

Texas FFA



SAE Handbook

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Preface

The purposes of this publication are to (1) define what a Supervised Agricultural Experience Project (SAE) is, (2) to provide detailed information regarding SAEs, (3) how to finance SAEs, (4) provide innovative ideas for SAEs, (5) define career pathways, (6) list possible careers associated with career pathways, and (7) provide examples of SAEs associated with career pathways.

SAEs provide students enrolled in agriscience courses the opportunity to place into practice the knowledge and skills gained from classroom and laboratory instruction. In addition, SAEs also provide students the opportunity to apply and further develop knowledge and skills in situations closely related to those used in the agricultural industry.

SAEs meet the Texas State Board of Education guidelines. SAEs include basic skills relevant to Agriculture, Food and Natural Resource courses as they integrate reading, writing, mathematics, science, and decision-making procedures in order to improve student's academic knowledge.

This publication was developed by the Texas FFA Association in cooperation with the Texas Education Agency and the National Council for Agricultural Education. It will provide teachers and students with methods to use in meeting requirements of the SAE and provides information needed to substantiate the SAE.

Section 1. WHAT IS AN SAE?

The **Supervised Agricultural Experience (SAE)** program involves practical agricultural activities *performed by students outside of scheduled classroom and laboratory time*. SAEs provide a method in agricultural education for students to receive real-world career experiences in an area of agriculture that they are most interested in. Supervised Agricultural Experiences are an important component of agricultural education and are required element of all Agriculture, Food and Natural Resources (AFNR) courses as explained by the Texas Administrative Code, Chapter 130, Subchapter A.

The National Council for Agricultural Education (The Council) revised the SAE descriptors in 2017. For clear understanding and expectations, The Council now defines SAE as a **student-led, instructor-supervised, work-based learning experience** that results in **measurable outcomes** within a predefined, agreed upon set of **Agriculture, Food and Natural Resources Technical Standards and Career Ready Practices** aligned to your **Career Plan** of study. **All SAEs should be graded aspects of agricultural education courses.**

Here's what the definition means for students:

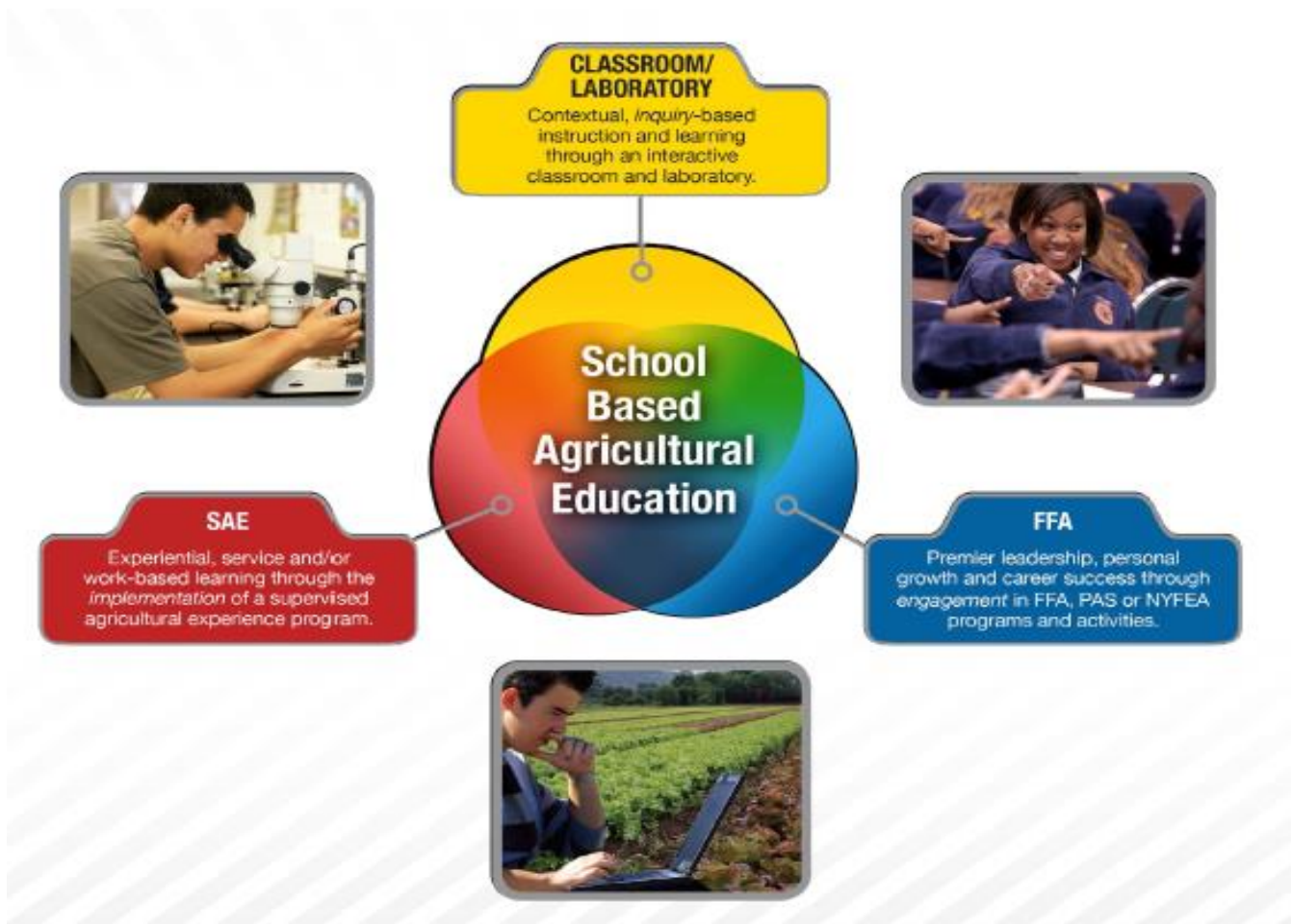


SAEs are mandatory, year-long school projects for all students enrolled in AFNR courses. This type of experiential learning is the 100% “hands-on” portion of the total agricultural education program. The SAE is designed and carried out by the student with the support of the parent and the supervision of the agriculture teacher and/or employer. The SAE could involve the student working for an employer, starting their own small business, raising livestock, or some other type of agricultural activity or research based on agriculture. The student will then keep accurate records (hours worked, money made, etc.) of their experience and compile it in the online SAE record book.

While it is not necessary that an SAE take place on a farm, ranch or other private agricultural enterprise, the experience should correlate with classroom instruction as described in the Texas Essential Knowledge and Skills (TEKS), as well as a student’s career exploration, interest and planning within one of the recognized AFNR career pathways. In order to meet the intended outcomes of the TEKS, the SAE must relate to AFNR skills that are currently being studied (current course) or have been previously studied.

The Importance and Benefits of the SAE Program

The importance of SAE programs extends far beyond the agricultural education classroom. An SAE is a catalyst for personal growth, career development and responsible citizenship that leads to individual, group and societal benefits not possible through formal education alone. Skills, knowledge, experiences and connections gained through SAEs remain with students for a lifetime and positively influence others along the way. An SAE is more than an integral part of agricultural education; it is tangible learning with an applied purpose and measurable results. Having an SAE is essential for the student to succeed in the agricultural education program. SAE programs benefit students, schools, employers, communities, parents, and teachers.



