An Educational Display:

“Succulent S.A.E. Projects”

A Senior Project

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By

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Abstract

The purpose of this senior project was to create an educational display about succulent S.A.E. Projects. This display was presented at the Idea Show of the California Agriculture Teachers’ Association (CATA). This show is part of CATA’s annual summer conference hosted by California Polytechnic State University, San Luis Obispo. The goal was to provide high school agriculture teachers throughout the state with creative ways to implement SAE projects in their programs. The project included extensive planning and designing of the display as well as photographs, 3-Dimensional projects and numerous teaching materials in handout form.
Acknowledgments

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Chapter 1

Introduction

In California, every county is responsible to turn in yearly statistical information on agriculture for the statewide summaries. For the last several years, the top three agriculture commodities in order, for California have been dairy, grapes and horticulture. However, the horticulture statistics only represent the production side. If retail and landscape were added to the data, horticulture would take second place. Currently, California is the national leader in all horticulture production categories, i.e. trees, shrubs, bedding plants, and ground cover with the exception of houseplants. California’s mild and Mediterranean climate has contributed to much of the state’s success in horticultural industries, mostly because growers can produce product all year-round. Therefore, other sectors of the industry, such as retail and landscape, can work all year-round. That being said, there are many career opportunities in horticulture, which should be examined at the high school level, specifically in agriculture programs.

Many high schools throughout California have an agriculture program. There are three major components to these programs: classroom instruction, participation in the F.F.A. organization and the completion of a student Supervised Agricultural Experience (S.A.E.) project. SAE projects are the hands-on, learn-by doing aspect of any agriculture program. SAE projects are a requirement to receive funding from either the state incentive grant and/or the federal Perkins grant (Agriculture Incentive Program, 2011). For this senior project, an educational display was developed to showcase ideas for agriculture teachers to implement succulent SAE projects in their programs.
Statement of the Problem

Because S.A.E. projects are required for agriculture program to receive the Incentive Grant and/or the Federal Perkins Grant, it is important that agriculture teachers offer a wide-array of options for their students to choose from. Since not all agriculture teachers have specialized in all aspects of agriculture, it is imperative to provide them with S.A.E. project ideas. Equally important, is to provide the teachers with current and trendy ideas to facilitate the greatest amount of student success.

Importance of the Problem

According to Dan Lassanske, “most agriculture instructors are not graduates from a horticulture degree program, but instead have a Bachelors of Science degree in Agricultural Science. At best, some of these graduates might have a concentration in horticulture, which would hardly qualify them to be knowledgeable about horticultural SAE projects.” Consequently, providing these teachers with useful horticulture S.A.E. project ideas is essential. Dan Lassanske is a Professor Emeritus of the Horticulture and Crop Science Department at California Polytechnic State University, San Luis Obispo. He has worked with undergraduate as well as graduate students for 39 years. Due to his horticultural knowledge, extensive teaching experience, and his involvement with agriculture education, he is the most credible resource for this project.
Purpose of the Project

The purpose of this project was to provide high school agriculture teachers with resources and ideas to integrate succulent S.A.E. projects into their programs. This was accomplished by developing an educational display.

Objectives
The objectives of this project are:

1. To create a visually appealing, educational display showcasing succulent S.A.E. projects.
2. To showcase this display at the California Agriculture Teachers’ Associations’ (C.A.T.A.) annual Idea Show during their summer conference.
3. To encourage high school agriculture teachers to incorporate succulents and succulent S.A.E. projects into their programs.
4. To develop useful handouts as free teaching material.
5. To provide 3-dimensional examples of possible S.A.E. projects related to succulents.

Definition of Terms

- CATA-The California Agricultural Teachers’ Association was formed in 1920. The purpose of the organization is to promote and improve the teaching of agriculture in California and to foster the welfare of those engaged in this work (calagteachers.org).
- FFA- The National FFA Organization envisions a future in which all agricultural education students will discover their passion in life and build on that insight to
chart the course for their education, career and personal future. (National FFA Organization, FFA.org)

- Record Books- The record books are used to keep an accurate record of all activities with SAE projects. It keeps track of daily occurrences, financial transactions, contracts, and a list of activities participated in. Students are required to log income and expenses, paid and unpaid hours, and specific activities and details related to their projects. The record books are an integral part of every SAE project, not only to teach the students responsibility and good record keeping skills but also to reward the students for their hard work.

- S.A.E.-An agricultural education program is made up of three integrated parts: Classroom instruction, FFA and Supervised Agricultural Experience (SAE). Students with an SAE project, learn by doing. With help from their agricultural teachers, students develop an SAE project based on one or more SAE categories:
  
  • Entrepreneurship
    Own and operate an agricultural business (e.g. a lawn care service, a pay-to-fish operation, holiday poinsettia production and sales.)
  
  • Placement
    Get a job or internship on a farm or ranch, at an agriculture-based business, or in a school or factory laboratory.
  
  • Research and Experimentation
    Plan and conduct a scientific experiment. (e.g. Determine whether the phases of the moon affect plant growth, or test and determine the efficacy of different welding methods.)
• Exploratory

Explore careers in agriculture by attending an agriculture career fair, or creating a report or documentary on the work of a veterinarian. (National FFA Organization, ffa.org)

❖ Succulent- Botany having thick, fleshy, water storing leaves or stems

(thefreedictionary.com/succulent).

Summary

This senior project discusses the importance of horticultural S.A.E projects, specifically succulent S.A.E projects, in high school agriculture programs. In order to demonstrate this importance, the authors have researched the history of agricultural education, the FFA, and the California Agriculture Teachers’ Association along with S.A.E project specifics and various topics related to succulent growth and care. This paper reflects the steps needed to create an educational display to showcase succulent S.A.E. projects to high school agriculture teachers.
Chapter Two
Review of Literature

The purpose of this project was to develop an educational display for high school agriculture teachers, on succulent Supervised Agriculture Experience (S.A.E.) projects. Horticulture is often one of the areas of study within agricultural education programs. One of the major benefits of horticulture S.A.E.s is the fact that with little investment one can receive monetary results quickly, thus making them great projects for high school students. The following resources were helpful in providing a historical perspective of the beginning of agriculture education, the FFA, Supervised Agriculture Experience projects, and various aspects of horticultural education.

The History of Agricultural Education

Agricultural education is designed to inform students on a wide-variety of subjects within the agriculture industry. Agriculture was first introduced into third-year schools (Universities) around 1825 and began to progress in 1830 (Growing a Nation, 2). In 1862, the Morrill Land Grant College Act was passed to provide funding for higher learning in each state.

