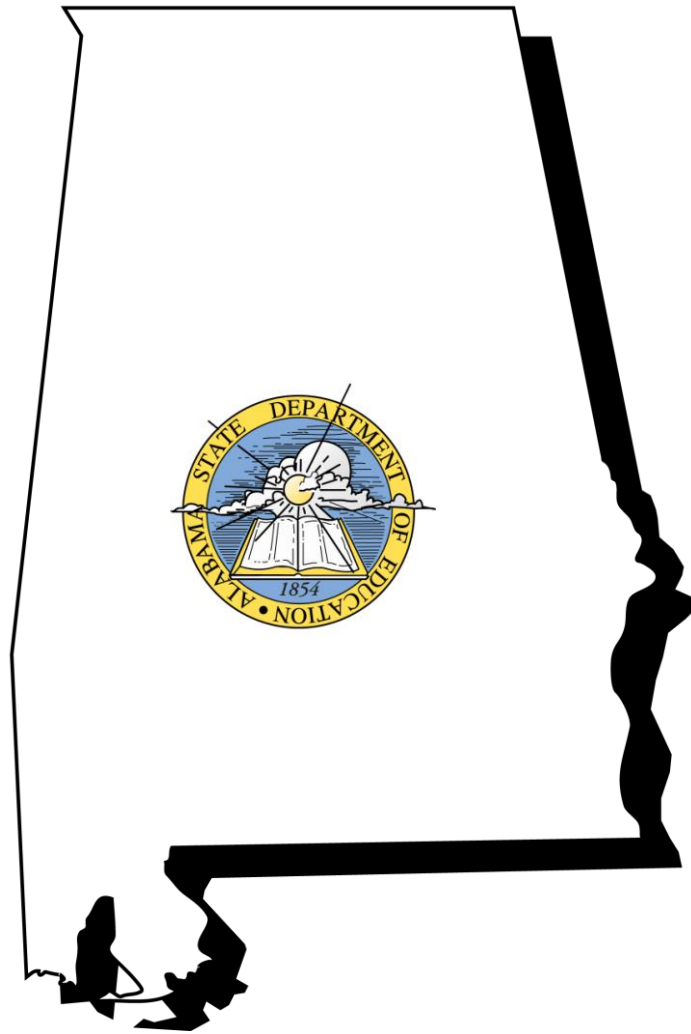


Alabama Course of Study Career and Technical Education



Joseph B. Morton
State Superintendent of Education
ALABAMA DEPARTMENT OF EDUCATION

STATE SUPERINTENDENT OF EDUCATION'S MESSAGE

Dear Educator:

The *Alabama Course of Study: Career and Technical Education* presents a sound curriculum designed to prepare students for the career and technical education demands of the future in both the workplace and in the postsecondary education setting. Local school system teachers and administrators will find this document to contain a challenging set of standards for students at each grade level and career interest. I encourage each system to use the document to develop local curriculum guides to determine how local school students will achieve these standards and perhaps go beyond them.

Local system leadership, school leadership, and effective classroom instruction are instrumental in students' success. Important local decisions include **how** students will accomplish these standards, in **what sequence** teachers will address them, and **how much time** will be allotted for instruction of the standards. These decisions are as significant as the identification of **what** students need to know and be able to do.

I heartily endorse the curriculum goal of career empowerment through knowledge and skills. To help students meet current demands, reading, writing, research, mathematical, and critical-thinking skills are emphasized throughout this document in all curriculum areas.

JOSEPH B. MORTON
State Superintendent of Education

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PREFACE

The 2008 *Alabama Course of Study: Career and Technical Education* provides the framework for the Grades 7-12 study of career and technical education in Alabama's public schools. Content standards in this document are minimum and required (*Code of Alabama*, 1975 §16-35-4), fundamental and specific, but not exhaustive. Courses are organized by clusters, which are aligned with national standards. When developing local curriculum, school systems may include additional content standards to reflect local philosophies and needs and add implementation guidelines, resources, and activities.

In developing the minimum required content, the 2007-2008 Career and Technical Education Course of Study Committee and Task Forces made extensive use of the *Alabama Course of Study: Career/Technical Education* (Bulletin 2002, No. 20) as well as national standards documents and certification standards.

In addition, Committee and Task Forces members reviewed information found in professional journals, Internet Web sites, and similar documents from other states. The Committee and Task Forces attended state and national conferences, listened to and read suggestions from interested individuals and groups throughout Alabama, considered suggestions from independent reviewers, sought the advice of advisory councils, and discussed each issue and standard among themselves. Finally, the Committee reached unanimous agreement that the standards contained herein provide a sound and challenging career and technical education curriculum for Alabama's students.

Acknowledgments

This document was developed by the 2007-2008 Career and Technical Education Course of Study Committee and Task Forces composed of middle school, high school, and college educators appointed by the State Board of Education and business and professional persons appointed by the Governor (*Code of Alabama*, 1975, §16-35-1). The Committee and Task Forces began work in March 2007 and submitted the document to the State Board of Education for adoption at the March 2008 meeting.

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ALABAMA'S CAREER AND TECHNICAL EDUCATION CURRICULUM

General Introduction

Alabama's Career and Technical Education curriculum empowers students with the work-readiness skills necessary for success in the twenty-first century. Career-empowered students are productive citizens who are prepared with the knowledge and skills for postsecondary education or for employment. The career and technical education classroom provides an opportunity for all students to combine academics with other high-caliber learning experiences.

This course of study is intended for all students in Grades 7-12 in the general or comprehensive school setting and in specialized career and technical educational center settings. Within these settings, student learning is strongly encouraged by teachers who stimulate their interests and curiosities concerning the world around them. As students grow through adolescence into young adulthood, exposure to career preparedness becomes increasingly important. The Career and Technical Education curriculum focuses on providing students with the knowledge and skills that allow them to reinforce learning of academic content through experiential learning.

The content of this program is based on the sixteen career clusters identified by the United States Department of Education for providing a framework for arranging curriculum and instruction around groups of similar occupations. Within the clusters, separate content standards have been developed for fifty career pathways.

Alabama's Career and Technical Education program is designed to keep abreast of the rapid changes in business and industry by offering students a rigorous array of course work to help prepare them for advanced learning and a wide range of career opportunities. Rigor in the course of study is derived from two primary sources—**academic** and **industry-specific** workplace knowledge and skills. Rigor in the workplace is evidenced by the knowledge and skills required for students to achieve, maintain, and advance in employment in a particular pathway. The level of academic and workplace rigor is a function of the degree to which each career and technical education program prepares students for high-skill, high-wage, or high-demand careers. For select career opportunities, credentials and certifications have been established that validate the rigor of the curriculum to parents, students, and business and industry. In addition, articulation agreements in partnership with postsecondary institutions have been developed to allow for a seamless transition for students pursuing opportunities for continued education.

Alabama's growing economy has created the demand for an increased number of quality employees. The Career and Technical Education program of studies, through the implementation of this course of study, equips students with the life skills and knowledge necessary to meet this and other demands by preparing them for lifelong learning.

ALABAMA'S CAREER AND TECHNICAL EDUCATION CURRICULUM

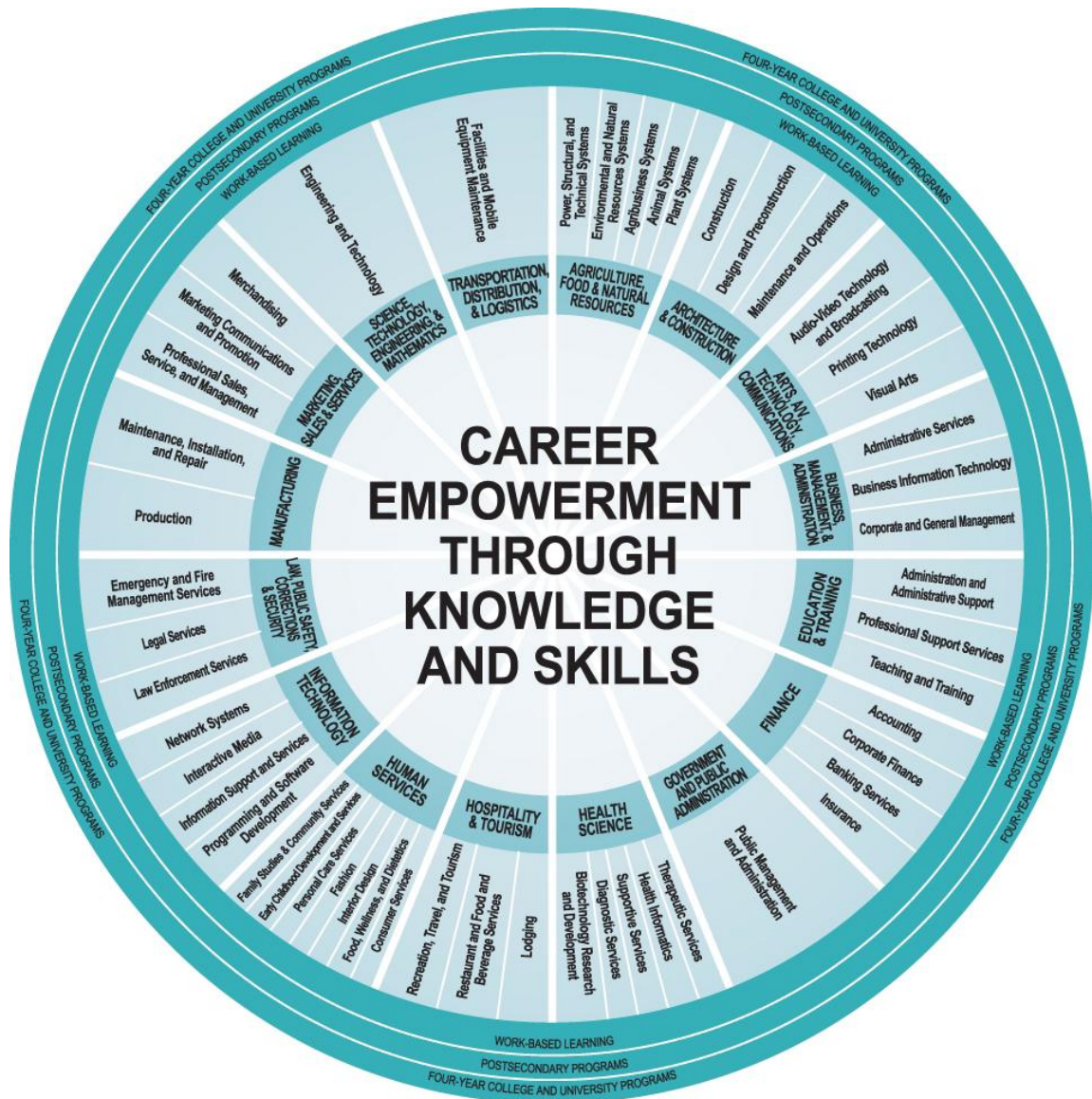
Conceptual Framework

Alabama's Career and Technical Education program is designed to empower students to meet the daily challenges of the twenty-first century with the work-readiness skills needed for success. This program provides a curriculum wherein students are actively engaged in learning through career-oriented activities.

A graphic representation of the program is shown on the conceptual framework graphic located on page 3 of this document. The framework, represented by a wheel with a hub in the center of the diagram, spokes that extend from the center outward, and three outer rings, depicts in broad terms the sequence of student learning opportunities for pursuing individual career objectives within the Career and Technical Education program.

The goal, *Career Empowerment Through Knowledge and Skills*, is common to all the clusters as represented by its prominent position on the hub of the wheel. The sixteen national career clusters, each of which contains a foundation course embedded with the essential knowledge and skills common to all career and technical education programs, encircle and form the outer rim of the hub. The fifty supported national career pathways are represented on the spokes of the wheel that radiate from the hub to the outer rings. These national career pathways supply a sequence of courses designed to provide students strong backgrounds in specific careers leading to work-based learning, four-year college and university programs, and other postsecondary programs as indicated on the three outer rings of the wheel. The Career and Technical Education curriculum, together with postsecondary and four-year college and university programs, empowers students to become competitive employees and productive citizens.

CAREER AND TECHNICAL EDUCATION



POSITION STATEMENTS

Classroom and Laboratory Environment

The effective career and technical education classroom is equipped with current and emerging technologies and other supplies and materials representative of the content area. In such a classroom, students and teachers utilize equipment to enhance a variety of classroom instruction and learning activities. The career and technical education classroom environment is unlimited and encompasses more than the traditional four walls of the classroom. Students and teachers have access to laboratory environments on and off campus that provide students with practical and real-world experiences in the industry represented.

Technology, Equipment, and Facilities

Adequate classroom equipment must be available, maintained, and upgraded according to a regularly scheduled plan. In addition, other classroom supplies and materials such as textbooks, reference materials, and software should be readily available for student use to support instruction, including access to classroom libraries, reading and research areas, and material centers. Maintaining up-to-date technology enhances students' learning environment as well as readies them for future career opportunities. Sufficient funds must be allocated to support the technology and materials necessary for a superior career and technical education program.

Safety

Student safety is a prime consideration in any location of the learning environment. A written safety plan is an essential part of planning, implementing, and evaluating each career and technical education program. An effective plan may include federal, state, local, school, and program guidelines. Students are required to pass a safety test with one-hundred per cent accuracy.

Professional Development

As technology and instructional methods continue to change, it is essential for teachers to take advantage of professional development and technical training opportunities to stay abreast of current trends and methods pertaining to their content area and the industry represented. Teachers who continually expand their knowledge and skills are able to adjust the learning environment to reflect current and emerging trends in teaching methods and learning styles. Regular assessment by students, educators, administrators, and business and industry also strengthens the instructional program and enhances professional development.

Administrative Support

Administrative support is essential in providing the necessary components for a successful career and technical education program. Administrators should recruit teachers who are highly qualified and who possess appropriate credentials for teaching positions. Time must be provided for professional development activities and for planning for integration of academic content areas into the Career and Technical Education program. Funding must be secured for professional development programs and for industry certification for teachers. In addition, administrators should actively participate in the marketing of the career and technical education programs within the school and within the community.

Instructional Model

In the career and technical education classroom, it is imperative that students apply knowledge, skills, and ideas to solve problems and make decisions. This course of study is designed to address the challenges of a changing, technological, diverse, and global society. Students develop their abilities to analyze, communicate, manage, and lead. The Career and Technical Education curriculum is one that is project-based, process-oriented, and work-based.

The rigorous content standards contained in this document require students to use innovative, critical-thinking skills. Utilization of this document requires teachers to identify the issue or concern addressed in a specific content standard and then to plan appropriate learning experiences. These experiences should be project-based and require higher-order thinking, communication, management, and leadership skills.

The Career and Technical Education curriculum emphasizes the integration of academics. To achieve the solution to a given problem, students must possess an adequate foundation in communication skills for reading, writing, speaking, listening, viewing, and presenting; knowledge and skills in mathematics, science, and social studies; and knowledge of current and emerging technologies.

Students' individual learning styles and interests require the use of various instructional strategies. Individual needs of students must be determined by a variety of assessments that evaluate interests, aptitudes, and abilities. Once individual needs have been determined for special populations, a support service program should be planned cooperatively with the career and technical education teacher and other appropriate personnel. Individual education plans are more effective when developed with career and technical education instructors. Courses and equipment may be tailored to ensure equal access to the full range of learning experiences and skill development in the Career and Technical Education curriculum.

Student Organizations

Nationally affiliated student organizations are an integral part of classroom instruction in each career and technical education program. The focus of these organizations is to help students develop an understanding of all aspects of industry and technology in the program areas while learning teamwork and leadership skills. Goals of student organizations include:

- Developing individual potential;
- Developing effective leadership and citizenship skills through social, economic, scholastic, and civic activities;
- Increasing knowledge and understanding of an ever-changing society;
- Assisting in the exploration of occupational choices;
- Participating in career development events; and
- Serving the school and community through student organization projects.

Business-Industry-School Relationships

Certification

Maintaining relationships with local businesses and industries is vital to the Career and Technical Education program certification process as well as to federal funding through the Carl D. Perkins legislation. Certain elements of Business and Industry Certification (BIC) require local industries to participate in the Career and Technical Education program's adoption of industry standards. Representatives from local businesses and industries interact with school programs to address the ever-changing needs of the competitive global economy. From this interaction, program structure is reviewed to ensure that needs are being met through lesson plans, instructional techniques, facilities, professional development, technical updates, and equipment.

Student Work Experience

As students begin to plan careers, it is essential to provide them with opportunities to visit, tour, and work at local industries and businesses. Real-world experiences such as cooperative education, internships, apprenticeships, and job shadowing are beneficial to enhance classroom learning. Continuous feedback from students and supervisors provides further assessment of the program and facilitates changes necessary to satisfy industry needs.

Advisory Councils and Partnerships

In accord with Alabama Department of Education guidelines, each career and technical education program has an advisory council that may provide opportunities to establish partnerships as a means for professional input regarding equipment needs, curriculum emphasis, technical updates, and problem solving. This external support is a necessary link to business and industry for the potential acquisition of equipment, resource materials, community support, and qualified speakers. These resources include judges for student career development events, program sponsors, financial support, scholarships, field trip sites, and other program needs.

Community Involvement and Service

There are many ways students and teachers become involved with community and service projects. Mentoring activities may include teacher-to-teacher, teacher-to-student, student-to-student, student-to-community resident, and community member-to-students-and-teacher. Local organizations such as community civic clubs, professional educational organizations, youth organizations, and community adult education organizations are valuable resources for career and technical education programs. Open houses, tours, and presentations provide families and other interested citizens with opportunities to become more involved in the education environment.

Postsecondary and Higher Education Articulation

Postsecondary and higher education articulation is a significant element in a student's career clusters. Secondary and postsecondary instructors must communicate on a regular basis to ensure a smooth transition for students and to ensure students are aware of articulation opportunities. Articulation may occur through program alignment with postsecondary programs, early college enrollment, or dual enrollment programs. Students benefit in a variety of ways when cooperation exists between secondary and postsecondary institutions. One of the benefits is the earning of postsecondary credit in conjunction with work done at the secondary level. Postsecondary teachers offer additional

benefits by serving as guest speakers, donating equipment, sharing expertise through professional development activities, and addressing other needs appropriate for the school community.

