

Introduction to Agricultural Sciences

Primary Career Cluster:	Agriculture, Food, & Natural Resources
Consultant:	CTE.Standards@tn.gov
Course Code(s):	C18X00
Prerequisite(s):	None
Credit:	½ - 1
Grade Level:	6-8
Graduation Requirements:	This course does not satisfy credit attainment for concentrator status, because it is not part of an approved program of study.
Programs of Study and Sequence:	This course serves as a middle school primer for all programs of study in the Agriculture, Food, & Natural Resources career cluster.
Aligned Student Organization(s):	FFA: http://www.tnffa.org
Coordinating Work-Based Learning:	All Agriculture students are encouraged to participate in a Supervised Agricultural Experience (SAE) program. In addition, teachers who hold an active WBL certificate may offer placement for credit when the requirements of the state board's WBL Framework and the Department's WBL Policy Guide are met. For information, visit https://www.tn.gov/education/educators/career-and-technical-education/work-based-learning.html .
Available Student Industry Certifications:	None
Teacher Endorsement(s):	048, 150, 448, and 950
Required Teacher Certifications/Training:	None
Teacher Resources:	https://www.tn.gov/education/educators/career-and-technical-education/career-clusters/cte-cluster-agriculture-food-natural-resources.html Best for All Central https://bestforall.tnedu.gov/

Course at a Glance

CTE courses provide students with an opportunity to develop specific academic, technical, and 21st century skills necessary to be successful in career and in life. In pursuit of ensuring every student in Tennessee achieves this level of success, we begin with rigorous course standards which feed into intentionally designed programs of study.

Students engage in industry-relevant content through general education integration and experiences such as career and technical student organizations (CTSO) and work-based learning (WBL). Through these experiences, students are immersed with industry-standard content and technology, solve industry-based problems, meaningfully interact with industry professionals, and use/produce industry specific, informational texts.

Using a Career and Technical Student Organization (CTSO) in Your Classroom

CTSOs are a great resource to put classroom learning into real-life experiences for your students through classroom, regional, state, and national competitions, and leadership opportunities. Below are CTSO connections for this course, note this is not an exhaustive list.

- Participate in CTSO Fall Leadership Conference to engage with peers by demonstrating logical thought processes and developing specific industry-specific skills that involve teamwork and project management.
- Participate in FFA career and leadership events (CDE/LDE) that align with this course including but not limited to Agriscience Fair, Agricultural Communications, Agricultural Issues, Conduct of Meetings, Creed Speaking, Dairy Cattle handlers, Employment Skills, Public Speaking, and Extemporaneous Speaking.

Using Work-Based Learning (WBL) in Your Classroom

Sustained and coordinated activities that relate to the course content are the key to successful work-based learning. Possible activities for this course include the following. This is not an exhaustive list.

- **Standards 1.1-3.1** | Invite an industry representative as a guest speaker to discuss the history and impacts made because of the agriculture industry.
- **Standard 5.1-11.1** | Interview or job shadow local agricultural professionals to determine career opportunities and skills needed to secure employment.
- **Standard 11.2** | Have students do a project that is supervised or evaluated by an agricultural engineer, agricultural technician, or qualified technician.

Course Description

Introduction to Agricultural Sciences is a middle school course designed to assist students in making informed decisions regarding their future academic and occupational goals, and to provide information about careers in the agriculture, food, and natural resource career cluster. This course helps students understand the importance of agriculture in daily life by exploring basic principles of agribusiness, agricultural mechanics, animal science, natural resources, and horticulture systems. Depending on LEA capacity and preference, the course may be tailored for sixth, seventh, and eighth grades, with the additional option for flexible implementation schedules. Upon completion of this course, proficient students will be prepared for high school coursework in agriculture.

Course Standards

1. Agricultural Science Impact and Trends

- 1.1 Three Components: Illustrate and describe the **three components of the total agricultural education program** (e.g., classroom instruction, FFA, and Supervised Agricultural Experience).*
- 1.2 Impact: Describe and discuss how **agriculture provides the basic human needs and their impact** on Tennessee's economy and workforce.*
- 1.3 Commodities: Identify the **top ten agricultural commodities in Tennessee** and summarize their importance to Tennessee's economy.

2. Agricultural Science Employment Skill and Requirements

- 2.1 Career Exploration: Complete a **career awareness interest survey** such as AgExploror to identify your top career focus areas. Identify the educational, work experience, and skills needed for the top three occupations in each focus area.*
- 2.2 Employability Skills: Identify three possible Supervised Agricultural Experience (SAE) programs aligned to the **student's top three occupations**. Discuss a possible plan for the student to become **employable in each identified occupation**.*
- 2.3 Business and Skill Attainment: Create, implement, and maintain **business and skill attainment records** for a SAE related to the student's career goals and needs.

3. Agriscience Investigation

- 3.1 Scientific Investigation: Conduct a Agriscience Fair project, either building on an existing project or designing a new project, using the **scientific investigation process aligned to one of the following categories**:*
 - a. animal systems;
 - b. environmental and natural resource systems;
 - c. food products and processing systems;
 - d. plant systems;
 - e. power, structural and technical systems; and

f. social science.

Your project should include a written report using the FFA Agriscience Fair template suggested for divisions 1-2.*

4. Safety

4.1 Safety: Accurately **read and interpret safety rules**. Identify and explain the intended use of safety equipment available in the classroom. Demonstrate the ability to pass a safety test at 100 percent accuracy on all lab equipment.*

5. Agribusiness

5.1 Fundamental Agribusiness Skills: Discuss and demonstrate the **fundamental agribusiness skills**, including but not limited to:

- a. leadership roles,
- b. organizational structures,
- c. efficient teamworking skills,
- d. types of communication,
- e. recordkeeping processes and reports,
- f. basic public speaking skills.*

5.2 Parliamentary Procedure: Identify and demonstrate **basic parliamentary procedure skills** needed to conduct a business meeting.

6. Introduction to Veterinary and Animal Science

6.1 Health and Restraints: Identify the **signs and symptoms of good animal health**. Explain or demonstrate the **proper restraint methods** used for basic animal care.*

6.2 Animal Systems: Distinguish between the functions of the **components of the digestive, reproductive, and other major systems of animals**.*

6.3 Feed Rations: Create a **feed ration for livestock or companion animals** based on the animal's stage of life.

6.4 Animal Evaluation: **Evaluate livestock or companion animals** based on the breeds confirmation standards. Provide either written or oral justification for the evaluation.

7. Introduction to Environmental and Natural Resources Systems

7.1 Industry Aspects: Compare and contrast the **aspects of the forestry and natural industry** including but not limited to best management practice.*

7.2 Forestry: Explain various **forest management practices** including but not limited to prescribed burns, wildfires, clear cut, thinning, and reforestation.*

7.3 Soils: Explore the basic principles of soil science by analyzing **soil structure and formations, and research common soil conservation solution methods**.*

7.4 Dendrology: Summarize the **basic principles of dendrology** including the parts of a tree, treetops, and physiological processes of tree growth.

8. Introduction to Horticulture and Plant Science

8.1 Plant Propagation: Create new plants through **asexual and sexual propagation techniques**.*

8.2 Environmental Conditions: Summarize **environmental conditions** for plant growth (e.g., light, air, water, and soil).*

8.3 Plant Uses: Describe the general characteristics of **common plants** used in food production, greenhouse, landscaping, and turfgrass applications.*

8.4 Aquaculture and Hydroponics: Research the **general principles of aquaculture and hydroponics** to explain their contribution in sustainable agriculture practices for future generations.

9. Food Science

9.1 Food-Born Bacteria: Research and identify the most recent **food-borne bacteria outbreaks** in the United States and identify their associated pathogen, foods associated, their method of transportation, and their living conditions.*

9.2 Conditions for Bacterial Growth: Identify and discuss the conditions that are favorable for **bacterial growth** in food.*

9.3 Enzyme: Define **enzyme** and research examples of their **role in food processing and food quality**.

10. Agriculture Supply Value Chain

10.1 Career Opportunities: Compare and contrast **local and regional career opportunities** in the agriculture supply value chain using local job postings and Tennessee labor and workforce data.*

10.2 Agriculture Supply Value Chain: Explain the **importance of the agriculture supply value chain**. Select an agriculture by-product and research where or how it is produced or manufactured. Compare and contrast the steps necessary to transport the product to a supermarket versus a local farmer's market. Identify the aspects of science, technology, engineering, and math involved in this process.*

11. Introduction to Agricultural Mechanical Systems

- 11.1 Mechanical Practices: Demonstrate a conceptual understanding of the following **current practices in agricultural mechanics systems**:
- functions of basic hand and power tools;
 - demonstrate the safe use and maintenance of basic hand and power tools, including passing a safety test at 100 percent accuracy;
 - describe common building methods and materials used in the agricultural industry; and
 - appropriately apply unit conversions and calculate acreage, length, and volumes.*
- 11.2 Projects: Plan and construct a **basic agricultural mechanics project** utilizing a bill of materials.

Implementation Notes

*Marked areas to be taught in a single grade level nine-week rotation format.

Standards Alignment Notes

References to other standards include:

- SAE for All: [Evolving the Essentials](#): All Agriculture students are encouraged to participate in a Supervised Agricultural Experience (SAE) program to practice and demonstrate the knowledge and skills learned in their agriculture courses.
- AFNR: [National Agriculture, Food, & Natural Resources \(AFNR\) Career Cluster Content Standards](#):
 - Note: While not directly aligned to one specific standard, students engaged in activities outlined above should be able to demonstrate fluency in Standards AS.01 and PS.01 at the conclusion of the course.
- P21: Partnership for 21st Century Skills [Framework for 21st Century Learning](#)
 - Note: While not all standards are specifically aligned, teachers will find the framework helpful for setting expectations for student behavior in their classroom and practicing specific career readiness skills.