Benefits to Students

- Assists with career and personal choices while building self-esteem
- Applies business practices such as record keeping and money management
- Nurtures individual talents and develops a cooperative attitude toward others
- Builds character and encourages citizenship and volunteerism
- Provides a comfortable environment for practical learning that is challenging, engaging & fun
- Provides an opportunity for students to explore various agricultural subjects and interests
- Develops self-confidence
- Provides educational and agricultural experiences in a specialized area of agriculture
- Gives practical meaning to courses studied in school
- Provides an opportunity to earn money while learning
- Develops employability and thinking skills
- Promotes recognition for individual achievement
- Helps teach good work ethics
- Helps develop the ability to assume responsibility
- Assists in making the transition from school to work
- Provides an opportunity to become established in an agricultural business/career

Benefits to School and Teachers

- Strengthens relations between the school, community and agriculture program
- Serves as a motivational tool for student learning and scholastic achievement
- Creates familiarity with and promotes new technologies and agricultural practices
- Provides year-round instruction that is practical, relevant and industry-based
- Expands agricultural competencies learned in the classroom and laboratory

Benefits to Employers and the Agricultural Industry

- Provides a labor force skilled in technical and applied agricultural practices
- Keeps young people involved in the local community and/or the agriculture industry
- Serves as an effective venue for on-the-job training and career preparation
- Assists schools in keeping instruction relevant based on industry needs

Benefits to Communities

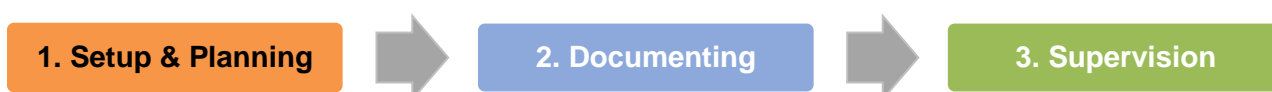
- Promotes community service and involvement
- Provides the community with a competent and educated workforce
- Improves the efficiency of the agriculture-related jobs in the community
- Develops knowledgeable, conscientious and informed citizens
- Creates an awareness and appreciation of the community's economic, environmental and human resources

Essential Elements of an SAE

An SAE is an essential component of the AFNR program where students participate by experiential learning. This is a STUDENT-LED project that is a required component for agricultural education and is intended for students.

According to the National Council for Agricultural Education, “Students are able to consider multiple careers and occupations, learn expected workplace behavior, and develop specific skills within an industry, and are provided opportunities to apply academic and occupational skills in the workplace or a simulated workplace environment”.

A complete SAE is comprised of three essential elements:



Setup & Planning – *As a student-led project, each one should be a planned SAE Project. Successful SAE planning includes considering the following topics:*

- General Overview
 - Project name and project dates (estimated start and finish)
 - Level of involvement – individual, school-based or service learning, which helps describe the project
 - Who is supervising – may include a teacher, employer, parent/guardian
 - How it connects to agriculture or related to careers
- Resources Needed
 - Time – hours beyond the normal class period (1 credit), which may include additional arrangements of laboratory time, work-based learning courses and time beyond the school day
 - Money – sources of funding, budget, expected results and equipment needed
- Expected Learning Outcomes
 - A connection to Agriculture, Food and Natural Resources (AFNR) or related state content standards
 - Actual project results and comparisons to planned learning outcomes

Documenting – *Keeping proper documentation throughout the entire SAE experience is essential to measure results. Proper SAE documentation includes:*

- Consistent recordkeeping of SAE, but should also include FFA and classroom experiences
- Track time and monetary investments in the SAE and dates of actual involvement
- Summarize SAE project results
 - Annual summary of project responsibilities and learning outcomes
 - Determine if SAE is ongoing or completed (inactive)

Supervision – *Expected SAE supervision includes one or more teacher(s), employer(s), and/or parent/guardian(s) to:*

- Assist students in achieving project objectives and content support
- Guide how the SAE experience connects to career planning/interest
- Access the student’s project plan, records and SAE outcome/results

SAE participation should connect to real-world situations and enhance career development. Student SAE projects are typically categorized into one of three “Levels of Focus”:

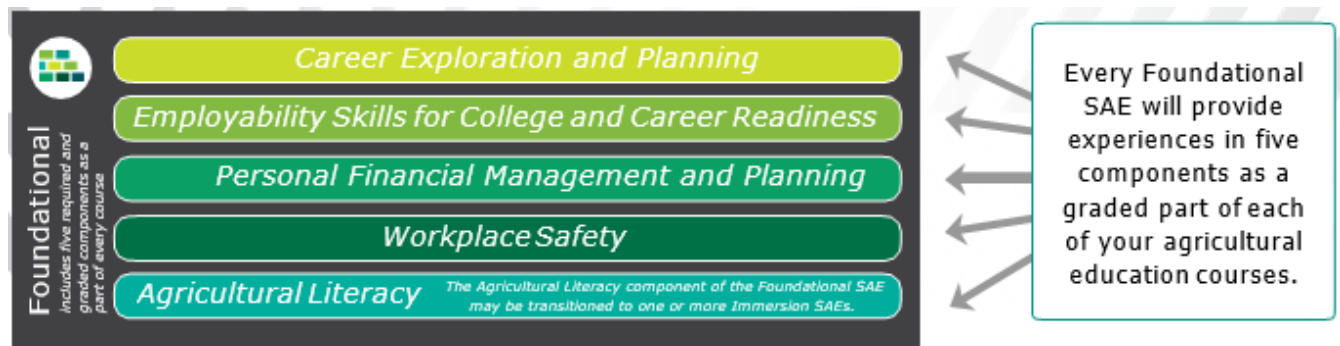
- 1. Individual (student and/or family supported)**
- 2. School-based (completed with financial support from the school/partnership), or**
- 3. Service-Learning (completed with support of a non-profit or community partner).**

Section 2. DETAILED INFORMATION FOR SAEs

Foundational SAE

All students in an AFNR course (at all grade levels) are required to have an SAE. Foundational SAEs support their career interest. Projects and experiential learning activities for all types of SAEs will develop the student in each of the five Foundational component areas explained below. Projects will involve both in and out of classroom experiences such as:

- Career Exploration
- Employability Skills & College Readiness
- Personal Financial Management
- Workplace Safety
- Agricultural Literacy



1. Career Exploration and Planning

In this component, students will research and explore career opportunities within the AFNR industry. They will complete interest inventories and identify a career goal. Ultimately, students will be able to describe AFNR career opportunities and the path to achieving those opportunities.

Links to resources for Career Exploration and Planning:

<https://www.agexplorer.com>

<http://agrilinks.org>

<https://www.onetonline.org>

2. Employability Skills for College and Career Readiness

Through the Employability Skills component, students will develop the skills needed to succeed in both college and career. These skills include responsibility, communication, innovation, critical thinking and collaboration.

3. Personal Financial Management and Planning

Crafting a personal financial management plan is the focus of the Personal Financial Management and Planning component. Students need to understand how personal financial practices like budgeting, saving and appropriate use of credit leads to financial independence.

4. Workplace Safety

Where many of the ANFR career pathways contain hazardous occupations, it is critical that all students have a strong base of instruction and experience with workplace safety. In this component, students will examine and summarize the importance of health, safety and environmental management systems in the AFNR workplace.

5. Agricultural Literacy

All students also need a base understanding of the width and breadth of the agricultural industry. This

component will require students to research and analyze how issues, trends, technologies and public policies impact AFNR systems. They will also evaluate the nature and role of agriculture in society and the economy.

Immersion SAE (Grouping of Core SAEs)

Even though Immersion SAEs are an extension of the Agricultural Literacy component of the Foundational SAE, they will contribute to a student's growth in all of the Foundational components in an authentic, contextualized manner. As students move beyond agricultural literacy to develop knowledge, skills and expertise within a specific AFNR pathway through an Immersion SAE, there will be more opportunities for recognition, awards and rapid development of employable skills for college and career readiness.

Over time, you will likely identify opportunities to become even more immersed in gaining skills for a career in a certain area of the agricultural industry. Immersion SAEs provide a way for students to build upon their Foundational SAE and gain direct experience in their selected career path.



Supervision of Immersion SAE is a critical component that is overseen by the local agriculture instructor. **Immersion SAEs can happen in the school facilities and occasionally during the school day if the program is student-managed, outside formal instruction time, stimulates a real-world work environment, is tied to a career plan and is otherwise not connected to directed laboratory instruction by the teacher.**

There are three types of Immersion SAEs that primarily use individual resources:

1. Placement/Internship
2. Ownership/Entrepreneurship
3. Research (Experimental, Analysis or Invention).

Two additional aspects of these SAEs also exist where the student needs additional resources to complete the project, which are (1) School-Based Enterprise, and (2) Service Learning.

1. PLACEMENT/INTERNSHIP SAE

In a **PLACEMENT SAE**, the student is in an employment setting (either paid or unpaid). The student performs the tasks determined by the employer which are necessary for the operation of the business. Students are evaluated by the employer under the guidance of the agriculture instructor. The placement experience must provide opportunity for the development and advancement of skills and abilities aligned to the AFNR Technical Standards and Career Ready Practices.