CAREER CLUSTERS, PATHWAYS, AND COURSE WORK

Alabama's Career and Technical Education program is representative of the national career and technical education model. The national model includes sixteen career clusters. Career clusters in Alabama's curriculum include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century. The sixteen clusters included in this document are:


- Agriculture, Food, and Natural Resources
- Architecture and Construction
- Arts, Audio-Video Technology, and Communications
- Business, Management, and Administration
- Education and Training
- Finance
- Government and Public Administration
- Health Science
- Hospitality and Tourism
- Human Services
- Information Technology
- Law, Public Safety, Corrections, and Security
- Manufacturing
- Marketing, Sales, and Service
- Science, Technology, Engineering, and Mathematics
- Transportation, Distribution, and Logistics

The following pages contain both a narrative and a chart for each of the sixteen career clusters contained in this document. Each narrative provides an overall description of the cluster. The chart that follows the narrative includes the name of the cluster, information regarding optional and foundation courses, pathways for the cluster, a list of all courses included in each cluster pathway, other related pathways, and cluster elective courses.

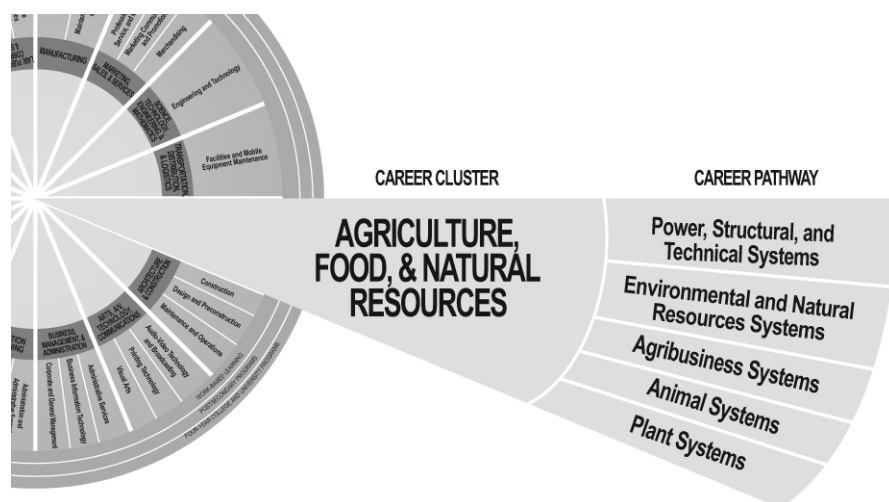
Cluster names are located at the bottom of each chart.* Optional courses for students who are beginning their orientation to career and technical education in middle school are listed immediately above the cluster name. These courses provide students with an overview of the clusters and pathways. Immediately above the optional courses are the foundation courses.

Each of the sixteen clusters is composed of one or more pathways that students may pursue within a cluster. Pathway names are found above the middle and junior high school courses in the charts. Listed within each column for the pathways are the courses that students may study in that pathway to achieve mastery in an industry sector. Three hundred courses have been developed to satisfy the pathways contained in this document. At the top of the chart are other related pathways and cluster electives. These are also grouped by pathways.

All career and technical education courses, including the required content for each course, are found on the pages following the career cluster narratives and charts. Courses in this document are listed in alphabetical order rather than grouped by pathway to avoid repetition of courses.

*Career cluster icons on pages 10-40 are used with permission by the  States' Career Clusters Initiative, 2008, (www.careerclusters.org).

AGRICULTURE, FOOD, AND NATURAL RESOURCES




In the Agriculture, Food, and Natural Resources cluster, pictured above, students choose one of five pathways—Power, Structural, and Technical Systems; Environmental and Natural Resources Systems; Agribusiness Systems; Animal Systems; or Plant Systems. Specific content standards describe what students should know and be able to do at the end of each course. Middle and junior high school courses are offered in Grades 7 and 8. The foundation course, Agriscience, may be offered to all ninth- through twelfth-grade students, although students are encouraged to take this course before entering a specific pathway.

Students in Grades 7-12 possess varying levels of maturity as well as an array of learning styles. Their backgrounds include diverse family structures and varying social and emotional environments. Throughout these grades, students are adjusting to personal, physical, and emotional changes as well as to social changes taking place in the world around them. Students who select a pathway in the Agriculture, Food, and Natural Resources cluster are interested in the planning, implementation, production, management, or marketing of agriculture, food, and natural resources.

Instruction in the Agriculture, Food, and Natural Resources cluster provides students with the essential knowledge, high-level skills, and training demanded for work in this cluster. Learning activities simulate types of work environments students may encounter, which include opportunities to gain knowledge and skills through coordinated workplace learning experiences such as on-site visits and work shadowing. The classroom and laboratory for this cluster provide a safe and appropriate setting for active, structured, and stimulating student learning and assessment.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth..

Cluster Electives	<ul style="list-style-type: none"> Workforce Essentials Entrepreneurship Personal Finance Senior Career Pathway Project Cooperative Education Seminar 				
Supporting Pathways	<ul style="list-style-type: none"> Construction Design and Preconstruction Engineering and Technology Facilities and Mobile Equipment Maintenance 		<ul style="list-style-type: none"> Marketing Communication and Promotion Professional Sales, Service, and Management Merchandising 		<ul style="list-style-type: none"> Design and Preconstruction
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> Two- and Four-Stroke Engines Power Equipment Technology Construction Site Preparation and Foundation Construction Framing Construction Finishing and Interior Systems Introduction to Metal Fabrication Introduction to Metal Inert Gas and Flux Cored Arc Welding Residential and Commercial Power Equipment Safety and Health Regulations Residential Wiring Introduction to Drafting Design Introduction to Masonry 	<ul style="list-style-type: none"> Forestry Urban Forestry Forestry Equipment Fish and Wildlife Management Environmental Management 	<ul style="list-style-type: none"> Agribusiness Technology Agribusiness Marketing Agricultural Communications Agribusiness Management 	<ul style="list-style-type: none"> Animal Biotechnology Aqua Experience Aquaculture Science Aquatic Biology Equine Science Poultry Science Introduction to Veterinary Science Veterinary Science Animal Science 	<ul style="list-style-type: none"> Plant Biotechnology Greenhouse Production and Management Creative Floral Design Horticultural Science Sports Turfgrass Production and Management Specialty Floral Design and Management Floral Design and Interiorscaping Landscape Design and Management Residential Landscape Establishment and Maintenance Nursery Production and Management Introduction to Drafting Design
Foundation Course: Agriscience					
Pathways	Power, Structure, and Technical Systems	Environmental and Natural Resources Systems	Agribusiness Systems	Animal Systems	Plant Systems
Middle and Junior High School Optional Courses: Introduction to Agriscience, Agriscience Exploration					
Middle and Junior High School Exploration Optional Course: Career Cluster Explorations					
			Cluster Course Offerings Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.		

Directions for Interpreting the Minimum Required Content

1. **CONTENT STANDARDS** are statements that define what students should know and be able to do at the conclusion of a course or grade. Content standards in this document contain minimum required content. The order in which standards are listed within a course or grade is not intended to convey a sequence for instruction. Each content standard completes the phrase “*Students will.*”

Students will:

Analyze an engine block for wear and damage to determine corrective action.

(Diesel Engines I – Content Standard 4)

2. **BULLETS** denote content that is related to the standards and required for instruction. Bulleted content is listed under a standard and identifies additional minimum required content.

Students will:

Determine the impact of revenue and expenses on net income and loss.

- Analyzing inflation rates to determine how they affect interest rates

(Business Finance – Content Standard 13)

3. **EXAMPLES** clarify certain components of content standards or bullets. They are illustrative but not exhaustive.

Students will:

Explain shop operations involved in managing a floriculture business.

Examples: conducting sales and service, creating advertising and promotional displays, designing facilities, maintaining equipment

(Specialty Floral Design and Management – Content Standard 7)

Advanced Fisheries Technology

This is a one-credit course that provides students an in-depth study of modern commercial fisheries throughout the United States and the world. Topics studied in the course include the use of modern harvesting techniques and equipment, shore-side processing facilities, and vessel-to-retail processes. Students also study the import and export of seafood, the effect of commercial fishing on the economy, and rules and regulations involved with each fishery. Introduction to Fisheries Technology is a prerequisite for this course.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Commercial Species

Students will:

1. Demonstrate fishery technology, including licensure, harvesting, and processing of various commercial fish species.
Examples: tuna, lobster, crab, shellfish
2. Compare different commercially important inshore and offshore fish species.
Examples: redfish, tarpon, snapper, grouper, wahoo
3. Explain components of a marketing plan for the charter and recreational fishing industry.

Charter and Recreational Fishing for Game Fish

4. Explain characteristics of charter and recreational fishing, including licensing requirements for game fish.
5. Interpret state and federal rules and regulations associated with the aquaculture industry.

Aquaculture

6. Compare fisheries technology to aquaculture, including fishery operation, importing and exporting, and licensure requirements.

Agribusiness Management

Agribusiness Management is a course that provides students with a basis for making effective decisions, setting goals, assessing and solving problems, appraising financial progress and success, evaluating the management of resources, and gaining skills useful in the agricultural industry. Students also evaluate national and international policies, regulations, and values that affect the production and trade of agricultural commodities. Topics include career opportunities, safety, principles of agribusiness economics, financial management, marketing agricultural products, business regulations, and entrepreneurship.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

Agribusiness Management may be offered as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 8, 11, and 14 must be included.

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Career Opportunities

Students will:

1. Identify career opportunities in agribusiness management.
 - Identifying employer expectations, work habits, and interpersonal skills necessary for careers in agribusiness management

Safety

2. Describe occupational safety practices in agribusiness management.

Principles of Agribusiness and Economics

3. Describe agribusiness partnerships and corporations.
 - Describing agribusiness management techniques
Examples: planning, organizing, directing, coordinating
4. Describe the law of supply and demand as related to the agricultural industry.
 - Evaluating effects of monetary, fiscal, and international policies on the agricultural industry

5. Describe various techniques for measuring the performance of an agribusiness.

Financial Management

6. Differentiate among methods of depreciating capital goods.
Examples: straight line, sum-of-year digits
7. Compare types of accounting systems used in agribusiness.
8. Identify sources for obtaining agribusiness loans.
 - Describing procedures for obtaining an agribusiness loan

Marketing Agricultural Products

9. Compare various market venues for agricultural products.
10. Explain ways the law of comparative advantage affects the agribusiness industry.
11. Identify ways technology is used in agribusiness marketing.
Examples: Web sites, mass e-mail, Web page advertising

Business Regulations and Compliance

12. Explain the impact of government policies and regulations on agribusiness management decisions.
 - Examining benefits of participating in government programs that supplement agricultural production

Entrepreneurship

13. Explain strategies for marketing agricultural products and services.
14. Design an agribusiness entrepreneurial plan, including management and marketing strategies.

Agribusiness Marketing

Agribusiness Marketing is a one-credit course that provides students with the opportunity to develop an understanding of the principles and practices of marketing as they relate to agricultural products and services. Students learn fundamental aspects of developing a business plan as well as establishing and maintaining an effective and profitable business strategy. Course content enables students to explore various aspects of marketing from local market niches to operating in the global arena, including marketing concepts, marketing risks, advertising, agreements, and contracts.

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Career Opportunities

Students will:

1. Identify career opportunities associated with agribusiness marketing.

Marketing Plans

2. Explain components of a marketing plan.
 - Explaining the role of management in agribusiness
 - Demonstrating the preparation and implementation of a marketing plan

Marketing Concepts

3. Describe characteristics of the free agribusiness market system.
 - Explaining the importance of the free enterprise system in agribusiness marketing
 - Describing consumer influence on agribusiness marketing
4. Explain the role and importance of various marketing concepts in agriculture.
Example: law of supply and demand
5. Identify factors that influence agricultural investment and business decisions.
Examples: present value, future value, simple interest, compound interest, wise use of credit

6. Describe information resources utilized in agribusiness marketing.
Examples: commodity reports, Alabama Cooperative Extension System, Internet, print media, marketing agents and brokers
7. Describe various approaches for sales and marketing in the agribusiness marketing industry.
Examples: global sales and marketing, niche sales and marketing, traditional agricultural sales and marketing, direct-to-consumer sales and marketing
8. Evaluate various entities that ensure product quality in agribusiness marketing systems.
Examples: producer, shipper, processor, distributor, retailer
 - Explaining the role of cooperatives and associations in agribusiness marketing
9. Describe factors to consider in pricing agricultural products and services.
Examples: materials, labor, overhead, profit
10. Identify components of a sales presentation for an agricultural product or service.

Global Marketing

11. Describe the impact of global marketing on agricultural products and services produced in Alabama and in the United States.
 - Assessing the importance of international issues in global marketing
Examples: cultural appeal, market accessibility, tariffs, quotas

Niche Marketing

12. Explain the impact of niche markets on local areas in Alabama.
Examples: peach market in Clanton, tomato market in Slocumb, shrimp market in Bayou La Batre

Marketing Risk

13. Explain the significance of financial position and risk-taking in agribusiness marketing.
 - Evaluating risks in various marketing systems
Examples: stock, bond, and fund markets; future trading and options; global marketing
 - Comparing strategies for market diversification
 - Assessing benefits of marketing agricultural by-products
Examples: selling processed manure as garden fertilizer, selling processed peanut hulls as animal feed

Agreements, Contracts, and Regulations

14. Explain the role of legal counsel in agribusiness marketing, including negotiating agreements and contracts, interpreting marketing regulations, and resolving disputes.
15. Explain the role of negotiation in agribusiness marketing.
Examples: establishing prices for products and services, setting terms for contract and lease agreements
 - Comparing objectives of various parties involved in negotiating agreements and contracts
16. Describe government involvement and influence in agribusiness marketing.
Examples: regulations, programs, policies

Advertising

17. Identify various methods of advertising in agribusiness marketing systems.
Examples: video, Internet, print media, signs, billboards

Technology

18. Describe the use of computer technology in agribusiness marketing.
Examples: market analyzing, sales forecasting, telemarketing, video marketing

Agribusiness Technology

Agribusiness Technology is a one-credit course designed to facilitate student success in careers in agribusiness technology or success in any agricultural field. This course provides students with opportunities to acquire knowledge and skills related to agribusiness technology in the workplace. Topics include careers, safety, agribusiness software, telecommunications, networking, global positioning systems, and electronic control systems.

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Career Opportunities

Students will:

1. Identify career and entrepreneurship opportunities in the field of agribusiness technology.

Safety

2. Explain safety practices in agribusiness technology.

Agribusiness Software

3. Identify software used for agribusiness tasks, including accounting, production management, communications, and marketing.
 - Formulating business reports from spreadsheets
Examples: budget, payroll, cash flow statement, profit and loss analysis, balance sheet, inventory, production records
4. Select a database for organizing agricultural data.
Examples: agricultural data—production records, budget records, market data
 - Explaining relationships among data fields, records, and files
 - Critiquing methods for searching databases to retrieve information
 - Identifying devices for storing and transferring data, including flash drives, portable media players, and personal digital assistants (PDAs)

5. Utilize software to produce an agribusiness publication.
6. Utilize software to create an agribusiness presentation.

Telecommunication

7. Describe telecommunication technology for agribusiness settings.

Networking

8. Describe advantages of computer networking in an agribusiness.

Positioning Systems

9. Explain the history of the global positioning system (GPS) and the geographic information system (GIS).
10. Explain ways GPS and GIS units are used in the agricultural industry.
11. Describe ways GPS and GIS data is merged with agricultural production records.

Electronic Control Systems

12. Explain ways electronic control systems are used in the agribusiness industry.
Examples: thermostat in poultry house, timer in greenhouse

Agricultural Communications

Agricultural Communications is designed to enable students to effectively communicate in agribusiness settings. Topics include career opportunities, effective communication, conflict resolution, group dynamics, goal setting, time management, effective leadership, parliamentary procedure, and supervised agricultural experience programs.

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This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 3, 8, 11, 12, 13, and 14 must be included.

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Career Opportunities

Students will:

1. Identify occupational opportunities in agricultural communications.
2. Explain the importance of a college education to the agricultural industry.

Effective Communication

3. Demonstrate effective oral and written communication skills.
 - Identifying types of speeches, including persuasive, informative, demonstrative, and commemorative

Conflict Resolution

4. Explain the importance of conflict resolution in an agribusiness.
 - Describing techniques used in resolving conflicts

Group Dynamics

5. Explain the importance of group dynamics in the agricultural industry.
 - Identifying roles of individual team members in reaching group goals

Goal Setting

6. Describe the importance of long- and short-term goals and goal setting in an agribusiness.

Time Management

7. Explain time management techniques in the agricultural industry, including setting priorities and scheduling.

Effective Leadership

8. Describe the importance of leadership in agribusiness.
 - Explaining leadership traits needed for operating an agribusiness
 - Describing personal leadership skills necessary for success in agribusiness
 - Explaining the importance of ethics in agribusiness
9. Differentiate among types of leaders in the agribusiness setting, including authoritarian, democratic, autocratic, and participative.
10. Describe qualities of a strong work ethic in an agribusiness.
 - Explaining reasons for following rules and regulations in the agribusiness setting
11. Evaluate personal attributes, including interpersonal relationship skills and value systems, as they relate to leadership in agribusiness management.
 - Describing behaviors necessary for success in interpersonal relationships in agribusiness
12. Describe ways FFA activities enhance personal leadership skills.

Parliamentary Procedure

13. Demonstrate parliamentary procedure in agribusiness meetings.
Examples: types of motions, voting methods, steps in presenting a main motion, duties of the chairperson

Supervised Agricultural Experience

14. Describe the importance of maintaining records for a SAE program.

Agriscience

Agriscience is a course that provides students with a general overview of the Agriculture, Food and Natural Resources cluster, which contains five pathways—Power, Structure, and Technical Systems; Environmental and Natural Resources Systems; Animal Systems; Plant Systems; and Agribusiness Systems. Students are involved in classroom and laboratory activities in each of the five pathway areas. Topics included in this course include career opportunities, safety, technology applications, agribusiness leadership, environmental science, soil science, plant science, forestry, animal science, aquaculture, wildlife science, pest management, woodworking, metalworking, small engines, electrical wiring, and plumbing.