Each state received 30,000 acres of federal land for each congressional representative from that state to be sold to provide an endowment for at least one college where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to
teach such branches of learning as are related to agriculture and mechanic arts... (The Morrill Act & the Land-Grant Colleges, 2009).

Following the Morrill Act, in 1917, the Smith-Hughes Vocational Education Act was passed. This act established a Federal Board of Vocational Education to monitor and regulate the various programs. Additionally, states were required to submit plans for vocational programs and specific teacher training, along with an annual report on the status of the program (Patterson, 2001). The act granted $7,000,000 for vocational programs below the college level. The money was specified to pay for half of vocational education teachers’ salaries, as well as training. The students participating in the vocational programs funded by the Smith-Hughes Act were required to devote at least 50% of their education to vocational education rather than academic instruction. (Patterson, 2001) With the implementation of this act, vocational agriculture developed quite rapidly. Ten years later, in 1928, the Future Farmers of America (FFA) was founded. The FFA organization formalized vocational education as it pertains to agriculture.

The History of FFA

Not long after the Smith-Hughes Act was passed and implemented, the Future Farmers of Virginia was created as a club for boys enrolled in agriculture classes. Soon after, other states followed and in 1928 the national organization was formed with three structured levels: local, state, and national. The individual high school programs make up the local level, all of the programs in the state make up the state level, and each state makes up the national level. The purpose of the organization was to promote agricultural education by encouraging students to participate in all aspects of the program, also known
as the three circles: 1) Classroom/Laboratory work 2) membership in FFA and 3) hands-on
work experience through Supervised Agricultural Experience (SAE) programs. The
program’s mission was established to “make a positive difference in the lives of students by
developing premiere leadership, personal growth and career success through agricultural
education (National FFA Organization, 2012).”

To accomplish its mission, FFA:

- Develops competent and assertive agricultural leadership.
- Increases awareness of the global and technological importance of
  agriculture and its contribution to our well-being.
- Strengthens the confidence of agriculture students in themselves and their
  work.
- Promotes the intelligent choice and establishment of an agricultural career.
- Encourages achievement in supervised agricultural experience programs.
- Encourages wise management of economic, environmental and human
  resources of the community.
- Develops interpersonal skills in teamwork, communications, human relations
  and social interaction.
- Builds character and promotes citizenship, volunteerism and patriotism.
- Promotes cooperation and cooperative attitudes among all people.
- Promotes healthy lifestyles.
- Encourages excellence in scholarship

(National FFA Organization, 2012)
CATA Conference

“The California Agricultural Teachers’ Association was formed in 1920. The purpose of the organization is to promote and improve the teaching of agriculture in California and to foster the welfare of those engaged in this work” (calagteachers.org, 2012).

At the summer session of agriculture teachers held at the University Farm, at Davis, teachers developed the organizational structure of the CATA and elected officers to serve the organization. Charles Booth from Chaffey High School served as the first State CATA President, while R.E. Burton from Santa Cruz served as Vice-President and R.J. Werner, Esparto High School, served as Secretary/Treasurer. With the dramatic increase in programs statewide, the State Department of Education added regional supervisor positions to assist with the development of local programs and divided the state into regions to facilitate and coordinate instructional improvement activities” (www.calagteachers.org/history).

“In the early 1920’s, agricultural education faced many challenges from administrators and others. In an attempt to meet these challenges, sectional, regional, and statewide meetings were held on a regular basis so that teachers could share ideas for teaching techniques and for improving curriculum in agricultural education. This peer support and cooperation has been a trademark of agricultural education and has continued to serve as the strength for the CATA organization. In 1928, the California Association of Future Farmers of America was organized. The leadership development of young people involved in agricultural education became an important consideration of the CATA. Over the next several years, the CATA would develop a series of contests and activities to assist the FFA organization in a leadership development program. A set of rules governing these
contests and activities would be developed, which we fondly refer to today as the CATA Curricular Code (www.calagteachers.org/history, 2012).”

Over the next several decades, there was continued growth and expansion of agricultural education throughout California. The Junior/Community College agricultural programs had a slow start, but began to develop rapidly in the 1960's. Leadership by agricultural instructors at the community college level has contributed tremendously to the success of the total educational effort in agricultural education. The close communication and cooperation between high school and community college programs has benefited thousands of students enrolled in agriculture” (www.calagteachers.org/history, 2012).

Throughout its history, CATA has maintained a strong tradition of leadership and involvement in other state and national organizations. Several CATA officers have served on national committees and boards of related organizations, contributing to the overall success of agricultural education.

In the early 1980's, CATA members recognized the need to improve their voice in state and national policies affecting agricultural education. Members voted to increase the level of dues paid to the organization, create the position of Executive Director, and to establish a State CATA Office adjacent to the State Capitol in Sacramento. Over the next several years, CATA had a dramatic influence on several key initiatives, including the formation of the Agricultural Incentive Grant program, which greatly increased funding for secondary agricultural education programs in California.

For the past eighty years, the California Agricultural Teachers' Association has contributed greatly to the success of agricultural education efforts in California and beyond. This success can be attributed to the dedication of purpose, self-sacrifice, and
vision shared by those involved in this tremendous profession. California’s tradition of agricultural excellence is due in great part to those whose lives have been touched by the members of CATA - a legacy of which we can all be very proud” (www.calagteachers.org, 2012).

Teaching Resources

According to Turning Points, the Five Principles of Curriculum Development are as follows:

• Curriculum development and teaching methods are based on an understanding of the middle school child as an intellectually capable, complex person, who is responsive to challenges.

• Curriculum should be based on what we want students to know and be able to do. All curriculum development, teaching, and assessment are tied to a broader definition of standards than the typical state standards, which tend to be content-focused. Turning Points curriculum includes habits of mind, skills development, and in-depth study. Turning Points schools go beyond state and local standards to define what students need to do to be thoughtful, caring, and valued members of the community.

