

Course of Study

Landscape Technology

Warren County Career Center

**3525 North State Route 48
Lebanon, Ohio 45036**

Adopted July 17, 2008

*This document is for the use of the staff at Warren County Career Center.
Credit is given the designer of the template, Upper Valley JVS, Piqua, Ohio.*

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Landscape Technology Warren County Career Center

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Statement of Recommendation

The Landscape Technology Advisory Committee at Warren County Career Center has reviewed this course of study and recommends it for use as the foundation for instruction in the Landscaping class.

The developers of this course of study have considered local labor market needs and the school's ability to offer specialized programs. The competencies have been reviewed and accepted as being congruent with our school's vision, mission, and strategic goals. When appropriate, additional competencies related to the program area have been incorporated into this course of study.

Achievement of technical competencies, utilizing proper attitudes, and demonstrating appropriate values are critical for successful employment and for furthering educational opportunities within a student's chosen field. We believe that this course of study adequately and correctly focuses upon student development.

This course of study is recommended on: July 17, 2008

Warren County Career Center Vision Statement

WCCC is the valued partner of choice within the educational and economic systems of our communities, by providing quality academic and career technical education.

We pave the way for a future of opportunities unique to each of our learners.

Warren County Career Center Mission Statement

To prepare youths and adults to make informed career choices and to successfully enter, compete, and advance in a changing work world.

Warren County Career Values

- Treating each other with respect, dignity, trust and mutual value
- Communicating openly and honestly
- Taking ownership of personal actions and being held accountable for results
- Upholding and demonstrating high ethical, educational and fiscal standards
- Exhibiting high levels of professionalism
- Providing high quality instruction and highly qualified staff to ensure success for all learners
- Making quality customer service a high priority
- Promoting partnerships and a team environment
- Celebrating team and individual achievements
- Using data to drive planning, decision making and actions
- Embracing educational opportunities for change and diversity

Course Design

Courses are designed to reflect career-focused education, which combines high-level academics with real-life technical skills. The intent is to maximize a student's present and future academic and career success.

Career-focused education enhances the integration of academic and technical skills, designs programs that prepare students with transferable skills and promotes each student's career opportunities.

Course Philosophy

We believe that the Landscape Technology program at the Warren County Career Center should meet the educational and occupational needs of the students and industries in the community by training young people and adults for job-entry skills including compatible skills of communication, citizenship, leadership, decision-making, attitude to learn, and personal and occupational responsibility. The Landscape Technology career-technical and related coursework develops the knowledge and skills that are needed to enter the workforce or continue to receive post-secondary education or training.

Course Goals

The course goals for the Landscape Technology program are to:

Develop basic and specialized skills in landscaping practices and procedures

Develop knowledge of and follow established safety practices

Demonstrate proper social and human relations

Participate in accepted business practices

Develop skills in reading, writing, mathematics, social studies, and science

Develop an understanding of the landscaping profession relating to career opportunities

Develop the characteristics of:

- Good time management
- Intelligent personal finance management
- An appreciation of diversity and tolerance for others
- Becoming a life-long learner
- Knowing how to maintain a healthy lifestyle

Course Description

Students entering the Landscape Technology program should be at a junior level status. This allows for the students to take the courses at WCCC that will benefit their learning in the Landscape Technology program, e.g. Psychology and Speech.

Suggested coursework at home schools:

- English I & II
- Math (Algebra, Geometry)
- Science (Environmental Science, Biology)
- History
- Physical Education
- Health

Students in the Landscape Technology program gain experience in designing landscapes, then transferring their designs into actual landscaping projects at schools. Students will learn types of plants, shrubs, and trees and gain an understanding of their general care.

Computers are used to assist in landscape design. This two-year program offers an opportunity for students to be creative by designing projects and implementing their designs.

Students are given the opportunity to receive a Pesticide License through the Ohio Department of Agriculture.

Students landscape the grounds of over thirty schools in Warren County along with other various projects and raise over 10,000 bedding plants in the greenhouse operations.

Academic and Technical Integration

Expectations of curriculum must be aligned with what is written, taught, assessed, and reported. Student expectations focus on active, project-centered learning—an approach to learning that emphasizes a connection between ideas in a discipline and the outside world. Educational programming and course content will clearly connect career and post-secondary opportunities. At the Warren County Career Center, the main goal is to design courses and projects that use strategies for authentic instruction. These characteristics of instruction focus on deep understanding, established opportunities for concept connections, provide anticipatory and abstract thinking, and emphasize genuine application.