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This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 6, 7, 9, 10, 12, 16, 18, and 19 must be included.

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Introduction

Students will:

1. Identify major agricultural commodities in the local area, state, nation, and world.
 - Sequencing major changes and accomplishments in the history of agriculture
 - Describing various agricultural organizations and their roles in the agricultural industry
 - Defining agriculture and major divisions of the agricultural industry

Career Opportunities

2. Determine factors in developing an effective career plan, including procedures for obtaining employment.
 - Identifying various careers in the agricultural industry

Safety

3. Identify tool and equipment safety procedures in woodworking, welding, electrical, small engine, plumbing, and masonry operations.

Technology Applications

4. Utilize technology to access, manage, and integrate information in the agricultural industry.
Examples: Internet, spreadsheets, databases
 - Identifying technological advancements that enhance the agricultural industry

Agribusiness Leadership

5. Apply problem-solving skills to resolve agribusiness issues.
 - Explaining the eight steps in the decision-making process
 - Describing fundamental principles of economics that affect the management of a business, including supply and demand
6. Identify characteristics of a SAE program, including manageability, record keeping, availability of facilities, and financing.
 - Identifying principles of financial literacy
 - Describing factors to be considered in agricultural entrepreneurial opportunities
Examples: risk, reward, business climate, obtaining finances
7. Demonstrate communication skills, including prepared public speaking, extemporaneous speaking, creed speaking, and parliamentary procedure, through career development events (CDEs).
 - Demonstrating leadership and teamwork skills gained through student organization activities
Examples: activities—CDEs, proficiency awards, officer leadership opportunities, teamwork opportunities

Environmental Science

8. Identify methods for conserving the environment.
 - Explaining the importance of natural resources
 - Describing techniques for recycling, reusing, and reducing the use of natural resources

Soil Science

9. Identify major soil areas in Alabama.
 - Identifying layers of soil in a soil profile
 - Determining the texture of various soil samples
 - Determining the land capability class for a given plot of land
 - Explaining how to adjust soil pH

Plant Science

10. Determine characteristics and functions of plants.
 - Explaining plant processes, including photosynthesis, respiration, and transpiration
 - Identifying the sixteen essential elements needed for plant health and growth
 - Identifying various requirements needed to produce successful vegetable gardens, greenhouse plants, and landscape plants
 - Propagating plants sexually and asexually
 - Explaining how agricultural crops can be utilized as alternative fuel sources

Forestry

11. Determine forest management practices.
 - Identifying trees for local, state, national, and global markets
 - Applying mathematics concepts to the measurement of trees and land

Animal Science

12. Identify common breeds of livestock and their characteristics, including cattle, swine, sheep, equine, and poultry.
 - Identifying species-specific terminology used to describe livestock
Examples: bovine—bull, cow, heifer, steer, calf
equine—stallion, mare, foal, gelding, filly
swine—boar, sow, piglet, gilt, barrow
 - Explaining practices used to manage livestock, including handling, breeding, vaccinating, and transporting
 - Determining nutritional requirements for livestock, including cattle, swine, sheep, equine, and poultry

Aquaculture

13. Differentiate among types of aquaculture enterprises in Alabama, including catfish, crawfish, shrimp, and tilapia.

Wildlife Science

14. Assess ethical and legal responsibilities for conduct in wildlife management.
 - Identifying state hunting laws and regulations concerning wildlife
 - Explaining hunter ethics
 - Determining management practices used to enhance wildlife habitats
 - Explaining hunting safety practices

Pest Management

15. Describe the importance of pest management in the agricultural industry.
 - Comparing types of pesticides and how they control pests

Woodworking

16. Apply mathematical, reading, and writing skills used in woodworking.
 - Developing a plan of procedure for a woodworking project
 - Interpreting a plan of procedure for a woodworking project
 - Demonstrating procedures for constructing a woodworking project, including completing a bill of materials, calculating board feet, selecting tools, applying measurements, cutting, assembling, and finishing

Metal Working

17. Demonstrate procedures used in arc welding.

Small Engines

18. Explain the theory of operation for two- and four-cycle small engines.
 - Performing routine care and maintenance on small engines

Electrical

19. Demonstrate procedures used in wiring electrical circuits.

Plumbing

20. Identify procedures for installing and maintaining water and sewage lines for agricultural structures.
 - Demonstrating the installation of plumbing fixtures

Agriscience Exploration

Agriscience Exploration is an exploratory course that provides Grade 8 students the opportunity to gain knowledge and acquire skills relating to the agricultural industry. Topics include career opportunities, safety, aquaculture, animal science, plant science, soil science, ecology, conservation, impact of agriculture, and agrimarketing. Instruction also focuses on agriscience technologies in the areas of woodworking, electricity, and power mechanics.

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This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 4, 5, 6, 8, 12, 13, 14, and 15 must be included.

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Career Opportunities

Students will:

1. Describe career opportunities in the agricultural industry.
 - Evaluating factors for selecting an agriscience career
Examples: personal interests, abilities, preparation, salary
 - Describing desirable work habits for the agricultural industry
Examples: reporting to work on time, wearing appropriate clothing, following directions, cooperating with coworkers

Safety

2. Describe safety rules and regulations that apply to the agricultural industry.
 - Demonstrating safe use of hand tools
 - Demonstrating safe use of power tools
 - Demonstrating safe techniques for small engine maintenance

Impact of Agriculture

3. Explain the impact of agriculture on a county's economy, utilizing National Agricultural Statistics Service (NASS) information.
 - Describing the impact of an abundant, inexpensive, and safe food supply
Examples: abundant—independence from foreign food imports
inexpensive—less income spent on food
safe—better overall health of populations
 - Comparing United States and world agricultural practices

Supervised Agricultural Experience

4. Identify types of SAEs, including exploratory, research, placement, and entrepreneurship.
 - Describing criteria for selecting an appropriate SAE
Examples: years in program, career interests, career advantages

Leadership Development

5. Demonstrate communication skills utilized within an agribusiness.
Examples: public speaking, letter writing
 - Demonstrating qualities of leadership, cooperation, and good citizenship within an agricultural organization
 - Demonstrating parliamentary procedures used to conduct agribusiness meetings

Animal Science

6. Identify major body parts of cattle, swine, sheep, equine, and poultry.
 - Describing the impact of selective breeding and cloning on livestock breeds
 - Evaluating selected groups of animals according to confirmation, frame size, muscling, grade, and breed characteristics

Aquaculture

7. Describe methods and facilities used in the production of various aquatic species.

Plant Science

8. Describe structures and functions of major parts of a plant.
 - Comparing photosynthesis and respiration
 - Identifying sexual methods of plant reproduction
 - Illustrating important techniques of asexual plant propagation
Examples: cuttings, division, grafting, layering, tissue culture

Soil Science

9. Identify major components of soil.
 - Comparing soil horizons
 - Relating soil characteristics to uses
Examples: texture, drainage, permeability, organic composition, class capabilities
 - Explaining the importance of soil to agriculture

Ecology and Conservation

10. Relate populations within a habitat to communities, ecosystems, and biomes.
 - Comparing biotic and abiotic components of an ecosystem
 - Identifying limiting factors that affect plant and animal populations in an ecosystem
Examples: food, shelter, water, climate, nutrients, physical space, disease, pollution, natural disasters
11. Evaluate agricultural and nonagricultural sources of pollution.
 - Describing the potential impact of climate change on plants, animals, and land
 - Explaining effective methods of reducing pollution

Woodworking

12. Develop a bill of materials and plan of procedure for a woodworking project.
 - Selecting the hardware required for a woodworking project
 - Calculating the number of board feet required for a woodworking project
13. Construct a woodworking project.

Electricity

14. Identify sources of electrical energy.
 - Explaining the electron theory and its relevance to electrical circuitry
 - Explaining the relationship between electricity and magnetism
 - Describing electrical terms, units, and symbols
 - Applying techniques for making electrical splices

Power Mechanics

15. Perform routine care and maintenance on small engines.

Technology

16. Describe computer skills used in the agricultural industry.
Examples: researching electronic reference sources, managing data, analyzing data, communicating information
17. Explain uses of the geographic information system (GIS) and global positioning system (GPS) as they relate to agriculture.

Agrimarketing

18. Explain ways agricultural products and services are marketed.
 - Describing the role of communication in agricultural marketing

Animal Biotechnology

Animal Biotechnology is a one-credit course that provides students with an opportunity to gain knowledge of the principles and practices of animal genetics and biotechnology as they relate to agricultural products and services. Topics include career opportunities, safety, impact of animal biotechnology, and applied genetics and breeding.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Describe career opportunities associated with animal biotechnology.

Safety

2. List safety considerations and procedures required for working in animal biotechnology.
Examples: considerations—biological, chemical, radiation
procedures—laboratory requirement

Impact of Animal Biotechnology

3. Trace the historical development of animal biotechnology.
4. Describe the importance of animal biotechnology to humans, including medical, environmental, and product advancements.
Examples: medical advancements—synthesis of medicines
environmental advancements—animal disease resistance, pest control
product advancements—increased yield, disease-resistant animals

5. Describe advances in biotechnology that enhance the ability of animal immune systems to fight diseases.
 - Identifying differences in disease resistance and susceptibility in commercial animal groups
Examples: animal groups—cattle, swine, poultry, sheep, equine
diseases—brucellosis, anthrax, bovine encephalitis, coccidiosis, avian pneumonia, streptococcus, equine encephalitis
6. Describe ways scientific research, consumer preferences, and advances in biotechnology influence animal development and production.
Examples: milk content, egg size, loin eye size
 - Performing a deoxyribonucleic acid (DNA) transformation into bacteria using genetic engineering methods
 - Purifying protein from a transformation experiment
7. Compare cultural and bioethical views of genetic manipulation, including genetic engineering and cloning.

Applied Genetics and Breeding

8. Describe heterogeneity as an important strategy in maintaining health and productivity in animal populations.
 - Describing methods of maintaining heterogeneity in various animal populations
Examples: introduction of nonnative animals, managed breeding
 - Identifying desired characteristics in an animal as homozygous or heterozygous
Examples: coat color, presence of horns, slick hair
 - Explaining the importance of heterosis for increased productivity in commercial herds
 - Recognizing heritable characteristics of animals
Examples: physical structure, chemical composition, behavior
9. Identify desirable characteristics for an animal population.
Examples: incorporation of heat tolerance into a cattle herd, improvement of weaning weight and milk production
 - Explaining the importance of selective breeding for an animal population
10. Describe inheritance patterns based on chromosomes, genes, alleles, and gene interaction.
 - Comparing dominant and recessive traits
 - Comparing incomplete dominance and codominance

Animal Science

Animal Science is a course that provides students with instruction regarding this area of the agricultural industry. Students participate in activities related to the animal science field as they engage in the study of topics such as career opportunities, safety, importance of the livestock industry, breed identification and characteristics, nutrition, disease and parasite control, genetics and reproduction, animal rights versus animal welfare, and specialty animal production and animal products.

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Career Opportunities

Students will:

1. Identify employment opportunities in the livestock industry.
Examples: farm management, livestock production

Safety

2. Describe safety procedures for handling livestock.

Importance of Livestock Industry

3. Trace the domestication of livestock.
4. Identify livestock by common names.
 - Explaining the importance of binomial classification
5. Explain benefits of livestock production to society.
Examples: medicine, food, clothing

Breed Identification and Characteristics

6. Trace the history of major large animal breeds.
Examples: beef, swine, equine, goat, sheep, specialty animal breeds
 - Explaining the economic importance of major large animal breeds
7. Describe facilities used to manage livestock.
Examples: corral, catch pen, head chute

Nutrition

8. Compare digestive systems of large animals.
Examples: nonruminant, ruminant
9. Describe proper nutrition and balanced rations for animals.
 - Differentiating among nutrients affecting the health of livestock
Examples: vitamins, minerals, proteins, fats, carbohydrates, roughages, concentrates, feed additives

Disease and Parasite Control

10. Evaluate methods of disease prevention in livestock.
Examples: parasite control, vaccination, sanitation
 - Categorizing symptoms of animal diseases for diagnostic purposes
Example: black leg symptoms
 - Comparing drugs used to treat animal diseases
Examples: antibiotics, wormers
 - Critiquing environmental factors affecting livestock operations
Examples: soil loss, water quality, air quality

Genetics and Reproduction

11. Describe the structure and function of male and female reproductive systems in livestock.
 - Describing the process of genetic engineering, including the use of recombinant deoxyribonucleic acid (DNA)
 - Assessing the use of biotechnology in animal reproduction
Examples: cloning, genetic engineering, embryo transfer
 - Describing how selective breeding has influenced the improvement of animals
Examples: trimness, muscle expression, structure, size, scale

Animal Rights Versus Animal Welfare

12. Differentiate animal rights from animal welfare.
 - Describing responsible ownership of animals
 - Listing ways the use of animals in research has benefited humans and animals
 - Interpreting laws governing the use of animals for research

Specialty Animals and Animal Products

13. Identify economically important specialty animals and animal products.
Examples: animals—alligators, cashmere goats, quail, ratites, pheasants
animal products—specialty meats, cheeses
14. Compare requirements for specialty animal production with traditional animal production.
Examples: care and feeding, management, marketing, sales

Aqua Experience

Aqua Experience is an aquaculture class designed to enhance student understanding of the aquaculture industry. This course gives students an overview of the scientific research associated with the aquaculture industry and the economic significance aquaculture plays at the local, state, and national levels, including entrepreneurship and related business functions. Additional areas of instruction include career opportunities, safety, water quality management, and system design and maintenance.

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This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 5, 6, 7, and 11 must be included.

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Career Opportunities

Students will:

1. Identify career opportunities in aquaculture.

Safety

2. Identify safety precautions associated with producing fish.

Introduction

3. Trace the history of aquaculture.

4. Explain extensive, semi-intensive, and intensive aquaculture production.
Examples: extensive—low animal density, low economic risk, little or no environmental manipulation, including aeration, feeding, and fertilization
semi-intensive—moderate animal density, moderate economic risk, moderate environmental manipulation, including supplemental aeration and supplemental feeding
intensive—high animal density, high economic risk, complete environmental manipulation, including continuous aeration, nutritionally complete feeding, and biological waste management
5. Describe the role of scientific research relative to the aquaculture industry.
 - Identifying vaccines, antibiotics, and breeding techniques used in the aquaculture industry
 - Identifying sources of nutrients and feed components used in the aquaculture industry
 - Identifying aquaculture production methods and management strategies for recirculating systems, cages, raceways, ponds, partitioned aquaculture systems, and super-intensive aquaculture systems
6. Explain the economic impact of aquaculture at the local, state, and national levels.

Water Quality Management

7. Differentiate among water quality parameters relative to the culture of aquatic organisms, including ammonia and nitrate toxicity and pH, oxygen, and temperature tolerances.

Business and Economics

8. Explain entrepreneurship opportunities available in the aquaculture industry.
9. Explain results of an aquaculture market survey.
 - Comparing various aquaculture market outlets
Examples: local, regional, national, international
 - Identifying market promotions for the aquaculture industry
10. Construct a budget for an aquaculture operation.

System Design and Maintenance

11. Compare aqua system designs for various aquatic species.
 - Designing a maintenance plan for an aqua system
 - Identifying site specifications, components, and operations for aqua systems

Aquaculture Science

Students in this one-credit course are introduced to practical applications of both physical and biological concepts and skills. While aquaculture is the cornerstone of this course, the program places heavy emphasis on integration of knowledge to solve problems and broaden depth of understanding about topics such as career opportunities, safety, history, water chemistry and management, aquaculture systems, aquatic biology, and health and sanitation.

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Career Opportunities

Students will:

1. Describe various career opportunities in the aquaculture industry.

Safety

2. Describe safety precautions for the aquaculture industry.

History

3. Explain the historical background of aquaculture.
 - Explaining how aquaculture relates to agriculture
 - Describing science and technology related to aquaculture
 - Identifying the economic significance of aquaculture at the local, state, and national levels
4. Differentiate among freshwater, brackish water, and saltwater ecosystems.
 - Identifying chemical, geological, and physical features of aquatic ecosystems
5. Relate geological and hydrological phenomena and fluid dynamics to aquatic systems.
6. Explain the importance of biogeochemical cycles in an aquatic environment.
7. Categorize aquaculture species as cold, cool, or warm water species.

Water Chemistry and Management

8. Determine important properties and content of water as related to aquaculture.
Examples: turbidity, pH, pollutants, dissolved oxygen, high specific heat, density, temperature
 - Describing the influence of water quality on aquaculture
Examples: aquatic plant control, water quality management, recognition and correction of oxygen deficiency, pH control
 - Identifying sources of aquatic pollution
Examples: point and nonpoint pollution, volcanic ash, waste disposal
 - Describing methods of reclaiming wastewater and polluted water
Examples: settling ponds; hydroponics; irrigation water; chemical additives; mechanical, biological, and chemical filtering systems
 - Calculating pH, oxygen, and nitrogen levels in aquatic environments

Aquaculture Systems

9. Describe various structures and equipment used in growing aqua crops.
Examples: open ponds, cages, raceways, tanks, silos
 - Determining the suitability of habitat construction for aquaculture
 - Identifying biological concerns in a recirculating or closed system
10. Describe infrastructure necessary for aquaculture production.
Examples: labor, feed manufacturing, transportation

Aquatic Biology

11. Identify the genotype and phenotype for specific characteristics in aquatic animals resulting from selective breeding.
Examples: disease-resistant fish, rapid maturation rates
 - Explaining the importance of anatomy and physiology in aquaculture
Examples: body systems, internal and external anatomy of fish, basic structure of an oyster
 - Calculating genotypic and phenotypic percentages and ratios for aquatic species
12. Describe adaptations that allow organisms to exist in specific aquatic environments.

