

Savvy About Succulents

A Senior Project

presented to

the Faculty of the Agricultural Education and Communication Department

California Polytechnic State University, San Luis Obispo

In Partial Fulfillment

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Agricultural Science; e.g. Bachelor of Science

by

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### **Abstract**

The purpose of this project was to create an educational booklet explaining that succulents make fantastic SAE projects. The booklet was designed to be helpful to both high school students and high school instructors. All students enrolled in agriculture programs have projects known as SAE's. This booklet includes a variety of topics that are relevant to having an SAE project. All information was based on industry statistics and information gained from courses. The booklet can be distributed both electronically and in a print version. The major consideration in the design of this project was to develop a booklet that would be user-friendly. The purpose of this project isn't to take the place of any curriculum, but instead to be a resource for students who are interested in succulents as their SAE project.

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a. Savvy About Succulents- Booklet

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The level of education that has been completed by thirty participants was documented from those who provided feedback for the project evaluation. Each of the participants were categorized as either an Undergraduate or Graduate.

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States the responses from the evaluation form as to whether or not the project would be used as a resource for their students as a high school teacher. Comments and suggestions in response to the project were documented and tallied.



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1. Figure 1: Total number of participants surveyed

The results for this sample are represented using a pie chart. This chart displays the percentage of students who answered “Yes” or “No” as to whether they would utilize this as a resource in their classroom.

## **Chapter 1**

### **Introduction**

Agriculture education is an important part of today's educational curriculum. At the high school level, there are several agriculture areas taught that are available to students; mechanics, welding, floral design, plant and animal science, biology, and viticulture. These classes are linked to the highly successful organization, Future Farmers of America (FFA). The FFA offers numerous extra-curricular activities, proficiencies, awards/ degrees, and leadership opportunities. Prior to entering the high school system, many students have not been introduced to agriculture in the classrooms. Therefore, the need to engage students at all high school grade levels into the Agricultural Department is crucial

Since high school is such an influential time for students, it's important to develop programs that will harbor student interest, specifically in horticulture. Horticulture provides a variety of opportunities for successful student based projects and can develop into a cost-effective enterprise. Developing a horticulture program, specializing in succulents, within a high school agricultural program could have an immense effect on students. Students are able to do hands on activities that take place outside of the classroom, work directly with teachers and volunteers of the school, spark early interests in agriculture, as well as gain knowledge and skills that they can apply in the next few years. Teachers will be able to utilize the horticulture facilities as an "outside" classroom laboratory to broaden the educational experiences of their students.

Supervised Agricultural Experiences (SAE) are supervised projects that agriculture students work on throughout the year that can involve all aspects of the agriculture industry. SAE's are designed to enhance the learning of agriculture students. More specifically, students

are able to take the knowledge that they learn in the classroom and apply to the “real-life” experience of having an SAE project. Students learn important life assets, such as leadership and responsibility that will continue to develop into valuable life skills. Specifically, succulent SAE projects would provide students with minimal cost projects that have the ability to educate on time and money management, as well as responsibility. Succulents are an easy project to propagate and maintain. The project will pay for itself because of its ability to produce a high quantity of plants from a single mother stock. Students are able to learn about proper plant care, working together as a team, self-confidence, and also the importance of growing and selling products in the form of a fundraiser for their school.

### **Statement of the Problem**

Agricultural students are not being taught about succulents and don’t understand their potential and high success rate as an SAE project. Currently, high school agricultural students primarily focus their SAE projects on livestock breeding and market projects. This area of interest can be a costly investment that requires proper facilities, equipment, and veterinary care. However, for students that don’t have the correct facilities to house a livestock animal, horticulture is an area that requires a much limited amount of space and cost. Horticulture can offer agriculture students the same SAE project experience. Specifically, working with succulents is an excellent and successful SAE project that so many agriculture teachers don’t emphasize. Students that are introduced to new subjects areas in agriculture have the opportunity to explore what the industry has to offer; expanding their knowledge to future education.

### **Importance**

A SAE succulent project allows for the opportunity to incorporate hands-on learning into the classroom and is a way for students to earn money. It is important that students have an

understanding of how plants are produced through their determination, leadership and their ability to excel in agriculture outside of the classroom. SAE projects should be a positive experience for high school students. Therefore, it's important as teachers to remember to help students choose projects that will be successful so that they will continue to expand their SAE to its full potential.

It is also important to spread the knowledge of succulents to other agriculture departments so that every agriculture student has the opportunity to encompass a successful SAE no matter what their circumstances may be.

### **Purpose**

The purpose of this project is to create a booklet that promotes succulents as a SAE projects for FFA students.

### **Objectives**

The objectives to accomplishing the purposes of this project are as follows:

1. Provide a
  - a. Basic overview of how to properly care for succulents.
  - b. Identify and develop a list of tools and materials.
  - c. Discuss how to perform basic propagation skills.
  - d. Display major varieties of succulent.
  - e. Compile a list of marketing techniques to employ.
2. Create an Evaluation Form to gather data

### **Definitions of Terms**

SAE- Supervised Agricultural Experience: Supervised by their agricultural instructor, students develop a learn by doing project based on one or more of the following categories: Entrepreneurship, Placement, Research and Experimentation, and Exploratory.

FFA- Future Farmers of America: A national organization that is dedicated to making a positive difference in the lives of students by developing their potential for premier leadership, personal growth and career success through agriculture education.

Horticulture- the science of cultivating fruits, vegetables, flowers, or ornamental plants

Succulents- a plant that has thick, fleshy, water- storing leaves or stems

Mother stock- A single plant that is used to propagate from

## **Summary**

Hands-on learning experiences in horticulture build knowledge, skills, and an interest in the horticultural field. Developing an SAE succulent project will serve as a guide to schools looking into integrating a new or restoring a horticulture enterprise. Also, it is important to keep the needs of the student in mind when selecting a SAE project. Succulents are an amazing project with a large amount of potential.

