers as well as resources to use in the classroom as supplements for the garden tower
- <https://www.glenrosearkansasffa.com/lesson%20plans.htm>
- <https://www.purdue.edu/hla/sites/cea/greenhouse-management-guidesheets/> - geared toward high school students; website provides resources on pests to scout for as well as tips on running a greenhouse business

CHAPTER 5. CONCLUSION

Through this section, the project reflection will be given as well as the graduate program reflection. Discussion will be provided in relation to the courses that helped create the idea for this creative component, as well as the courses that were essential in creating the guide provided for teachers to use when planning for a fundraiser in the form of a plant sale. For anyone looking to use this resource, recommendations will be given on how to properly use the guide as well as the resources provided so that sales are successful and students gain valuable skills and knowledge through the process. Finally, discussion will be given in regards to the extensions and future plans for the project.

Project Reflection

At the end of the day, regardless of the situation, it is important to remember that all programs must start somewhere. In the beginning, it might take a lot of planning and resourcefulness, but over time, plant sales can become second nature for some agricultural education teachers. School plant sales can become events that people look forward to and get excited about. Each year, customers can arrive at the sale and see the hard work that not only the teachers, but the students, put in. There is something quite special in conducting a plant sale for the local community. It brings about a sense of pride for students as they get to sell the plants that they helped grow to their parents, grandparents, and neighbors. Students work hard to make the plants look great and they work the plant sale with respect toward the customers. As popularity increases, you can also start to increase your profit margins by adding garden art to your sale or basic planting materials such as potting soil and fertilizer. The two major plant sales that our school does each year makes me proud to part of the agricultural education program

because the sale is just another example of how agricultural education helps develop future leaders for our communities.

It is not about how nice the school greenhouse facilities are, or the number of people that show up to your first plant sale. Rather, it is about the work that the students put in and the overall success of the sale. If your sale is well-planned, the plants are healthy, and the sale run smoothly, the opportunity for success is great and the chances that you can begin to fund different activities from your sale are present. Plant sales can then become a staple for your agricultural education program and as your program grows, you can develop new ideas for your horticulture adventures to cater to your chapter's monetary needs.

Graduate Program Reflection

Through my graduate studies at Iowa State University, I have developed as a professional and have many takeaways from the overall experience. Foremost, I have expanded my connections through agricultural education and correlate with teachers from several states across the country. When I first started my graduate studies, I was unsure of the knowledge and skills that I would develop, but I have been pleasantly surprised with the program.

One of the most rigorous courses that I had the opportunity to take through Iowa State University is that of Horticulture 571, Vegetable Production and Management. Although I teach horticulture and floriculture throughout the year, I expanded upon my knowledge in vegetable production through this course. It was a well-designed course for graduate students because of the valuable information provided and the activities that were assigned. There are several activities that I plan to modify from this course and implement in my own classroom to help push my high school students to expand their knowledge in plant production as well.

Another course that I feel has been instrumental in my graduate studies is that of AgEdS 510, Introduction to Research in Agricultural Education. During my time as an undergraduate, there were few times where I was asked to do extensive research projects so I came into my graduate studies with little experience in proper research techniques. Through AgEdS 510, I developed skills that have been used to develop this creative component and use proper resources in the process. The course was designed in a way that helped students build upon their knowledge and work their way up to develop a full research proposal appropriate for agricultural education. I appreciate that the course was agricultural education based and topics were relevant to my career.

Other courses that were instrumental in my professional development in this process is that of AgEdS 520, AgEdS 533, and AgEdS 550. Through AgEdS 520, I was involved in many discussions with other agricultural education teachers that teach in different capacities. It showed me that there is a diversity among agricultural education programs in this nation and helped me find an appreciation for the support that our program receives. This course also helped me develop knowledge about myself as an educator as we were asked to evaluate ourselves through different platforms. AgEdS 533 forced me to re-evaluate my teaching philosophy and allowed me to see the change that has occurred in my philosophy through my three years of teaching. AgEdS 533 also helped develop my understanding of various educational theories. Through AgEdS 550, we were asked to look at agricultural education through different lenses. It has made me more aware of how my school views our agricultural education program and has helped me develop a sense of awareness for how we portray agricultural education.