13. Describe processes and environmental characteristics that affect growth rates of aquatic animals.
Examples: reproductive habits, feeding habits, interdependence of organisms, overcrowding, seasonal changes
 - Collecting aquatic growth-rate data
14. Determine effects of the fishing industry on the aquatic environment.
Examples: aquaculture, overfishing
 - Describing basic principles involved in fish production
 - Explaining various methods of pond preparation, predator control, and species management
 - Explaining harvesting techniques and methods of transporting fish to market

Health and Sanitation

15. Define concepts associated with health management of aqua crops.
16. Describe the control of diseases and pests in aquatic environments.
Examples: pathogenic microspecies, parasites, predators, trash fish
 - Identifying relationships among pathogen, environment, and host

Aquatic Biology

Aquatic Biology is a one-credit course that explores the aquaculture industry as it relates to biology. Emphasis is placed on scientific concepts involving the use of microscopes and the conversion of unit measurements. Topics include career opportunities, safety, history, aquatic species, water management, health and sanitation, biotechnology, and aquaculture issues.

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Career Opportunities

Students will:

1. Describe various aquatic career opportunities.

Safety

2. Explain safety concepts related to aquatic biology.

History

3. Describe the historical background and technological advancements of aquaculture as it relates to agriculture.

Aquatic Species

4. Classify aquatic species using scientific nomenclature.
 - Describing characteristics of various species of aquatic life
 - Identifying exotic, invasive, and indigenous aquatic species
 - Identifying microscopic and aquatic organisms using dichotomous keys
5. Describe types of aquatic animal production in the United States.
 - Comparing the aquaculture pond to natural aquatic ecosystems, including recreational fish ponds

6. Classify characteristics of ectothermic animals.
 - Describing roles of various aquatic organisms in aquaculture

Water Management

7. Describe concepts of diffusion and osmosis related to aquatic organisms.
Examples: gill function, counter and current gas exchange
8. Interpret water quality data related to natural and artificial aquatic environments.
Examples: temperature, dissolved oxygen, ammonia, nitrate, nitrite, pH
 - Managing water quality parametersExamples: analysis, treatment

Health and Sanitation

9. Diagnose major diseases and their causes in aquaculture environments.
10. Describe preventive measures for aquatic predators and pests.

Biotechnology

11. Identify contributions of biotechnology to aquaculture.
Examples: gene probes for diagnosing viral infections in shrimp, polymerase chain reactions (PCR) for detecting bacterial pathogens in seafood shipments

Aquaculture Issues

12. Trace biogeochemical cycles through the environment, including water, carbon, oxygen, phosphorus, and nitrogen.
 - Relating natural disasters and climate changes to the dynamic equilibrium of ecosystems
13. Identify agencies responsible for the development of effluent limitations, guidelines, and standards for aquatic production.
 - Identifying effluent treatment methods
14. Identify potential land and water use conflicts in the aquaculture industry.
15. Recognize problems with sustainability in aquaculture production.

Career Cluster Explorations

Career Cluster Explorations is a 70-hour course designed for students in Grade 7 to improve communication skills, learn about the value of work, develop leadership skills, explore career opportunities, and become aware of basic employability skills.

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Technology

Students will:

1. Demonstrate basic technology skills.
Examples: managing files, using the Internet, using application programs

Work Ethics

2. Explain personal and societal benefits of work.

Communication Skills

3. Demonstrate oral presentation skills that sustain listener attention and interest, including eye contact, clear enunciation, and use of visual aids.
 - Preparing support materials to accompany a presentation, including tables and charts
4. Apply active listening skills to obtain and clarify information.
5. Summarize written materials from various career sources clearly, succinctly, and accurately.

Employability Skills

6. Create a personal plan of study to meet career goals and objectives.
7. Demonstrate positive work behaviors and personal qualities, including displaying a willingness to acquire new knowledge and skills, demonstrating integrity in a work situation, and indicating a willingness to follow rules and procedures.
8. Describe employment skills needed for obtaining and maintaining a job.

Leadership

9. Demonstrate interpersonal skills, including teamwork, conflict management, problem solving, and networking.
10. Demonstrate leadership skills for creating an environment that fosters mutual trust and confidence.

Career Opportunities

11. Demonstrate the ability to locate resources to determine job and career opportunities related to the Alabama Career and Technical Education clusters.
 - Describing the nature of each of the Alabama Career and Technical Education clusters
12. Identify employment opportunities to match personal interests and aptitudes.

Construction Finishing and Interior Systems

Construction Finishing and Interior Systems is a one-credit course designed to facilitate student understanding of the finishing phase of a structure. Students become familiar with the exterior and interior finishing of a structure. Topics include career opportunities, safety, windows, doors, plumbing, electrical wiring, insulation, wall coverings, storage, and finishes.

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Career Opportunities

Student will:

1. Describe career opportunities associated with construction finishing.
Examples: construction foreman, painter, carpenter, plumber, electrician

Safety

2. Demonstrate job site safety in the finishing phase of construction.

Windows and Doors

3. Demonstrate the installation of a window in a structure.
 - Identifying various types of windows
Examples: casement, storm, fixed, sliding, double-hung
4. Demonstrate the installation of a door in a structure.
 - Identifying various types of materials used for door construction
Examples: wood, metal, fiberglass
 - Identifying types of doors
Examples: interior, exterior, bi-fold, swinging, sliding
 - Identifying types of thresholds used with exterior doors
 - Installing door hardware
Examples: hinges, locksets, dead bolt locks

Plumbing

5. Design water supply and sewage drainage systems for a structure.
 - Identifying tools used in plumbing
Examples: pipe cutter, pipe wrench, torch, tubing cutter
 - Explaining the selection of specific types of pipe used in plumbing
Examples: steel, copper, polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC), acrylonitrile butadiene styrene (ABS)
 - Explaining the selection of proper fittings for joining various kinds of pipe

Electrical

6. Analyze components needed for wiring a structure.
Examples: power source, wire, connector, circuit breaker, switch, receptacle
 - Identifying tools used for electrical wiring
Examples: wire strippers, wire cutters, lineman's pliers, screwdrivers, test meter
 - Describing how national and local electrical codes affect the wiring of structures
 - Illustrating the use of electrical terms and symbols in electrical diagrams
Examples: alternating current (AC), direct current (DC), voltage, amperage, switch, receptacle, light
7. Demonstrate techniques for making electrical splices and connections for a single-pole switch with light, three-way switch with light, and a duplex receptacle.
 - Utilizing ground fault circuit interrupters where required by code

Insulation

8. Identify criteria for selecting insulating materials for structures.
Examples: resistance-value (R-value), cost, durability
9. Describe procedures for installing various insulating materials for structures.

Exterior and Interior Wall Coverings

10. Demonstrate the installation of exterior and interior wall coverings for structures.
 - Differentiating among types of exterior wall coverings for structures
Examples: wood, vinyl, masonry, metal
 - Differentiating among types of interior wall coverings for structures
Examples: wood, drywall, paneling

Interior Storage

11. Identify materials, hardware, and fasteners used in cabinet construction.
12. Demonstrate the construction of storage units in structures.
 - Designing base- and wall-hung storage units
 - Determining countertop materials for storage units
 - Installing plumbing fixtures
 - Installing shelving

Finishes

13. Identify various finishes for exterior surfaces.
14. Apply finishes to interior surfaces.
 - Examples: paints, lacquers, varnishes, stains, preservatives
 - Preparing interior surfaces for finishing
 - Identifying types of application methods for finishes
 - Examples: pneumatic application, natural bristle brushes, synthetic bristle brushes

Construction Framing

Construction Framing is a one-credit course designed to provide students with an understanding of the framing phase of a structure, including framing components. Topics include career opportunities, safety, lumber, material estimation, floor systems, wall framing, ceiling framing, stair construction, roof framing, and roof materials in various structures.

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Career Opportunities

Student will:

1. Compare various career opportunities associated with frame construction.
Examples: engineer, construction foreman, carpenter

Safety

2. Demonstrate job site safety in frame construction.

Grades and Types of Lumber

3. Compare applications of hardwood and softwood lumber used in framing structures.
 - Identifying grades of lumber
Examples: appearance grade, timber grade, dimension grade
 - Identifying defects that affect lumber grade
Examples: knot, wane, split, check, warp

Estimating Materials

4. Calculate a bill of materials for the framing of a wood structure.

Floor Systems

5. Compare advantages of concrete flooring systems and wood flooring systems.
6. Design a floor framing system for a structure.
 - Describing the purpose of a sill used in structures
 - Demonstrating the layout of joist headers and floor joists used in structures
 - Contrasting various subfloor materials used in structures
Examples: tongue and groove plywood, plywood, oriented strand board, shiplap boards
 - Demonstrating the installation of a subfloor for a structure

Wall Framing

7. Design a wall framing system for a structure.
 - Comparing the use of wood and metal wall framing components
 - Describing the use of a soleplate in structures
 - Demonstrating the construction of corner posts with and without blocking
 - Demonstrating the use and installation of full, cripple, and trimmer studs
 - Demonstrating the installation of a double top plate in structures
 - Demonstrating the installation of rough openings for doors and windows, including headers
 - Demonstrating techniques for bracing a wall
8. Compare various wall sheathing materials for structures.
Examples: foam board, oriented strand board, insulating board, plywood
9. Explain the importance of vapor barriers used in wall framing.
 - Comparing advantages of using plastic and building felt as vapor barriers in walls

Ceiling Framing

10. Design a ceiling framing system for a structure.
 - Demonstrating the installation of ceiling joists
 - Explaining the use of headers in two-story structures
 - Demonstrating the installation of rough openings for stairs, attic access, and chimneys

Stair Construction

11. Identify types of stairs used in structures.
 - Comparing materials used in stair construction
 - Calculating the total rise, number and size of risers, and treads for a stairway
12. Demonstrate the procedure for laying out and cutting stringers for stair construction.
13. Demonstrate the procedure for installing handrails to stairs.

Roof Framing

14. Identify types of roofs used on structures.
Examples: hip, gable, gambrel, shed
15. Compare conventional and truss roof systems for structures.
 - Laying out common, hip, and valley rafters
 - Laying out a truss using a framing square
 - Demonstrating the installation of rough openings for vents, skylights, and chimneys
16. Compare various decking materials for roof systems.
Examples: tongue and groove plywood, plywood, oriented strand board

Roofing Materials

17. Describe types of materials used for roof systems.
Examples: felt, shingles, metal roofing, roll roofing
18. Demonstrate the installation of roofing materials.

Construction Site Preparation and Foundations

Construction Site Preparation and Foundations is a one-credit course designed to facilitate student understanding of the first phases of construction, including types of structures and their uses. Topics include career opportunities, safety, planning, location, layout, concrete and masonry, and foundations of various structures.

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Career Opportunities

Students will:

1. Identify career opportunities in the construction industry.
Examples: draftsman, engineer, construction foreman, carpenter, concrete finisher, plumber, electrician

Safety

2. Demonstrate job site safety concepts required for site preparation and foundation construction.
Examples: personal protection equipment, hand tool safety, power tool safety, electrical safety

Planning Structures

3. Demonstrate the mechanical drawing process used in designing structures.
 - Identifying various mechanical drawing components
Examples: symbols, dimension lines, extension lines, hidden lines, object lines, center lines, lettering
4. Explain local building codes affecting the construction of buildings.
5. Calculate equipment and work space requirements for structures.
6. Identify factors in selecting building materials used in structures.
Examples: cost, availability, suitability

7. Formulate a bill of materials for a specific structure.
Examples: concrete, lumber, fasteners, roofing materials, hardware, electrical supplies, plumbing supplies

Structure Location

8. Identify positive characteristics of a building site.
Examples: proper drainage, location, orientation
9. Explain the importance of conducting property surveys for structures, including the location of property and setback lines.

Structure Layout

10. Demonstrate building layout procedures for a specific structure.
Examples: staking, squaring, constructing batter boards, leveling

Foundations

11. Explain how to lay out and construct pier, edge, and footing forms.
12. Describe the use of concrete reinforcements in structures.

Concrete and Masonry

13. Demonstrate the use of concrete and masonry tools in construction.
14. Demonstrate the process of mixing concrete.
 - Estimating the amount of concrete needed for a project
 - Applying various finishing techniques used with concrete
15. Demonstrate the process of laying block.
 - Estimating the number of concrete blocks needed for a project

Creative Floral Design

Creative Floral Design is a one-credit course designed to inspire students to use creative capabilities in the floriculture industry. Topics include career opportunities, safety, design mechanics, floral designs, creative designing, and visual marketing.

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Career Opportunities

Students will:

1. Describe careers in creative floral design.
2. Identify professional florist associations.

Safety

3. Apply safety precautions involved in creative floral design.

Design Mechanics

4. Demonstrate the use of design mechanics in creative floral designs.
Examples: wiring and taping techniques, interpreting progressive color theory, analyzing floral design forms

Floral Designs

5. Demonstrate design techniques used in creating contemporary arrangements, including basing, clustering, pillowing, layering, bundling, and wrapping.
6. Design abstract and interpretive arrangements using both natural and man-made materials.
7. Create period designs, including southwest, colonial, country, oriental, and European.

Creative Designing

8. Describe factors involved with balloon decorating.
 - Creating symmetrical and asymmetrical balloon designs
9. Create tabletop floral arrangements for special events.
10. Construct various specialty arrangements, including dish gardens, topiaries, jardinières, and *pot-de-fleur*.
11. Demonstrate the ability to dry and preserve flowers and foliage.
 - Designing a dried flower arrangement
12. Identify various types of permanent flowers.
Examples: silk, plastic, paper

Visual Marketing

13. Create window and in-store displays, including radiation, step, pyramid, and zigzag designs.
 - Critiquing window displays for visual balance, harmony, lighting, and aesthetics

Entrepreneurship

Entrepreneurship is a one-credit course designed to provide students with skills needed to effectively organize, develop, create, and manage a business. This course includes business management and entrepreneurship, communication and interpersonal skills, economics, and professional development foundations. Instructional strategies may include the development of a business plan, a school-based enterprise, computer and technology applications, real and simulated occupational experiences, or projects related to business ownership.

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Entrepreneurship

Students will:

1. Evaluate social and civil responsibilities of business ownership.
Examples: environmental issues, ethical issues, employment issues
2. Describe typical behavioral characteristics of an effective entrepreneur.
 - Identifying personal strengths and weaknesses to determine the need for additional information
3. Critique a variety of business classifications, including retailers, wholesalers, servicers, and manufacturers, to determine potential business ventures.
4. Compare types of business ownership.
Examples: sole proprietorship, franchise, partnership, limited liability corporation (LLC), corporation
5. Determine technological needs of a small business, including hardware, software, networking, and telecommunications.
6. Explain risk factors that affect entrepreneurs, including financial, psychological, and physiological aspects.

Finance

7. Analyze national and international economic fluctuations to determine effect on business markets of interest.
8. Develop a business plan, including identifying an executive summary; conducting a marketing and competitive analysis report; and developing a marketing, management, and financial plan.
9. Analyze credit and collection policies to determine consumer credit plans.

10. Explain taxes associated with business ownership and employment, including local, state, and federal taxes.
11. Use mathematics skills to analyze profit and loss margins for a business.

Legal Implications

12. Analyze government regulations to identify impact on business ownership.
13. Explain laws and regulations related to hiring and retaining employees.

Marketing

14. Determine marketing functions needed for effective business ownership.
15. Interpret research data to determine market-driven problems faced by entrepreneurs.
Examples: research data—business journals, stock market reports, newspapers, international trends

Career Opportunities

16. Determine career opportunities, responsibilities, and educational and credentialing requirements related to various entrepreneurship ventures.

E-Business

17. Identify advantages and disadvantages of Internet entrepreneurial opportunities.
 - Creating an effective e-business site
 - Designing a customer survey for an e-businessExamples: customer needs and satisfaction survey, demographics survey, products survey

Environmental Management

Environmental Management is a one-credit course that provides students with the opportunity to develop an understanding of the principles and practices of environmental management. Topics include career opportunities, safety, importance of natural resources, waste management, water quality, soil science, air quality, pesticide management and use, ecology, and energy conservation.

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Career Opportunities

Students will:

1. Recognize career opportunities related to environmental stewardship.

Safety

2. Identify safety considerations required for working in environmental management.

Natural Resources

3. Explain the importance of conserving natural resources and the environment.

Waste Management

4. Describe methods of managing various types of waste.
Examples: recycling, reusing, reducing
 - Describing factors to be considered in preparing a waste management plan

Water Quality

5. Describe properties of water that make it a universal solvent.
 - Describing uses of water in agricultural operationsExamples: consumption, irrigation, cleaning, heating and cooling, transporting agricultural products
6. Identify sources of local drinking water.
 - Determining the quality of freshwater using chemical testing and bioassessment
 - Describing the use of chemicals and microorganisms in water treatment
 - Describing water conservation methods
 - Describing the process of underground water accumulation, including the formation of aquifers
 - Identifying major residential, industrial, and agricultural water consumers
 - Identifying principal uses of water
7. Identify reasons coastal waters serve as an important resource.
 - Examples: economic stability, biodiversity, recreation
 - Classifying biota of estuaries, marshes, tidal pools, wetlands, beaches, and inlets
 - Comparing components of marine water to components of inland bodies of water
8. Describe factors to be considered in preparing a water conservation or management plan for groundwater and surface water resources.
 - Examples: water availability, water quality, water source
9. Identify major contaminants in water resulting from natural phenomena, housing, industrial waste, and agricultural pollutants.
 - Describing the eutrophication of water by industrial effluents and agricultural run offs
 - Classifying sources of water pollution as point and nonpoint

Soil Science

10. Describe the composition of soil profiles and soil samples of varying climates.
 - Identifying various processes and activities that promote soil formationExamples: weathering, decomposition, deposition
 - Relating particle size to soil structure and type of sand, silt, or clay
11. Describe land use practices that promote sustainability and economic growth.
 - Examples: no-till planting, crop rotation
 - Defining various types and sources of waste and their impact on the soilExamples: types—biodegradable and nonbiodegradable, organic, radioactive, nonradioactive;
sources—pesticides, herbicides
 - Identifying ways to manage waste, including composting, recycling, reusing, and reclaiming

12. Describe agents of erosion, including moving water, gravity, glaciers, and wind.
- Describing methods of preventing soil erosion
- Examples: planting vegetation, constructing terraces, providing barriers

Air Quality

13. Identify the impact of pollutants on the atmosphere.
- Identifying layers of the atmosphere and the composition of air
 - Describing the formation of primary, secondary, and indoor air pollutants
 - Relating pollutants to smog and thermal inversions
 - Investigating the impact of air quality on the environment
 - Interpreting social, political, and economical influences on air quality

Pesticide Management and Use

14. Compare effects of various pesticides on the environment.

Ecology

15. Describe short- and long-term climatic conditions and their importance in agricultural production.
16. Identify the influence of human populations, technology, and cultural and industrial changes on the environment.
- Describing the relationship between carrying capacity and population size
17. Identify positive and negative effects of human activities on biodiversity.
- Identifying endangered and extinct species locally, regionally, and worldwide
 - Identifying causes for species extinction locally, regionally, and worldwide
18. Analyze agricultural activity for its impact on the ecosystems of Alabama.