## **Chapter 2**

### **Review of Literature**

#### **Introduction**

Agriculture is an important aspect in our country and should be implemented into every classroom. “As early as 1908, agriculture teacher Rufus Stimson was encouraging students to utilize experiences gained in projects at home as a basis for study in school, originating the concept of the ‘home project’, or supervised agricultural experience (SAE) programs, as we envision that concept today”(Dyer & Osborne, 1995). There are many opportunities to utilize lesson plans, science projects, as well as numerous hands-on learning experiences. Starting a horticultural program opens a door for students, faculty, school, and the whole community that encircles.

The objective to starting a horticulture project is to enhance the learning opportunities of the students. The program will consist of all grades contributing to the work and activities necessary to maintain the plants. As the students work together they are able to watch their hard work cultivate.

#### **SAE Involvement**

John Dewey developed the most notable philosophy of how children of the twentieth century learn. Specifically, he stated that education should be based upon the personal experiences of the learner, and if education is based upon this, then both quality and quantity of learning would highly increase (Smith, 1997). In 1908, an agricultural instructor named Rufus Stimons began encouraging students to have projects at home that they could gain experience from. This past moment created what is known today as a Supervised Agricultural Experience

(SAE). In 1917, Stimon's amazing vision became reality with the passing of the National Vocational Act and; therefore, establishing a mission statement for the future of agriculturists. There are several key factors that influence a student's involvement in SAE projects. Some of these factors that must be considered are instructors' experience and attitude of the project and the enrollment of consecutive agriculture courses (Dyer & Osborne, 1995).

Across the nation, SAE participation has been decreasing steadily over the past several years. In New York, less than 30% of students participate in SAE projects, over half of the students in Florida do not participate in SAE projects at all during high school, and over 43% of students in the state of California do not have SAE projects. These statistics are real and shocking due to the low percentage; every student in the agriculture department should be involved in a SAE. Even more so, students in Louisiana and North Carolina together have 73% of students who do not participate in SAE projects at all. While there are numerous students who do not participate in SAE programs, there are a large amount of students who do participate. Specifically, over half of the students in agricultural departments in Texas participate. Colorado and Montana have students who still participate in SAE programs even after they have graduated high school (Dyer & Osborn, 1995).

## **Succulents**

Propagation with succulents can be beneficial for many reasons. One of these reasons is to increase the quantity of mother stock with new and exciting varieties of succulents and to also share the diverse varieties with others. Propagating succulents by taking cuttings allows the exact replication of the desired plant and can be done with ease and in a timely manner. The direct sticking method is the most commonly used method when propagating succulents. More specifically, a propagator is able to remove an entire leaf from a succulent plant and then plant it

in its own pot for it to grow. The leaf can be direct stuck immediately after taking the cutting it or it can be allowed to dry for a day or two. Succulents are very forgiving. This method allows for a quick and easy way to dramatically increase the quantity of succulents in a student's SAE project. When using the direct sticking method, a cut should be made just at the stem joint or where a bud or leaf joins the stem. Also, cuttings should be taken at the beginning of the growing season, usually spring through summer. (Hodgkiss, 2011)

### **Horticulture in the Classroom**

Introducing horticulture at the high school level is a valuable tool in the classroom. "Gardening with children is not a new concept. Children have probably been gardening for food/survival for thousands of years." (Virginia Tech, 2010). There are many different teaching opportunities that can be linked to a horticulture program. The Master Gardeners of San Joaquin County have developed a horticulture program that is making a positive impact on the students and community.

A school garden program can bring nature and agriculture to life on campus. School gardens give young people an opportunity to better understand their relationship with nature creates a dynamic environment for learning core subjects and promotes cooperation through group activities. A garden often encourages self-confidence and a sense of responsibility. Children become excited about math, history, science and nutrition through gardening experiences. Students have the opportunity to learn about where food really comes from. Parents are given an opportunity to get involved with their child by volunteering in the school garden. Most importantly students can learn by doing, getting their hands dirty, thereby becoming immersed in learning (Master Gardeners).



The academic impact that a horticulture program has on students is vast. The lessons gained from this type of supervised agricultural experience are that of ethics, dedication, pride, and developing skills that they are able to apply towards future education.

The need to improve students test scores through academics is a concern in the United States. When compared to other countries, the United States falls in eighth place to fifteen other countries. The immediate solution that has been applied is to extend the hours in a school day and in some cases add days to the academic year. Instead, schools are now considering agri-science resources to teach different subjects. "Agriculture provides a marvelous vehicle for teaching genetics, photosynthesis, nutrition, pollution control, water quality, reproduction, and food processing where real live examples can become part of the classroom experimentation and observation" (Connors & Elliot, 1995). This has made for a huge push towards integrating agriculture education into schools, even at a grade school level.

There have been studies that reflect the change of behavior in students that take part in school gardens. "Virginia Tech, Virginia (1996): In a survey of teachers that garden in the classroom, seventy- five percent of teachers reported that student behavior often or always improves when a garden is the learning environment"(Virginia Tech, 2010). This positive indication on student behavior is an additional benefit to integrating agriculture into the classroom.

### **Development of a Booklet**

Many individuals portray their thoughts of the "quality of education" to continuously be changing. However, numerous people say that the quality of education comes from the presentation of knowledge- simply books. Books provide students with knowledge that they can hold in their hands and absorb information by reading. Teachers constantly use textbooks in the

classroom because it helps to meet the qualifications and standards that are set forth by the state. Therefore, books are a driving force behind the quality of education. This leads into teachers knowing whether a textbook contains quality information to enhance the learning of their students. The development of framework that goes into creating a textbook is sometimes seen as “garbage” rather than as quality. However, it is important to remember that knowledge comes in all forms and one form does not triumph another.

Audrey Hepburn once stated that “a quality education has the power to transform societies in a single generation, provide children with the protection they need from the hazards of poverty, labor exploitation and disease, and given them the knowledge, skills, and confidence to reach their full potential.” (Hepburn, 2010). This quote proves that the quality of education is important in the success of the future generations of students. Developing a book requires thought and knowledge in a particular subject. Authors must be able to answer the question “why is this important” for students to know and how should the material be organized in order for them to learn efficiently. Structure and organization are the two key components when developing an educational tool (Moore, 2011).

