AGRISCIENCE RESEARCH SAE PROGRAM

GOALS & OBJECTIVES

- The National FFA Agriscience Research SAE Program recognizes student researchers studying the application of agricultural scientific principles and emerging technologies in agricultural enterprises.
- The Agriscience Research SAE program is for middle and high school students. Participation begins at the local level and progresses to state and national levels.

RESEARCH SAE QUALITY INDICATORS

- The student:
  - Engages in identifying an ongoing program of research following an approved **Supervised Agricultural Experience (SAE) Research 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
  - Delivers a summary to a local committee organized by the agricultural education instructor

DEVELOPING A RESEARCH SAE

- Developing a quality agriscience SAE includes and requires:
  - Focusing on an important agricultural issue, question or principle.
  - Specific research objectives
  - Using a number of steps
  - Following a scientific process to collect and analyze data
  - Student commitment to a moderate or substantial amount of time
  - Teacher supervision

TYPES OF RESEARCH SAES

- An **EXPERIMENTAL RESEARCH 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 the research**, **collect the data**, **draw conclusions** from the data and **recommend** further research that can be done.
- 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. You will conduct an analysis of data, facts and other information to determine the answer to the question posed.
- 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 a design process of **prototyping** and testing that results in a product that meets the identified need.

PROJECT PROCESS

- Identify research topics of interest
- Draft questions to research
- Identify the variables and question you want to research
- Choose the variation of Research SAE that fits your question
- Identify intended outcomes
- Complete the required documentation

CONDUCTING RESEARCH; PRESENTING FINDINGS

- Research
  - Primary research
    - Interviews
    - Exploratory experiments
    - Surveys
  - Secondary research
    - Books
    - Journals/newspapers
    - Internet
    - Peer-reviewed articles
  - Reporting results
    - Charts
    - Graphs

WRITTEN REPORT

- Type
- Abstract
- Introduction
- Literature Review
- Materials and Methods
- Results
- Discussion and Conclusion
- Acknowledgements
- References
- APA Style/Spelling

PATHWAYS

- Animal Systems (AS)

The study of animal systems, including life processes, health, nutrition, genetics, management and processing, through the study of small animals, aquaculture, livestock, dairy, horses and/or poultry.

Examples

- Compare nutrient levels on animal growth
- Research new disease control mechanisms
- Effects of estrous synchronization on ovulation
- Compare effects of thawing temperatures on livestock semen
- Effects of growth hormone on meat/milk production

PATHWAYS

• Environmental Services/Natural Resource Systems (ENR)

Environmental Service Systems: The study of systems, instruments and technology used to monitor and minimize the impact of human activity on environmental systems.

Natural Resource Systems: The study of the management, protection, enhancement and improvement of soil, water, wildlife, forests and air as natural resources.

ENR research involves only non-invasive and non-intrusive methods that do not negatively affect a vertebrate animal's health or well-being. Studies that are designed or anticipated to cause vertebrate animal death are prohibited.

Examples

- Effect of agricultural chemicals on water quality
- Effects of cropping practices on wildlife populations
- Compare water movements through different soil types

PATHWAYS

- Food Products and Processing Systems (FPP)

The study of product development, quality assurance, food safety, production, regulation and compliance and food service within the food science industry.

Examples

- Effects of packaging techniques on food spoilage rates
- Resistance of organic fruits to common diseases
- Determining if varieties of sweet corn have different chemical energy
- Control of molds on bakery products
- Effects of the amount of sucrose used in baked goods
- Use of a triangle test in sensory science

PATHWAYS

- Plant Systems (PS)

The study of plant life cycles, classifications, functions, structures, reproduction, media and nutrients, as well as growth and cultural practices, through the study of crops, turf grass, trees and shrubs and/or ornamental plants.