Placement SAE Quality Indicators:

- The student Maintains SAE documentation which contains:
 - Supervised Agricultural Experience (SAE) Agreement (SAE Plan)
 - Hours worked

- Income received
- List of tasks performed in the placement
- Knowledge and skills attained
- Receives regular employer/supervisor evaluation

The **INTERNSHIP SAE** is an advanced level of the placement SAE. It entails greater involvement of the student, instructor and the employer in determining the activities the student performs in the job setting. The internship experience is directed not as much by the business operation but by an **SAE Training Plan** created for the maximum benefit of developing the student's knowledge and skills. The plan also contains a list of AFNR Technical Standards and Career Ready Practices which the student will master as a part of their internship experience. Student evaluation is performed by the employer and measures student performance based upon the measures identified in the training plan. Training plans are required for students that are engaged in paid or unpaid internship experiences. Additional information and approved forms are available on the TEA website (www.tea.texas.gov/CTE).

Internship SAE Quality Indicators. The student:

- Completes elements from the Placement SAE
- Develops and implements a Training Plan (SAE Plan) centered on the educational development of the student
- Documents regular reflection on the experience
- Presents a summary of the experience to a local committee organized by the agriculture instructor

2. OWNERSHIP/ENTREPRENEURSHIP SAE

Students conducting an **OWNERSHIP SAE** operate an individual business which provides goods and/or services to the marketplace. The operational and risk management decisions on how goods and/or services are provided are made by the student owner. Some facilities, input resources and equipment necessary for the SAE operation can be provided from outside individuals without expectations of compensation coming from the student or SAE. The operation must be of sufficient scope to enable development of student skills and abilities aligned to the AFNR Technical Standards (TEKS) and Career Ready Practices.

Ownership SAE Quality Indicators. The student:

- Completes the basic SAE Agreement (SAE Plan)
- Provides the labor resources for operation of the SAE
- Maintains financial records which reflect all inputs and outputs of the production functions performed by the business
- Performs an analysis on the productivity and profitability of the enterprise at the completion of each production/business cycle
- Documents knowledge and skills gained through the experience

A student transitions to an **ENTREPRENEURSHIP SAE** at the point the Ownership SAE is enhanced to contain or meet additional criteria. It incorporates all aspects of an Ownership SAE and requires the student to identify and account for, either financially or non-financially, all resources used in the business. The Entrepreneurship SAE includes an **SAE Business Plan** which provides for the continued growth and expansion of the operation.

Entrepreneurship SAE Quality Indicators. The student:

- Completes all elements from the Ownership SAE
- Creates and updates an SAE Business Plan annually (SAE Plan)
- Performs analysis on both production functions and profitability of business using standard acceptable business statements

- Identifies those features of the business which are not realistic to the real world (Examples: buying an animal for show at greater than market value; feeding a ration different than a normal market animal would receive; selling in an artificial market or premium sale; etc.) and analyzes the business using real world scenarios
- Identifies and accounts for, either financially or non-financially, all resources utilized in the business in the accounting system

3. RESEARCH: EXPERIMENTAL, ANALYSIS OR INVENTION SAE

A student conducting a **RESEARCH SAE** is involved in an investigation of materials, processes and information to establish new knowledge or the validation of previous research. Research conducted must have applications within AFNR Technical Standards. There are three variations of research SAE available that students may conduct:

EXPERIMENTAL: An Experimental Research SAE involves the application to the scientific method to control certain variables while manipulating others to observe the outcome. The student defines the hypothesis the experiment will test, determines the experimental design, conducts the research, collects the data, draws conclusions from the data and recommends further research that can be done.

ANALYTICAL: An Analytical Research SAE often begins with a question that asks why or how something occurs, followed by a period of data collection using qualitative and/or quantitative methodologies. The student then conducts analysis of data, facts and other information to determine the answer to the posed question.

INVENTION: An Invention Research SAE applies the engineering design process to create a new product or service. This type of research often begins with the identification of a need and the development of a product followed by an iterative process of prototyping and testing that results in a product that meets the identified need.

Research SAE Quality Indicators. The student:

- Engages in identifying an ongoing program of research following an approved SAE Research Plan (SAE Plan)
- Follows scientific process and/or accepted best practices for conducting research to ensure reliability, validity and replicability of research
- Conducts peer reviews with supervising agriculture instructor and other professionals during multiple stages of the research cycle (Example: proposal; report of findings; publications; etc.)

4. SCHOOL-BASED ENTERPRISE SAE

A **School-Based Enterprise SAE** is an SAE with a twist. The difference is that the operation is based at the school and involves a group of two or more students working cooperatively outside of normal class time.

School-Based Enterprise SAEs are student-led business enterprises that provide goods or services. They are operated from the school campus utilizing facilities, equipment and other resources provided by the agricultural education program or the school in general. The business itself may be “owned” by the school or FFA chapter, meaning that the organization holds the risk of the business that is managed by students through different arrangements.

School-Based Enterprise SAE Quality Indicators. The student:

- Creates and updates an SAE Business Plan annually (SAE Plan)
- Operates the business under the overview of a board of directors (Teacher) to which the student management team provides reports throughout the business operation cycle
- Structures the business to provide for varying levels of student responsibility to allow for skill development

and student advancement

- Operates the business in a realistic workplace environment providing real world workplace expectations for the students involved

Note: If an enterprise operated from the school setting is managed by an individual student, then it is considered an individual SAE and is treated as either an Ownership/Entrepreneurship SAE or Placement/Internship SAE that happens to occur on the school grounds.

5. SERVICE LEARNING SAE

A **Service Learning SAE** is conducted by one or more students in which they plan, conduct and evaluate a project designed to provide a service to a school, public entities or the community. It must provide benefits to another organization, group or individuals other than the FFA chapter.

The project must be pre-approved by a review committee that includes local stakeholders in addition to the agriculture teacher. It will be of sufficient scope to enable development of student skills and abilities aligned to the AFNR Technical Standards and Career Ready Practices.

Examples of Service Learning SAE: plan, prepare, and implement in the development of a city park, dog exercise area, or community garden.

Service Learning SAE Quality Indicators. The Student/Service Learning team:

- Develops an SAE Learning Plan (SAE Plan)
- Operates under the overview of a local committee to which the student management team provides reports throughout the service learning experience
- Provides for varying levels of student responsibility to allow for skill development and student advancement
- Operates in the local school, community or beyond and provides real world service learning experiences for the students involved
- Provides a summary report of the impact of the project to the local school and community
- Writes a reflection paper which describes their growth from the experience

Note: A Service Learning SAE should not appear within a chapter's Program of Activities (POA) in a prior year unless it has been significantly expanded or changed.

WHAT IS THE DIFFERENCE BETWEEN COMMUNITY SERVICE AND SERVICE LEARNING?

The main difference between community service and service learning is the level of commitment and difference of intention. **Community service** projects are usually short, one hour to one day, investments of time to an organization or a cause that will benefit the community.

Service learning involves being part of the planning, preparation and implementation that results in benefit to the community. Service learning requires a higher level of commitment and a sustained investment of time. It also starts with an intention of learning and an expectation of reflection and evaluation.

Managing and executing a community service project is service learning, where volunteering the day of the event is community service.

WHAT IS THE DIFFERENCE BETWEEN COMMUNITY SERVICE AND FUNDRAISING?

Community Service/Service Learning are volunteer opportunities working for others and there is no benefit to FFA chapter or FFA chapters.

- Example 1: Prosper FFA Toy Drive (benefiting Toys for Tots)
- Example 2: Visiting a local nursing home to sing carols and serve Christmas dinner
- Example 3: Adopt-a-Highway

If volunteer opportunity is a **financial benefit for the FFA chapter** in **ANY** way, it is **NOT** community service, it is a **Fundraiser**.

- Example 1: Having a car wash to raise money to buy buckles for the local stock show
- Example 2: Working the concession stand at the chapter stock show. Even if this FFA member doesn't have an animal project – the concession stand money still benefits the chapter and its members

Section 3. HOW DO I FINANCE MY SAE PROJECT?

Many SAE projects and programs, especially those that are entrepreneurial, require financial assistance. As with operating any business venture, students should be aware of resources available to assist with start-up costs, livestock purchases, new equipment, etc. A good idea or program should not be cut short because of lack of funding! Here are a few financial options:

National FFA SAE Grants (<https://www.ffa.org/participate/grants-and-scholarships/sae-grants>)

Supervised Agricultural Experience Grants of \$1,000 to help start or expand SAEs are available. The SAE Grant application process opens September 5 and closes November 15 of each year. Eligible grant applications are scored and the grant recipients are announced mid-December. The number and type of grants available changes each year based on sponsor participation. In 2017 there are 33 different grants with 152 total grants available.