## **Summary**

SAE provide students with hands-on experience that allows them to participate in a learning environment outside of the classroom. The positive performance that occurs is astronomical. Within each high school agricultural program, there are different levels of complexity that students can choose as their SAE projects, especially in horticulture. There are numerous opportunities for students to grow and develop as individuals through their SAE projects. It is important to get young generations excited about agriculture education to carry on

the future of the agriculture industry. Books provide students with information that they can hold in their hands. Also, books give children the opportunity to learn and gain knowledge in order to conduct investigation and experimentation. The development of a book should be designed to be user- friendly and to provide the most usefulness to students. Quality is everything in education; and therefore, must be carried to the highest extent possible when choosing textbooks for students.

## **Chapter 3**

### **Methods and Materials**

In order to begin creating a booklet, it is in one's best interest to construct an overall outline of the areas that should be presented to the target audience to keep information organized and concrete. In this case, the target audience would be agriculture instructors and their students. To include all aspects of our subject matter, sections that are included in the booklet are: national trends, easy to care, easy to propagate, types of succulents, proper caring, propagation techniques, and marketing. The next step is to collect all of the core information. Much of the information that was gathered for this project came from prior courses taken at Cal Poly, San Luis Obispo with Professor Dan Lassanske in his EHS 424: Nursery Crop Production, EHS 230: Environmental Horticulture Science and HCS 400: Special Problems in Horticulture classes, as well as personal work experience at the Horticulture and Crop Science Unit. Each class focused on proper care and maintenance from an industry and consumer perspective in horticulture. Methods of propagation, planting, pruning, pest management and other practices were demonstrated and performed.

It was necessary that when developing this booklet it covered as much material as possible to act as a guide for anyone interested in growing succulents. The design of the booklet was made to capture the audience and flow in order of production. First, it is important to introduce the subject matter and why students should choose succulents for their SAE projects. Presenting information about the growing national trends, as well as the ease of care and propagation gives the audience a buy in into considering this particular topic. Next, it is essential to appeal visually to the reader and have photographs incorporated into the booklet when

discussing the types of succulents, tools needed, and the step by step process of propagation. Photography adds clarity to each section within the booklet.

All of our photos were taken at the Cal Poly Horticulture and Crop Science Unit and were systematically placed within each chapter of the booklet. Each plant showcased was grown and cared for by Cal Poly student employees and volunteers. A list of the photographs that needed to be captured were established prior to our visit to the Horticulture Unit. It was important that when there was a new tool, technique, or method of propagation introduced there was a clear picture to illustrate. Making each proposal as straightforward as possible helps the reader to understand the real simplicity of a succulent project.

Bringing this booklet together as a whole was done by utilizing the program *InDesign*. This layout software tool allows the user to create a professional document that the user has the ability to construct each page individually and insert photos as needed. The finished product is polished and professional. More specifically, the researchers began by learning how to use the *InDesign* program. There are trials that are offered by InDesign that show how to use the basic features of the program to allow users to have a jump start on creating projects. Once the researchers decided the title of each page (by making a rough draft of the entire booklet), they were then able to begin to construct each page. The first step was to set up the project by selecting “document” and adding the correct number of pages. Next, the researchers merged the rough draft of the booklet, which was in Microsoft Word 2003-2007 version, into the InDesign document. This then allowed the researchers to copy and paste what information they wanted on each individual page. Next, the researchers formatted the text on the pages so that each page looked somewhat different. Picture boxes were then designed and put into the document so that pictures could be inserted. All pictures were required to be resized when merged into the

document. The final step was to make sure that all text and pictures looked correct when saving the document as a pdf file.

## **Population**

The population that evaluated this project was a total of thirty Cal Poly students from the College of Agriculture, Food and Environmental Sciences. A majority of students that offered constructive feedback are currently enrolled in the Education series, working on their Credentials, and will be student teaching in the fall and spring. The selection of this population was to find individuals that are nearing student teaching within the next one to two years.

## **Instrumentation**

The project was presented to groups of Cal Poly students within the Single Subject Credential Program through a visual presentation of the “Savvy About Succulents” book. Background and relevance of this project were given through an oral discussion. Those observing the project were given an opportunity to give oral feedback and their comments were documented. In addition to verbal reactions, an evaluation form was given for supplementary feedback. The questionnaire provided two questions as to whether or not they would utilize this book in their classroom and whether or not it was appealing enough to incorporate as a teaching resource.

## Data Collection

During the data collection, each participant was given an evaluation sheet for comments and additional constructive criticism. There was also a record taken of the oral discussion during the time of presentation. Evaluations forms were distributed to the students during the end of a class period once the instructor had completed the lesson for the day. Ample time was given to view the material, construct feedback, and answer the evaluation questions in written form. Collection of the evaluation forms was done so in a professional, timely, and confidential manner. After the data sheets were collected, their comments were read and tallied.

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**EVALUATION FORM**

*\*Please answer the following questions in complete honesty. Answers will be used for data analysis for a senior project. All evaluation forms will be kept anonymous and confidential.*

I

**Question #1:** Would you use this as a resource for your students as a high school teacher?

**Question #2:** Please specify whether or not you felt "Savvy About Succulents" was well displayed and would be utilized in your future classroom. Please circle Yes or No.

YES                      NO

## **Data Analysis**

The data was collected and reviewed by the researchers in order to determine the overall effectiveness of the project. Methods used to interpret the data include both a pie chart and a series of tables. In order for a respondent to be included in the data analysis he or she must have provided answers to the following questions:

*Question 1:* Would you use this as a resource for your students as a high school teacher?

*Question 2:* Please specify whether or not you felt “Savvy about Succulents” was well displayed and would be utilized in your future classroom. Please circle yes or no.

The responses were used to analyze and interpret what percent of professionals, going out into the teaching field, would find this information useful. The amount of positive responses and wanting to utilize the resource concludes that this booklet is something future agricultural educators are enthusiastic about.



## **Chapter 4**

### **Results and Discussion**

The booklet sample was designed to be eye-appealing and completely user friendly. Specifically, the sample was designed to be both beneficial to instructors and to students who are seeking a successful SAE. This booklet focuses on using succulents for an SAE, acting as a guide on how to care, propagate, and market the project. The language used in the sample is language that high school students would be familiar with and understand. The concepts discussed in the sample were designed to flow in the order of production of succulents, so that the students experienced the “farm to fork” aspect (growing to marketing phases). An oral discussion was held during the presentation of the sample. Participants were also asked to fill out an evaluation form that contained two questions. These two questions were specific in finding out whether or not the sample would be useful as a resource for students and high school instructors. All comments and discussion were recorded by the researchers.