• Students and teachers should be engaged in authentic, intellectual work. All student work should have significance beyond the classroom. This work should be purposeful and rigorous, and it should develop skills and knowledge that will prepare students for high school and beyond. As a result, Turning Points curriculum is often project-based.
• Assessment should demonstrate that students can do important work. A crucial part of curriculum planning is developing formal and informal assessments to understand what students know and what they are learning in relation to the learning goals.
• A coherent curriculum should be developed across the entire school. Teachers and administrators use a process called “mapping” to build a well-articulated, coherent curriculum across the school. (Guide to Curriculum Development, 10)

Supervised Agricultural Experience

One of the significant parts of the FFA program is the SAE component. It is this specific component that this senior project was based on. SAE projects are the hands-on, learn-by doing aspect of any FFA program. SAE projects are a requirement to receive funding from either the state incentive grant and/or the federal Perkins grant. (Agriculture Incentive Program, 2011)

To begin an SAE project, the student must choose a topic based on one or more of the following categories: entrepreneurship, placement, research and experimentation, and/or exploration. Entrepreneurship involves owning and operating an agricultural business such as maintenance equipment repair services or exhibiting a market or breeding animal at the local fair. Placement is obtaining a job or internship with an agricultural company or school facility. Research and experimentation projects require the student to conduct an experiment such as determining the effectiveness of multiple plant growth regulators. Exploratory projects involve attending career fairs to learn about the various careers within the agriculture industry or creating a report on a specific profession,
like a botanist. Regardless of the project’s subject matter, the students are required to complete record books for every project they have. They are required to log income and expenses, paid and unpaid hours, and specific activities and details related to their projects.

The record books are an integral part to every SAE project, not only to teach the students responsibility and good record keeping skills but also to reward the students for their hard work. There are several awards that students with sound record books may be eligible for, such as: agriculture proficiencies, agri-entrepreneurship, the State FFA degree, the American FFA degree, and American stars (National FFA Organization).

**Plant Projects**

**Growing and Selling**

Growing plants at home has become an increasingly popular recreational activity in the last four years and the trend is not going to stop any time soon. But gardening has many more benefits than just being a nice hobby: the pleasure to watch something grow that you planted. And perhaps the best thing about growing your own vegetables is, of course, the reward of eating them (growingplants.org, p.1).

As with every undertaking, one needs to get familiar with some basics in order to be a successful gardener. What do plants need to grow? Can they develop indoors? Can they thrive without soil, and is it even possible to grow them in a water solution? These and similar questions are not unusual for a beginner. With enough time and practice, students can become successful with their particular project. (growingplants.org, p.1).

The possibilities are endless. One can choose from growing house plants, raising unique herbs, different vegetable varieties, annual and perennial plants, or bonsai.
According to Lassanske, whichever option is chosen, it is essential to do a fair amount of research work before growing and selling plants. Students will learn how to propagate, grow, fertilize, water, prune and harvesting plants using the most favorable techniques for the plants’ health.

According to Dan Lassanske, most people start out by planting flowering annuals or vegetables, such as potatoes, tomatoes, bell peppers, and cucumbers. Some beginner gardeners opt for small fruits, such as strawberries, blueberries, and raspberries. Another possibility is growing herbs that one can use for cooking, such as basil, oregano, parsley, and cilantro.

“Whether one chooses to grow plants in the garden or in containers, the preparation, maintenance and harvesting methods are quite similar” (growingplants.org, p.1).

**Succulents**

**Color and Texture**

Succulents with colorful leaves are the celebrities of the plant world and the darlings of garden designers. People invariably notice a plant with unusual foliage color. Because succulents have such glorious foliage, flowers may seem aesthetically unnecessary. Because the fleshy stems hold moisture, the blooms of many succulents will stay fresh for a week or more in a vase, or without water. Grown in mass, succulents with colorful foliage make an unforgettable display. Solo, they serve as the centerpiece of a potted arrangement or as garden focal points (Baldwin, p.2)
Ease of Propagation

The majority of succulents are winter-dormant, so the best time to propagate them is in the spring, as they begin their active growth cycle and before summer heat intensifies. Autumn is the best time to start summer-dormant succulents. Getting new plants off to a good start in pots or flats is essential. Small pots, pony packs, and flats should be placed in a shaded area, away from full sun during the hottest part of the day. In addition, it is important to note, that winter protection is necessary for succulents. The most popular forms of propagation for succulents are stem and leaf cuttings, division, offsets and plantlets (Designing with Succulents, p.5).

Lassanske states, “in order to fill these containers, small stem cuttings can be directly stick, which eliminates a transplanting step. Once rooted, the plants are now ready to be sold or shifted into a larger container.”

Propagation in commercial nurseries and at botanical gardens takes place in temperature-controlled greenhouses, beneath fixtures that provide artificial sunlight. Professionals also have methods of collecting, labeling, storing and germinating seeds, and they follow prescribed schedules for the repotting plants in successively larger containers (Succulents in Container Gardens, p.12)

Event Planning

“A special event is a one-time event focused on a specific purpose such as a groundbreaking, grand opening or other significant occasion in the life of a library. Special events may also be created for other targeted purposes such as a job fair; awards banquet or logo contest” (Meskauskas, p.1).
Of course before having a successful event one must publicize it well with flyers, word of mouth, media invites i.e. radio, TV, text messages, phone calls, and Facebook. Having an appealing event is the key to success, but the type of event greatly dictates what is appealing to the guests.

According to Debora Meskauskas, the following steps are offered to help guide your event planning:

1. Develop strategies for success
   - Make sure the purpose for the special event is important enough to merit the time and expense needed to properly stage, publicize and evaluate the event.
   - Carefully match the type of event that is selected to the purpose that it serves. Do you want to reach out to new users or thank your supporters?
   - Ensure that the library staff fully supports the special event. Select a working committee with broad representation.
   - Target groups that have a special stake in the event such as library users, funders, politicians, business leaders, senior citizens or parents.
   - Start planning at least three months, and in many cases, a year ahead of time.
   - Develop ways to evaluate the event’s success. Measurable event objectives may include attendance, the amount of money raised, the number of library cards issued or increases in circulation.
   - Talk to other librarians who have successfully staged similar events.

2. Make a checklist
   - A checklist provides a step-by-step guide to organizing and executing a
special event. The checklist should include:

- Select a Chair and member of your planning committee.
- Develop a master plan and set the event date.
- Organize volunteers for each committee.
- Formulate a publicity plan.
- Prepare a copy of program and printed materials.
- Hold a “tie down” meeting the day before the event. Distribute a schedule of events to each committee member. Answer any questions.
- Remember to thank everyone who participated. Send photos if possible.
- Conduct an evaluation.

3. Create a budget

- The objective is to provide event planners with a financial blueprint. The budget should be specific, and include revenue opportunities (sponsorship, ticket sales, donations. concession sales) as well as expenses (printing, permits, insurance, speakers, food. supplies, security).