Energy Conservation

19. Evaluate various fossil fuels for effectiveness as energy resources.
- Describing the formation and use of nonrenewable fossil fuels
 - Identifying by-products of the combustion of fossil fuels, including particulates, mercury, sulfur dioxide, nitrogen dioxide, and carbon dioxide
 - Identifying chemical equations associated with the combustion of fossil fuels
 - Describing benefits of abundant, affordable energy to mankind
 - Identifying effects of fossil fuel by-products on the environment, including ozone depletion, formation of acid rain, brown haze, greenhouse gases, and concentration of particulates in heavy metals

20. Evaluate other sources of energy for effectiveness as alternatives to fossil fuels.
- Comparing nuclear fission and nuclear fusion reactions in the production of energy
 - Comparing energy production and waste output in generating nuclear energy
 - Differentiating among renewable and nonrenewable energy resources
 - Identifying local energy resources
Examples: landfill gas, wind, water, sun
 - Identifying ways the law of conservation of energy relates to fuel consumption
Examples: development of hybrid cars, construction of energy-efficient homes

Equine Science

Equine Science is a course that enables students to become knowledgeable in the areas of caring for and managing horses. Topics include career opportunities, safety, history and development, anatomy and physiology, nutrition, health, and selection and conformation. Students also learn about tools, tack, and facilities necessary for the proper care of horses.

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Career Opportunities

Students will:

1. Describe career opportunities in the equine industry.

Safety

2. Identify safety techniques to be considered when handling horses.
Examples: approaching a horse from the front and side, avoiding sudden movement, speaking quietly
 - Describing horse behavior that can cause injuries to the horse and to the handler
Examples: submission to some members of the herd, dominance over some members of the herd, fight-or-flight behaviors

History and Development

3. Differentiate characteristics of light horses, draft horses, and ponies, including structure, muscling, color, and shape of head and neck.
 - Listing various breeds of light horses, draft horses, and ponies
Examples: breeds of light horses—Quarter Horse, Appaloosa, Thoroughbred, Arabian, Morgan, American Saddlebred, Tennessee Walking Horse, Paint
breeds of ponies—Welsh, Shetland, Pony of the Americas, American Walking Pony
 - Describing historical roles of horses in transportation and recreation

Anatomy and Physiology

4. Describe the external anatomy of a horse.
Examples: withers, crest, poll, forehead, muzzle, point of shoulder, pastern, coronet, fetlock
5. Describe structures and functions of the equine digestive system.
6. Explain functions of the equine circulatory system.
7. Identify parts and functions of equine male and female reproductive systems.
 - Describing factors in an equine breeding program
Examples: heat cycle, gestation, lactation, artificial insemination, fertility

Nutrition

8. Analyze equine feed ingredients to determine nutritional value.
Examples: grain, roughage, vitamins, minerals
 - Identifying possible problems associated with feeding equine
9. Explain the balance of rations used in feeding equine.
 - Explaining nutritional requirements at various stages of equine development

Health

10. Describe causes of major equine diseases and methods for prevention.
Examples: disease—equine encephalitis
method of prevention—improved management practices
11. Differentiate among internal and external parasites prevalent in equine.
Examples: internal—ascarids, strongyles, pinworms
external—deerflies, lice, mites, ringworm, ticks, botflies
12. Describe hoof problems in equine.
 - Recognizing symptoms of lameness in equine
13. Diagnose conditions that require the assistance of a farrier.
Examples: farrier assistance—trimming, shoeing
 - Identifying tools used by a farrier
Examples: apron, hoof gauge, hoof knife, hoof pick, anvil, rasp, hoof nippers, nail clincher

14. Categorize normal equine ranges for vital signs, critical and noncritical injuries, and treatment of wounds.

Examples: vital signs—heart rate, respiratory rate
critical injuries—broken bones
noncritical injuries—cuts
treatment of wounds—cleaning, applying ointments, applying bandages, stitching

Selection and Conformation

15. Distinguish factors in selecting horses for a particular use.

Example: draft horses for pulling heavy loads

- Describing procedures for determining the age of a horse
Example: checking size of teeth
- Describing factors to consider in judging equine halter and performance classes
- Evaluating various equine training techniques

Facilities and Tack

16. Describe equine barn styles and facilities.

Examples: barn styles—gambrel, gable
facilities—round pen, stables

- Identifying various tack and equipment used in the horse industry
- Analyzing environmental issues to maintain and care for horses
Examples: waste management, overgrazing

Fish and Wildlife Management

Fish and Wildlife Management is a course that provides students with the opportunity to gain knowledge regarding the management of natural resources. Topics included in the course are career opportunities, outdoor safety, history, issues, classification, fish and wildlife ecology, fish and wildlife management, endangered species, fish and wildlife pest management, and outdoor recreation.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 5, 6, and 8 must be included.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Career Opportunities

Student will:

1. Describe career opportunities in fish and wildlife management.

Outdoor Safety

2. Determine principles of hunting, boating, and recreational vehicle safety.
 - Identifying survival and first aid techniques related to outdoor recreation

Fish and Wildlife Management

3. Explain the history of fish and wildlife management.
 - Describing the impact of sport hunting in Alabama
Examples: economy, wildlife population
4. Describe laws that protect fish and wildlife.
5. Compare habitat needs of selected fish and wildlife species native to Alabama.
Examples: water, shelter, food
 - Designing a wildlife management plan
 - Explaining methods used to improve fish and wildlife habitats

Fish and Wildlife Issues

6. Analyze human activities for positive and negative effects on fish and wildlife.
Examples: positive—planting sea grass, conserving habitats
negative—polluting, filling wetlands
 - Explaining environmental effects of introducing nonnative species into an area
 - Describing economic damage to crops caused by wildlife
 - Evaluating issues concerning endangered and threatened species of fish and wildlife
Example: recovery strategies

Fish and Wildlife Classification

7. Distinguish game from nongame wildlife species.
 - Comparing classes of wildlife, including mammals, birds, reptiles, amphibians, and fish
8. Identify common fish and wildlife species indigenous to Alabama.

Fish and Wildlife Ecology

9. Compare aquatic and terrestrial ecosystems.
Examples: wetlands, woodlands, grasslands
 - Identifying methods used to correct an unbalanced ecosystem
 - Describing interdependence between biotic and abiotic components of a wildlife ecosystem

Fish and Wildlife Pest Management

10. Identify pests and diseases affecting fish and wildlife species.

Outdoor Recreation

11. Identify outdoor recreational opportunities in Alabama.
 - Identifying methods of developing and managing outdoor recreational enterprises
12. Describe differences among state parks in Alabama.

Floral Design and Interiorscaping

Floral Design and Interiorscaping is a one-credit course designed to introduce students to the floral industry. Topics include career opportunities, safety, floral design, and interiorscaping.

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Career Opportunities

Students will:

1. Identify career opportunities in the floral industry.

Safety

2. Practice safe usage of tools and supplies in floral design and interiorscaping.

Floral Design

3. Create floral arrangements using basic line designs.
4. Differentiate among flowers, foliage, and plants used in the floriculture industry.
 - Demonstrating procedures for handling foliage and flowers
5. Identify common floral arrangements used in the floral design industry.

Examples: corsages, boutonnieres, bud vases, centerpiece arrangements

 - Demonstrating various floral construction techniques
Examples: wiring flowers, making bows
 - Preparing potted plants for sale
 - Calculating the cost of floral arrangements
Examples: ratio mark-up, variable ratio mark-up, percentage mark-up

Interiorscaping

6. Compare effects of light, temperature, air, and water on plant growth in interiorscaping.

7. Differentiate among drainage characteristics of various growing media.
8. Describe disease and insect control methods used in interiorscaping.
9. Compare major plant fertilizers used in interiorscaping.
 - Identifying symptoms of common nutrition disorders in plants
10. Explain principles of interior landscape design.
 - Examples: use of line, form, texture, and color
 - Demonstrating dynamics of arranging plant materials in interior settings
 - Examples: balance, size, relationships of plants
11. Design a maintenance schedule for interiorscape sites.
12. Design interiorscapes for commercial clients.

Forestry

Forestry is a course designed to enable students to become knowledgeable of forestry and wood technology. Students acquire an appreciation for increased emphasis on managing and conserving forests for the future. Topics include career opportunities, safety, history, dendrology, tree measurement, mapping, silviculture, forest products, and forest protection.

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This course may be taught as a one-credit or half-credit instructional-hour course. For a half-credit course, standards 1, 2, 3, 4, 5, 6, 8, 9, 11, and 13 must be included.

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Career Opportunities

Students will:

1. List employment opportunities in forestry.

Safety

2. Identify potential hazards in Alabama forests, including topographical hazards, stinging insects, venomous spiders and snakes, and poisonous plants.

History

3. Describe historical events that have influenced forestry in Alabama and the United States.
 - Comparing roles of Alabama forestry agencies

Dendrology

4. Describe major parts of a tree and their functions.
5. Identify common forest trees of Alabama.
 - Comparing hardwood and softwood trees
 - Comparing gymnosperms and angiosperms

Tree Measurement

6. Demonstrate the use of tree measurement tools.
Examples: Biltmore stick, hypsometer, clinometer, tree calipers, tree diameter tape
 - Describing techniques for measuring diameter at breast height (DBH)
 - Describing techniques for measuring total tree height
 - Describing techniques for measuring pulpwood at marketable height
 - Describing techniques for measuring sawlogs
7. Determine the volume of standing timber.
Examples: using Doyle Log Rule, Scribner Log Rule, and International Log Rule
 - Calculating forest product value using cords, board feet, and cubic feet
8. Describe various methods for cruising timber.
Examples: line plot, strip, total
 - Grading a tree for defects, size, and type to determine possible products
 - Determining techniques for timber stand improvement (TSI)

Mapping

9. Interpret map characteristics and features.
 - Locating various positions on a map
 - Using a scale to determine distance on maps
 - Identifying markings on a mapExamples: colors, symbols, contour lines
10. Demonstrate the use of mapping tools, including direction, elevation, and distance-reading tools.
 - Locating land corners and boundaries
 - Determining acreage using a legal land description, topographic map, and a hand compass
 - Describing how topographical maps combined with aerial photographs are used to identify the location of specific property
 - Describing uses of a global positional system (GPS) in forestry
 - Describing a legal land description, including townships, ranges, and sections
 - Comparing systems of land surveyingExamples: rectangular, metes and bounds

Silviculture

11. Compare methods of harvesting timber, including seed tree cutting, clear cutting, selection cutting, and shelter wood cutting.
 - Identifying common harvesting techniques in forestryExamples: felling, bucking, skidding, loading

12. Compare artificial and natural reforestation methods.
 - Identifying sources of tree seedlings
 - Selecting methods for the handling and care of seedlings
 - Evaluating tree planting methods
13. Explain the importance of prescribed burning.

Forest Products

14. Describe chemical and physical properties of wood.
15. Identify lumber, timber, and paper products produced from wood.
 - Describing the process by which various forest products are made
16. Analyze characteristics of lumber to determine grade.
Examples: decay splits, milling defects, knots, stains
17. Describe wood treatment processes.
Examples: preservative oils, water-borne salts, pressure treatment techniques

Forest Protection

18. Identify causes of forest fires.
 - Identifying fire-fighting tools and methods

Forestry Equipment

Forestry Equipment is a one-credit course designed to enable students to become knowledgeable in the maintenance and safe operation of all equipment used in the forestry industry, including types of gasoline and diesel engines. Topics include career opportunities, safety, large equipment, small equipment, engine maintenance, and hydraulics.

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Career Opportunities

Students will:

1. Examine careers in sales and service of forestry equipment.

Safety

2. Recognize the need for safety clothing and gear used in the forestry industry.
 - Identifying safe practices in the forestry mechanics industry
 - Describing the safe operation and maintenance of forestry equipment

Large Equipment

3. Compare uses of tree-harvesting equipment.
Examples: skidder, loader, cutting machine, delimber
4. Identify road and fire lane maintenance equipment.
Examples: bulldozer, road grader

Small Equipment

5. Demonstrate the use of forestry hand tools, including pruning saws, bow saws, loppers, and brush cutters.
6. Identify sharpening techniques for chain saws, axes, pruners, and pole saws.

7. Identify types of urban forestry equipment, including tree-climbing equipment and tree-moving equipment.
8. Explain common techniques of chain saw maintenance.
 - Identifying major components of a chain saw
 - Differentiating types of chains used on a chain saw

Engine Maintenance

9. Identify systems that require inspection before engine operation.
10. Describe preparation of forestry equipment for storage.
Examples: draining fluids, lubricating

Hydraulics

11. Describe uses of hydraulic systems in the forestry industry.
 - Identifying basic components of a simple hydraulic system
 - Comparing advantages and disadvantages of using a hydraulic system

Greenhouse Production and Management

Greenhouse Production and Management is a one-credit course related to the production of greenhouse crops. Topics include career opportunities, safety, plant propagation, growing media, plant identification, greenhouse production, pest control, business management, and equipment and facilities. The hands-on approach to learning is a key component in this course.

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Career Opportunities

Students will:

1. Describe careers in the greenhouse production and management industry.

Safety

2. Describe safety precautions related to the greenhouse production and management industry.

Plant Propagation

3. Demonstrate propagation methods for greenhouse plants.
4. Practice seed germination techniques in greenhouse operations.

Growing Media

5. Adjust greenhouse growing media properties by adding amendments.
 - Adjusting the pH of greenhouse growing media
6. Prepare growing media mixtures for greenhouse plants.

Plant Identification

7. Identify greenhouse plants by common name.

Greenhouse Production

8. Differentiate among environmental factors affecting greenhouse plant growth.
 - Controlling environmental conditions for plant growth in the greenhouse
Examples: temperature control, ventilation, watering
9. Produce seasonal greenhouse crops.
Examples: winter—poinsettias
spring—trumpet lilies
10. Identify common greenhouse plant disorders.
Examples: root rot, insect damage, fungus
11. Select types of fertilizers and methods of application used in greenhouse production.

Greenhouse Pest Control

12. Apply pesticides to greenhouse crops.
 - Identifying safety and first aid precautions in greenhouse management
 - Using correct pesticides for intended target in greenhouse management
 - Disposing of containers and leftover pesticide mixtures according to Environmental Protection Agency (EPA) standards

Business Management

13. Select quality greenhouse plants for marketing.
14. Demonstrate managerial skills for successfully operating a greenhouse business.

Greenhouse Equipment and Facilities

15. Maintain greenhouse facilities.
16. Maintain equipment used in greenhouse operations.

Horticultural Science

Topics in Horticultural Science include career opportunities, safety, plant physiology, growing media, greenhouse facilities, greenhouse and nursery crop production, plant identification and classification, pest management, hydroponics and vegetable gardening, and technological applications.

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This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 5, 6, 7, 9, 13, 14, and 16 must be included.

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Career Opportunities

Students will:

1. Explain the importance of horticulture to local, state, national, and world economies.
2. Identify careers in horticulture.

Safety

3. Describe safety practices in horticulture.

Plant Physiology

4. Describe vegetative structures and functions in annuals, biennials, and perennials.
Examples: root for plant anchor and support, stem for plant support, leaf for photosynthesis and respiration
 - Identifying sexual reproductive structures and functions of plants
Examples: flower, fruit, seed
 - Identifying asexual reproductive structures and functions of plants
Examples: stem, root, leaf

5. Describe the purpose and use of growth regulators.
Examples: rooting, growth stimulant, retardant

Growing Media

6. Differentiate soil from soilless media in the horticulture industry.
7. Identify components of soil.
Examples: sand, silt, clay
8. List macronutrients and micronutrients needed for plant growth.
 - Identifying the function of macronutrients and micronutrients
Examples: major macronutrients—nitrogen, phosphorus, potassium
secondary macronutrients—calcium, sulfur, magnesium
micronutrients—zinc, iron, boron, copper, manganese, carbon, hydrogen, oxygen, molybdenum, chloride
 - Recognizing common nutrient deficiency symptoms
9. Design short- and long-term fertilization plans based on information provided by a soil test.
 - Comparing organic and inorganic fertilizers
 - Demonstrating fertilizer application methods
 - Describing pH modification procedures

Greenhouse Facilities

10. Describe various greenhouse designs and types of coverings.
Examples: designs—even-span, Gothic arch, uneven-span, Quonset, lean-to, attached or gutter-connected
coverings—glass, polyethylene, fiberglass, acrylic, polycarbonate
 - Comparing methods used in controlling greenhouse temperatures
Examples: misting, heating, ventilating
 - Describing tables or benches used in greenhouses
Examples: wood, welded wire, prefabricated plastic

Greenhouse and Nursery Crop Production

11. Design greenhouse and nursery crop production schedules.
12. Compare container and field nurseries.
13. Describe techniques for maintaining plants, including pruning, mulching, fertilizing, and irrigating.