Parents/Family

Often times, parents of the FFA member will help with the startup cost of an SAE project. You could also provide a trade of labor for supplies and other costs associated with your project. Example: Student will work on the family farm in exchange for livestock or supplies.

Local Financial Institutions (Banks or lending centers):

- **USDA Rural Youth Loans**

The U.S. Department of Agriculture's Farm Service Agency (FSA) makes operating loans of up to \$5,000 to eligible individual rural youths age 10 through 20 to finance income-producing, agriculture-related projects. The project must be of modest size, educational, and initiated, developed and carried out by rural youths participating in 4-H clubs, FFA or a similar organization. More information can be found here: <https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/youth-loans/index>

- **Lone Star Ag Credit FFA Loan Programs**

FFA loan programs provide financing to young people who are involved in FFA livestock projects and need financing for the purchase of an animal and/or feed expenses. The interest rates charged on these loans are lower than those normally charged on similar loans. Loans will be subject to certain qualifications. More information can be found here: <https://www.lonestaragcredit.com/products-and-services/loan-programs/young-beginning-and-small-farmers-and-ranchers>

- **Texas Farm Credit**

Texas Farm Credit can tailor loans to fit the unique financial needs of young, beginning and small (YBS) ag producers through customized underwriting and working closely with government loan guarantee programs and other organizations. <https://www.texasfcs.com/products-services/ag-land-loans/ybs>

- **Traditional Bank Loans**

Many local or regional banks and agriculturally-related financial institutions offer loans for FFA projects. For example, Farm Credit Services offers financing programs for young, beginning and small farmers. You could also secure a small loan through a local bank. This would probably require a co-sign from a parent or guardian.

| GENERAL AGRICULTURAL EDUCATION TERMS & EXAMPLES | |
|--|--|
| Terms | Definition & Examples |
| Agriculture, Food and Natural Resources (AFNR) | The Agriculture, Food and Natural Resources (AFNR) Career Cluster focuses on the essential elements of life – food, water, land and air. This career cluster includes a diverse spectrum of occupations such as: farmer, educator, veterinarian, geologist, wind energy, and oil and gas production. The courses in the AFNR Career Clusters are designed to prepare learners for careers in the areas of: planning, production, processing, marketing, distributing, financing, development of agricultural commodities, services, and natural resources (including food, fiber, wood products, water, minerals, and petroleum) |
| Supervised Agricultural Experience (SAE) | The Council defines SAE as a student-led, instructor supervised, work-based learning experience that results in measurable outcomes within predefined, agreed upon set of AFNR Technical Standards and Ready Practices aligned to a career plan of study. An SAE is a project completed (a) outside of the normal class time, (b) related to agricultural courses and (c) supervised. <i>Examples include a wildlife research project, employment at farm store or show animal experience.</i> |
| Foundational SAE | An SAE conducted by each student enrolled in AFNR courses which consists of five components: Career Exploration and Planning, Employability Skills for College and Career Readiness, Personal Financial Management and Planning, Workplace Safety, Agricultural Literacy. |
| Immersion SAE | Immersion SAEs are an extension of the Agricultural Literacy component of the Foundational SAE and can happen in the school facilities, sometimes during the school day if the program is student-managed, outside formal instruction time, simulates a real-world work environment, is tied to a career plan, and is otherwise not connected directly to laboratory instruction by the teacher. There are five types of Immersion SAEs: <ul style="list-style-type: none"> ● Placement/Internship SAE, ● Ownership/Entrepreneurship ● Research SAE ● School-Based Enterprise SAE ● Service Learning SAE |
| Placement/Internship SAE | Placement SAE is a project that is a job experience, either paid or unpaid. <i>Examples include working at a dairy, farm store, or other related employment in agribusiness.</i> Internship is an advanced level of the Placement SAT that provides a more targeted experience that focuses on meeting your specific needs. |
| Ownership/Entrepreneurship SAE | Ownership SAE is a project that requires monetary investment for the potential to gain a profit (Revenue is greater than the expense). <i>Examples include starting a mowing service, developing a mobile app, raising a show animal or breeding animal project.</i> |
| Research SAE | In a Research SAE, you will investigate materials, processes and information to establish new knowledge or the validation of previous research. Research must have an application within the ANFR industry. There three categories to pursue: <ul style="list-style-type: none"> ● Experimental SAE: Involves the application of the scientific method to control certain variables while manipulating others to observe the outcome. You will define a hypothesis, determine an appropriate experimental design, conduct research, collect data, draw conclusions and recommend further research that can be done. ● Analytical Research SAE: Begins with a question that asks why or how something occurs, followed by a period of data collection using quantitative methodologies. You will conduct analysis of data, facts and other information to determine the answer to the question posed. |

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| | <ul style="list-style-type: none"> ● Invention Research SAE: Applies the engineering design process to create a new product or service. It will begin with the identification of a need and the development of a product, followed by a design process prototyping and testing that results in a product that meets the identified need. |
| School Based Learning | A School-Based Enterprise is an Entrepreneurship SAE with one slight difference. The operation is based at the school and involves a group of two or more students working cooperatively. School-Based SAEs are student-led business enterprises that provide goods or services. The business itself may be “owned” by the school or FFA chapter, but must be structured by students, not the teacher. |
| Service Learning | A Service Learning SAE is conducted by one or more students in which they lead through a plan, conduct and evaluate a project designed to provide a service to a school, public entities or the community and evaluate their efforts in the outcome. It must provide benefits to another organization, group or individuals other than the FFA chapter. This project must be pre-approved by a review committee. Students will plan, manage and execute the project and document their efforts. |
| Community Service | These projects are short, one hour to one day, investments of time to an organization or cause that will benefit the community. Students do not plan or manage the project – they just show up for their required shift. This is a volunteer opportunity working for others and there is NO financial benefit to FFA chapters other than the value of the event to their chapter POA. Community service or volunteer opportunities should be completed without pay. <u>***Community service CANNOT be duplicated as SAE hours/labor through a service-based SAE***</u> . It is possible that a student with an SAE which is community service-based project could split the hours between community service & SAE, but they cannot be counted twice. Examples may include: <i>Toy drive benefiting Toys for Tots, Visiting the local nursing home to sing Christmas carols, Adopt-a-highway or Holding a canned food drive for a local food pantry.</i> |
| Program of Activities (POA) | Agriculture education program of events that are (a) targeted to a program’s objective, (b) related to the program’s mission statement; and (c) planned with measurable goals used in measuring results. An example includes hosting an educational ag-day with elementary schools, which relates to the public relations objective of the program. |
| Fundraiser or POA Events in terms of SAE | This is an event in which the FFA chapter receives a financial benefit in any way. This is recorded as an FFA activity for the student and possibly part of the program’s POA, but is not listed as a student’s SAE project since they are not leading the event. <i>Example: Working concession stand at local school district stock show; Car wash to raise money to buy buckles for the local stock show; traditional meat/fruit sales.</i> |

Section 4. INNOVATIVE IDEAS FOR SAE PROJECTS

Probably the most difficult part of the SAE is picking out the right project for you. Some students will naturally fall into an SAE if they live on farm, already have a part-time job at an agribusiness, or a hobby related to agriculture. Other students may have to be more creative when deciding what to do for their project. On the next few pages, ideas for SAE projects are listed by career cluster area, not by proficiency award area. Before you begin to browse through the list of ideas you should review a number of factors that should be first considered when selecting an SAE program.

Factors to Consider Before Selecting an SAE Project:

Cost – How much money will be required to buy the supplies and equipment for the SAE? If a substantial amount of money is required to start the SAE, where will it come from?

Potential for profit – If the SAE is an entrepreneurship type of SAE, is there a reasonable chance to make a profit? Will people want to buy the product or service? The goal is to make money.

Marketing – Where will the product be sold? Is there a demand for the product or service? How will the product or service be advertised and marketed?

Space or land required – Some SAE programs require land, pens, greenhouse bench space, lab space, etc. Is space or land available? Will you have to pay rent for the space? Who will provide the space or land?