Overall, the graduate program at Iowa State University has provided me with unique opportunities to participate in high-quality educational experiences. Completing my Master's

through an online platform concerned me to begin with, but the process has been seamless and each professor I had was accommodating and helpful. From this experience, I have gained knowledge that I can use in my everyday classroom as well as developed an understanding for different types of agricultural education programs. I also have several pieces of instructional material that I created and I plan to use in my high school lesson plans. It has been a unique and exciting opportunity for me to attend Iowa State University, even from a distance-learning standpoint. I appreciate the professors that have poured their knowledge and skill into the courses and I am excited to finalize this step of my educational journey.

Recommendations

This guide should be used as a resource reference for teachers planning a plant sale to raise funds for their agricultural education program. The resources in this guide are geared toward basic plant sale principles and the guide offers tips that can help amp up your typical sale to increase profit margins. In addition to the resources provided, there are multiple places where standards are tied to the process of planning and conducting a plant sale. These ties to the standards can be used to encourage plant sale approval from administration as well as local program supporters. Although many of the standards are based on curriculum developed by the state of Georgia, there are several national standards used as well. This guide is meant for all agricultural educators, not just those in Georgia.

When using this guide, remember to consider the area that you plan to grow your plants and plan accordingly. What works for me here in Georgia, might not be the case for someone trying to grow plants in Montana, especially during the wintertime. It is also important to remember that plant sales do not have to be large-scale, especially if your program lacks initial funding. Start small and build your way up. If you can show that you can make a profit on a

small-scale with plant production equipment in the classroom, it could help encourage administration and school board members to set aside money to increase your plant production space in the future.

My final recommendations for the use of this guide and the planning of a plant sale is related to proper marketing techniques. At the end of the day, even if you have beautiful products to sell, it is hard to move them if you do not market appropriately. If your chapter does not already have social media accounts, those platforms can serve as excellent bulletins for you to keep potential customers informed. Throughout the growing process, post often to show everyone the hard work that students put into growing the plants. Video short clips of students working in the greenhouse or lab and combine them into a short video for the staff at your school to see in a Friday email. These ideas sound simple, but they can make a huge difference in how other teachers and administrators view your program. In addition to posting on social media platforms, it is important to remember that a lot of community members, especially elder members, still read the weekly newspapers. Often, you can send in a quick article with a picture of students working outside in the raised garden beds or in the greenhouse and the editors will not charge to post the article for you. It helps build community support when people see agricultural education being posted in the newspaper alongside the top sports news for the week.

The last marketing tip that I will leave is related to a new platform that I used this spring to market my own chapter's plant sale. Not only did it help us to sell out of every single item that we had, but it also brought customers in from several surrounding counties. Due to the shut-down of schools from COVID-19, I was asked to conduct a drive-thru plant sale. Typically, our sale is inside of our school barn and customers come in, gather their plants, and check-out with students at the front. This year, I had to post the plants we had for sale on an online platform and

customers selected their plants, then payed online. I set a deadline for the sale and all orders were received, then placed in order in the greenhouse. It was a seamless process and customers were so appreciative that we adjusted to fit within the social distancing guidelines. In addition, the online sale was shared through multiple social media platforms and we developed a new set of customers as they came from multiple counties in the surround area. Students still put in their part of the work as I asked them to put in the plant requirements beside each variety and they had input with the design of the online setup. It was a great option for our sale and I highly recommend using CheddarUp for plant sales in the future. Screenshots from the website with the plant sale we conducted can be found in the Appendixes.

Extensions

This project will be expanded upon as new, helpful resources are discovered and different plant profit opportunities are explored. It is my hope that this can be the foundation for an all-encompassing guide for teachers on how to not only run a plant sale, but how to effectively run a greenhouse management class. There could be a section added to include weekly charts for students to use in the greenhouse. Often, students get tired of doing the same task so I use chore charts in my own classroom to allow students to rotate through stations. Not only does this keep students from getting bored in the greenhouse, but it is an effective way for them to learn new skills throughout each semester. For the classroom portion of plant science, there could be a section added to include sample lesson plans and lab activities that get students to investigate soil nutrition and plant needs. Even though there are a few classroom activities mentioned in this project, there is room for expansion in the classroom incorporation area.