4. Consider logistics

- With many activities going on simultaneously, there are many details to be checked. Major areas to consider and plan for include: size of space or building used, utility support needed, setup (tables and chairs. tents, portable toilets, parking, signage) coordination, cleanup, emergency plans.
transportation, and public services such as police and fire departments.

5. Plan publicity
   - Promoting a special event takes creative thinking balanced with practicality. The primary objective is to publicize the event, but secondary objectives should be considered.
   - Are you trying to inform, educate or entertain?
   - Increase awareness or attendance of the event?
   - Build a base support from a specific audience?
   - Facilitate good community relations? Brainstorm all the available media in including marquees, school newsletters, church announcements, and cable and commercial stations. Make a detailed list with names of whom to contact and when.

6. Evaluate the event
   - Take time to evaluate right after the event while the details are fresh. You may want to consider having a questionnaire for participants to fill out. Some general evaluative criteria include:
     - Did the event fulfill its goals and objectives? Why or why not?
     - Identify what worked and what needs fine-tuning. Which vendors should be used again?
     - What items were missing on the checklist?
     - Was the event well attended?
     - Was informal and formal feedback about the event positive?
     - Given all that went into staging, was it worth doing?
Finally, it is important to remember to celebrate your successes and to thank all those who contributed throughout the numerous stages of the project.

(Meskauskas, p.1)

Summary:

Numerous resources were used to highlight the history and major components of Agricultural Education as well as the associations identified within the teaching profession, the components of S.A.E. and plant projects, and major factors to consider when planning an event. Agriculture education was first founded around 1825. Since then it has grown tremendously and is still continuing to do so. With this foundation, organizations such as CATA and FFA were started and are major contributors to agriculture education today. CATA is a professional organization for agriculture educators and the FFA is a student organization founded on sound agricultural principals. These programs help students and teachers explore many aspects of agriculture and support the three components of agriculture programs: classroom instruction, FFA, and S.A.E. This senior project focused on succulent S.A.E projects, which culminated in an educational display that educated agriculture teachers throughout California. They in turn will hopefully inform their students about these succulent projects. The information in this chapter provides background and research for the basis of this project, before beginning the step-by-step procedure needed to implement this display.
Chapter 3  
Materials and Methods

This project consisted of designing and creating an educational display for California Agriculture Teachers. The display was showcased at the California Agriculture Teachers Association’s Idea Show in June 2012. The idea show gives agriculture teachers an opportunity to find ideas and resources that will be useful to them personally and their agriculture programs. This chapter includes the step-by-step procedure for implementing and evaluating this educational display.

Designing the Display

Layout and Backdrop

This project revolved around a planned and designed educational display for the CATA Conference Idea Show that took place in the Farm Shop at California Polytechnic State University, San Luis Obispo in June of 2012. Initially, contact was made with Dr. Bill Kellogg, head of the Agricultural Education and Communication Department at California Polytechnic State University, San Luis Obispo, in order to obtain a booth space of 8’x16’ for the Idea Show.

Next, a series of freestanding 30”x30” connecting plywood panels were obtained and refurbished. These panels helped to showcase enlarged photographs and specimen succulents by asking as a backdrop, which encouraged people to

Figure 1: Display panels before paint.
enter the display. Since Mike Zohns donated the panels to the display, the design was altered to fit the panels.

Each specific panel was held together by 4”x4”x4’ redwood posts. These were stacked on top of one another by a small piece of rebar, which was inserted into two adjoining sleeved holes. The panels were painted black and the posts were painted grey.

Then, an overall floor plan layout was created and finalized before proceeding with the rest of the project. In doing so, it was determined that the plywood booth partitions between different displays would be covered with black tablecloths.

In addition, specific tabletop display layouts were finalized. In doing so, it was determined that two 3’x8’ tables and one 3’x6’ table would be covered with Cal Poly green tablecloths. The tables were decorated with Supervised Agricultural Experience (S.A.E) project ideas, specimen succulents, enlarged photographs and teaching materials. The final design layout is below.
Photographs

Once the tables were laid out and designed, the purchasing of specimen succulent plants and the photographing of succulents began, at Succulent Gardens, a nursery in Castroville, California. Each plant that was purchased was hand selected according to color, texture, and overall uniqueness of the plant. The same criterion was used in deciding which plants to photograph. The purpose of the plants and the enlarged photos was to draw the audience into the display and capture their interest, with the ultimate goal of encouraging the audience to start succulent SAE projects with their students at their respected schools. After reviewing and processing the photos, a few were selected, enlarged, and added to the display panels. A Cannon Rebel T1i was used
to take the photographs and they were developed and enlarged at Costco in San Luis Obispo. The purpose of the plants and the enlarged photos was to draw the audience into the display and capture their interest, with the ultimate goal of encouraging the audience to start succulent SAE projects with their students at their respected schools.

Developing Teaching Materials

In addition, numerous handouts were developed for use by the teachers in attendance, as free teaching materials. These handouts were created by brainstorming topics with Dan Lassanske that would be useful to agriculture teachers. After selecting the top 3 topics, Microsoft Word and clip art were used to create the following handouts:

- **Becoming a Succulent Connoisseur**: an interactive handout of student use in identifying major succulent genera, uses, specific needs, and propagation methods. This handout also included a list of references for a variety of succulent topics.

- **You Do The Math**: a comparison of the budgets of a pig project vs. a succulent project. This is meant to shows students and teachers that succulent projects can be just as, if not more, profitable than animal projects.

- **Making Money with Succulents**: a list of several succulent SAE project ideas for any time of year. This can be used to give students project ideas, as well as get them thinking of new ideas.

All of the handouts listed above, as well as handouts created by Dan Lassanske, are included in the appendix section of this senior project.
Constructing 3-Dimensional Samples of S.A.E. Project Ideas

The next step in the project was to design and build 3-dimensional merchandising pieces for the display. These projects included:

1. Pots with Pizzazz: lightweight pots made of peat moss, perlite, vermiculite and mortar. These pots are ideal for succulents and are a great fundraiser or S.A.E. project.

2. Sectioned Display Box: This box was specifically designed to showcase succulents. It is a wooden box that has been segmented into various shapes to create interest for the viewer. It also has a kickstand on the back so it can be propped upright.