The academic courses at the WCCC follow the state model curricula. They are designed to meet both associate school and state requirements. These standards respond to the need to improve student achievement, quality of curriculum and instruction, and strengthen school and community relationships.

Technology

The Warren County Career Center board and staff believe that technology skills are essential for all students to achieve in the 21st century. It is the goal of this district to infuse technology into all facets of education:

- Instruction
- Assessment
- Administration
- Career planning
- Course design
- Professional development

Strategies to incorporate technology into all facets of education are a priority of the district and there is commitment to a continual process to provide updated hardware, software, and professional development for staff members for the purpose of providing a high quality education, with the integration of technology, for all students.

Job Shadowing

Job Shadowing is designed to give the student a short-term overview of the many opportunities within a career field. Career-technical instructors confer with students to determine appropriate experiences.

Internships and Job Placement vary somewhat, but during each experience students should accomplish the following goals:

1. Work with mentors, supervisors, co-workers, and others to accomplish assigned tasks that contribute to the long- and short-term goals of the student. All aspects of the internship/placement (including dates, times, responsibilities, evaluations, etc.) will be outlined in an approved Internship Learning Plan that is coordinated by the career-technical instructor.
2. Apply basic skills and knowledge to "real world" business settings and learn new skills that are relevant to the career path.
3. Demonstrate a solid understanding of the basic skills outlined in the Internship Learning Plan.
4. Reflect upon the internship/placement/job shadowing in terms of post-secondary education/career options.

The criterion for participation in career-based learning experiences is included in the approved packet for each activity and may be obtained by the instructor from the Career Pathways office.

The specifics of how these opportunities are offered in this career-technical program or statement of academic support are:

Students that meet the requirements set forth by the Early Placement Committee are eligible to work with local businesses during the second semester of their senior year. This allows the student to work during designated lab time with the approval of the Instructor. The Instructor will monitor academic eligibility along with the status of their field progress using contractor evaluations. In addition, parent approval and a written contract with the student for certain goals to be achieved will be required.

Students Served

The population served by this program is juniors and seniors.

Scope and Sequence

Business Operations

Standard Statement:

Applying principles of economics and business management in both an entrepreneur/manager and an employee role. Planning, implementing, managing, and/or providing support services to marketing, finance, human resource management, materials management, technologies, and legal policies.

Foundation Benchmarks:

Students enrolled in a foundation program are expected to address all business principles and management practices identified in the standard. The focus of instruction should be on those principles and practices related to basic business skills in all environmental and agricultural systems.

Secondary Benchmarks:

Students enrolled in a specialized workforce development program are expected to address the business principles and management practices identified in the standard. Instructional activities should focus on the business principles and practices that pertain to your specific agricultural program, (i.e. agriculture, horticulture, or natural resources, etc.).

Post-Secondary Benchmarks:

Students enrolled in a post-secondary program are expected to address the business principles and management practices identified in the standard. Students will apply the knowledge and skills to specific agricultural businesses that are addressed in their major.

Marketing & Sales

Secondary Specialized Benchmark:

Develop and apply a marketing plan for a product and/or service

Post-Secondary Benchmark:

Develop a comprehensive marketing plan for a business

Indicators:

- 1.1 Identify and evaluate methods of marketing products and services
- 1.2 Apply economic principles to marketing (e.g., supply and demand)
- 1.3 Research products and service design(s)
- 1.4 Merchandise products and services
- 1.5 Promote products and services
- 1.6 Advertise products and services
- 1.7 Identify and develop value-added products
- 1.8 Develop public relation campaigns
- 1.9 Develop a production plan
- 1.10 Identify key components to organize a sale
- 1.11 Conduct sales presentation
- 1.12 Develop sales goals and incentive programs
- 1.13 Conduct market research and analysis

Management

Secondary Specialized Benchmark:

Analyze a business plan

Post-Secondary Benchmark:

Develop a comprehensive business plan using a full range of business principles

Indicators:

- 2.1 Identify types of businesses by legal structure
- 2.2 Identify capital resources
- 2.3 Identify organizational structures
- 2.4 Identify management types
- 2.5 Establish short- and long-term goals
- 2.6 Establish a mission statement
- 2.7 Develop business agreements
- 2.8 Identify, follow, and know consequences of local, state, and federal regulations

- 2.9 Perform human resource management functions (e.g., recruit, select, train, evaluate)
- 2.10 Maintain records (e.g., production, performance)