In addition, there could be a section dedicated to school greenhouse maintenance because there are many weekly, monthly, and yearly checks that need to happen for all systems within the

greenhouse to run effectively. Finally, additions could be made to expand upon the plant section to include tips on how to market plants and how to choose colors for each of the varieties you plan to sell. Choosing plants can be overwhelming, especially if you have a large area to grow multiple varieties. However, there are ways to navigate through the choices to ensure that the plants you choose will make customers happy. Overall, there is room for expansion for this project to develop into an all-inclusive handbook for teachers with horticulture-based courses, and even room for those that are not horticulture-exclusive.

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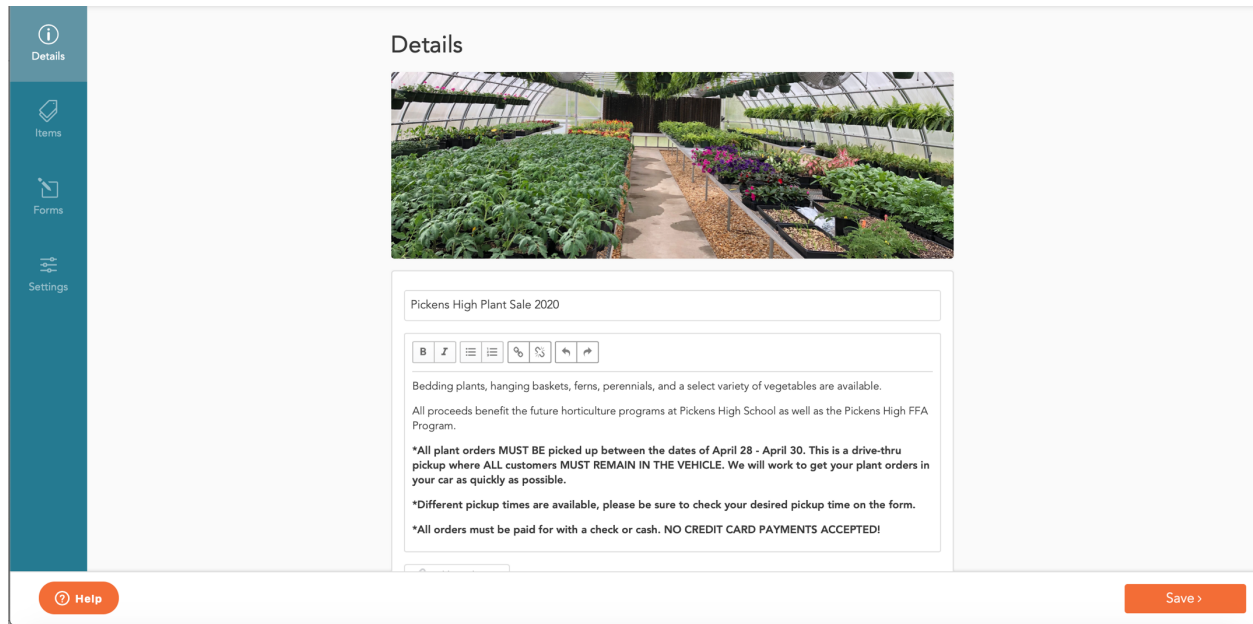
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APPENDICES