3. A 3-tiered Container Stand: This stand was designed to hold 3 containers of increasing size. For the display we used pots with pizzazz, in 3 different sizes. The containers need to have a hole in the center to slide onto the stand. This is a great display piece and shop project for FFA programs.

4. Custom Wall Art Décor: Galvanized Metal box with 3 holes for succulents. This box is meant to hang on a wall and include small succulents.

All of the project specifications are included in the appendix section of Figure 5:
Pots with Pizzazz
Figure 6: Sectioned Display Box
Figure 7: 3-tiered Container Stand
Figure 8: Custom Wall Art Decor
this senior project. In addition to the above projects, Melinda Lynch, the floral design teacher for Cal Poly also assisted in the creation of three rose and succulent bouquets, as well as four boutonnieres.

**Display Sign**

Lastly, a custom poster titled “Succulent S.A.E.” The poster was hung on the center panel on the display backdrop. Staples, in San Luis Obispo, California, printed the poster.

**Instrumentation**

In order to receive feedback from the audience, an evaluation sheet titled “How did we do,” was created. This evaluation asked the audience to rate the display from 1 (being the least) to 10 (being the best) in the following categories:

- **Item 1. Eye appeal**
- **Item 2. Educational Value**
- **Item 5. Overall Effectiveness of the display**

The audience was also asked the two following yes/no questions:

- **Item 3. Are the handouts detailed enough, in order to replicate the projects at your school?**
- **Item 4. After viewing this display, are you encouraged to start student succulent SAE projects?**
Lastly, the audience was also asked to provide additional comments and suggestions.

It was important for the success of the project to obtain a score of overall appeal from its viewers. Eye appeal was very important and was included in every step of the display design, which is why it included large display mechanics, large specimen plants, enlarged photographs, fresh floral arrangements, and professionally dressed hosts. Therefore, asking the audience to evaluate the display in this way was imperative.

The educational value was also very important in terms of measuring the success of the display. One of the project’s main goals was to provide educational handouts, ideas, and practical examples to the audience, thus this item was crucial in the overall evaluation of this project.

The question of overall effectiveness provided a more general sense of the audience’s opinion of the entire project and the effort that went into creating it. This item scored the displays overall success.

The handouts for this display were a major design and educational component. It was crucial to know whether or not the handouts were detailed enough to actually be used by the target audience.

The second yes/no question also addresses the display’s effectiveness. This question investigates another one of the project’s goals: encouraging teachers to start succulent SAE’s at their respective schools. If the audience answered no to this question, then one of the major goals was not achieved.

The last item on the survey, invited the audience to provide any additional comments and/or suggestions for the display. This was beneficial and necessary to allow the audience to include feedback that was not already addressed in the evaluation.
Data Collection

First, evaluation sheets were created with the items listed above and then printed on half sheets of paper. The data was collected on June 19th 2012 at the California Agriculture Teachers Association’s Idea Show. Two stacks of evaluation sheets were placed on each side of the display and the viewers were asked to fill out the evaluation as they left the display. After completing the evaluation, the audience was asked to leave the sheet in a designated area in the booth. Once the Idea show was over, the evaluation sheets were collected, reviewed, and the data was consolidated into graphs to be presented in Chapter 4 of this senior project.

Data Analysis

When analyzing the data, each item was reviewed and the number of responses was counted for each possible answer. The results were then converted into percentages and transcribed onto graphs through Microsoft excel. These graphs were used to visually display the results of the evaluation.

Summary

In summation, this chapter highlighted the step-by-step process needed to complete this project. The overall goal was to create an educational display for California Agriculture Teachers. In order to achieve the project’s goals, many components of the project had to be planned and orchestrated. These components included: designing the display, photographs, developing teaching materials, constructing 3-dimensional samples of S.A.E project ideas, display sign, instrumentation, data collection and data analysis.
Chapter 4

Results and Discussion

The results section of this senior project will provide the reader with an understanding of the evaluation process and the results used in evaluating their educational display at the California Agriculture Teachers Association’s Idea Show. The goal when creating the evaluation sheet was to gain insight on the overall effectiveness of their display. In order to achieve this goal, 5 question items were carefully crafted and answered by the target audience, the agriculture teachers that attended the idea show.

This evaluation was placed in the two corners of the display booth on the day of the show, June 19, 2012. The viewers were asked to complete the evaluation as they left the booth. Once the show concluded, the data were reviewed and consolidated. Each possible response was calculated, converted into a percentage and graphed in Microsoft Excel.

Results

After compiling the responses from the evaluation sheets, the results were tabulated. Items 1, 2, and 5 of the evaluation asked the audience to rate the display from 1 (being the least) to 10 (being the best) in the following categories: Item 1.Eye Appeal, Item 2.Educational Value and Item 5. Authors’ Effort. Among the respondents, 70% indicated the display’s eye appeal value as a 10, 23% as a 9 and 6% as an 8. Next, in regard to educational value, 60% responded with a value of 10, 28% with a value of 9, 8% with an 8, 3% with a 7 and 1% with a 6. The majority (80%) responded with a 10, 12% with a 9, and 2 % with an 8 for the overall effort put forth by the authors. (See Table 1 below)
In addition to the above categories, the audience was also asked the following two yes/no questions:

Item 3. Are the handouts detailed enough, in order to replicate the projects at your school?

Item 4. After viewing this display, are you encouraged to start student succulent SAE projects?