Finance

Secondary Specialized Benchmark:

Analyze and evaluate business finances

Post-Secondary Benchmark:

Integrate financial components into a business plan

Indicators:

- 3.1 Budget resources (e.g., capital, human, financial, time)
- 3.2 Manage assets for optimum utilization
- 3.3 Manage risk of liabilities
- 3.4 Evaluate credit uses and options
- 3.5 Analyze investment options (e.g., buy, lease, finance, risk)
- 3.6 Prepare and interpret financial statements (e.g., balance sheet, profit/loss statement, cash flow statement)
- 3.7 Prepare tax forms (e.g., W-4, I9, depreciation, 1099, workers compensation)
- 3.8 Determine cost of doing business
- 3.9 Compare and examine advantages and disadvantages of banking procedures (i.e., bank reconciliation)

Business Leadership

Secondary Specialized Benchmark:

Develop and demonstrate business leadership techniques

Post-Secondary Benchmark:

Apply leadership skills to a business situation

Indicators:

- 4.1 Make business presentations
- 4.2 Identify time management techniques
- 4.3 Develop educational and career goals
- 4.4 Conduct a business meeting using proper parliamentary procedures
- 4.5 Identify leadership styles
- 4.6 Develop relationships with peer groups and professional organizations

Customer Service

Secondary Specialized Benchmark:

Demonstrate customer service and sales techniques

Post-Secondary Benchmark:

Develop a customer service and sales program

Indicators:

- 5.1 Build and develop customer relationships
- 5.2 Provide post-sale service
- 5.3 Handle customer complaints
- 5.4 Prospect new customers
- 5.5 Provide warranty & maintenance education to the customer

Technology Operations

Secondary Specialized Benchmark:

Demonstrate efficient use of technology

Post-Secondary Benchmark:

Analyze and demonstrate efficient use of technology

Indicators:

- 6.1 Operate leading technology (e.g., Global Positioning System [GPS], Geographical Information System [GIS], Personal Data Application [PDA], cellular)
- 6.2 Create and utilize documents using word processors, spreadsheets, databases and electronic mail
- 6.3 Conduct research using the Internet
- 6.4 Conduct oral/visual presentation using presentation software

Materials Management

Secondary Specialized Benchmark:

Determine cost-effective materials management

Post-Secondary Benchmark:

Evaluate material control options

Indicators:

- 7.1 Plan and manage inventory
- 7.2 Apply just-in-time concepts
- 7.3 Calculate costs of carrying inventory
- 7.4 Perform logistics management

Issues

Secondary Specialized Benchmark:

Analyze issues affecting the industry

Post-Secondary Benchmark:

Determine, analyze, and present solutions for industry issues

Indicators:

- 8.1 Identify issues affecting industry
- 8.2 Research history, politics, and policies related to the issue
- 8.3 Identify conflicting points of view
- 8.4 Determine effects of the issue on the industry
- 8.5 Determine potential resolutions to the issue

Engineering

Standard Statement:

Applying principles of engineering to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology. Planning, implementing, managing, and/or providing support services to facility design and construction; equipment design, manufacture, repair, and service; and agricultural technology.

Foundation Benchmarks:

Students enrolled in a foundation program are expected to address the engineering principles and practices identified in the standard. They will learn and apply general principles of operation and maintenance to machines, equipment, and structures. The application of these general principles and practices will apply to those applications that cross all Environmental and Agricultural Systems programs.

Secondary Benchmarks:

Students enrolled in a specialized workforce development program are expected to address the engineering principles and practices identified in the standard. Students will apply principles of maintenance and operation to machines, equipment and structural components commonly used in the industry most closely connected to their workforce development program. Only Agricultural and Industrial Mechanics programs would address all benchmarks in engines; power transmission; hydraulics; electricity; HVAC; and steering, suspension, and traction. Students in Agribusiness and Production Systems would apply knowledge and skills to the machines, equipment, and structures used in the management of domesticated livestock, equine, companion animals, grain and oil seed crops, forages, and other specialty crops and animals. Students in Natural Resource Management would apply knowledge and skills to the machines, equipment, and structures used in the management of wildlife, fisheries, forests, and other native plant populations. Students in Horticulture programs would apply knowledge and skills to the machines, equipment, and structures used in nursery production, landscape design and maintenance, and the retail garden center trade. Instructional activities would likely focus on the general principles and practices that cross all machines, equipment, and structures in the program.