Appendix A: Cheddar Up Online Platform Resource



The screenshot displays the Cheddar Up online platform interface. On the left is a vertical navigation menu with icons and labels for 'Details', 'Items', 'Forms', and 'Settings'. The main content area is titled 'Details' and features a large photograph of a greenhouse filled with various plants. Below the photo is a text editor with a title field containing 'Pickens High Plant Sale 2020'. The editor includes a toolbar with icons for bold, italic, list, link, unlink, and image. The text within the editor reads: 'Bedding plants, hanging baskets, ferns, perennials, and a select variety of vegetables are available. All proceeds benefit the future horticulture programs at Pickens High School as well as the Pickens High FFA Program. *All plant orders MUST BE picked up between the dates of April 28 - April 30. This is a drive-thru pickup where ALL customers MUST REMAIN IN THE VEHICLE. We will work to get your plant orders in your car as quickly as possible. *Different pickup times are available, please be sure to check your desired pickup time on the form. *All orders must be paid for with a check or cash. NO CREDIT CARD PAYMENTS ACCEPTED!'. At the bottom of the page, there is a 'Help' button on the left and a 'Save >' button on the right.

This is a view of the online platform used to sell plants this year. The resource is called Cheddar Up and it allows you to create an account and a collection that you plan on selling (the resource is not used to sell plants only). This is the first image and information that customers who viewed the plant sale would see.

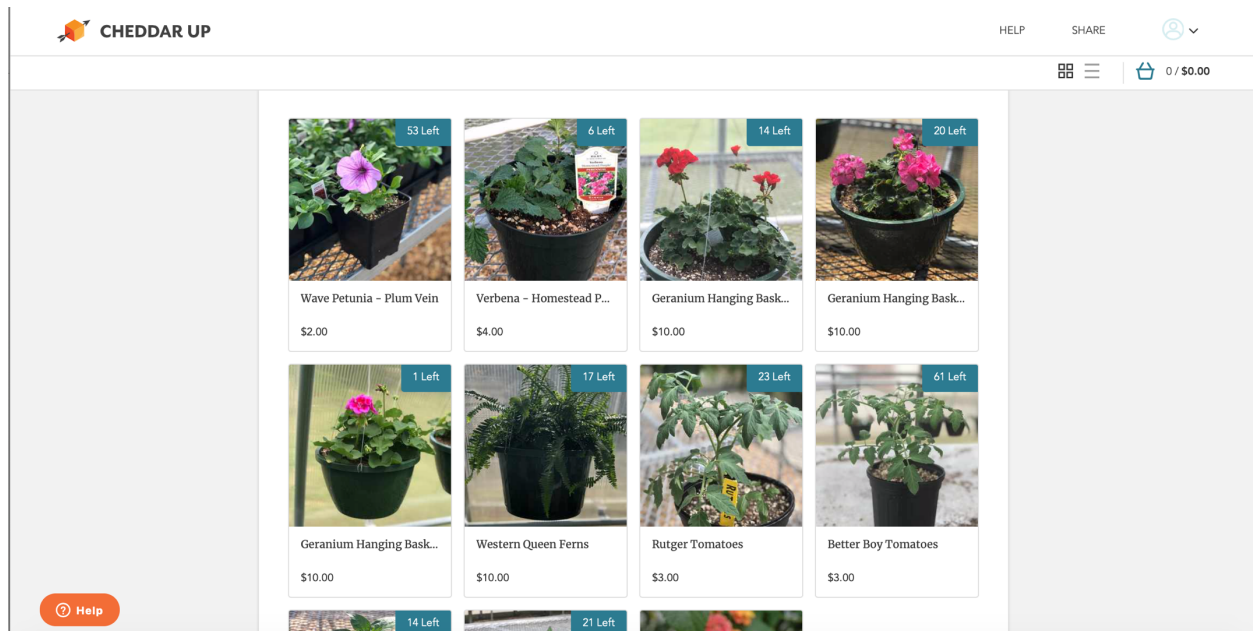
Appendix B: Example of Online Plant List

The screenshot displays a web application for an online plant sale. At the top, there's a header section with a link, a status dropdown (Active), and financial summaries: Total Collected (\$8,310.00) and Available to Withdraw (\$686.00). Below this is a navigation bar with tabs for Payments, Items (selected), Forms, and Visitors. The main content area shows a list of 25 items with columns for Item, Price, Qty Remaining, and Collected. A search bar and sort dropdown are at the top of the list. To the right of the list is a sidebar with 'ITEM REPORTS' and a button to 'Export Item Summary (xlsx)'. A 'Help' button is located in the bottom left corner.