For Item 3, 100% of the respondents selected yes as their answer. Additionally, 100% of the respondents also selected yes as their answer for question 4. (See Table 2 below)
Lastly, the audience was also asked to provide additional comments and suggestions. It was calculated that 46% of respondents provided comments and suggestions. The comments were then coded and assigned a value (ranking). The rankings were as follows: 3 (C Rating), 2 (B Rating), and 1 (A Rating), with A being the best. Each of these ratings were then assigned keywords in order to evaluate the comments themselves. The keywords for a C rating were: good, nice, neat, and cool. Of the 29 comments, 9 of them were graded with a C. The B rating keywords were: awesome, wow, and great; which accounts for 13 of the 29 comments. Lastly the keywords for the A rating were: outstanding, best, love, wonderful, and practical, which categorizes the remaining 8 comments. (See Tables 3 & 4 Below)
**Table 4: Comments arranged by rating of keywords (N=29)**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Best Display of Show!</td>
</tr>
<tr>
<td></td>
<td>Love the passion and energy</td>
</tr>
<tr>
<td></td>
<td>Outstanding Effort and true picture of the Cal Poly's quality and “learn by doing” ideals</td>
</tr>
<tr>
<td>B</td>
<td>You girls are great</td>
</tr>
<tr>
<td></td>
<td>Great Ideas! Creative, Attractive!</td>
</tr>
<tr>
<td></td>
<td>Awesome! Can't wait to get started!</td>
</tr>
<tr>
<td>C</td>
<td>Very Neat Ideas</td>
</tr>
<tr>
<td></td>
<td>Outstanding Effort and true picture of the Cal Poly's quality and “learn by doing” ideals</td>
</tr>
<tr>
<td></td>
<td>Hands on display with practical handouts. It showed me how easy and successful this could be for students.</td>
</tr>
<tr>
<td></td>
<td>Wonderful Display. Excellent way to pull in subjects other than horticulture.</td>
</tr>
<tr>
<td></td>
<td>Wonderful Job! Great display and info!</td>
</tr>
<tr>
<td></td>
<td>Best Display of Show!</td>
</tr>
<tr>
<td></td>
<td>Best in the Building</td>
</tr>
<tr>
<td></td>
<td>Awesome Work</td>
</tr>
<tr>
<td></td>
<td>Good Idea</td>
</tr>
<tr>
<td></td>
<td>Keep up the good work!</td>
</tr>
<tr>
<td></td>
<td>Very Nice, Great job</td>
</tr>
<tr>
<td></td>
<td>Nice Job!</td>
</tr>
<tr>
<td></td>
<td>Very Nice, Great job</td>
</tr>
<tr>
<td></td>
<td>Nice, fresh ideas</td>
</tr>
<tr>
<td></td>
<td>Great Job! Loved the Boutonnieres!</td>
</tr>
</tbody>
</table>

**Table 5: Rating of Respondents’ Comments (N=29)**

<table>
<thead>
<tr>
<th>Number of Comments/Rating</th>
<th>A Rating</th>
<th>B Rating</th>
<th>C Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8</td>
<td>12</td>
<td>9</td>
</tr>
</tbody>
</table>

[Bar chart showing the distribution of A, B, and C ratings]
Discussion and Summary

After looking at the responses and the summations to all of the questions, it was obvious that the display achieved the goals for this project. The following goals were achieved: an attention getting display was generated, effective and detailed handouts were created for many Ag teachers for use in their respective classrooms, and the teachers left encouraged to start succulent Supervised Agriculture Experience projects.

- 100% of the respondents, scored the display's eye appeal with a value of 8 or higher
- 96% of the respondents, scored the display's educational value with a value of 8 or higher
- 100% of the respondents, scored the display's educational value with a value of 8 or higher
- 100% of the respondents answered yes to the handout effectiveness
- 100% of the respondents answered yes to being encouraged to start their own programs
- 45% of the respondents left additional comments regarding the display, all of which were positive
- 69% of the additional comments were given an A or B rating.

With these results, the conclusion and recommendations discussed in the next chapter, were apparent.
Chapter 5
Summary, Conclusions, and Recommendations

This project included creating an educational display for Succulent SAE projects that targeted high school Agriculture teachers. This project was presented at the California Agriculture Teacher’s Association Conference that was held in June, 2012. In this chapter, a list of conclusions and recommendations based on the results have been presented.

Conclusions

The following conclusions have been made based on the results presented in Chapter 4 of this senior project:

• An attractive display was designed and created. This is evidenced by the 70% of respondents that graded the display’s eye appeal with a 10. Furthermore, the respondents did not select any response below an 8, which proves all of the respondents were generally pleased with the display’s appearance.

• The audience found educational value in the display as witnessed by the 88% of respondents that responded with a 9 or 10. The difference between 88% and 100% also shows that some respondents found less educational value than others.

• The respondents were generally impressed with the efforts put forth by the authors as evidenced by the 80% of respondents replying with a value of 10. There were also numerous comments such as “Best display of show” and “Hands on display with practical handouts. It showed me how easy and successful this could be for students,” that confirmed this conclusion.
• The handouts were detailed and effective and the respondents were encouraged to start succulent Supervised Agriculture Experience projects at their schools. This is evidenced by the yes/no questions that both resulted in a 100% yes response.

Recommendations

1. Create a CD or digital platform for the handouts to create easy accessibility for the teachers
2. Provide audience with a list of specific succulent and horticulture resources so that they can effectively implement succulents in their programs.
3. Each year Ag students should create a similar display to showcase another aspect of Horticulture.
4. Add educational value by including plant name labels with plants presented in the display and also included a video for how to create the floral pieces, that the teachers could use as a tool in their classroom.
Bibliography


Lassanske, Daniel. Personal Interview. 2 February 2012.


Appendix A: Becoming a Succulent Connoisseur (pg.1)

**Becoming a Succulent Connoisseur**

★ Succulent Defined: 

MAJOR GENERA:

- Aeonium
- Agave
- Aloe
- Cotyledon
- Crassula
- Dudleya
- Echeveria
- Euphorbia
- Gasteria
- Graptopetalum
- Haworthia
- Kalanchoe
- Sedum
- Sempervivum
- Senecio
- Yucca

★ Landscape Use:

★ Soil:

★ Water:

★ Exposure:

★ Major Pests:
Appendix A: Becoming a Succulent Connoisseur (pg.2)

★ Grooming:

★ Propagation:

REFERENCES:

★ Succulents for the Contemporary Garden, 2003
  Author: Yvonne Cave, Timber Press Inc.

★ Designing with Succulents
  Author: Debra Lee Baldwin, 2007, Timber Press Inc.

★ Succulent Container Gardens, 2010

★ Succulents II The New Illustrated Dictionary, 2000

★ The Complete Book of Cacti & Succulents, 1993
  Author: Terry Hewitt, DK Publishing, Inc. 375 Hudson Street, New York, New York, 10014.