Plant Identification and Classification

14. Identify common names of greenhouse and nursery plants.
 - Explaining the importance of the binomial classification system

Pest Management

15. Identify plant damage caused by insects.
 - Describing types of pesticides
Examples: herbicides, miticides, insecticides, fungicides, rodenticides, molluscides, nematocides
 - Describing the Integrated Pest Management (IPM) concept
 - Identifying practices required in the safe use of pesticides

Hydroponics and Vegetable Gardening

16. Compare hydroponic systems used in the horticulture industry.
Examples: sand culture, gravel culture, bag culture, aeroponic, continuous flow, nutrient film technique
17. Design a vegetable garden plan, including site and suitable plant varieties for the local area.

Technology Applications

18. Utilize various technologies in the horticulture industry.
Examples: computers, computer software, watering timers, sensors

Introduction to Agriscience

Introduction to Agriscience is an exploratory course that provides Grade 7 students with an overview of the agriculture industry. Topics include career opportunities, safety, impact of agriculture, supervised agricultural experiences, leadership development, environmental science, animal science, plant science, technology and biotechnology, agribusiness, and woodworking.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

Introduction to Agriscience may be taught as a 35-, 70-, or 140-hour course. It may be offered as a component of a rotation course allowing students to explore different career fields. If a course contains two 70-hour rotations, content standards 1, 2, 3, 5, 6, 10, 11, 13, 16, and 19 must be taught. If a course contains four 35-hour rotations, content standards 1, 2, 5, 6, 16, and 19 must be taught.

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Career Opportunities

Students will:

1. Identify career opportunities within the agriculture industry.

Safety

2. Identify safety rules and procedures required for working with hand and power tools in agricultural operations.

Impact of Agriculture

3. Determine the impact of the agriculture industry on the economies of Alabama, the United States, and the world.
 - Describing major factors in world consumer preferences
4. Describe basic human needs, including food, clothing, and shelter.
 - Describing benefits of an abundant, inexpensive, and safe food supply produced by United States farmers for the American population
 - Examples: abundance—independence from foreign food imports
 - inexpensive—less income spent on food
 - safe food supply—better overall health of populations

Supervised Agricultural Experience

5. Describe criteria for selecting a SAE.
Examples: years in program, career interest, career advantages
 - Identifying requirements of a SAE, including manageability, availability of facilities, financing, and record keeping

Leadership Development

6. Demonstrate qualities of leadership, including cooperation, citizenship, and communication.
Examples: cooperation—teamwork
citizenship—community service
communication—written and verbal skills

Environmental Science

7. Contrast sources of agricultural and nonagricultural pollution in water supplies.
Examples: agricultural pollution—fertilizers, pesticides
nonagricultural pollution—trash, industrial wastes
8. Differentiate renewable from nonrenewable natural resources.
Examples: renewable—water, trees
nonrenewable—fossil fuels
9. Compare methods of soil, water, and wildlife conservation.
Examples: soil—cover cropping, wind breaks, no-till farming, terracing
water—creating water reservoirs
wildlife—restocking, following governmental regulations
10. Explain benefits of forests and woodlands.
Examples: aesthetics, recreation, building materials, wildlife, water, air purification

Animal Science

11. Compare structure, size, and scale of various breeds of domesticated animals.
 - Describing the importance of domesticated animals
 - Describing benefits of various breeds of domesticated animals

Plant Science

12. Explain the role of plants in the transfer of energy through food chains.
13. Describe the structure and function of seeds.
 - Describing proper handling, storage, and care of seeds

14. Distinguish fruits from vegetables.
 - Identifying locally grown fruits and vegetables
15. Explain the impact of fertilizers and pesticides on plant growth.

Technology and Biotechnology

16. Analyze biotechnology to determine benefits to the agriculture industry.
Examples: improved productivity, medical advancements, environmental benefits
17. Describe technology used in the agriculture industry.
Examples: remote sensing, robotics, global positioning systems (GPS), geographical information systems (GIS), electronic reference sources, data management software

Agribusiness

18. Explain the importance of agribusiness marketing skills, including salesmanship, customer service, and advertising.

Woodworking

19. Interpret a woodworking project plan.
 - Identifying whole number and fractional designations on a standard ruler
 - Recognizing uses of basic woodworking tools and materials
 - Demonstrating techniques for sanding and finishing wood

Introduction to Drafting Design

Introduction to Drafting Design is a one-credit course that serves as an introduction to the drafting design technology field. It provides essential information that builds a strong foundation for the entire program. Emphasis is placed on student orientation, safety, tools and procedures, geometric construction, sketching, dimensioning practices, visualization, and orthographic projection concepts. Computer-Aided Drafting (CAD) functions and techniques using CAD software applications are introduced. Upon successful completion of this course, students are able to utilize tools and interpret basic drafting standards to complete a multi-view drawing. This entry-level course is a prerequisite to all other drafting design technology classes.

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Orientation

Students will:

1. Relate the importance of drafting design technology in today's technological work force.

Safety

2. Demonstrate the safe handling of drafting design tools according to classroom and environmental practices, procedures, and regulations.

Applied Mathematics for Drafting

3. Demonstrate mathematics skills related to drafting design, including basic fractions, scale reading, and conversion of customary to metric and metric to customary measurements.
 - Solving higher-order mathematics applications
Example: calculating thread depth and pitch
 - Calculating architectural computations
Examples: area, rise and run

Drafting Instruments and Techniques

4. Demonstrate the use of drawing media and drafting instruments.
Examples: architectural scales, graphite, lead holders
 - Utilizing computer software for drafting applications
 - Reproducing drafting originals
Examples: print, plot, blueprint, photocopy

Lettering and Drawing Techniques

5. Demonstrate drafting techniques for freehand sketching, lettering, geometric figures, and the alphabet of lines to create a drawing.

Multi-View Drawings

6. Construct basic multi-view, two-dimensional drawings, including visualizing principle views, creating third-angle projections, selecting proper drawing scale, and organizing layout of primary views.

Basic Dimensioning

7. Apply dimensions and notes to multi-view drawings, utilizing the American National Standards Institute (ANSI) dimensioning standards and decimal, metric, or dual dimensioning.

Fundamentals of Computer-Aided Drafting

8. Utilize CAD software to generate a multi-view drawing using appropriate file management techniques, basic drawing commands, and basic dimensioning techniques.
Examples: file management techniques—create, set up, and save files
basic drawing commands—line, ellipse, circle, scale
basic dimensioning techniques—linear, angular
 - Utilizing CAD software and computer to print a multi-view drawing

Introduction to Fisheries Technology

This is a one-credit course designed to introduce students to local fishing industries within the state. Students study rules and regulations pertaining to each type of fishing industry and the equipment and processing techniques used to harvest seafood from local waters. Also included in the course are ways technology has impacted equipment and techniques over time.

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Commercial Hook and Line Fishing

Students will:

1. Describe working vessels in the commercial hook and line fishing industry.
 - Identifying required equipment utilized in the commercial hook and line fishing industry
2. Compare state and federal licenses and rules and regulations associated with the commercial hook and line fishing industry.

Net Fishing

3. Describe working vessels in the net fishing industry related to the commercially important species fishing industry.
 - Identifying required equipment utilizing the net fishing industry related to the commercially important species fishing industry
4. Compare state and federal licenses, rules, and regulations associated with the net fishing industry related to the commercially important species fishing industry.

Charter Fishing

5. Describe working vessels in the charter fishing industry.
 - Identifying required equipment utilized in the charter fishing industry
6. Compare state and federal licenses and rules and regulations associated with the charter fishing industry.

Longline Fishing

7. Describe working vessels in the longline fishing industry.
 - Identifying required equipment utilized in the longline fishing industry
8. Compare state and federal licenses and rules and regulations associated with the longline fishing industry.

Ecology and Conservation

9. Explain impacts of ecology and conservation on commercial fishing.

Introduction to Masonry

Introduction to Masonry is a one-credit course designed to provide students with the basic knowledge and skills of masonry. Emphasis is placed on safety, tools of the trade, measuring, blueprint reading and layout, and masonry wall construction. Upon successful completion of this course, students demonstrate basic block and brick construction techniques.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for masonry construction.
2. Identify rules and regulations related to masonry construction.

Orientation

3. Describe skills needed to work as a mason.
4. Identify tools and equipment used in performing masonry work.

Blueprint and Layout

5. Interpret construction drawings and specifications for masonry construction.
6. Identify components and types of mortar used in masonry construction.
 - Demonstrating various mortar mixing procedures using specified equipment
Examples: mixing mortar by hand, mixing mortar with a mechanical mixer
7. Describe types of masonry bonds.
8. Describe various techniques used in masonry wall construction.
Examples: masonry bonds, setup, joints, construction

Jointing

9. Demonstrate basic block and brick construction techniques.
10. Use basic bricklaying procedures, including mixing of mortar, laying a mortar bed for block and brick, and laying bricks with a head joint.

11. Identify composition, reinforcement, and forms used for concrete construction.

Foundations

12. Identify various kinds of footings, including continuous, spread, stepped, and pier.
13. Demonstrate site layout and measurements for a slab-on-grade with existing foundation and a slab-on-grade with integral foundation.
14. Demonstrate the finishing of concrete according to specifications for a masonry project.

Estimation

15. Determine materials and supplies needed for a masonry project.

Introduction to Metal Fabrication

Introduction to Metal Fabrication is a course that provides students with opportunities to examine safety and technical information in metal fabrication and to participate in hands-on activities in the laboratory. Topics include career opportunities, safety, identification and selection, metal preparation and finishing, metal cutting, weld quality, and shielded metal arc welding (SMAW).

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 6, 9, 12, and 13 must be included.

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Career Opportunities

Students will:

1. Identify careers available in metal fabrication.
2. Describe the history of metal fabrication and its impact on the industry.
Examples: history—blacksmithing, oxyfuel development, arc welding, metal inert gas (MIG) welding, tungsten inert gas (TIG) welding
impact—automated systems making jobs obsolete, reduction in number of workers in job market

Safety

3. Demonstrate safety procedures used in the metal fabrication industry.

Identification and Selection

4. Explain uses of metal fabrication tools and equipment.
Examples: tools—hacksaw, cold chisel, file, drill, chipping hammer, metal vise grips, grinder, striker, tip cleaner, wire brush, tongs
equipment—welding helmet, fuel valves, oxyfuel torches
5. Differentiate among types of metal used in metal fabrication.
Examples: iron, aluminum, steel, tin, titanium, copper, magnesium, chromium, zinc

Metal Preparation and Finishing

6. Demonstrate techniques for preparing metal for fabrication.
Examples: stripping, cleaning, grinding, buffing

Metal Cutting

7. Prepare an oxyfuel unit for operation.
 - Explaining color-coding of oxyfuel tanks and hoses
Examples: green for oxygen, orange or black for acetylene
 - Comparing shaded lenses used in oxyfuel welding and cutting
 - Checking for cracks and leaks in oxyfuel hoses and regulators
8. Use an oxyfuel torch, including adjusting the flame to neutral and cutting and fusing metal.
9. Demonstrate procedures for using plasma arc cutting equipment.
 - Describing the plasma arc cutting process
 - Identifying components of plasma arc cutting equipment
 - Cutting metal with a plasma arc cutter

Weld Quality

10. Analyze weld imperfections to determine corrective measures.
11. Compare destructive and nondestructive weld testing methods.

Shielded Metal Arc Welding

12. Explain the SMAW process.
 - Comparing various types of welding electrodes used in SMAW
Examples: E6010, E6013, E7014
13. Demonstrate procedures for adjusting and operating the SMAW machine.
 - Identifying various types of weld joints
Examples: butt, lap, corner, T
 - Contrasting methods of striking an arc
Examples: scratching, tapping, weaving
 - Identifying types of welds
Examples: stringer, overlap, fillet
 - Demonstrating techniques for flat, vertical, horizontal, and overhead welding

Metal Assembly

14. Cut threads in metal using a tap.
15. Cut metal threads using a die.
16. Explain the process of laying out and cutting sheet metal.
17. Demonstrate the use of rivets in sheet metal assembly.

Introduction to Metal Inert Gas and Flux Cored Arc Welding

Introduction to metal inert gas (MIG) welding and flux cored arc welding (FCAW) is a one-credit course that provides students with opportunities to examine safety and technical information in metal fabrication and participate in hands-on activities in the laboratory. Topics include career opportunities, safety, planning metal structures, identification and selection, and weld quality.

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Career Opportunities

Students will:

1. Identify career opportunities in MIG welding and FCAW.

Safety

2. Demonstrate safety concepts required in MIG welding and FCAW.

Planning Metal Structures

3. Interpret welding symbols on blueprints.
4. Explain the procedure for planning and estimating materials needed to complete a metal fabrication project.
5. Explain the importance of metal preparation for welding.

Identification and Selection

6. Determine uses of tools and equipment in MIG welding and FCAW.
Examples: tools—hacksaw, cold chisel, file, drill, chipping hammer, metal vise grips, grinder, striker, tip cleaner, wire brush, tongs
equipment—welding helmet, fuel valves, MIG welder, FCAW welder

7. Distinguish among types of metal, used in MIG welding and FCAW.
Examples: iron, aluminum, steel, tin, titanium, copper, magnesium, chromium, zinc

Weld Quality

8. Critique MIG welding and FCAW welds for imperfections.
 - Determining corrective measures to improve welds
 - Explaining weld testing methods
9. Explain various parts of MIG welding and FCAW machines.
10. Compare shades of lenses needed in MIG welding and FCAW.
11. Explain how tensile strength, polarity, and rate of travel affect weld quality.
12. Demonstrate the use of MIG and FCAW welders.
 - Identifying various types of weld joints
Examples: butt, lap, corner, T
 - Adjusting MIG welding and FCAW machine settings for welding
 - Utilizing flat, vertical, horizontal, and overhead welding positions
 - Identifying stringer, weave, overlap, and fillet welds

Introduction to Veterinary Science

Introduction to Veterinary Science is a one-credit course designed to provide students with an introduction to the veterinary science profession. Topics include career opportunities, safety, humane treatment, laws and regulations, anatomy and physiology, animal health, and veterinary services.

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Career Opportunities

Students will:

1. Compare job characteristics of various careers in veterinary science.

Safety

2. Identify safety precautions for veterinary science personnel.

Humane Treatment

3. Describe responsibilities of animal control and humane societies.
 - Describing responsible ownership of animals
4. Describe humane treatment of animals.
5. Describe effects of captivity on exotic animals.

Laws and Regulations

6. Identify laws and regulations involving animals.
Examples: leash laws, noise control, mandatory euthanasia

Anatomy and Physiology

7. Describe various body systems of animals, including skeletal, muscular, circulatory, respiratory, nervous, urinary, endocrine, and digestive.

Animal Health

8. Identify methods of disease prevention in animals.
Examples: worming, vaccination
 - Analyzing symptoms of animal diseases for diagnostic purposes
 - Selecting drugs to treat animals
Examples: antibiotics, wormers
 - Describing environmental factors affecting animals
9. Demonstrate procedures for administering vaccinations, including subcutaneous and intramuscular.
10. Identify proper hygiene for animals.
11. Describe normal and abnormal animal behaviors.
Examples: normal—signs of contentment, playfulness
abnormal—aggression, loss of appetite

Veterinary Services

12. Differentiate among veterinary services for various animals.

Landscape Design and Management

The Landscape Design and Management course allows students to become more knowledgeable about and appreciative of landscape design and management. Topics include career opportunities, safety, landscape design, plant selection, landscape growth and the environment, landscape establishment and management, interior plantscaping and xeriscaping, landscape business management, and technology.

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This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 5, 6, 8, and 9 must be included.

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Career Opportunities

Students will:

1. Compare job characteristics for various careers in landscape design and management.

Safety

2. Identify safe use of pesticides, power equipment, and hand tools in the landscaping industry.

Design

3. Apply principles of landscape design, including simplicity, balance, focalization of interest, rhythm and line, scale and proportion, and unity.
 - Describing computer programs used in landscape planning
 - Designing a landscape plan, including enhancement features
Examples: fencing, birdbath, gazebo, walkway, driveway

Landscape Plant Selection

4. Identify common plants used in landscape design.
Examples: trees, shrubs, ground covers, vines, flowers, turfgrass
 - Describing physical and cultural characteristics of common plants used in landscape design
Examples: physical—color, flowering, foliage, fruiting
cultural—cold or heat hardiness, sun or shade tolerance

Landscape Growth and the Environment

5. Describe environmental factors that affect plant growth.
 - Explaining the importance of specific plant processes
Examples: photosynthesis, respiration, transpiration
6. Analyze landscape plants for symptoms of nutrient deficiencies.
Examples: primary nutrients—nitrogen, phosphorus, potassium
secondary nutrients—calcium, sulfur, magnesium
trace nutrients—boron, manganese, chlorine, zinc, molybdenum, iron, copper, aluminum
7. Explain environmental issues related to landscape design and management.

Landscape Establishment and Management

8. Demonstrate methods for planting shrubs, trees, annuals, bulbs, groundcovers, and vines.
9. Describe techniques used for establishing and maintaining landscapes, including pruning, fertilizing, irrigating, mulching, and controlling pests.
 - Identifying insects, diseases, and weeds that pose a problem in the landscape
 - Describing types of selective and nonselective pesticides used in the landscaping industry
10. Identify criteria for the selection of hand tools, power tools, power equipment, and machinery for a specific landscape task.
 - Describing basic maintenance procedures required for tools and equipment used in landscaping
11. Describe the purpose of various sprinklers within an irrigation system.
Examples: impulse, oscillating, automatic, pop-up
 - Describing methods of drainage in a landscape
Examples: tiling, sloping

Interior Plantscaping and Xeriscaping

12. Identify common needs for indoor plants used in interior plantscaping.
Examples: light, media, watering and drainage, fertilization, temperature, humidity
- Explaining principles of interior design
 - Selecting techniques used to achieve xeriscaping concepts

Business Management

13. Demonstrate business-related work ethics and managerial skills for the successful operation of a landscape business.
Examples: work ethics—following instructions, being on time, cooperating with others
managerial skills—record keeping, budgeting, pricing, scheduling work, inventorying, purchasing, advertising, handling customer complaints, communicating in oral and written form

Technology

14. Identify advancements in technology that enhance the landscaping industry.

Nursery Production and Management

Nursery Production and Management is a one-credit course designed to introduce students to the production of nursery crops. Topics include career opportunities, safety, basic plant science, plant propagation, nursery growing media, plant identification, nursery production, nursery pest control, business management, and equipment and facilities.