The data that was collected was taken during and after conducting a presentation method approach. The researchers presented the sample to a group of students enrolled in the Education classes at Cal Poly. The researchers presented the sample, using a projector, and discussed the orientation of the book. The researchers documented discussions between the Education students that were derived off of questions and comments from the sample. Before the discussion and comment session began, the researchers informed the entire group of what a succulent actually is. The researchers performed data analysis by creating a pie chart that displayed how many of the participants would actually utilize the sample in their future classrooms. Comments and

discussions were clearly noted by the researchers and taken into consideration when discussing the final sample product.

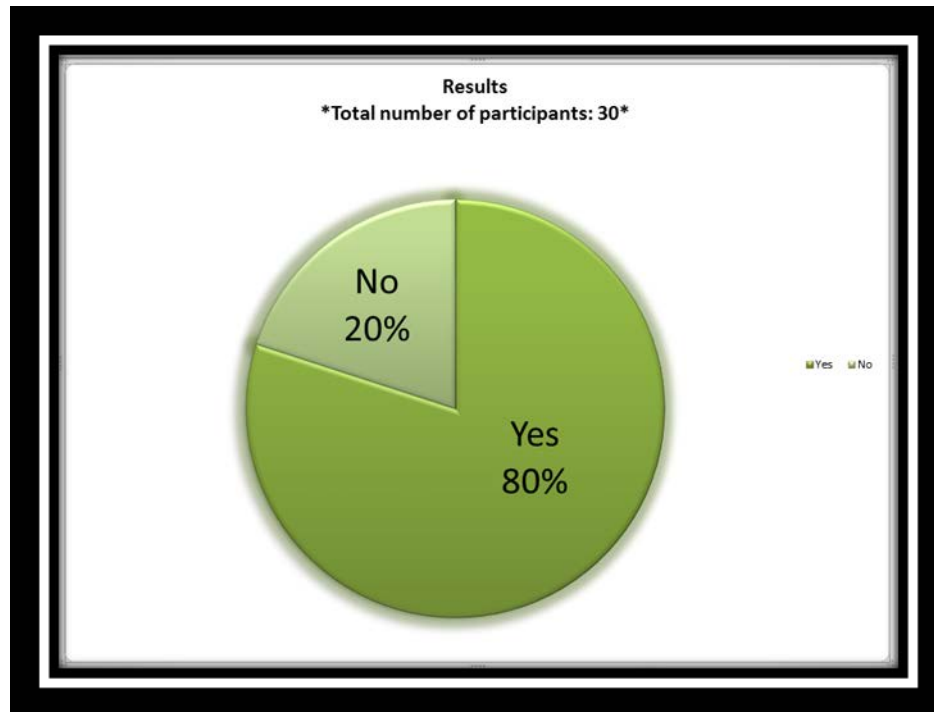
## **Results**

The results for this sample will be represented using a pie chart and a series of tables to show the comments and discussion from all of the participants. The first piece of data being presented below is the pie chart (Figure 1). This chart displays the percentage of students who answered “Yes” or “No” to the second question on the evaluation form. Specifically, 24 out of 30 participants stated that they would utilize this as a resource in their classroom. Figure 1 shows the percentage difference between the two groups.

## **Finished Project**

The completed Savvy About Succulent Booklet can be referenced in the Appendix.

Figure 1. Total number of participants surveyed



The following table (Table 1) simply states the level of education that has been completed by the thirty participants. The researchers documented the level of education completed by the thirty participants to see how closely these individuals are to becoming teachers. Based on the data presented, eleven of the participants are undergraduates and nineteen of the students are graduates.

Table 1. Level of education completed

Level of Education completed of participants:	
Undergraduate Participants:	11
Graduate Participants:	19
Total:	30

The following piece of data is a table (Table 2) that shows the responses from the first question on the Evaluation form. If the answers are highlighted yellow, that is a duplicated answer. Five out of thirty responses stated that they would not use this as a resource for their students as a high school teacher. However, a majority of the participants stated they would indeed use this as a resource for their high school students. One of the responses specifically pointed out that they would like to use this resource with their freshmen students.

Table 2. Evaluation of Responses

Question #1: Would you use this as a resource for your students as a high school teacher?	
Responses:	Number of Duplicated Responses:
I would incorporate Native succulents	
Succulents are awesome	4
Succulents are a great way to make a lot of money	2
I really liked the pictures, they drew me in	
Excellent title	3
Great layout	
This project applies both to the students and the instructor	
Informative and accessible	
Great color scheme	3
I feel like this book just made me "Savvy About Succulents"	
I would definitely use this as a resource for my students	2
I do not feel like this left me educated on succulents	
I would not use this as a resource for my students	4
Nice job on the pictures and layout. This would be a great resource	
I would love to have this as a resource for my students	
I would use this as a resource for my Freshmen students	

## Summary of Results

Based upon the data collected, there is a strong need for more educational resources that can be given to students about succulents for SAE projects. As the results showed, 24 out of 30 participants highly recommended that they would use the "Savvy About Succulents" booklet as a resource in their future high school agriculture program. The sample is documented to ensure easy interpretation by students of all grade levels in high school and can help lead them to

success in having a succulent SAE project. The sample is a resource that instructors can keep and continue to utilize over and over again because of the standard material that is presented.

## **Discussion**

The overall results of this sample concluded that 24 out of 30 participants would use this as a resource for their students at the high school level. Also, out of these thirty participants, eleven of these were undergraduates and the other nineteen of these individuals are graduate students. These participants are working towards becoming teachers. Eighty percent of the individuals concluded that this would be a viable resource for them as instructors, while twenty percent of the participants found the sample to be non-beneficial to them as teachers.