Availability of equipment – In order to conduct the SAE, is specialized equipment required? Some agriscience research projects may require microscopes, scales, petri dishes, etc. Is that equipment readily available for your use? Some farming activities also require specialized equipment such as combines, tractors, planters, etc. Is this equipment available for your use? Is it possible to lease the equipment or pay someone to do some of the activities for you?

Length of time to completion – How long will it take to complete the SAE activity? Will it become a long-term project? The SAE should provide opportunity for growth in scope and size throughout your high school career.

Amount of time student has available – How many other extra-curricular activities is the student involved in? How much time does the student have available to dedicate to the SAE activity? Some SAE programs may require minimal time commitments, while others may require substantial amounts of time. The timing of when most activities occur in the SAE also must be examined. If a student plays a lot of baseball, then this could interfere with a lawn care SAE since both occur during the same season.

Will you learn something new? – Absolutely! The goal of the SAE is to learn, preferably to learn something new, and expand on that new knowledge each subsequent year.

Is the SAE of sufficient scope to be challenging but not overwhelming? – Some SAE activities could be very simple to do and some can be very, very challenging. The secret is to select an SAE activity that is in the middle. It will require some effort but will not be overwhelming.

Legal Issues – There are certain legal issues that must be considered in selecting an SAE. Child labor laws prevent 14- and 15-year-old students from doing certain types of work. In selecting an SAE, you want to make sure it is legal to do the SAE you have in mind.

Availability of transportation – If a student considers a placement type of SAE, how would she or he get to the place of employment? Transportation must be available.

Related to Career Choice – Perhaps one of the most important factors to consider in selecting an SAE is, “Is this SAE related to my potential career?” Ideally, the SAE will have some relationship to the career choice of the student.

Personal Interest – One of the most important factors in selecting an SAE is personal interest. One should select a project that appeals to him or her and will be enjoyable.

On the next few pages are some innovative SAE ideas you could use for your project that fall within the AFNR Pathways. This, however, is NOT a complete list of all activities you can do! There are hundreds of other opportunities you can do for the SAE. If you also have something in mind, feel free to discuss it with your advisor.

Section 5. CAREER PATHWAYS, CAREERS, EXAMPLE SAES

Agribusiness Systems Career Pathway

Agribusiness systems careers involve using technology to coordinate all activities that contribute to production, processing, marketing, distribution, financing, and development of agricultural commodities.

Careers associated with Agribusiness Systems

Agricultural Loan Officer, Agribusiness Manager, International Ag. Marketing Specialists, Marketing Communications Manager, Financial Officer

Example SAEs related to Agribusiness Systems

- Be a sales associate at a garden or farm supply store.
- Become an agricultural consultant for farm news for local radio or newspapers
- Conduct a study of commodity trading over a period of time
- Conduct insect scouting for a seed corn company.
- Create a custom labor venture: mow pastures, remove undesirable weeds from crops paint outbuildings, etc.
- Create and produce a weekly television or radio show about FFA and agriculture
- Create digital video programs about FFA
- Design a computer application plan for some agricultural facility or program
- Design custom computer programs using Excel or other software to solve problems for producers
- Form a cooperative with other students and share in profits of a greenhouse crop
- Job placement in food distribution, restaurant, etc.
- Job placement with local florist
- Job-shadow agribusiness professionals, visits to agribusinesses to interview personnel, educational tours, etc.
- Maintain the chapter webpage
- Make business cards, stationary, etc., for businesses or chapter members
- Marketing Christmas trees (at home or school provided facilities)
- Offer a custom parts and supplies delivery business to farms in your county
- Operate a business that computerized farmers' records
- Operate a custom spraying service
- Operate a hay hauling service
- Operate a lawn maintenance/mowing service
- Operate a poultry litter clean out service
- Operate custom combining service
- Operate custom heifer raising service
- Operate custom hog raising business
- Package fresh fruit or vegetable gift packs
- Pre-sell fresh meat to clients on a weekly basis
- Pre-sell fresh seafood to clients on a weekly basis
- Pre-sell fresh vegetables in family portions delivered weekly
- Preserve food for home use
- Processing creamed corn in a food processing facility
- Produce a weekly column for the local newspaper about agricultural issues
- Provide a custom barbecue service for community
- Provide a custom feed for livestock. Tap the organic, all natural, no-chemical market.
- Provide a hand weeding crew for local peanut/vegetable farmers
- Provide a sausage making business at home; can be sold if regulations are met
- Provide basic internet and email training to producers to increase their level of confidence in using technology
- Provide custom hay baling and/or hauling
- Provide farm sign business (manufacture, sale, install, and maintain)
- Provide livestock hauling
- Provide small engine maintenance and repair service
- Provide systematic maintenance and service on outdoor power equipment at home or at school provided facilities
- Purchase and resale aerial photographs from tax office to local landowners
- Remove pesticide jugs monthly from farms and transport to landfill
- Research the differences among farm management software systems
- Sell ready to freeze processed vegetables

- Start a basic computer help service for area Ag producers
- Start a composting business by buying cow manure from local farmers, bagging for resale
- Start a farm sitting business for vacationing farmers.
- Start a franchise of existing fruit/vegetable stand
- Start a kerosene route for homeowners (probably little demand in the summertime)
- Start a MSDS compliance business by compiling and maintaining current sheets for farms and in business in your county
- Start a recycling business (collecting and selling newspapers and plastics to recycling plants)
- Start an agricultural business promotion business. (Sell custom caps, T-shirts with farm or Ag business names or logos to clients.)
- Start an agriculture photography service (Animals, equipment, barns, families, children with animals, show animals)
- Start local farm produce sale paper and sell ads to farmers
- Start service that cleans leaves from gutters
- Volunteer to design a website for a local agriculture group
- Volunteer to do website and brochure development for local Ag businesses
- Work as a grain tester/handler for a local elevator
- Work as a service provider in grocery store
- Work as a teaching assistant for your local agricultural teacher and FFA advisor
- Work as an assistant sales manager at a turf equipment company
- Work as an intern for the local agriculture department
- Work at a seed corn dealership
- Work at the local feed store
- Work for a local tax accountant that handles ag customers
- Work for an ag auctioneer service
- Work for an ag marketing services company
- Work for an irrigation service provider
- Work for local cement company that installs ag applications
- Work for the local ag insurance agency
- Write "How To" pamphlets to sell at local garden supply stores. (Ex. How to Grow Tomatoes, etc.)
- Write news articles on agriculture or FFA for local newspaper for Ag. Communications

Power, Structure and Technical Systems Career Pathway:

Careers in this pathway involve applying of engineering, power hydraulics, pneumatics, electronics, structures and controls to agriculture, in order to develop ways to improve the processing of agricultural products.

Careers associated with Power, Structure and Technical Systems

Agricultural Engineering, Diesel Mechanic, Welder, Farm Equipment Mechanic, Global Positioning Technician

Example SAEs related to pathway

- Assist with GPS mapping for an agronomic services company.
- Build a patio for the home
- Build frames for raised beds for gardeners
- Build garden sheds for homeowners.
- Build handicap ramps in local community
- Build picnic tables/sale to schools and local community
- Complete home or farmstead improvement construction activities
- Conduct general home maintenance
- Construct a hydro ram pump and calculate the efficiency and water delivery rate
- Construct a utility building
- Construct a wind powered generator and show its applications to agriculture
- Construct and sale birdhouses and feeders
- Construct and sale lawn furniture made of PVC.
- Construct compost bins to sell
- Construct concrete projects for the home or farm
- Construct or recondition a welding project (such as a trailer, cooker, etc.) at home or in school provided facilities
- Construct prefabricated wooden fence panels for sale to local hardware, building supply stores
- Construct prototypes of hydraulic systems
- Construct spray rigs for four wheelers
- Constructing and marketing woodworking projects (birdhouses, dog houses, etc.)
- Constructing metal projects