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Career Opportunities

Students will:

1. Identify career opportunities in the nursery production and management industry.

Safety

2. Describe safety precautions related to the nursery production and management industry.

Basic Plant Science

3. Differentiate among environmental factors affecting nursery plant growth.
4. Describe uses of primary, secondary, and trace nutrients.
Examples: primary nutrients—nitrogen, phosphorus, potassium
secondary nutrients—magnesium, calcium, sulfur
trace nutrients—iron, manganese, boron, molybdenum, copper, zinc, chloride, aluminum
5. Interpret results of a soil analysis.
 - Differentiating among components of soil
Examples: sand, silt, clay
 - Describing methods for adjusting pH
 - Calculating the amount of fertilizer needed for nursery crops

Plant Propagation

6. Demonstrate propagation methods for nursery plants.

Nursery Crop Growing Media

7. Adjust nursery growing media properties by adding amendments.
8. Prepare growing media mixtures for nursery plants.

Plant Identification

9. Identify nursery plants by common name.

Nursery Production

10. Control environmental conditions for plant growth in the nursery industry.
Examples: temperature, ventilation, water, light
11. Produce nursery crops.
12. Identify nursery plant problems.
Examples: root rot, insect damage, fungus
13. Select types of fertilizers and methods of application used in nursery production.

Nursery Pest Control

14. Apply pesticides to nursery crops.
 - Identifying safety and first aid precautions in nursery crop production
 - Selecting correct pesticides for intended targets in nursery crop production
 - Disposing of containers and left-over pesticide mixtures according to Environmental Protection Agency (EPA) standards in nursery crop production

Business Management

15. Select quality nursery plants for marketing.
16. Demonstrate managerial skills needed for successful operation of a nursery business.

Equipment and Facilities

17. Demonstrate maintenance of nursery crop growing facilities, including propagation structures, greenhouses, shade houses, and mist equipment.
18. Maintain power equipment used in nursery operations.

Plant Biotechnology

Plant Biotechnology is a one-credit course that provides students with an opportunity to develop an understanding of principles and practices of plant genetics and biotechnology regarding agriculturally related products and services. Topics include career opportunities, safety, cellular biology, biotechnology advancement, applied genetics and biotechnology concepts, and social and environmental impacts of biotechnology.

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Career Opportunities

Students will:

1. Identify career opportunities associated with plant biotechnology.
Examples: environmental chemist, genetic engineer, plant breeder, plant physiologist

Safety

2. Identify safety considerations and procedures required in plant biotechnology.
Examples: biohazards, chemical hazards, laboratory protocol, waste disposal

Botany Concepts

3. Identify the twelve plant kingdom divisions.
 - Classifying native Alabama plants using dichotomous keys
4. Describe phylogenetic relationships between plants and other organisms.
 - Classifying plants as vascular or nonvascular
 - Classifying seed-bearing and spore-bearing plants
 - Classifying plants as gymnosperms or angiosperms
 - Contrasting monocots and dicots
 - Describing mutualism among algae and fungi in lichens
5. List plant adaptations required for life on land.
 - Describing the alternation of generations in plants
 - Comparing characteristics of algae and plants

6. Identify major types of plant tissues found in roots, stems, and leaves.
Examples: parenchyma, sclerenchyma, collenchyma
 - Critiquing tissue-culturing procedures
Example: callus production
7. Identify types of roots, stems, and leaves.
Examples: roots—tap, fibrous
 stems—herbaceous, woody
 leaves—simple, compound
8. Explain the importance of soil type, texture, and nutrients to plant growth.
 - Describing water and mineral absorption in plants
 - Analyzing roles of capillarity and turgor pressure
9. Explain plant cell processes, including light-dependent and light-independent reactions of photosynthesis, glycolysis, aerobic and anaerobic respiration, and transport.
10. Describe plant responses to various stimuli.
 - Identifying effects of hormones on plant growth
Examples: gibberellin, cytokinin, auxin
 - Differentiating among phototropism, gravitropism, and thigmotropism
11. Identify life cycles of mosses, ferns, gymnosperms, and angiosperms.
12. Describe the structure and function of flower parts.
 - Describing seed germination, development, and dispersal
 - Germinating monocot and dicot seeds
13. Describe various natural and artificial methods of vegetative propagation.
Examples: natural—stem runners, rhizomes, bulbs, tubers
 artificial—cutting, grafting, layering
14. Describe the ecological and economic importance of plants.
Examples: ecological—algae-producing oxygen, bioremediation, soil preservation
 economic—food, medication, timber, fossil fuels, clothing
 - Analyzing effects of human activity on the plant world
15. Identify viral, fungal, and bacterial plant diseases and their effects.
Examples: viral—tobacco mosaic, Rembrandt tulips
 fungal—mildew, rust
 bacterial—black rot

Biotechnology Advancement

16. Explain the historical development of plant biotechnology.
Examples: making cheese, wine, bread; distilling vinegar; pickling fruits and vegetables
- Identifying medical advancements in plant biotechnology
Examples: insulin, vaccines, vitamin enrichment of grains, therapeutic proteins
 - Describing environmental advancements in plant biotechnology
Examples: reduced pesticide usage, lower energy requirements, disease-resistant plants, herbicide-resistant plants, bioremediation, phytoremediation
 - Describing food product advancements in plant biotechnology, including genetic alteration and selective breeding
Examples: increased yield, potatoes with higher solid content, higher protein peanuts, tomatoes with longer shelf life, *Bacillus thuringiensis* (Bt) corn

Applied Genetics and Biotechnology Concepts

17. Describe methods of genetic engineering.
Examples: tissue culturing, plant breeding
18. Explain the concept of hybridization as it relates to plant biotechnology.
19. Evaluate properties of plants for selecting superior plants for harvest.
Examples: cold tolerance, salt tolerance, ripening rate, higher starch content, Vitamin A content, water and mineral absorption

Social and Environmental Impacts of Biotechnology

20. Identify public agencies that conduct research and regulate the usage of plant biotechnology.
Examples: United States Department of Agriculture (USDA), Environmental Protection Agency (EPA), Food and Drug Administration (FDA)
- Describing positive and negative aspects of labeling genetically modified organisms for import and export
 - Evaluating effects of plant hormones on plants, animals, and human growth and development
Examples: indigenous hormones, intentionally introduced hormones, unintentionally introduced hormones
 - Describing how public opinion on marketing, sales, labeling, and government regulations affect plant products grown in the United States

Poultry Science

Poultry Science is a one-credit course that allows students to develop an appreciation of the importance of the poultry industry. Topics include career opportunities, safety, environmental issues, breeds of poultry, nutrition and disease prevention, consumer issues, biotechnological advancement, and management and marketing practices.

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Career Opportunities

Students will:

1. Describe various careers associated with poultry science.
2. Explain the history of poultry science.

Safety

3. Demonstrate the safe handling of chemicals and drugs used in poultry production.
Example: preventing chemicals from leaking into the groundwater supply
 - Identifying safety procedures for transporting poultry
Examples: securing birds in crates, securing crates on trucks

Environmental Issues

4. Identify procedures for disposal of poultry litter, including spreading wet, dry, and dehydrated litter.
5. Identify procedures for disposal of dead birds, including composting and freezing.

Breeds of Poultry

6. Identify various breeds of poultry, including chickens, ducks, geese, quail, and turkeys.
 - Describing the structure and function of poultry skeletal, digestive, reproductive, excretory, respiratory, circulatory, and nervous systems

Nutrition and Disease Prevention

7. Explain accepted feeding practices for various kinds of poultry.
8. Describe procedures for controlling diseases and parasites in poultry production.
 - Identifying symptoms for common poultry diseases and parasites
9. Describe factors to be considered in the design of energy-saving housing for poultry, including ventilation and lighting.
 - Explaining uses of automation in poultry production
Examples: feeding, watering, air-conditioning, egg collecting, removing waste
 - Analyzing cooling systems used for reducing heat stress in poultry houses
Examples: fan systems, fogging systems, evaporative cooling systems
10. Analyze health issues associated with poultry processing to avoid the spread of bacterial and viral infections.

Consumer Issues

11. Identify governmental agencies regulating the poultry industry.
Examples: Alabama Department of Agriculture and Industries, United States Department of Agriculture (USDA), Occupational Safety and Health Administration (OSHA)
 - Describing the importance of consumer education and community relations in poultry production
Examples: odor issues, irradiation of meat, water quality

Biotechnological Advancement

12. Describe biotechnological advancements in poultry science.
Examples: using eggs to produce medicines, vaccinating eggs

Management and Marketing Practices

13. Explain the operation of modern poultry businesses.
 - Comparing methods of marketing poultry products
 - Identifying advantages and disadvantages of contracting with large poultry firms

Power Equipment Technology

Power Equipment Technology is a one-credit course designed to prepare students for entry-level employment or advanced training in the power mechanics field. Topics include career opportunities, safety, tools, hydraulics, pneumatics, drivetrains, control systems, starters, and preventive maintenance.

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Career Opportunities

Students will:

1. Identify career opportunities in power equipment technology.

Safety

2. Explain safety procedures for working with power equipment systems.

Tools

3. Differentiate among common tools used with hydraulic and pneumatic systems.
Examples: mechanical tools, hose crimpers
4. Identify common test equipment used with hydraulic and pneumatic systems.
Examples: gauges, flow meters

Hydraulics

5. Identify systems in power equipment that utilize hydraulics.
6. Distinguish between single-acting and double-acting hydraulic cylinders.
7. Describe components of a hydraulic system.

8. Explain how a hydraulic system works.
 - Diagnosing problems with a hydraulic system
 - Solving problems found in a hydraulic system

Pneumatics

9. Identify parts of a pneumatic system.
10. Explain how a pneumatic system works.
 - Diagnosing problems with a pneumatic system
 - Solving problems found in a pneumatic system

Drivetrains

11. Identify power equipment drivetrain components and the functions of each.
12. Diagnose power equipment clutch and transmission problems.

Control Systems

13. Identify controls used in hydraulic and pneumatic systems.
Examples: electronic, digital, robotic, manual
14. Describe the use of compliance controls on power equipment.
Examples: engine kill switch, inertia brake control

Starters

15. Demonstrate the procedure for manual starter overhaul.
 - Diagnosing manual starter problems
16. Demonstrate the procedure for repairing electric starters.
 - Diagnosing electric starter problems

Preventive Maintenance

17. Identify preventive maintenance procedures used in checking and servicing hydraulic and pneumatic systems.
Examples: changing fluids, changing filters, checking fluid levels, checking hoses

Residential and Commercial Power Equipment

Residential and Commercial Power Equipment is a one-credit course designed to prepare students for entry-level employment or advanced training in the power mechanics field. Topics include career opportunities, safety, lawn and garden chassis, chain saw, string trimmer, tillers, generators, pumps, Environmental Protection Agency (EPA) pollution controls, electrical systems, and electrical system repair on power equipment.

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Career Opportunities

Students will:

1. Recognize career opportunities related to the residential and commercial power equipment industry.

Safety

2. Demonstrate safety procedures for working with power equipment.

Lawn and Garden Chassis

3. Diagnose frame and sheet metal problems in power equipment.
 - Repairing frame and sheet metal problems in power equipment
4. Diagnose cutting-deck problems in power equipment.
 - Demonstrating the procedure for correcting cutting-deck problems

Chain Saw

5. Diagnose chain saw problems.
 - Demonstrating the procedure for correcting chain saw engine problems
 - Demonstrating the procedure for correcting bar and chain problems

String Trimmer

6. Diagnose string trimmer problems.
 - Demonstrating the procedure for correcting string trimmer engine problems
 - Demonstrating the procedure for correcting tube and cutting-head problems

Tillers

7. Diagnose tiller problems.
 - Demonstrating the procedure for correcting tiller engine problems
 - Demonstrating the procedure for correcting tiller drivetrain problems

Generators

8. Diagnose output problems in generators.
 - Demonstrating the procedure for correcting generator engine problems
 - Demonstrating the procedure for correcting generator electrical output problems

Pumps

9. Calculate the output pressure of various pumps.
10. Demonstrate the procedure for rebuilding various pumps.

Environmental Protection Agency Pollution Controls

11. Describe EPA pollution control units for power equipment.

Electrical Systems

12. Discuss the use of Ohm's law.
 - Applying Ohm's law to series and parallel circuits
 - Diagnosing electrical problems
13. Demonstrate procedures for repairing power equipment electrical systems.

Oxyfuel Equipment

14. Demonstrate safety techniques for using oxyfuel equipment.
15. Perform a variety of oxyfuel tasks, including heating metal, cutting, welding, or brazing.

Welding

16. Prepare a welding machine for operation.

Examples: flux cored, shielded metal arc

- Selecting materials for various welding techniques

Residential Landscape Establishment and Maintenance

Residential Landscape Establishment and Maintenance is a one-credit course that focuses on the residential landscape industry. Topics include career opportunities, safety, plant nutrition, pest management, plant identification, residential landscape design and maintenance, tool and equipment maintenance, residential landscape business management, and technology.

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Career Opportunities

Students will:

1. Describe job characteristics for career opportunities in the residential landscape industry.

Safety

2. Identify safety precautions in the residential landscape and maintenance industry.

Plant Identification

3. Identify residential landscape plants and turfgrasses by common name.

Designing a Plan

4. Design a residential landscape plan.
 - Choosing plants and turfgrasses for a landscape based upon selected criteria
 - Demonstrating residential landscaping techniques

Tools and Equipment

5. Identify tools and equipment used for the installation and maintenance of a residential landscape.
 - Demonstrating the maintenance of hand tools and small power equipment

6. Utilize skills needed to maintain drainage and irrigation systems.
 - Identifying various sprinklers used in an irrigation system

Residential Landscape Maintenance

7. Maintain trees, shrubs, plants, and turfgrasses in a residential landscape.
Examples: fertilizing, controlling weeds, mowing, edging, weed-eating

Nutrition

8. Select types of fertilizers and methods of application used in the residential landscape and maintenance industry.

Residential Landscape Pest Control

9. Identify insects, diseases, and weeds that affect residential landscape plants.
Examples: insects—army worms, grubs, mole crickets
diseases—dollar spot, rusts, fungi
weeds—crabgrass, pigweed
10. Differentiate among various types of pesticides used on residential landscape plants.
 - Describing techniques for preparing pesticide mixtures

Business Management

11. Demonstrate appropriate business-related work ethics and managerial skills for a lawn maintenance business.

Technology

12. Describe technological advancements in the residential landscape industry.

Residential Wiring

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. This course emphasizes safety, grounding, conduit and electrical metallic tubing (EMT) bending, boxes and fittings, conductor installation, conductor termination and splices, installation of electrical services, circuit breakers and fuses, and residential wiring systems. Upon successful completion of this course, students are able to wire a house with limited supervision.

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Safety

Students will:

1. Demonstrate safety procedures as recognized by governing agencies and approved industry standards when testing and replacing components or installing wiring in residential applications.
Examples: lockout, tagout
2. Identify electrical hazards and how to avoid and minimize them in the residential construction environment.

Grounding

3. Explain the purpose of grounding systems in residential wiring applications.
4. Distinguish between ground faults and short circuits in residential wiring applications.
5. Describe the difference between system grounding and equipment grounding related to residential wiring.
6. Demonstrate the installation of various grounding devices related to residential wiring.

Conduit and Electrical Metallic Tubing Bending

7. Demonstrate the process of conduit bending according to specifications using hand and power equipment.
 - Computing angles for conduit bends and offsets
 - Demonstrating procedures for correcting and modifying existing conduit and EMT bends

Boxes and Fittings

8. Calculate type and size of electrical boxes based on application, number, and size of conductors using the National Electrical Code (NEC) handbook.
 - Demonstrating the ability to locate and install electrical boxes according to the NEC handbook
 - Explaining the NEC requirements for supporting lighting fixtures
 - Demonstrating the ability to install lighting fixtures according to specifications

Conductor Installation

9. Select the correct size and type of conductors for residential wiring applications and NEC handbook.
10. Demonstrate different methods for installing common conductors used in residential wiring.

Conductor Termination and Splices

11. Produce quality conductor terminations.
12. Demonstrate the procedure for installing lugs and connectors onto conductors.
13. Explain the importance of using correct bolt torque when working with bus bars.
14. Demonstrate correct conductor splicing and crimping.

Installation of Electrical Services

15. Install main disconnects, switches, panel boards, and over-current protection.
 - Describing various types of residential electrical service installations
 - Calculating circuit loads for installation of electrical services

Circuit Breakers and Fuses

16. Identify devices used for over-current protection.
17. Describe the operation of circuit breakers and fuses.

Residential Wiring Systems

18. Use a specific plan to complete a wiring project for residential applications.

Safety and Health Regulations

In this one-credit course students gain valuable information that serves as a foundation for further study in this area. Students learn the importance of government and industry regulations as well as individual responsibilities for performing activities from a safety perspective. Students identify common safety hazards found in the workplace and their role in minimizing and avoiding unsafe practices. Specific topics include flammable and combustible liquids, egress and fire protection, electrical safety, environmental control, machine guarding, tool safety, first aid, hazard communication, personal protective equipment, walking and working surfaces, and material handling and storage.

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Introduction

Students will:

1. Explain the importance of Occupational Safety and Health Administration (OSHA) industry regulations and individual responsibilities in workplace safety and health practices.
2. Describe job-related, high-hazard area risk assessment techniques and the impact of accidents on industry.
 - Utilizing job safety analysis worksheets
3. Compare federal and state child labor laws regarding hours and locations where youth may work, including required permits.
4. Explain worker rights according to OSHA Safety and Health Regulations standards.