Item	Price	Qty Remaining	Collected
Wave Petunias - Magenta	\$2.50	Sold Out	\$87.50
Wave Petunias - Blue	\$2.50	Sold Out	\$87.50
Wave Petunia - Plum Vein	\$2.00	53	\$334.00
Wave Petunia - Red Velour Variety	\$2.00	Sold Out	\$320.00
Celosia (Cock's Comb)	\$5.00	Sold Out	\$180.00
Begonia - Whiskey Variety	\$3.00	Sold Out	\$126.00
Begonias - Tequila Variety	\$3.00	Sold Out	\$114.00

This gives an overview of all the items we had available. You list the specific quantity available and it lets you know when that item sells out and how much money you made off that specific product. It also provides a running total at the top showing the amount brought in total and the amount paid through credit cards.

Appendix C: Cheddar Up – Customer View



This is an example of the screen where customers would shop. I had students take pictures of each plant variety and upload them to the sale. It also lists the price so that customers are aware.

Appendix D: Cheddar Up Transaction Form

LINK
https://pickens-high-school-plant-sale-round-2.cheddarup.com [Copy](#)

Active ▾

TOTAL COLLECTED
\$1,140.00 [Balance Summary](#)

AVAILABLE TO WITHDRAW
\$579.50 [Withdraw](#)

Payments Items **Forms**

Forms: 1

Name	Type	Respondents
Plant Pickup Information	Form	39

ADD A RESPONSE
Easily record responses on behalf of a respondent and keep your tracking in sync.
[Add a Response](#)

FORM REPORTS
Download the Form Summary pdf for a printable summary of all form responses on your collection.
[Print Forms \(pdf\)](#)

[Help](#)

There is also an option to add a form that customers must complete in order to checkout. Since the plant sale was run as a drive-thru, I needed to know a good contact number for each customer as well as an estimated pickup time. I gave them specific options to choose from on the form.

Appendix E: Greenhouse Chore Chart

Chore Chart

Chore	Week 1	Week 2	Week 3	Week 4	Week 5
Greenhouse Maintenance	Group 1	Group 2	Group 3	Group 4	Group 5
Transplanting	Group 2	Group 3	Group 4	Group 5	Group 1
Soil	Group 3	Group 4	Group 5	Group 1	Group 2
Water	Group 4	Group 5	Group 1	Group 2	Group 3
Plant Labels	Group 5				
Inventory		Group 1			Group 4
Raised Beds			Group 2		
Tower Garden Maintenance				Group 3	