The researchers feel that the results could have been conducted in a more in-depth fashion. Specifically, the evaluation form could have included more questions that pertained directly to the color scheme and topics presented in the sample. The researchers overall reactions to the sample is that it will be extremely beneficial to both high school students and instructors. One of the researchers feels that teachers from across the nation, involved in agriculture, will be able to benefit from the sample, while the other feels it may depend greatly on location.

## Chapter 5

### Conclusions and Recommendations

The process of conducting this senior project was done so in a structured and organized fashion. However, there are several recommendations that should be taken into consideration if another researcher was to create an educational booklet. First, the researchers agreed that if this project were to be conducted again, the evaluation sheet should have more questions that are specific to the actual content in the sample. By changing this, the results would be much more qualified and exact. All recommendations given for this project are listed in in Table 2 in Chapter 4. The researchers would have also spent more time learning how to use the *InDesign* program in order to make the sample more attractive and professional looking. The only additional research and information that might be included to strengthen the project would be to include more depth and information for the “Types of Succulents” chapter in the sample. Overall, the researchers feel that the project is thorough and well designed to fit the needs of students and instructors.

This senior project is best suited for high school agriculture students and high school agricultural instructors. Agriculture students will be able to use this booklet as a guide to help them raise succulents as an SAE project. Also, this project was designed to get agriculture students interested in conducting a succulent SAE project.

The researchers conclude that it is possible to create a product that can be used as an informational tool in the classroom that will be beneficial to both agricultural students and agricultural instructors. Also, the researchers feel that the information in this booklet is up to date with industry information and statistics. Based off of the results, it can be clearly stated that this booklet will be highly beneficial to all high school agriculture departments.

The overall outcome of this project was to create an education tool that could be used in high school agriculture departments. This tool was designed to inform teachers and students about having succulents as an SAE project.

## References

- Brenzel K. (2001). *Sunset: The Western Garden Book, Annuals for Seasonal Color*. Menlo Park, California. Sunset Publishing Corporation, 70-71.
- Connors, J., & Elliot, J (1995) The Influence of Agriscience and Natural Resources Curriculum on Students' Science Achievement Scores. *Journal of Agriculture Education*, 36, 57-58.
- Dyer, J., & Osborne, E. (1995). Participation in Supervised Agricultural Experience
- Hepburn, Audrey. (2011). Thinkexist. Retrieved from <http://thinkexist.com/quotes/like/a-quality-education-has-the-power-to-transform/407117/>
- Programs: A Synthesis of Research. *Journal of Agricultural Education*, 36, 6 – 10.
- Hodgkiss, Robert. "The Cultivation Page." The Succulent Plant Page. R. J. Hodgkiss, 20 March 2011. Web. 9 Apr 2011. <<http://www.succulent-plant.com/propagation.html>>.
- Master Gardeners of San Joaquin County. *University of California Cooperative Extension*. Retrieved May 23, 2010, from [http://sjmastergardeners.ucdavis.edu/School\\_Gardens/](http://sjmastergardeners.ucdavis.edu/School_Gardens/).
- Moore, Mary Carroll. (2011, May 21). How to plan, write, and develop a book. Retrieved from <http://howtoplanwriteanddevelopabook.blogspot.com/>
- Smith, Mark K. "John Dewey." Infed. CarbonNeutral, 08 May 1997. Web. 22 May 2011. <<http://www.infed.org/thinkers/et-dewey.htm>>.
- United States Department of Agriculture, *Junior Master Gardener Program*. Retrieved May 23, 2010, from [http://www.agclassroom.org/directory/search\\_result\\_details.cfm?PID=1031](http://www.agclassroom.org/directory/search_result_details.cfm?PID=1031).
- University of Florida. *Florida School Garden Competition*. Retrieved May 23, 2010, from [http://gardeningsolutions.ifas.ufl.edu/schoolgardens/school\\_gardens/funding.shtml](http://gardeningsolutions.ifas.ufl.edu/schoolgardens/school_gardens/funding.shtml).



Virginia Tech Horticulture Department. *School Gardens*. Retrieved May 23, 2010, from  
<http://www.hort.vt.edu/HORT6004/network/schoolgardens.html>.

## Appendix



# **SAVVY ABOUT SUCCELENTS**

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## I. Prologue

Projects are meant to broaden an individual's level of understanding. Supervised Agricultural Experiences allow agriculture students to conduct a project(s) in areas of agriculture that they have interest in. These types of projects give students the ability to learn about the proper handling and caring techniques and marketing plans. There are several areas in agriculture that students are able to have SAE projects in. These areas are mechanics, welding, floral design, plant and animal science, biology, viticulture, and etc. It is through these projects that students learn to excel in leadership and become outstanding individuals in the field of agriculture.







## CHAPTER 2



## II. Introduction

Agriculture education has become a vital tool in the educational curriculum. At the high school level, there are several agriculture areas that are available to students; mechanics, welding, floral design, plant and animal science, biology, and viticulture. These classes are many times linked to the highly successful organization, Future Farmers of America (FFA). The FFA offers numerous integral activities, proficiencies, awards/ degrees, and leadership opportunities. Prior to entering the high school system, many students have not been introduced to agriculture in the classrooms. The need for early educational field experience at every school level is crucial.

Since high school is such an influential time for students it's important to develop programs that will harbor their interest, specifically in horticulture. Developing a horticulture program, specializing in succulents, within a high school agricultural program could have an immense effect on students. With this program, students are able to do hands on activities that take place outside of the classroom, work directly with teachers and volunteers of the school, spark an early interest in agriculture, gain knowledge and skills that they can apply in the next few years of their life. Teachers will be able to utilize the horticulture facilities as an "outside" classroom, laboratory, to broaden the educational experiences of their students.

Supervised Agricultural Experiences (SAE) are supervised projects that agriculture students work on throughout the year that can involve all aspects of the agriculture industry. SAE's are designed to enhance the learning of agriculture students. More specifically, students are able to take the knowledge that they learn in the classroom and apply to the "real-life" experience of having an SAE project. Students learn important life aspects, like leadership and responsibility; which will continue to stay with them as they continue on in their future. Specifically, succulent SAE projects would provide students with minimal cost projects that have the ability to educate students on time and money management as well as responsibility. Succulents are an easy project to propagate and maintain. The project will pay for itself because of its ability to produce a high quantity of plants from a single mother stock. Students are able to learn about proper plant care, working together as a team, self-confidence, and also the importance of growing and selling products in the form of a fundraiser for their school.