★ Hardy Succulents-Tough Plants for Hardy Climates

★ Echeveria Cultivars, 2005
  Authors: Lorraine Schulz & Attila Kapitany, Schulz Publishing, Box 40, Teesdale, VIC 3328, Australia, tarrex@ozemail.com.au, gecko@connexus.net.au

★ Aeonium In Habitat and Cultivation, 2007
  Author: Rudolf Schulz, Schulz Publishing, 461 Beech Ave, San Bruno, California, 94066, tarrex@ozemail.com.au

Share Your Succulents!
Appendix B: Making Money with Succulent

Making Money with $ucculent$

1. Seasonal Coffee Mug Containers
   a. Christmas
   b. Easter
   c. Halloween
   d. 4th of July
   e. Thanksgiving
   f. St. Patrick's Day
   g. Valentine's Day

2. 6 pack Mini-Collection (6 different succulents)

3. Pots with Pizzazz (different sizes, colors, planted, unplanted)

4. Box style wall art frames

5. Succulents planted in metal colanders (available in thrift stores or antique shops)

6. Wreaths

7. Student could become a specialty grower
   a. Aloes
   b. Echeverias
   c. Sedums

8. Sell at Farmer's Market

9. Department Plant Sales

10. Sell to Local Retail Nurseries

Brainstorm additional ideas with students!!!
Appendix C: Transplant Mix Recipe

Transplant Mix Recipe

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.

Resources:

For:
Propagation Flats
Pony Packs
4” Dura Pots
5 1/2” Quart Labels
Peat Moss
Perlite

McConkey Co.
Garden Grove, California
Branch Office, Production and Warehouse Facility
12321 Western Avenue Garden Grove, California 92841-2989
(714) 894-0581 (714)891-0028
(FAX) sales@mcconkeyco.com
mcconkey.co.com
*Also have locations in Oregon and

FOR:
Peat Moss
Perlite
Osmocote
Dolomite
Treble Super Phosphate
Potassium Nitrate

Crop Production Services
There are numerous locations throughout California

See the Website for more info:
http://www.cpsagu.com/
You Do the Math!

A Financial Comparison Between Raising A Market Pig & Raising Succulents

<table>
<thead>
<tr>
<th>Market Swine SAE</th>
<th>Succulent SAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Cost of Pig</td>
<td>* Cost of Succulents</td>
</tr>
<tr>
<td></td>
<td>311 Plants- Home Depot $1.89 for 2” Pots</td>
</tr>
<tr>
<td>* Feed</td>
<td>* 4” Dura Pots</td>
</tr>
<tr>
<td></td>
<td>311 pots at $0.07 ea.</td>
</tr>
<tr>
<td>* Insurance</td>
<td>* Transplant Mix, 1 Cu. Ft.</td>
</tr>
<tr>
<td></td>
<td>36 4” Pots- 1 Cu. Ft. of Transplant Mix at $2.17</td>
</tr>
<tr>
<td>* Vet Expenses</td>
<td>* Labels</td>
</tr>
<tr>
<td></td>
<td>311 labels at $0.02 ea.</td>
</tr>
<tr>
<td>* Show Supplies</td>
<td>* Propagation Flats</td>
</tr>
<tr>
<td></td>
<td>20 flats at $1.02 ea.</td>
</tr>
<tr>
<td>* Entry Fee</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td><strong>Total Expenses</strong></td>
</tr>
<tr>
<td>$655.00</td>
<td>$655.71</td>
</tr>
</tbody>
</table>

**Project Sale**

<table>
<thead>
<tr>
<th>Sold Pig</th>
<th>Sold Succulents</th>
</tr>
</thead>
<tbody>
<tr>
<td>260 lbs sold at $3.00/lb</td>
<td>311 plants sold at $3.50/4” Pot</td>
</tr>
</tbody>
</table>

**Project Profit**

<table>
<thead>
<tr>
<th>Profit minus Expenses</th>
<th>Profit minus Expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>$780.00 - $655.00</td>
<td>$1,088.50 - $655.71</td>
</tr>
</tbody>
</table>

This is an estimate of your expenses and receipts. Prices can vary! This is a conservative budget on the receipt side and a fairly thorough budget for expenses. You may not need to make all purchases if you borrow them from school.
Appendix E: Display Board Panels (pg. 1)

Display Board Panels

Materials:
- Redwood, not pressure treated. Rough Lumber, not suggested. Had to run everything through the planer.
  Suggestion: use surfaced material, S4S, hard grade redwood, concommon wood
- (2) 4”x4”x3’6” (don’t have longer than 8’, standard ceiling height)
- (2) 2”x4”x24” (to be cut to exact length during installation)
- (1) ¾” plywood piece, 24”x32” (to be cut to exact length during installation) (can be ¼ to ½” in thickness)
- Total Panel Dimensions: 31 ½” x 24” (exact fit)
- Steel tubing that a pin will fit into for a more sturdy long lasting structure. Holes will be drilled in the post to assemble the structure and these holes will be lined with a piece of steel tubing. Inside diameter of steel tubing should accept the steel pins as it is assembled, make sure it is smooth! Holes should be 3” deep.

Assembly:
1. Cut 4”x4” to length: suggested 3’6”
2. Cut 2”x4” to length: suggested 23”
3. Dado groove in one side of each 2”x4” and in one side of each 4”x4”. Dado should be wide enough to accept whatever dimension plywood is used, and ½” deep.
   a. Note: Remember dimension of plywood has to be able to fit snugly, not too tight and not too loose, in between the 4”x4” left to right and 2”x4” top to bottom
   b. Thought: When making the groove in the 4”x4”, consider not continuing the groove clear to the end because it will show, or if the groove is made to end to end, then perhaps use filler material to install into groove so it is not seen
4. Drill hole for pins. Drill 4”x4” so the units can be assembled on top of one another. To do this affectively, care should be taken. The holes should be centered, exactly parallel to the 4”x4”. To achieve this, perhaps some sort of jig fixture may be created to ensure the accuracy of these holes.

![Image 1]
![Image 2]
Appendix E: Display Board Panels (pg. 2)

5. With the 4"x4" laying flat on the workbench, move 2"x4" in using a square to create a right angle. Using 16 penny finish nails or a nail gun and glue attach the 4"x4" to the end of the 2"x4".

6. Slide plywood into dado groove of the left 4"x4" and bottom 2"x4".

7. Bring right 4"x4" into position and attach to lower 2"x4".

**Construction Tip:** 4"x4" may be attached to 2"x4" in a variety of ways, nails 16 penny finish nails, or equal size nails from the nail gun, or extra long deck screws, lag screws, or some kind of timber fastener.

8. Slide top 2"x4" into position, and attach to left and right 4"x4" in an identical manner to the bottom.

**Tips:**

- Finish to your liking.
- If the panel is to be clear finished a better grade of lumber should be considered. Could be painted school colors. If it is to be painted school colors, then a less expensive type of lumber could be used.
- A functional set of these will be 3 or 5 panels connected together. If 5 or more panels are used, use a longer 2"x4" to create a hanging point on panels (could be used for plant materials).