- Contract with local EMCs or Power Companies to remove bolts, wire, etc from old power poles. (Sell copper for recycling.)
- Contract with school system to maintain and service lawn care equipment
- Create a demonstration model that shows proper and improper welding techniques
- Create a teaching model to show how a small gas engine works and sell to FFA chapters
- Cut out and paint lawn figures for sale
- Design, build and sell lawn ornaments
- Electrical repair service
- Install electrical circuits or wiring system at home
- Install plumbing fixtures or plumbing system in your own building
- Lawn mower maintenance service
- Machine and rebuild engine parts
- Making craft items from wood, metal, or concrete to sale at arts and craft shows
- Making personalized signs for sale
- Manage the steel inventory in the Ag shop
- Map fields, weeds, etc. for producers using GPS and GIS
- Operate a lawn mower service and repair business
- Paint agricultural buildings and farm houses
- Placement in a parts store
- Pour concrete forms for machine sheds or other buildings
- Provide a poultry house maintenance preparation business
- Provide custom painted mailboxes and stands
- Provide maintenance for school shop equipment
- Repair and rebuild damaged pallets for businesses
- Research the biggest challenges producers face when adopting new technology
- Research the differences in various styles of tillage equipment
- Research the energy use of different types of lighting systems in farm buildings
- Research the water savings accomplished by new irrigation technologies
- Restore a tractor and sell it or restore a tractor for someone else.
- Run a custom fence building and repair business
- Start a chain saw basic maintenance & service business
- Start a custom spraying service that utilizes GPS
- Start a custom vehicle refurbishing or painting business
- Start a detailing business for cleaning farm equipment on the farm (wash, wax, clean, maintain)
- Start a farm equipment tire disposal business. (Turn old tires into livestock feeders.)
- Start a farm fence maintenance business (cleaning fencerows, repairing)
- Start a farm fencing company for custom work
- Start a pallet manufacturing business
- Start a small engine repair service
- Start an equipment locating business. Match folks with something for sale with folks who want to buy something
- Test the strength of different types of welds
- Wire a home shop, utility room, barn, or tree house
- Wire buildings for lights and receptacles
- Work as a diesel mechanic assistant
- Work as a surveyor assistant
- Work as an agricultural mechanics aide
- Work as an assistant for an auto, truck or tractor mechanic
- Work at a welding operation
- Work for a local electrician
- Work for a plumbing business
- Work for a small engine repair shop overhaul and repair
- Work for an irrigation service company
- Work in a welding shop
- Work on plumbing waste systems, air and water systems
- Work with county soil and water engineers - assist in measuring and engineer design
- Working at a building supply business
- Working with a farm equipment dealer

Animals Systems Career Pathway

Employment in this pathway involves knowledge in the areas of genetics, nutrition, reproduction, growth and development of food and companion animals, inspecting livestock, grading livestock food products, purchasing livestock, sales, and marketing.

Careers associated with Animal Systems

Example SAEs related to Animal Systems

- Assist a horse group that assists handicapped students
- Assist at a horse stable
- Assist at local animal shelter
- Board horses
- Build a backyard poultry research project
- Buy and show a calf at fairs
- Care and incubation of hatching eggs
- Compare weight gain of chicks fed different feed rations
- Conduct a survey of all livestock operations in your area
- Conduct feed trials for growing broiler chickens
- Conduct surveys of wildlife populations
- Contract finish swine
- Coordinate and conduct a horse safety camp
- Create a classroom pet adoption program with elementary schools
- Develop a cow-calf operation
- Develop a small swine operation
- Develop a stocker cattle operation
- Discover the number of pet owners in community and their priority concerns
- Form a cooperative with other students to raise broiler chickens
- Grow catfish for sale to local cafes
- Maintain aquariums for local businesses
- Maintain the school's aquaculture system
- Manage a small aquatics lab
- Manage livestock show and supplies for FFA chapter
- Operate a pay-to-fish business
- Operate a pet sitting service
- Organize and/or run a petting zoo at local fairs or farmers markets
- Participate in a mentorship program with a taxidermist
- Plan and implement a "hands on" livestock field trip
- Produce feeder pigs
- Provide a beehive rental service for farms and gardens
- Provide a deer processing service
- Provide a home animal care service
- Provide a horse training service
- Provide a horseshoeing service
- Provide a kennel cleaning service
- Provide a lost home for homeless pets
- Provide a meat processing service
- Provide a poultry processing service
- Provide equine training services
- Provide fish pond management
- Provide fishing and hiking services for area youth groups and elementary students
- Raise a beef heifer for show
- Raise a dog for show
- Raise a horse for show
- Raise a market hog for show
- Raise a market steer for show
- Raise and sell farm fresh eggs
- Raise and sell purebred dogs
- Raise and train hunting dogs
- Raise breeding sheep for show
- Raise breeding swine for show or breeding
- Raise catfish in cages
- Raise chinchillas, hamsters, gerbils and sell them on the Internet
- Raise dairy goats
- Raise dairy heifers for show
- Raise dairy replacement heifers
- Raise dogs for sale
- Raise fish for the state fish and game department
- Raise fish in an aquaculture system
- Raise fish in cages in a pond or other body of water
- Raise fish in tanks or floating cages - research the rate of growth based on factors such as temp. and amount of feed given
- Raise game birds to sell for the training of bird dogs
- Raise game fish for sale to stock ponds
- Raise indigenous snakes and release into the wild (at approved area) each summer
- Raise llamas
- Raise market goats for show
- Raise market lambs for show
- Raise market pigs
- Raise meat birds (chickens, turkeys, ducks) to the desired weight and sell to consumers
- Raise meat goats
- Raise mice, hamsters, or gerbils
- Raise miniature cattle
- Raise miniature horses

- Raise pheasants or quail to be released into the wild
- Raise poultry for show
- Raise quail or other game birds for flight and meat
- Raise rabbits for pets or meat animals
- Raise replacement heifers
- Raise special breeds of dogs
- Raise tropical fish
- Raise tropical fish in aquariums
- Raise worms, collect and sell to bait stores
- Raise your own livestock or specialty animals
- Research cage layers versus floor layers for egg production
- Research effectiveness of various estrus synchronization hormones
- Research feed trial testing differing swine diets
- Research methods of predator control, methods of trapping
- Research the best diet to help obese pets lose weight
- Run a trapping business
- Staff FFA displays that have farm animals at county and state fairs
- Start a crawfish farm
- Start a cricket ranch
- Start a dog and cat boarding business for vacationing families
- Start a dog exercising business for elderly folks or sick people
- Start a dog obedience school
- Start a dog obedience training service
- Start a dog walking business
- Start a fish bait farm (mealworms, golden grubs, etc.)
- Start a gopher tortoise relocation service for landowners
- Start a honey production business (would work well with above hive rental)
- Start a pet grooming business
- Start a small animal care business
- Start a turtle farm (sale to pet stores and pond owners)
- Start an Easter egg business
- Study the effects of genetic selection in groups of animals over time
- Take care of classroom animals
- Take small animals to nursing homes for visits
- Test the selection of young pigs based on grade and lean yield at slaughter
- Train sporting dogs. (quail, rabbit, and retriever dogs)
- Volunteer to assist with a livestock show or county fair
- Work as a beef feedlot assistant
- Work as a veterinarian assistant
- Work as a wildlife outfitter or guide
- Work at a dog kennel
- Work at a horse operation or stables
- Work at a pet store
- Work at a poultry processing operation
- Work at a university research lab caring for small animals
- Work at a veterinary hospital
- Work at livestock farms or a ranch
- Work at pet shop
- Work at the local livestock auction barn
- Work for a pet sitting service
- Work for a predator control service
- Work for a rodeo company caring for animals and assisting with rodeos
- Work for the state game and fish department
- Work in the egg industry – packaging and distribution
- Work in the grocery store meats department
- Work on a beef cattle operation
- Work on a dairy farm or heifer raising farm
- Work on a dairy operation
- Work on a poultry operation
- Work on a sheep operation
- Work on a swine operation
- Work on an exotic animal farm

Plant Systems Career Pathway

Employment in this pathway involves ways to improve the nutritional and aesthetic value of plants and quality of seeds.