## CHAPTER 3





### III. Why Choose Succulents?

**S**ucculents are a growing trend in California. The amazing assortments of diverse plants are a great addition to anyone's home and landscape. Succulents have a reputation for their extreme ability to withstand high temperatures and thrive on neglect. In today's economy, California is in a water crisis and the need to conserve our most valuable resource is crucial. Agriculturalists are trying to find ways to conserve water by changing what they produce. Growers and nurseries are changing what they produce in order to keep water usage and cost at a minimum. Therefore, a great way to reduce the amount of water used to beautify any area is to choose succulents. Replacing any of your perennials with succulents of your choice will be extremely beneficial. It takes approximately 15 gallons of water on a weekly basis to sustain a perennial, yet a succulent only needs about 1 teaspoon of water per week. Selecting an SAE project that is focused on succulents will be a favorable and affordable opportunity for high school students.

Propagation of succulents can be conducted with ease while having high success rates. There are a number of different methods used to propagate these plants; such as, leaf cutting/layering, direct stick, plantlets, division, and offsets. Each process can be done with minimal materials and in small increments of time. Having "mother stock" plants set aside is a great way to generate a constant inventory of new plants that can be marketed at organized school plant sales.

A big issue for students who are interested in having an SAE project is where they are going to keep their project. Succulents are small and take up a limited amount of space. Also, succulents have been proven to be great houseplants. According to Garden Central, succulents are excellent houseplants because they are considered a low maintenance plant. Normally, succulents can withstand high temperatures during the day and low temperatures at night. Water is easily retained in their fleshy leaves and stems. Students can choose succulent plants that have the desired size and shape that is the most suitable for their environments conditions. The three most common succulent houseplants are aloe, jade plant, and the ponytail palm.



## CHAPTER 4





#### IV. Types of Succulents

Some varieties are listed

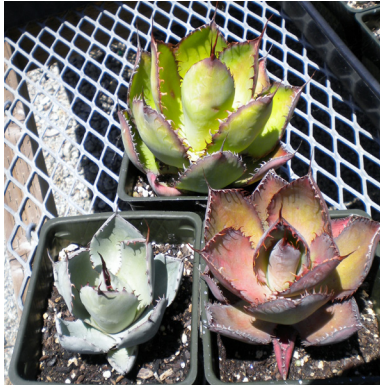
##### Aeonium

'Irish Bouquet', 'Kiwi', 'Blushing Beauty', 'Plum Purdy'



##### Agave

'Lafayette', 'Striata', 'Blue Agave', 'Funkiana'



##### Aloe

'Aloe Vera', 'Midnight', 'Pink Blush', 'Barbadensis Miller', 'Amaryllis'



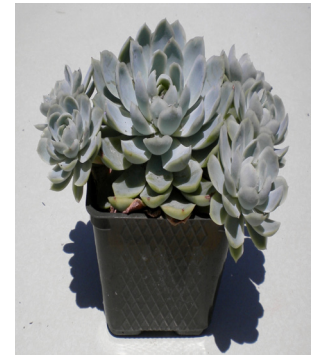
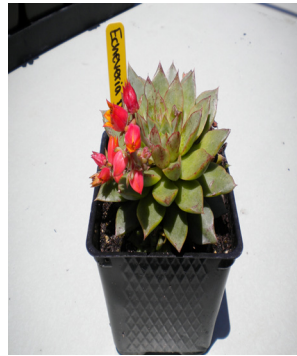
##### Crassula

'Tricolor', 'Bear Paws', 'Babies Necklace', 'Campfire'



## Echeveria

'Black Knight', 'Blue Waves', 'Firelight',  
'Pearle von Nurnberg', 'Aquarius'



## Kalanchoe

'Flap Jack', 'Mother of Thousands', 'Calandiva',  
'Bunney's Ears', 'Oak Leaf'



## Sedum

'Autumn Fire', 'Star Dust', 'Weihenstephaner  
Gold', 'Lemon Ball'







## CHAPTER 5





## V. Proper Care for Succulents

### V: Proper Caring

Succulents thrive on neglect and have a minimal amount of requirements for survival. Adequate lighting is important for the best growth of your plants. Succulents prefer full sun and can tolerate high temperatures since they are native to dry regions. Water requirements are low to care for these plants. Factors such as weather conditions, soil, and lighting all play a part in when to schedule watering. It is important not to overwater succulents. Just a general check to make sure the soil is dry before applying more water, simply stick your index finger into the soil as a feel test.

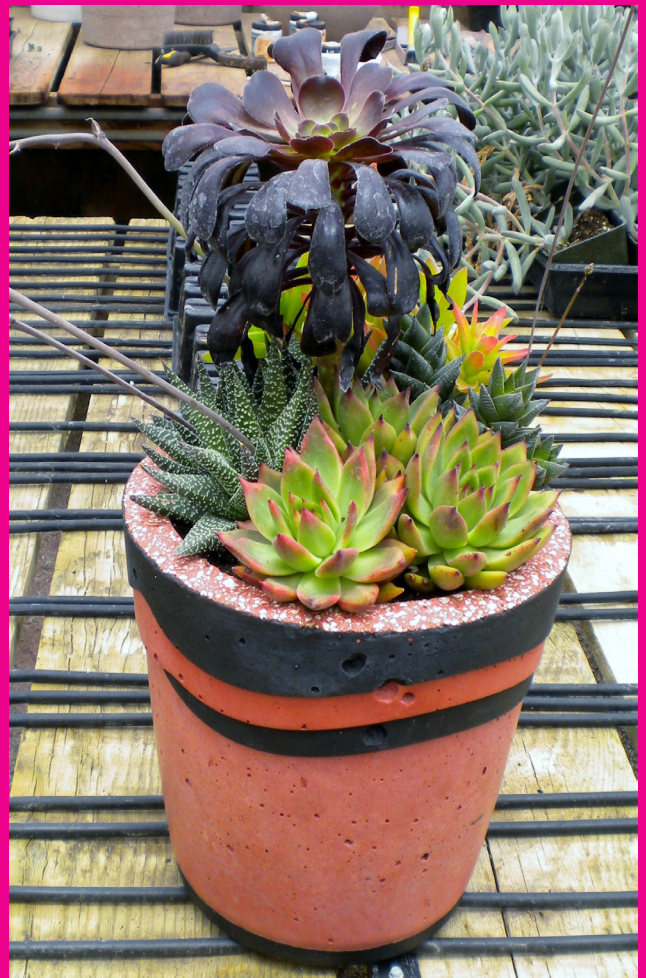


For the most part, succulents can live in poor soil and without nutrients provided. Yet, since this is your SAE you want to produce the most desirable product possible for you and your future customers. Adding fertilizers into your soil mixture, such as, Treble Superphosphate, Dolomite Lime, and Potassium Nitrate helps your succulents grow to their full potential.