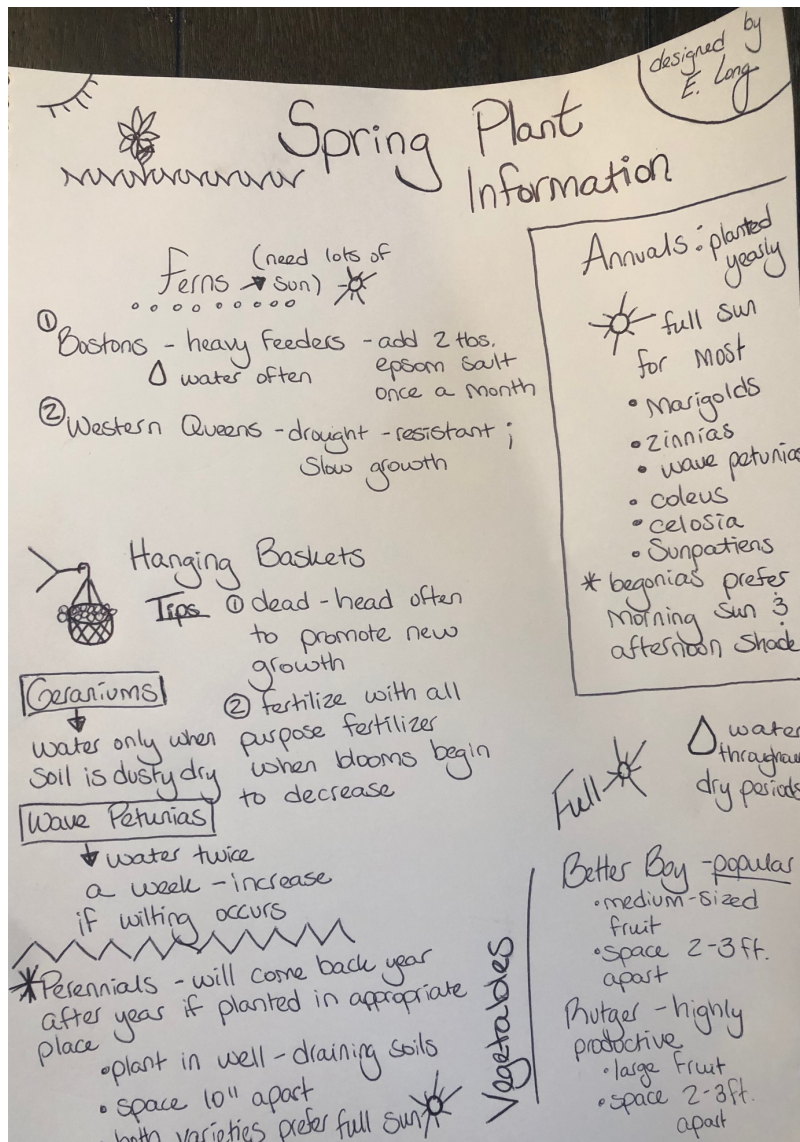
Chore Descriptions

Greenhouse Maintenance	Daily maintenance includes sweeping, pulling weeds inside and outside of the greenhouse, and scouting for pests. Weekly maintenance includes cleaning the cool cell pads with algaecide, spraying herbicides, and pesticides when appropriate. Other greenhouse maintenance items can include the repair of pipes, hose seals, and table repairs
Transplanting	The transplanting of plants includes planting plugs and liners that come in throughout the season. In addition, this chore could include planting seeds in the spring to be used in the vegetable garden.
Soil	Mixing soil includes maintaining the proper amount of moisture in the soil and mixing soil to put into trays, pots, and baskets for plants to be transplanted into.
Water	This chore includes the daily watering of plants throughout the greenhouse as well as the weekly fertilization of plants. Students in this group should be aware of proper fertilization rates for the plants in the greenhouse and should apply fertilizer as needed. At the end of each work day, students in this group should wash the floors of the greenhouse down to reduce pests and bacteria growth.
Plant Labels	When creating editable plant labels on Google Docs, students should include information such as light requirements, watering suggestions, fertilizer rates, and grow zones – other information may be added throughout the semester
Inventory	Although inventory does not have to be completed weekly, it is important for this to be done at least once a month. Students should take an inventory of pots, trays, soil bales, plant labels, fertilizer (both soluble and resin-coated), as well as plants left in plug trays (this is done so that the class has an idea of what is left to plant).
Raised Beds	The outdoor raised beds need weeding often and during the fall and spring, students till the raised beds for the planting of fall and spring vegetables. Students should use tools from the shed including shovels, hoes, buckets, and rakes to complete the work.
Tower Garden Maintenance	The tower gardens need to be checked monthly to ensure that the pH levels are appropriate. Groups should use the pH kit found in the cabinet to determine the pH and adjust the pH if needed with the different solutions. In addition, the tower gardens can develop algae so they need to be cleaned on a regular basis. Students should harvest any produce from the tower garden each rotation and inventory what is harvested. The produce should be cleaned and packaged for easy sales.

Even though there are only five weeks listed, the chart is used throughout the semester.

The dates are put into the chart as well as soon as the planting schedule is decided.

Appendix F: Student-Designed Plant Sale Information Sheet



This is an example of a student activity from spring semester. They must design a hand-drawn, or online template outlining basic plant information related to the plants in the spring sale. Even though this is a simple design, the student uses correct symbols that would correlate with symbols on an actual plant label and the student offers helpful tips to customers. Each spring, the students vote on the two top designs (one hand-drawn and one online). Those are the designs I copy and use for the actual sale.