Careers associated with Plant Systems

Agronomist, Entomologist, Plant Scientist, Golf Course Superintendent, Landscape Architect

Example SAEs related to Plant Systems

- Adopt a community building for beautification
- Adopt an area of school campus for beautification
- Build and maintain the compost units at the school
- Collect and laminate plants from a nursery landscape CDE at various stages of growth
- Collect and sale dry/preserved native plant materials (acorns, leaves, wiregrass); especially for floral design retail/wholesale
- Collect, press, mount and identify plants that are growing on campus
- Complete a report on 10 food plants that includes origin, uses and cultivation practices
- Conduct a plant growth and mineral deficiency experiment
- Conduct a plant growth and physiology experiment in school Agriscience lab
- Conduct a supervised control burn and assess plant growth in the area
- Conduct timber cruise and mark timber to be thinned
- Construct a garden arbor
- Construct backyard water gardens
- Container gardening ornamental plants
- Container gardening vegetables
- Create a brochure about common houseplant diseases and how to take care of them
- Create and market custom floral designs
- Develop a business making dried arrangements to sell
- Develop a park on public property
- Develop a test plot for various types of crops
- Discover the best types of artificial lights for plant growth
- Do a garden projection for school land and have it mapped out four years in advance
- Entrepreneurship in floral design
- Establish a community roadside wildflower planting
- Garden plots at home or at school; produce crops to market
- Grow and sale mushrooms
- Grow and sell plants through the high school greenhouse
- Grow and sell produce crops
- Grow and sell the red worms used to produce compost
- Grow crops with different mechanical/chemical applications, fertilizer, growth regulator, etc.
- Observe/report results
- Grow flowers for sale at a local farmer's market.
- Grow greenhouse plants on rented school greenhouse/coldframe space
- Grow herbs
- Grow lirioppe for sale
- Grow organic cut flowers for farmer's market
- Grow organic vegetables for a local café
- Grow, harvest and can or preserve fruits and vegetables
- Horticulture therapy
- Indoor plant rentals and care service for businesses and offices
- Landscape maintenance
- Landscape pruning enterprise
- Native plant materials
- Offer a shrub care service (pruning, trimming and cutting back shrubs, fertilization)
- Organic Vegetable Production
- Plan plant-related activities and laboratories for your class
- Plant and maintain a research plot on different types of turf grasses
- Plant raised beds and monitor the growth of plants
- Produce daylilies
- Produce farm crops (at home or school provided facilities)
- Produce forage crops (at home or school provided facilities)
- Produce fruit crops (at home or school provided facilities)
- Produce greenhouse crop (at home or school provided facilities)
- Produce perennials from seed
- Produce turf grass (at home or school provided facilities)
- Produce vegetables for decoration, Indian corn, mini pumpkins, gourds, etc.
- Produce watermelons
- Propagate and market shrubs
- Provide a fruit tree pruning service
- Provide a mulching service for urban gardeners.
- Provide forestry walk-thru tours for elementary students
- Provide landscaping materials for local businesses (Pine straw and rocks.)

- Provide services to fertilize lawns, till garden spots, prune trees, etc.
- Raise a trial garden plot on school grounds (similar to UGA); seed companies may donate seed/plugs
- Raise and sell pumpkins
- Raise and sell strawberries
- Raise Christmas trees
- Raise tomato seedlings and replant into one-gallon pots to sell
- Rent houseplants to homeowners. (care for plants, change plants weekly)
- Rent indoor plants to teachers in your school
- Rent land from a neighbor and grow soybeans
- Rent-A-Plant -- rent plants for wedding, banquets, parties (ferns and tropicals)
- Research plant propagation techniques
- Research project on how light intensity affects plant growth
- Research project on how light quality affects plant growth
- Research the best turf grass varieties for your area
- Research the effect of various planting times on yields of green beans
- Research the effectiveness of GM crops
- Scout cotton or peanuts for producers
- Sell and install water gardens
- Start a commercial flower upkeep business
- Change hanging baskets, potted plants, and window boxes for business.
- Start a floral design business by creating table centerpieces for sale at farmers markets, grocery stores, and vegetable stands
- Start a garden photography business
- Start a hydroponics vegetable business
- Start a lawn irrigation installation business
- Start a renovating houseplant business
- Start a turf grass establishment business (seeding, sodding, hydroseeding, etc.)
- Start a vegetable transplant seedling business
- Start your own forage testing service
- Start your own lawn mowing business
- Start your own pruning business
- Start your own soil sampling business
- Start your own spraying business
- Study effects of herbicide type and varying concentrations
- Take care of flower beds/gardens on school property
- Take pictures and make a CD for plant or insect identification
- Test drought tolerance of different types of watermelons
- Test forage samples under various conditions to determine feed values
- Test organic versus inorganic fertilizers on plant development
- Use the school lab to manage small vegetable crop variety plots
- Volunteer to work with landowners to improve their forest lots
- Work as a range consultant
- Work at a florist
- Work at a garden center
- Work at a golf course
- Work at a nursery
- Work at an area garden center
- Work at the grain elevator during the summer
- Work for a grain farmer
- Work for a lawn and landscape care business
- Work for a local flower shop doing design, plant care, deliveries, etc.
- Work for a sprinkler installation business
- Work for an agronomy service and collect soil samples
- Work in a nursery business
- Work in an orchard
- Work in and monitor the school forest
- Work on turf farm
- Work with county soil scientist to map soils

Food Products and Processing Systems Career Pathway

Employment in this pathway focuses on discovering food sources and developing ways to process, preserve, package or store food. In addition, they create new products and inspect food processing to ensure food safety.

Careers associated with Products and Processing Systems

Biochemists, Food Broker or Engineer, Food Science Technician, Quality Assurance Specialists

Example SAEs related to Food Products and Processing Systems

- Ask farmers for permission to glean fields for food to give to homeless shelters
- Assist at an herb farm
- Assist with produce selection at a grocery store
- Collect wild mushrooms and sell to local vendors
- Conduct food science experiments
- Deliver sweet corn to customers for a local grower
- Grow vegetables to give to local food pantry
- Help at a local fruit/vegetable stand
- Make jams and jellies for sale at a farmer's market
- Process and sell specialty products--bison, wild flowers, ostrich
- Process wild game for jerky, etc.
- Raise trout and sell to local restaurants
- Research genetic changes in various vegetables
- Research genetic crossings in winter squash
- Research incidents of food borne illnesses in a community
- Research the development and use of edible soybeans
- Research the environmental effects on milk
- Research why new food products fail to sell
- Sell gourmet popcorn products
- Sell picked vegetables
- Start a service to grow gardens for the elderly
- Start and manage a farmer's produce market in town
- Study the impact of various styles of labels on people's perception of the food product
- Test ideas for new food products
- Work at a cranberry farm
- Work at a meat production plant
- Work at a produce facility that repackages and sells produce
- Work at a vegetable or fruit canning factory
- Work at local bakery
- Work for an agricultural seed cleaning and bagging company
- Work for and/or operate a wild bird processing service
- Work in a deli or bakery at a grocery store
- Work to establish a community vegetable garden

Environmental Service Systems Career Pathway

Employment in this pathway involves pollution control, recycling, waste disposal, public health, hazardous waste management studies, and environmental research projects.

Careers associated with Environmental Service Systems

Environmental Engineer, Hazardous Materials Handler, Health and Safety Sanitation, Toxicologists

Example SAEs associated with Environmental Service Systems

- Assist community watershed action groups
- Assist landowners with installation of soil conservation practices
- Assist local agencies with data collection for watersheds
- Collect water samples for local or state agencies
- Conduct a local water quality study
- Conduct a tour of area farms and ranches that practice effective pollution control
- Conduct workshops for homeowners on composting
- Create service to remove algae from area lakes and fishing ponds
- Develop and implement a farm safety class for elementary school students
- Develop marshlands for game
- Develop plan to manage school food waste
- Establish green belts along streams on your farm
- Lead farm safety program for elementary students
- Monitor dust levels in air at various sites and various times throughout year
- Monitor local air quality; record and report
- Monitor pollen counts in an area by working with labs and weather stations
- Own and operate a water systems farm drainage (tiling) company
- Put together a town safety package---mark all signs, fire hydrants and water drains
- Research area pollution concerns
- Research methods for preventing common accidents in agriculture dept. laboratory
- Research rate of accidents on area farms and compare to national averages
- Research the effects of livestock feed on waste issues
- Research the effects of various cover crops on

- erosion
- Sell radon detectors and collect samples
- Sell shop safety equipment door to door
- Start a leaf collection service in the fall and sell mulch in the spring
- Start a manure removal business for acreage owners
- Start a service to collect used pesticide containers
- Start a water sample collecting service
- Start a wood chipping service for people and/or sell the chips as mulch
- Take part in a mentorship program with the local soil and water conservation district
- Volunteer to monitor water quality for community pond
- Work as a trencher for waste water lagoons
- Work as a water quality lab assistant
- Work at a fishery monitoring water quality
- Work for a company that installs plastic drainage tile farm fields
- Work for a testing laboratory
- Work for the natural resource and conservation district

Natural Resources Systems Career Pathway

Employment in this pathway work to develop, maintain and manage forest and natural environment, develop and protect natural resources, and conservation of water and other natural resources.