## CHAPTER 6



## VI. Propagation Techniques

**K**nowing how to propagate succulents will allow your SAE to flourish!

### Tools

Before you can get started, there are certain tools that you need to acquire. First, you will need a pair of by-pass pruner that is sharp to ensure a clean cut. Depending on the size of the cut you are going to make a smaller pruner, such as the Florist Shear can be used.



While making your making cuttings, you may be propagating from more than one plant. This is an issue when it comes to your plants health, as disease can spread from one plant to the next. To reduce these risks, it is best to have alcohol wipes on site to clean the pruning blades before moving to another plant. The alcohol kills bacteria and pathogens that can be harmful to your succulents.



Having a pair of gardening gloves can keep your hands protected, especially when working with certain succulents or cacti.



Maneuvering soil onto your work space or into the containers can be done with the use of a trowel.





A dibble is a device used to make an indentation in the soil to place the plant in.



## Containers

Depending on the size of plant or cutting you're working will depend on the size of container needed. Some of the most popular containers used are 4 inch pots, a pony packs 6 cells, and 72 count plug trays.



Labels are essential to the success of your project. There are many varieties and sub-varieties that look very similar, so having labels on each plant and done correctly will help you to manage your inventory. Those that are looking to purchase your product will want to know what they are buying. It is personal preference as to what goes on these labels. General information such as the variety and the name of the plant can be sufficient. However, you can have information about care, the type of flower and color, the size the plant will grow to, etc.



## Mix

■The medium that can be used to pot up your succulents is listed below:

BEDDING PLANT SEEDING & TRANSPLANT MIX		
Component	Amount	
Ground Bark	10 cu. Ft.	
Peat Moss	6 cu. Ft.	
Perlite (coarse grade #2)	4 cu. Ft.	
Osmocote (Scott's Plus 16- 8- 12)	5 lbs.	
Treble Superphosphate (0-45-0)	1 lb.	
Dolomite Lime	20 oz.	
Potassium Nitrate (13.75-0-44.5)	7 oz.	
<b>Note:</b>		
1 Ingredients and fertilizers make up to 20 cu. Ft. of transplant mix		
2 Add fertilizers to the major ingredients and thoroughly mix before adjusting the proper moisture content		

## Methods

■ Each method of propagation is fast, easy, and fun!

The same soil medium can be used for each propagation method. Don't over water your newly planted succulents, as many don't have roots to take up water. Lightly mist the soil of each container after you propagation.

### Leaf Cutting/ Layering:

Step 1: Remove the leaves from the stem of a parent plant. Usually the leaves can be easily removed by hand, if this is not the case, use your florist shears or by-pass pruners.

Step 2: Each leaf can be propagated to create a new young plant. There are two methods that can be utilized when taking leaf cuttings.

-Plug Tray Method: First, you may use a 72 count plug tray to directly stick each leaf into the soil medium. It is important that the end of the leaf that was directly connected to the stem, from the parent plant, makes the direct contact with the soil.

-Air Layering Method: The second method for propagating leaf cuttings is to use air layering. Succulents are so hardy that they have the ability to root in the air and later making contact with the soil.

Step 1: Simply take your leaf cuttings and sprinkle them over the top of a container filled with your potting mix. Within a few weeks you will be able to see roots beginning to form.

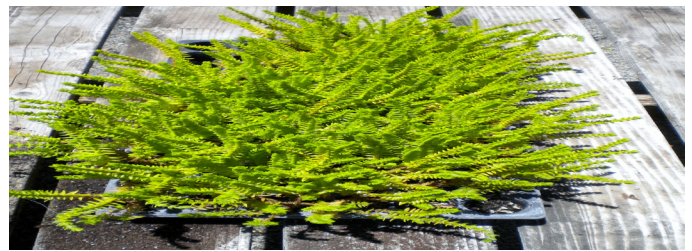
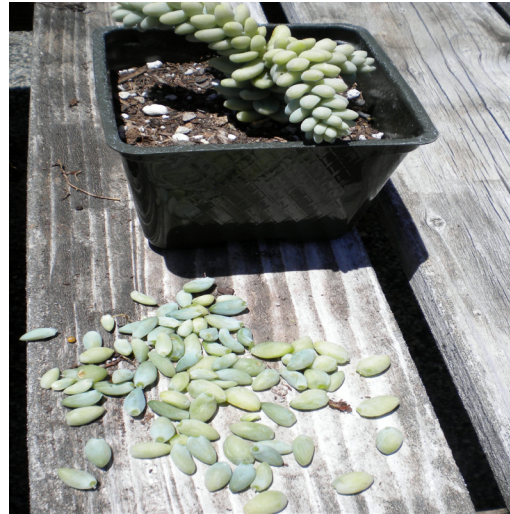
Step 2: Once they have rooted, remove each plant and transplant into containers of the proper size.

### Stem Cutting:

Stem cuttings are best taken during the plants growing season, spring through summer.

Step 1: Stem cuttings are taken from a parent plant at about two inches in length. Using your by-pass pruners or florist shears take a two inch cutting that you desire to propagate.

Step 2: A good rule of thumb is to then take off any lower bad leaves to ensure the best quality contact with the soil and polished presentation.