Examples

- Compare the rates of transpiration of plants in different locations in a landscape
- Effects of heavy metals such as cadmium on the growth rate of plants
- Compare GMO and conventional seed/plant growth under various conditions
- Effects of lunar climate and soil condition on plant growth
- Compare plant growth of hydroponics and conventional methods

PATHWAYS

- Power, Structural and Technical Systems (PST)

The study of agricultural equipment, power systems, alternative fuel sources and precision technology, as well as woodworking, metalworking, welding and project planning for agricultural structures.

Examples

- Compare the energy output of alternative fuel sources to traditional forms
- Create minimum energy use structures
- Compare properties of various alternative insulation products
- Examining the efficiency, the configurations of ventilation systems in a swine facility

PATHWAYS

- Social Science (SS)

The study of agricultural areas including agricultural education, agribusiness, agricultural communication, agricultural leadership and sales in agriculture, food and natural resources.

Examples

- Investigate perceptions of community members toward alternative agricultural practices
- Determine the impact of local/state/national safety programs upon accident rates in agricultural/natural resource occupations
- Comparison of profitability of various agricultural/natural resource practices
- Investigate the impact of significant historical figures on a local community
- Determine the economic effects of local/state/national legislation impacting agricultural/natural resources
- Consumer confidence and understanding of food labels
- Economic effect of employment rate and meat consumption

DIVISIONS

The National FFA Constitution provides flexibility to meet the needs of all students. Competition is open to all FFA members in grades 7–12. There are six divisions:

1. Experimental Research SAE (7-9 grades)
2. Experimental Research SAE (10-12 grades)
3. Analytical Research SAE (7-9 grades)
4. Analytical Research SAE (10-12 grades)
5. Invention Research SAE (7-9 grades)
6. Invention Research SAE (10-12 grades)

Grade is determined by the grade level of the member at the time of qualification at the state level.

STATE PARTICIPATION

- The state advisor or state FFA officials must certify that participants are eligible. If an ineligible student participates in the Agriscience Research SAE Program, the member will be disqualified.
- Members must qualify at the state level in the pathway and division in which they are to participate at the national level.
- Applications must be selected at a state or interstate Agriscience Research SAE Program held between the immediate previous national FFA convention and prior to the national FFA convention in which they are participating.
- States should conduct a qualifying competition
- States may enter one project in each of the 36 areas

PROFESSIONAL INTEGRITY

FFA members participating in national FFA programs and events understand and agree that all work must result from their own effort and ability, created, and completed alone (except for partner or chapter applications). When outside sources (direct quotes or phrases, specific dates, figures, or other materials) are used for a project, document, or application, the required reference citation must be completed according to the rules specified by the applicable handbook.

While participating in National FFA programs, FFA members are prohibited from:

- Plagiarizing
- Violating copyright
- Cheating
- Falsifying information
- Using another person's results or thoughts as their own, even with this person's permission. This includes work done by a family member or a mentor.
- Using information or data obtained from the internet without proper citation.

Any attempt to gain an unfair advantage will not be tolerated. Non-compliance represents plagiarism and will automatically disqualify a member.

USE OF ARTIFICIAL INTELLIGENCE (AI)

Artificial intelligence (AI) refers to computer systems capable of performing complex tasks that historically only a human could do, such as reasoning, making decisions, or solving problems. As AI continues to evolve, it can be a tremendous tool to help companies, organizations and individuals enhance their productivity and work. Therefore, the National FFA Organization allows the use of AI tools. FFA members may use AI tools, such as ChatGPT, Gemini, and CoPilot, to assist them in their learning.

Appropriate uses of AI may include:

- generating ideas for any FFA-related assignments, projects, contests and award applications
- checking facts of a phenomenon
- checking for and correcting grammatical errors in a paper written by a member

For more information, please see the Standard Operating Procedures on the Use of Artificial Intelligence (AI) for National Events document

ADDITIONAL RESOURCES FOR RESEARCH SAES

- SAE For ALL – Immersion SAE – Research
- Contact the Agriscience Research SAE Program Specialist – agriscience@ffa.org