**Construction Note:** Cross piece could have pins attached to it permanently.
Appendix F: Metal Wall Art Décor

**Metal Wall Art**

**Materials:**
- Heating and Air Duct Metal (Scraps) 18 gauge Galvanized 1 piece 1'x2'
- 2" Hole Saw
- Tuna Cans (1/hole for plant)
- Heavy Duty Construction Adhesive or Gorilla Glue (for metal)
  Note: Welding does NOT work; the heat is too much for the thin metal

**Assembly**
1. Determine can to be used to house plants
2. Drill holes on front side of box
3. Bend metal to accommodate can size (use sheet metal bender if available)
4. Glue cans in before bending the backside of the box
5. Attach picture hanger on back side with pop rivets
6. Bend the backside to finish the box
7. If desired, make a cap for the bottom of the box that will slide into the opening and glue in place.
Appendix G: Pots With Pizzazz!

POTS WITH PIZZAZZ!

Lightweight, natural looking, do-it-yourself stone pots

**Necessary ingredients:**

- 7 parts peat moss (use 1/4" screen mesh to remove stems)
- 7 parts perlite
- 3 parts vermiculite
- 7 parts Portland Type I White Cement or Portland Type I/II Grey Cement
- 9 Parts of water
- 2-3 Quikrete (liquid cement color bottles)
- Latex gloves, dust mask

**Materials and Supplies:**

- 1/2" masonry drill bit
- Molds depending on design, might include plastic color bowls.
- WD-40 (form release agent)
- Heavy file or rasp

**Directions:**

Thoroughly mix dry ingredients together in a wheel barrow. Add water and liquid cement color. Adjust water to make a mixture that holds together when pressed into your hand.

Spray molds with WD-40 (serves as a form release agent). Press the moist ingredients into your mold, being sure to press the materials tightly together. Allow to dry for several days. Carefully remove the pot from the plastic molds. Drill drainage holes in the bottom of the pot. File or rasp the pot to a desired texture. Wash pot with a strong stream of water. Install plants, water as needed.

**Notes:**

Garden art options are endless. An ideal planter for cacti and succulents. Sell containers planted or empty at your plant sales. These containers can be used with foliage plants for a tropical effect. Create a competitive category at local fairs for your planted containers. A great personalized gift.
Appendix H: Sectioned Display Box (pg. 1)

**Sectioned Display Box**

**Materials:**

**Box:**
- 1 by material for box sides and dividers
  (in this example the material is $\frac{3}{4}'' \times 3''$
- bottom material: $\frac{1}{4}''$ thick (in this example it is $\frac{3}{8}'' \times 3 \frac{1}{2}''$ with two pieces ripped (cut parallel to grain) to the dimension of this box, 12'' wide)
  
  Note: DO NOT use plywood or OSB or particle board, wont stand up to moisture
- Approx. 7 $\frac{1}{4}''$ of $\frac{3}{4}''$ & 3 of 5 $\frac{1}{2}'' \times 3 \frac{3}{4}''$ (four pieces of $\frac{1}{4}'' \times 3 \frac{1}{4}''$ by 16'' long)
- Interior design can be up to the creator

**Kickstand**
- 1 piece of $\frac{1}{4}''$ diameter round stock (steel) 24'' long
- 1 piece of $\frac{1}{4}'' \times 8''$ 10 gauge flat steel

**Assembly:**

**Box**

1. Cut four box sides. (2) at 12'' in length and (2) at 16'' in length
   (these cuts should be made at a 45 degree angle to the surface of the board, so that the corners will be a mitered.
   Construction tip: it is suggested that corners be constructed with glue as well as using finishing nails; check to make sure all corners are square
2. Holding the box sides square, attach the box bottom
   Note: at this point, care should be taken to accurately cut the length of the box bottom boards to make nice smooth joints
3. Now is when you can be creative by coming up with your own design for the divisions of the box.
   Note: Keep in mind that the width of the division boards should match the outside box sides in width. In some cases it may be advised to install division pieces prior to putting bottom boards on so you can put nails in or divisions could be assembled to each other and then dropped into place and fastened
4. After the box has been assembled, several drainage holes need to be provided for each compartment
5. This particular box may be used in three different modes: sitting flat, vertically standing, or horizontal standing. To accomplish this, use the kickstand.
Appendix H: Sectioned Display Box (pg. 2)

Kickstand:
1. Take a piece of ½" round stock and bend into an isosceles triangular shape with base at 6 ½ inches and sides being 7 ¾ inches.
2. This leaves tail at top which is 1 ½" long. The tail at top will be bent 1 ½ " from the tip to an angle of 30 degrees.
   Note: This will allow the planter box to stand vertically at a slight angle
3. The metal strap is fastened in the center of the box on the bottom side. Widthwise:
   a. [Image]
4. The three holes make it possible to stand the box at an angle from any direction you choose. The center hole will allow you to display the box in an upright position with any one of the sides at the top. If a shallower angle is desired, then use one of the end holes in the strap.
   Construction Note: the metal strap is mounted in a routed groove so as to be flush with the bottom of the box.
   a. [Image]
   a. [Image]
Appendix I: Three Tiered Stand

Three Tiered Stand

Materials:
- 18 Gauge Flat Steel
- 28” of 5/8” OD Pipe; 1/2” ID
- (3) 1/2” x 5” Bolts

Assembly
1. Cut out three circles 7.5”, 6”, and 5” across
2. Drill hole through center of two smaller circles; hole must be OD of pipe
3. Grind off bolt head
4. MIG weld the bolt, the pipe and the circle together at the same time. Bottom
   of the circle should be very smooth!
5. MIG weld pipe to center of bottom (largest) circle
6. Create a guide spear for top of stand by welding a small piece of pipe to a bolt;
   then grind the pipe to create a tapered edge
   Note: the guide will aid in pushing the stand through the soil in the planted
   pots
7. Paint stand if desired

* Guide Spear

* Finished Stand
Appendix J: How Did We Do???

**HOW DID WE DO??**

Eye Appeal:

1 2 3 4 5 6 7 8 9 10 (best)

Educational Value:

1 2 3 4 5 6 7 8 9 10 (best)

Are the handouts detailed enough, in order to replicate the projects at your school?

- YES
- NO

After viewing this display, are you encouraged to start student succulent SAE projects?

- YES
- NO

Rate the effort put forth by the students of this senior project:

1 2 3 4 5 6 7 8 9 10 (best)

Additional Comments/Suggestions: