

# Exploring Agricultural Education

<b>Primary Career Cluster:</b>	Agriculture, Food, & Natural Resources
<b>Consultant:</b>	<a href="mailto:CTE.Standards@tn.gov">CTE.Standards@tn.gov</a>
<b>Course Code(s):</b>	C18X01
<b>Prerequisite(s):</b>	None
<b>Credit:</b>	N/A
<b>Grade Level:</b>	6-8
<b>Graduation Requirements:</b>	This course does not satisfy credit attainment for concentrator status, because it is not part of an approved program of study.
<b>Programs of Study and Sequence:</b>	This course serves as a middle school primer for all programs of study in the Agriculture, Food, & Natural Resources career cluster.
<b>Aligned Student Organization(s):</b>	FFA: <a href="http://www.tnffa.org">http://www.tnffa.org</a>
<b>Supervised Agricultural Experience:</b>	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 <a href="https://www.tn.gov/education/educators/career-and-technical-education/work-based-learning.html">https://www.tn.gov/education/educators/career-and-technical-education/work-based-learning.html</a> .
<b>Available Student Industry Certifications:</b>	None
<b>Teacher Endorsement(s):</b>	048, 150, 448, and 950
<b>Required Teacher Certifications/Training:</b>	None
<b>Teacher Resources:</b>	<a href="https://www.tn.gov/education/educators/career-and-technical-education/career-clusters/cte-cluster-agriculture-food-natural-resources.html">https://www.tn.gov/education/educators/career-and-technical-education/career-clusters/cte-cluster-agriculture-food-natural-resources.html</a>  Add "Best for All Central: <a href="https://bestforall.tnedu.gov/">https://bestforall.tnedu.gov/</a>

## 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 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, 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 1.1-1.3** | Invite an industry representative as a guest speaker to discuss the history and impacts made because of the agriculture industry.
- **Standard 4.1-4.2** | Interview local agricultural professionals to determine career opportunities and skills needed to secure employment.
- **Standard 5.1-12.1** | Job shadow virtually or in person an industry representative to focus on their roles and responsibilities.

## Course Description

*Exploring Agricultural Education* analyzes the different aspects of the agricultural industry. This course is designed to provide a general introduction to the diverse career opportunities in the agriculture, food, and natural resource industry. This course helps students understand the importance of agriculture in daily life by exploring basic principles of agribusiness, agricultural mechanics, animal science, natural resources, horticulture/plant science, technology, and supply chain.

## Course Standards

### 1. Definition and History of Agriculture

- 1.1 Define Agriculture: Research the term **agriculture** to develop a working definition.\*
- 1.2 Comprehensive Definition: Create a written report of all the areas of agriculture to condense your report into a **comprehensive definition of agriculture**.\*
- 1.3 History: Prepare a timeline of the **major events or milestones in the history of agriculture** in the world.\*

### 2. Agriscience Investigations Methods and Engineering Design Process

- 2.1 Science and Engineering Design: Using a Venn diagram to compare and contrast the **science method and engineering design process**.\*
- 2.2 Agriscience Fair Projects: Select, design, and conduct an **Agriscience Fair project using a science practice**. Your project should be 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.
- 2.3 Engineering Design Problems: Choose an **agriculture problem** that can be **solved using the engineering design process** (this can be a class project). Follow these steps:
  - a. identify the problem,
  - b. identify criteria and constraints,
  - c. brainstorm possible solutions,
  - d. generate ideas,
  - e. select an approach,
  - f. develop a model or prototype; test and evaluate, and
  - g. communicate your results.

Reflect on whether the solution solved the problem, as well as what improvements could be made to the solution.\*

### 3. Safety

- 3.1 Safety: Accurately **read and interpret safety rules**. Identify and explain the intended use of safety equipment available in the classroom. Demonstrate how to properly use and maintain power tools.\*

### 4. Career Opportunities

- 4.1 Careers: Research **career opportunities** in the following areas of agriculture:
- agribusiness,
  - agricultural mechanics,
  - animal science,
  - environmental and natural resources,
  - horticulture/plant science, and
  - food science.\*
- 4.2 Career Opportunities: Identify and research one **career opportunity and its related fields** through a Foundational SAE.

### 5. Agribusiness

- 5.1 Agribusiness Finance: Explain the purpose of a **balance sheet and income statement**. Explain the **concepts of assets, liabilities, and equity**. Distinguish between **current and non-current assets and liabilities**. Prepare an income statement for a real or fictitious agribusiness that includes sales, cost of sales, gross profit, operating expenses, and net income.\*
- 5.2 Communication: **Communicate effectively** through writing, speaking, and interpersonal abilities found within the agribusiness industry.

### 6. Animal Science

- 6.1 Animal Welfare and Rights: Describe the difference between **animal welfare and animal rights**.
- 6.2 Animal Care: Select a domestic animal and research its **needs to maintain a healthy and comfortable life**. Develop an annual plan of care and a list of owner responsibilities to properly care for the selected animal.\*
- 6.3 Anatomy: Demonstrate your understanding of **basic animal parts** by preparing a detailed diagram.\*
- 6.4 Digestive Systems: Explain the differences between the **four main digestive systems**: avian, monogastric, ruminant, and pseudo-ruminant.

## 7. Environmental and Natural Resources Systems

- 7.1 Forest Regions: Identify the **major forest regions of the United States and Tennessee**.\*
- 7.2 Importance: Describe the **importance of forest and forestry products**.\*
- 7.3 Climate: Research the case for and against **climate change**, choose a position and present your argument in a presentation. Include the availability and sustainability of renewable and non-renewable resources.
- 7.4 Agricultural Impacts: Select an **agricultural activity that impacts the environment** and research the current practices used to minimize that impact.
- 7.5 Biogeochemical Cycles: Demonstrate your understanding of the **major biogeochemical cycles** by preparing detailed diagrams of the following:
- water cycle,
  - carbon cycle, and
  - nitrogen cycle.

## 8. Horticulture and Plant Science

- 8.1 Photosynthesis: Explain the **process of photosynthesis** and the interdependence between producers, consumers, and decomposers.\*
- 8.2 Plant Anatomy: Demonstrate your understanding of **basic plant parts** by preparing a detailed diagram.\*
- 8.3 Pesticides: Identify the recommended **uses and safety precautions from a pesticide label**.
- 8.4 Soils: Describe the **major components of soil**.\*
- 8.5 Plant Reproduction: Select a **plant that can be grown from seed** and plant it in the classroom, or in a raised bed or container.
- 8.6 Horticulture Industry: Demonstrate knowledge of the **three main areas of the horticulture industry**: ornamental horticulture, olericulture, and pomology.
- 8.7 Interpret Weather Maps: Identify the major symbols on a traditional weather map. Research how weather data is collected and used to **forecast weather**. Discuss how this information is used by farmers and agriculturalists.

## 9. Technology in Agriculture

- 9.1 Technology In Agriculture: Research recent **technological advances in agriculture**. Select one technological advance and prepare a presentation that includes how it was developed, how it benefited society, and how the role of science, technology, engineering, and math was used in its development.\*

## 10. Agricultural Mechanics and Power

- 10.1 Mechanics and Power: Select a common **mechanical device available in both gas-powered and electric models** (e.g., lawn mower) and list and explain the advantages and disadvantages of each.\*

## 11. Agricultural Construction

- 11.1 Bill of Materials: Design a simple farm building such as a shed using common materials (2x4s, plywood sheets, metal roofing). Use the following framing terminology: headers, double top plates, studs every 16" on center, king studs, cripple studs, etc. Prepare a **material list and an estimated bill of materials**. Identify the aspects of science, technology, engineering, and math involved in this process.

## 12. Transportation

- 12.1 Agricultural Supply Value Chain: Explain the importance of **transportation and distribution in agriculture**. Select a food product and research where it is grown or raised. 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.\*

## Implementation Notes

\*Marked areas to be taught in a nine-week rotation format.

## Standards Alignment Notes

References to other standards include:

- SAE: [Supervised Agricultural Experience](#): All Agriculture students are encouraged to participate in a Supervised Agricultural Experience 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 the 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.