Flammable and Combustible Liquids

5. Describe characteristics of flammable and combustible liquids, including flash point, flammable limits, boiling point, vapor density, vapor pressure, ignition temperature, and specific gravity.
6. Demonstrate storage and handling procedures for flammable and combustible liquids.
7. Compare classes of fire and fire extinguishers.
 - Discussing the proper use of fire extinguishers

Means of Egress and Fire Protection

8. Develop an emergency plan, including fire protection, means of egress, exit route and exits, and special concerns for confined spaces.

Electrical Safety

9. Explain assured equipment grounding programs.

General Environmental Control

10. Interpret general environmental controls, safety color codes for marking physical hazards, and specifications for accident prevention signs and tags.

Machine Guarding

11. Explain machine guarding general requirements for industrial and construction machines and operations.

Hand and Portable Power Tools

12. Explain tool safety guidelines, including hand, power, power-actuated, and pneumatic tools.

Introduction to Industrial Hygiene and First Aid

13. Explain industrial and construction health and first aid procedures, including personal protection from body fluids; skin, rash, or dermatitis incidents; and oil, gas, and chemical spills.

Hazard Communication

14. Explain the importance of hazard communication, including signs, signals, barricades, markers, lockouts, and tags used on a job site.
15. Explain the use of Material Safety Data Sheets (MSDS).

Personal Protective Equipment

16. Explain the use of personal protective equipment, including eye, face, foot, and respirator protection.

Walking and Working Surfaces

17. Explain site-specific protection procedures and safety requirements with regard to the importance of housekeeping procedures, the use of ladders and scaffolding, rigging procedures, and hazards of floor and wall openings.

Material Handling and Storage

18. Explain the importance of safety practices for manual lifting, load lifting, and rigging procedures.

Senior Career Pathway Project

Senior Career Pathway Project (SCPP) is a capstone course designed for career and technical education students who have completed two or more career and technical education courses. This course allows students to utilize their secondary coursework through an experience that showcases their learning. It provides an opportunity for a student to choose an area of interest and engage in an in-dept exploration of the area while demonstrating problem-solving, decision-making, and independent-learning skills. The SCPP contributes to an educational plan of challenging courses and practical experiences that prepares students for the workplace or for pursuing further education.

During the SCPP the student works with his or her coordinating teacher, academic teachers, and with a product or process mentor who has expertise in the student's field of study. At the conclusion of the SCPP, the student presents or demonstrates knowledge gained to an audience consisting of the coordinating teacher, academic teachers, the product or process mentor, peers, and community and business representatives.

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Project Proposal

Students will:

1. Create a formal, narrative proposal that communicates a specific concept, process, or product related to a chosen career pathway.
Examples: "Effects of Refrigerants on the Ozone Layer," "Irrigation and Drainage Systems of Sports Fields," "Remodeling a Bathroom for the Physically Handicapped," "Marketing a Product for Teenagers," "Internship for Becoming a Sushi Chef," "Developing a Disaster Response Plan for a Hospital Emergency Room"

Research

2. Conduct independent research related to a selected project concept.
Examples: Internet research, related readings, original research

Project Report

3. Write a detailed report on the chosen project.
 - Demonstrating correct usage of standard writing format

Presentation

4. Produce an original multimedia presentation based upon project results.
Examples: producing a digital presentation and oral explanation, creating a documentary, presenting a project model and explanation

Portfolio

5. Design a project portfolio that includes project-related documentation.
 - Critiquing a project portfolio for components and process validity
Examples: components—abstract, table of contents, project proposal, signature sheets, journal entries, research, formal timeline, self-assessment, mentor assessments

Specialty Floral Design and Management

Specialty Floral Design and Management is a one-credit course designed to enhance student employability skills, knowledge of business operations and management skills, and floral design skills. Topics include career opportunities, safety, history, employability skills, business operations, and specialty floral arrangements.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Identify careers in the floriculture industry.

Safety

2. Describe safety procedures used in the floriculture industry.

History

3. Trace the history of basic principles of design used in floriculture.

Employability Skills

4. Create a portfolio, including a résumé, cover letter, job application, and photographs, of personally designed floral arrangements.
5. Identify time management skills used in the floriculture industry.

Business Operations

6. Identify tools and equipment used in the floriculture business.

7. Explain shop operations involved in managing a floriculture business.
Examples: conducting sales and service, creating advertising and promotional displays, designing facilities, maintaining equipment

Specialty Floral Arrangements

8. Identify line designs used in specialty floral arrangements, including inverted-T, L-pattern, vertical, crescent, Hogarth curve, and contemporary freestyle.
9. Identify flowers, foliages, and potted plants used in specialty floral arrangements.
10. Describe the role of the florist in designing and planning wedding, sympathy, and special occasion arrangements.
11. Design wedding, sympathy, and special occasion arrangements.
Examples: wedding—bride and bridesmaid bouquets, groomsmen boutonnieres
sympathy—sprays, saddles, baskets, potted plants
special occasion—Valentine arrangements

Sports Turfgrass Production and Management

Sports Turfgrass Production and Management is a one-credit course that prepares students for sports turfgrass careers. Topics include career opportunities, safety, turfgrass growth, turfgrass management, sports fields, turfgrass tools and equipment, business management, and technology.

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Career Opportunities

Students will:

1. Describe job characteristics in various career opportunities in the sports turfgrass industry.

Safety

2. Identify workplace safety precautions for sports turfgrass personnel.

Turfgrass Growth

3. Identify common names, characteristics, and uses of warm- and cool-season perennial grasses.
 - Categorizing climatic regions in the United States to determine suitable grasses
Examples: Region 1—Kentucky bluegrass
Region 2—Bermuda grass
4. Differentiate among the growth patterns of turfgrasses, including rhizome, stolon, and bunch.
5. Explain soil preparation techniques needed during turfgrass renovations.
Examples: grading, draining, fertilizing
 - Describing components of soils and the importance of each to the turfgrass industry
 - Describing methods of establishing turfgrasses
Examples: seeding, sodding, plugging, sprigging

Turfgrass Management

6. Evaluate results of a soil analysis.
 - Comparing characteristics of primary and secondary macronutrients and micronutrients
Examples: primary macronutrients—nitrogen, phosphorus, potassium
secondary macronutrients—calcium, sulfur, magnesium
micronutrients—carbon, hydrogen, oxygen, iron, boron, manganese, copper, zinc, molybdenum, chloride
 - Describing symptoms of deficiencies in turfgrasses
7. Identify insects, diseases, and weeds that affect specific turfgrasses.
Examples: insects—army worms, grubs, mole crickets
diseases—dollar spot, fairy ring
weeds—crabgrass, annual bluegrass
8. Differentiate among various types of pesticides.
Examples: preemergence, postemergence, selective and nonselective monosodium methanearsonate (MSMA)
 - Describing techniques for preparing pesticide mixtures
 - Demonstrating safe use of pesticides
9. Explain mowing heights, frequency of mowing, and patterns of mowing for use on various turfgrasses.

Sports Fields

10. Design a sports field, including dimensions and components.
Examples: football, baseball, soccer, softball
11. Identify characteristics of various parts of a golf course, including greens, fairways, roughs, traps, and tees.
 - Describing basic design and layout features of a golf course
Examples: number of greens, number of sand traps, water features, yardage
 - Prescribing maintenance procedures for a golf course
 - Identifying responsibilities of the superintendent, director of grounds, golf professional, marshal, and maintenance crew
12. Evaluate skills needed to design drainage and irrigation systems.
 - Demonstrating skills needed to install and maintain drainage and irrigation systems
Examples: plumbing, electrical

Turfgrass Tools and Equipment

13. Identify uses of tools and equipment needed for the maintenance of turfgrasses.
Examples: tools—hand sprayers for applying pesticides, spreaders for applying fertilizers
equipment—power mowers for cutting turfgrass, gasoline blowers for removing debris

Business Management

14. Demonstrate business-related work ethics.
Examples: following instructions, being on-time, cooperating with others
- Demonstrating managerial skills for the successful operation of a landscape or turfgrass business
Examples: keeping records, budgeting, pricing, scheduling work, inventorying, purchasing, advertising, handling customer complaints, communicating in oral and written form

Technology

15. Identify advancements in technology that enhance the sports and recreation turfgrass industry.

Two- and Four-Stroke Engines

Two- and Four-Stroke Engines is a course designed to prepare students for entry-level employment or advanced training in the power mechanics field. Topics include career opportunities, safety, tools, four-stroke cycle engines, two-stroke cycle engines, cooling systems, preventive maintenance, engine overhaul, and exhaust systems.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 5, 8, 9, 14, 15, and 16 must be included.

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Career Opportunities

Students will:

1. Compare job characteristics of various career opportunities in the power equipment industry.

Safety

2. Demonstrate safety concepts required for performing maintenance on small engine systems.

Tools

3. Identify specific tools used on small engines.

Four-Stroke Engines

4. Explain the theory of operation for four-stroke engines.
5. Identify parts of a four-stroke engine.
 - Diagnosing mechanical system problems in a four-stroke engine
 - Solving mechanical system problems in a four-stroke engine

6. Explain how the ignition system works in four-stroke engines.
 - Diagnosing ignition system problems in a four-stroke engine
 - Solving ignition system problems in a four-stroke engine
7. Explain how the fuel system works in four-stroke engines.
 - Diagnosing fuel system problems in a four-stroke engine
 - Solving fuel system problems in a four-stroke engine

Two-Stroke Engines

8. Explain the theory of operation for two-stroke engines.
9. Identify parts of a two-stroke engine.
 - Diagnosing mechanical system problems in a two-stroke engine
 - Solving mechanical system problems in a two-stroke engine
10. Explain how the ignition system works in two-stroke engines.
 - Diagnosing ignition system problems in a two-stroke engine
 - Solving ignition system problems in a two-stroke engine
11. Explain how the fuel system works in two-stroke engines.
 - Diagnosing fuel system problems in a two-stroke engine
 - Solving fuel system problems in a two-stroke engine

Cooling Systems

12. Identify air and liquid cooling system components and their functions.
 - Explaining the process and need for draining and replacing coolants
 - Diagnosing cooling system problems in small engines
 - Solving cooling system problems in small engines

Preventive Maintenance

13. Identify preventive maintenance procedures for servicing small engines.

Engine Overhaul

14. Demonstrate procedures for disassembling and cleaning small engines.
15. Demonstrate the procedure for inspecting small engines for wear.
 - Demonstrating the procedure for measuring engine components
16. Demonstrate the procedure for assembling a small engine according to manufacturer's specifications.

Exhaust Systems

17. Explain the operation of an exhaust system on a four-stroke and a two-stroke engine.

Urban Forestry

Urban Forestry is a one-credit course designed to enable students to acquire forestry knowledge and skills for in an urban setting. Topics include career opportunities, safety, climbing and rigging, urban tree management, and tree disorders.

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Career Opportunities

Students will:

1. Describe career opportunities in urban forest management.

Safety

2. Identify arborist safety standards, including International Society of Arboriculture (ISA) regulations.

Climbing and Rigging

3. Describe climbing equipment used by arborists, including saddles, lanyards, snaps, and ascenders.
 - Demonstrating various types of knots and hitches used by arborists
 - Comparing types of ropes used by arborists
4. Compare rigging techniques used by arborists.
Examples: rope-positioning, false-crotch, speed-lining
 - Explaining tensile strength, working loads, and shock loads of ropes used by arborists
 - Identifying rigging equipment used by arborists
Examples: carabiners, slings, block-and-tackle, figure-eight descenders, lowering devices
5. Identify tree-climbing techniques.

Urban Tree Management

6. Compare management strategies for urban forests.
7. Compare tree removal methods.
8. Explain reasons for cabling and bracing a tree.
 - Describing the equipment needed for cabling and bracing a tree
 - Demonstrating tree-cabling and tree-bracing techniques
9. Explain reasons for tree pruning.
 - Demonstrating tree-pruning cuts
 - Identifying the appropriate time for pruning trees
 - Identifying types of tree-pruning tools
10. Design a landscape plan for a wooded environment.
 - Describing skills needed in wooded landscaping

Tree Disorders

11. Describe major tree disorders.
 - Examining tree growth and structure
 - Identifying tree defense systems
12. Identify insects, diseases, parasites, and weeds that afflict trees.
 - Describing pest management in urban forestry, including mechanical treatment, biological treatment, chemical treatment, and genetically engineered resistance

Veterinary Science

Veterinary Science is a one-credit course designed to prepare students for entry-level employment or for advanced training in the veterinary-assisting industry. Topics include career opportunities, safety, reproduction and genetics, hormones and growth disorders, animal anesthetics and basic surgery procedures, health and management, business management practices, and applications of technology.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Describe career opportunities available in veterinary science.

Safety

2. Identify hazards in the veterinary workplace.
 - Explaining safety guidelines for handling veterinary drugs

Reproduction and Genetics

3. Identify the structure and function of female and male reproductive systems.
 - Evaluating the use of biotechnology in veterinary science
 - Identifying factors affecting an animal breeding program
 - Examples: heat cycle, gestation, artificial insemination, fertility
 - Evaluating functions of deoxyribonucleic acid (DNA)
 - Explaining how genotype and phenotype differ
 - Describing inherited traits

Hormones and Growth Disorders

4. Compare growth abnormalities in mammals.
Example: dwarfism
 - Identifying treatments for correcting growth disorders
Example: hormone treatments

Animal Anesthesiology and Basic Surgery Procedures

5. Explain uses of anesthesiology for surgery and grooming.
6. Differentiate among basic surgery procedures for selected animals.
Examples: cesarean, castration, spaying, nail and claw removal

Health and Management

7. Describe common viral and bacterial diseases in animals.
 - Identifying internal and external parasites
 - Categorizing housing needs for animals
8. Evaluate nutritional requirements for selected animals.
 - Describing structures and functions of the digestive system
 - Analyzing feed ingredients to determine nutritional value
9. Evaluate the importance of balanced diets for animals.
 - Distinguishing nutritional requirements at various stages of animal development
10. Differentiate restraint from control techniques for animals.

Business Management Practices

11. Identify steps for maintaining accurate animal health records in the veterinary workplace.
12. Identify techniques for enhancing customer relations in the veterinary workplace.
13. Identify accepted practices in financial management in the veterinary workplace.

Applications of Technology

14. Identify uses of technology in veterinary science.
Examples: genetic engineering, tracking devices, wireless fencing, ultrasound

Workforce Essentials

Workforce Essentials is a one-credit course that provides students with higher-level academic and occupational skills that are transferable across jobs and occupational areas. Emphasis is placed on academic foundations for careers, applied technology, career development and employment, entrepreneurship and business economics, social and ethical responsibility, leadership, and teamwork, safety and health, and technical knowledge and skills. Students build on prior knowledge, strengths, interests, and needs that enhance preparation for future employment and continuing education and training.

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Career Development and Employability Skills

Students will:

1. Explain how to research and select career opportunities.
2. Compare the relationship between educational achievement and career planning.
3. Demonstrate how to locate, evaluate, and interpret career information for a specific career.
 - Identifying education requirements for a specific career
 - Utilizing career resources, ladders, and webs
 - Explaining advantages and disadvantages of self-employment
 - Recognizing employment trends
 - Analyzing the impact of population, climate, and geographic location on occupational opportunities
4. Determine personal responsibility for making education and career choices.

Examples: demographics, local resources, professional training, formulating career plans, retraining and upgrading skills, exploring school and community resources, comparing education and job opportunities

 - Examining the effect of work on lifestyles
5. Apply skills needed for seeking, obtaining, maintaining, and changing jobs, including preparing a résumé, completing job applications, participating in a job interview, and dressing and grooming for the workplace.
 - Accessing detailed information about job openings and opportunities

Examples: skills required for a full- or part-time job, working conditions and benefits, opportunities for change

Foundation Skills

6. Explain the importance of effective communication skills in the workplace.
Examples: listening strategies, oral and written communications, proper business etiquette, informal presentations and discussions, proficiency in speaking Standard English
7. Demonstrate mathematical computation skills in the workplace.
Examples: costs and time; ratios and percentages; tables, charts, and graphs; distance, weight, area, and volume

Ethics and Social Responsibility

8. Identify ethical and unethical behavior and actions in the workplace.
 - Describing legal issues affecting business, including affirmative action; sexual harassment; local, state, and federal laws; and workplace regulations, including the Occupational Safety and Health Administration (OSHA), the Americans with Disabilities Act (ADA); and the Environmental Protection Agency (EPA)

Leadership and Teamwork

9. Explain leadership skills and practices.
 - Identifying appropriate leadership styles
 - Discussing effects of communication in various settingsExamples: pairs, small groups, teams, large groups
10. Apply leadership skills through participation in career and technical student organization (CTSO) activities.
Examples: setting goals; conducting meetings; participating in conferences, workshops, competitions, and civic and community service activities
11. Identify behaviors that promote effective teamwork.

Applied Technology

12. Determine uses, capabilities, and limitations of technological tools for achieving personal and workplace needs.
 - Utilizing common tools, equipment, machines, and materials required for a selected job
 - Assessing results of investigations related to uses and limitations of technological tools

Technical Knowledge and Skills

13. Interpret a company's vision and mission statements, goals, and objectives with regard to a specific career objective or pathway.
 - Describing products and services offered by a specific company
 - Identifying rights and responsibilities of employees and employers

14. Evaluate opportunities to obtain business- and industry-recognized work-readiness credentials.

Economics and Finance

15. Explain economic principles and concepts fundamental to entrepreneurship.
Examples: goods and services, supply and demand, private enterprise, cost-profit indicators, trends
16. Differentiate among types of employment documents and records.
Examples: tax documentation, contract information, personal income, worker's compensation, social security, pay procedures, deductions, net pay, fringe benefits, electronic fund transfers

Safety and Health

17. Formulate a workplace safety plan.
Examples: preventing illness or injuries, communicating safety information, identifying hazards, performing basic first aid, identifying safe work attire
18. Describe how worker safety regulations protect employees and employers.