Careers associated with Natural Resources Systems

Conservation Officer, Water Quality Manager, Forestry Scientists Fisheries Scientist, Wildlife Manager

Example SAEs associated with Natural Resources Systems

- Adopt a local stream to monitor water quality
- Assist a timber stand improvement specialist
- Assist Christmas tree farmers with planting and trimming
- Assist local city management with summer programs as a guide
- Bale and market pine straw
- Build bat, bird, duck, squirrel houses for use or sale
- Buy unusable lumber from builder's supply and building sites; grind up or chip for mulch to sell
- Clean and prune orchards
- Collect green pine cones (for seeds in the fall)
- Collect used Christmas trees and yard trimmings Grind, compost, bag and sale as organic fertilizer
- Collect water run-off from school parking lot and analyze for various pollution indicators
- Collect, mount, and identify insects found on school campus
- Collect/market natural supplies (pine cones, acorns, nuts, corn shucks, etc.) to sell to craft stores
- Conduct a research project on how to prevent deer damage to a home garden
- Conduct a water quality study on area lakes or streams
- Conduct endangered plant surveys for landowners
- Construct and sell game feeders
- Construct deer stands for sale. (Portable and stationary)
- Construct duck nesting boxes for sale to landowners
- Construct turtle traps for pond owners (Use this in conjunction with turtle farm as a source of breeding stock.)
- Container Pine Seedling Production
- Contract with a tree removal service to cut firewood and remove fallen trees
- Contract with landowners to plant food plots for wildlife
- Contract with local timber companies and landowners to maintain boundary lines by painting and chopping
- Create a brochure on creating wildlife habitat in backyards to share with community
- Create activities or laboratories for a natural resources class
- Create and sell soil survey maps for area farmers and land owners
- Cut and sell firewood provided free by national forests and state and local parks
- Cut fire wood and sell at local stores
- Cutting and/or marketing firewood
- Develop a backyard bird habitat
- Develop a backyard wildlife habitat
- Develop a forest/wildlife management plan for a

local landowner

- Develop a schoolyard wildlife habitat
- Develop and/or maintain a wildlife food plot on private or public land
- Develop and/or maintain wetland area on private or public land
- Develop habitat trails for walking or hiking
- Develop hunting ranges; set up indoor/outdoor ranges for bow competitions
- Discover the native plants for your ecological area and determine how prevalent they are currently
- Grow longleaf pine seedlings
- Habitat construction, make brush piles, plant wildlife habitat
- Maintain and supervise the school prairie or grounds
- Measure land for the local FSA office
- Measure timber on school forestry plot; determine volume and establish a management plan
- Monitor success rate of bluebird houses
- Operate a trapping business
- Organize and participate in a wildlife field day
- Plan and develop a school nature trail
- Plan and develop an outdoor classroom
- Plant a butterfly garden at school
- Process and deliver seedlings to elementary school students
- Provide a debris removal service along rivers and streams; sell driftwood and other items to consumers
- Provide a pond fertilization and testing service
- Provide a soil sampling service for farms and lawns
- Provide custom dove shoots or quail hunts
- Provide non-game wildlife management
- Provide outdoor education material at camps
- Purchase bulk pine bark from sawmill, bag and resale
- Purchase seedlings from GA Forestry Commission and pot and grow out to sell
- Raise Christmas trees and sell at Christmas time
- Raise fish for the state fish and game department
- Raise mallard or wood ducks for sale to pond owners
- Raise popular game birds; sell them for meat and as taxidermy products
- Raise wild game fowl for sale to local hunters
- Remove lightning strike trees (insect damaged, mechanical injuries) for landowners
- Research best practices for improving fish habitat in local ponds
- Research impact of using ATVs on public lands
- Research pines planted on tight spacing, water and fertilize, and compare with regular spaced planted pines
- Research the benefits of using GIS mapping for natural resources
- Research the effectiveness of habitat restoration projects in your community
- Research the impact of various insects on woodlot management
- Serve as hunting guide
- Soil conservation project on private or public land
- Start a bullfrog farm. (Sell fresh frog legs to local restaurants.)
- Start a custom forest herbicide application crew (Must have forest commercial pesticide license.)
- Start a fish fingerling nursery. (Catfish, trout, bream)
- Start a fish pond and teach small children and adults to fish
- Start a forest tree planting business
- Start an ornamental tree care service
- Start a Red Cockaded Woodpecker relocation service
- Start a rock store; sell for landscaping purposes. (Gravel, pebbles, stones)
- Start a small Christmas tree plot
- Start a wildlife food plot and native plant enhancement business for local landowners and hunting clubs
- Start an equipment trailer fabrication business
- Stock and maintain fish populations in ponds
- Study effect of fertilizer run-off into a stream or pond
- Study effect of manure run-off into a stream or pond
- Study soil profiles from multiple locations in your community and develop a soil map
- Study the effects of excessive lawn chemicals on wildlife
- Trap nuisance animals
- Volunteer to assist at campgrounds with cleanup and maintenance
- Woodlot management and improvement including firewood, habitat, etc.
- Work at a bait shop
- Work at a saw mill

- Work for a landowner to plant habitat for wild game
- Work for a nature center
- Work for a park service during the summer
- Work for parks and recreation in maintenance
- Work for the fish and game department
- Work in the logging business

Biotechnology Career Pathway

Employment in this pathway allows you to unleash your inner scientist utilizing biotechnology in agriculture to enhance plants, animals, and microorganisms. Professionals in this field often have a strong interest and background in how science can modify an organism's genetic composition, also known as genetic engineering. Biotechnology assists in making plants more nutritious to eat while enabling fish to grow twice as fast. They even use biotechnology to solve global problems.

Careers associated with Biotechnology Systems

Geneticist, Microbiologists, Biochemist, Lab Technician, Animal Scientists, Plant Scientist

Example SAEs associated with Biotechnology systems

- Analyze the impact major regulatory issues have on public acceptance of biotechnology in agriculture
- Analyze the implications of biotech, laws and public perceptions on biotechnology applications in agriculture
- Apply biotechnology principles, techniques, and processes to enhance plant and animal care production
- Apply biotechnology techniques to enhance the production of food by using microorganisms and enzymes
- Conduct studies to evaluate treatment of a waste product using a genetically engineered organism
- Conduct studies to track the movement of transgenes in the environment
- Design a bioremediation project including plans to evaluate effectiveness of the effort
- Design a study to examine public perceptions of scientific arguments regarding biotechnology in agriculture
- Design and conduct experiments to evaluate an existing transgenic eukaryote
- Evaluate factors that influence gene expression
- Evaluate the biochemical properties of proteins to explain their function and predict potential uses
- Evaluate the impact of modified organisms on the natural environment
- Evaluate the scope and implications of regulatory agencies on biotechnology applications in agriculture
- Examine and perform scientific procedures using microbes, DNA, RNA and proteins in a laboratory
- Examine and synthesize the need for biofuels (cellulosic bioenergy, etc.).
- Implement standard operating procedures for safe handling of biological/chemical materials in a lab
- Investigate the relationship between past, current and emerging applications of biotechnology in agriculture
- Monitor and evaluate processes used in the synthesis of a molecule
- Operate advanced laboratory equipment and measurement devices
- Perform ongoing maintenance of laboratory equipment according to standard operating procedures
- Perform plant - breeding techniques (plant tissue culture, etc.)
- Perform sterilization techniques for equipment in a laboratory using standard operating procedures
- Produce alcohol/biodiesel/methane and co-products from biomass
- Research and categorize the types of pharmaceuticals developed for animals and humans through biotechnology
- Research factors and data regulatory agencies use to evaluate the risks new biotechnology applications pose
- Study the technologies used to create biofuels from biomass and weigh the pros/cons of each method
- Transform plant or animal cells by performing a cellular transformation
- Use antibodies to detect and quantify antigens by conducting an Enzyme-Linked Immunosorbent Assay (ELISA)