Step 3: The size of the container that you will be using depends of the size of the cutting that is taken. If you are working with smaller cuttings you may want to think about using a 72 count plug tray or pony packs (6 cells). Larger cuttings can be placed in four inch or quart size pots.

Step 4: Fill your container of choice with soil flush to the top. Do not compact the soil; this reduces the amount of air available to the plant.

Step 5: Hold your stem cutting so that the end that was removed from the parent plant is facing down toward the soil. Then gently push the stem directly into the center of the container until the vegetative portion is touching the top of the medium.

Step 6: Take both your thumb and pointer fingers and pinch the soil down around the base of the plant. This helps keeps the plant secure until its roots develop and can support it.

#### Plantlets:

Plantlets are usually found on the edge of parent plants or their flower stalks. This is common on Kalanchoes 'Mother of Thousands' and Aloe varieties.

Step 1a: Plantlets that are found on the flower stalks can be cut directly from the spike with a pair of by-pass pruners.

Step 2b: Many times there is not a stem to insert into the soil, so just place the plantlet on top of the filled container and pinch the soil up around it.



Step 1a: Those that are found at the edges of their parent plant can be much more fragile, smaller in size and should be hand removed.

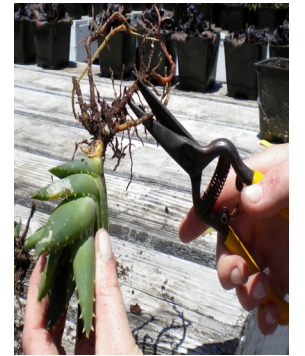
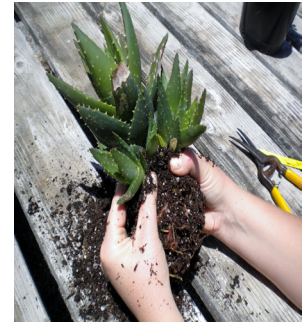


Step 2b: Due to their small size, a plug tray or pony pack may work best. Simply place each plantlet onto a cell, making sure there is direct contact with the soil.

#### Offsets:

Offsets are new plants that grow from the base of a parent plant. They are often referred to as “pups”, being the youngsters of a mother stock plant.

Step 1: When taking offsets from a parent plant that is containerized remove the plant completely from its pot to better see what you are working with. Start by breaking up the soil to expose the roots of each new plant.



Step 2: Separate each “pup” from the parent plant. Many times when removing offsets, there will be a fair amount of roots attached to each plant. Keep the roots intact; however, you may want to lightly trim them to ensure they will fit into the container.

Step 3: Pinch off and remove any lower bad leaves that there may be on each offset.



Step 4: Choose the proper container size for your offsets and start by adding a small amount of soil into the bottom of the container

Step 5: Insert and hold your plant at the desired height with one hand and fill in the soil around the plant using your other hand.



**Step 6:** Firm the soil in the container around the new plant.





## CHAPTER 7



## VII. Marketing

In order for an SAE project to be completely successful, a student must be able to market their project. Succulents are an easy SAE project to market for numerous reasons. One of these reasons is because they are “hearty” plants that require low maintenance. Low maintenance plants require less input, which saves money. Also, succulents come in a variety of different shapes, textures, and colors. Specifically, succulents allow individuals to choose from ordinary to extraordinary! [insert pictures here]



These two pictures show the contrast between the different varieties of succulents. These unique plants give people the opportunity to purchase plants that fit their own styles!

Containers play a huge role when trying to market succulents. First, the correct container must be chosen. Smaller plants should be kept in 4” pots and larger plants can be transplanted into gallon containers. Also, when considering what containers to use- a producer must always think of their consumer. In today’s market, individuals want variety. Therefore, a great way to market variety is to use a 6 cell pony pack or a 72 count plug tray. Each cell should contain a different type of succulent, and perhaps a different color. This technique will draw in customers and help to boost sales for a succulent SAE project.



Another aspect of marketing succulents is finding a way to make them stand out from other plant sales in the area. One way this can be done is to make color bowls using “pots with pizzazz”.



“Pots with pizzazz” is an easy pot to make that can add just the right touch of décor to any plant sale. These pots give consumers another option when considering purchasing a product. Also, “pots with pizzazz” give a new meaning to the word container. Specifically, containers are seen as ugly and plastic- but some people want to add a little color in their life; therefore, making “pots with pizzazz” the perfect choice for them!

The spreadsheet located below is a price sheet based off of industry prices for different container sizes for succulents. As it can be seen, these prices are highly reasonable when compared to only getting \$1.25 per pound for a market swine. Based off of the prices on this sheet, if a single student produced and sold one of each of these products- they would make a total of \$234.00, before subtracting expenses. It only leads to say that the market value and demand for succulents is high- with the right products being marketed.

PRICE SHEET- SUCCULENTS	
Container Size	Price per unit
4 " pot	\$4.00
Small- Pots with Pizzazz	\$10.00
*filled with succulents	\$15.00
Medium- Potss with Pizzazz	\$15.00
*filled with succulents	\$20.00
Large- Pots with Pizzazz	\$20.00
*filled with succulents	\$25.00
3 Tiered- Pots with Pizzazz	\$60.00
*filled with succulents	\$65.00
<b>Total:</b>	<b>\$234.00</b>



Another important aspect to look at when marketing a product is the presentation of the products. The pictures below show to examples of how to arrange succulents for plant sales. The price is clearly shown and all products are arranged in an orderly fashion.



Overall, marketing has the ability to make an SAE project successful. Using the correct techniques will allow students to maximize their product expansion and profit. Following the helpful tips that were mentioned above will also allow FFA students to be successful in learning how to market their succulents efficiently.







## CHAPTER 8



## VIII. Closure

Succulents are excellent SAE project for FFA students for numerous reasons. They are low maintenance and are easy to care for. Succulents can be propagated using a number of different methods, all in which can be completed in a few simple steps. Variety and color are huge ways to draw in consumers when trying to market a product. In terms of variety and color, succulents can range from looking “normal” to looking “extraordinary”- making them a great product to put on the market! Students will excel in leadership and marketing with this SAE project. Succulents as an SAE project allows students to gain real- world knowledge and experience through the production to marketing phases that will only help to lead them to success in their futures.