Post-Secondary Benchmarks:

Students enrolled in a post-secondary program are expected to address the engineering principles and practices identified in the standard. Students will apply principles of maintenance and operation to machines, equipment, and structures commonly used in the industry most closely connected to their technical program major. Opportunities for in-depth application of knowledge and skills are expected.

Safety Procedures

Secondary Specialized Benchmark:

Implement safety procedures and programs

Post-Secondary Benchmark:

Identify facility and equipment service safety issues and develop appropriate procedures

Indicators:

- 1.1 Demonstrate knowledge of safety rules and regulations
- 1.2 Interpret safety signs and symbols
- 1.3 Demonstrate desirable safety attitudes and habits
- 1.4 Demonstrate safety equipment in accordance with established procedures
- 1.5 Follow established procedures for the administration of first aid
- 1.6 Identify safety hazards

Maintenance

Secondary Specialized Benchmark:

Maintain machinery and equipment

Post-Secondary Benchmark:

Solve maintenance problem situations involving machinery and equipment

Indicators:

- 2.1 Perform a machine condition inspection
- 2.2 Lubricate machinery and equipment
- 2.3 Ensure presence and function of safety systems and hardware
- 2.4 Service electrical systems
- 2.5 Perform machine adjustments (e.g., belts, clippers, drive chains)
- 2.6 Service filtration systems
- 2.7 Maintain fluid levels
- 2.8 Maintain machinery and equipment cleanliness and appearance
- 2.9 Maintain fluid conveyance components (e.g., hoses and lines, valves, nozzles)
- 2.10 Design a preventive maintenance schedule
- 2.11 Identify causes of malfunctions and failures
- 2.12 Calibrate metering, monitoring, and sensing equipment
- 2.13 Inspect, maintain and store hand and power tools

Operation

Secondary Specialized Benchmark:

Operate machinery and equipment

Post-Secondary Benchmark:

Analyze machine functions by investigating operational options

Indicators:

- 3.1 Describe function of machine controls and instrumentation
- 3.2 Perform appropriate start-up procedures
- 3.3 Select proper machine(s) for specific task(s)
- 3.4 Safely operate equipment
- 3.5 Perform pre-operation inspection
- 3.6 List applicable laws for on- and off-highway operation
- 3.7 Load equipment and materials
- 3.8 Identify and exhibit the desired application of hand and power tools

Engines

Secondary Specialized Benchmark:

Service and repair the components of internal combustion engines

Post-Secondary Benchmark:

Evaluate and select different types of internal combustion engines for various applications

Indicators:

- 4.1 Analyze and troubleshoot engine
- 4.10 Remove, inspect and replace basic internal engine components

Design

Secondary Specialized Benchmark:

Design and plan structures, equipment, and facilities

Post-Secondary Benchmark:

Develop and analyze plans for structures, equipment, and facilities

Indicators:

- 10.3 Estimate material needs and costs

Construction

Secondary Specialized Benchmark:

Construct structures and facilities

Post-Secondary Benchmark:

Evaluate and design agricultural facilities

Indicators:

11.3 Install plumbing equipment and fixtures

11.4 Install electrical wiring components and fixtures

11.5 Prepare surfaces and select and apply coatings

11.6 Insulate facility

11.7 Install fencing

11.8 Install glass, rigid plastic panels, and/or film plastic

Surveying & Mapping

Post-Secondary Benchmark:

Use technological tools to map land, facilities, and infrastructure

Indicators:

12.2 Read maps

12.3 Use surveying skills

12.4 Perform site measurements

12.5 Draft maps

Structural Engineering Fundamentals

Secondary Specialized Benchmark:

Evaluate materials used in construction applications

Post-Secondary Benchmark:

Compare and contrast various materials used in structural engineering

Indicators:

14.1 Measure environmental and agricultural objects using standard and metric systems (i.e., length, volume, mass, temperature)

14.2 Compare and contrast the structural properties, grades, and types of wood and wood products

Environmental Science

Standard Statement:

Applying principles of environmental safety, health, and wise use of renewable and nonrenewable resources.

Planning, implementing, managing, and/or providing support services to soil, air, and water management; land use planning; watershed management and protection; water treatment; waste treatment; pollution control; land treatment; and recreational use of natural resources.

Foundation Benchmarks:

Students enrolled in a foundation program are expected to address the principles and practices identified in the standard. They will learn general principles of environmental safety, health, and wise use of renewable and non-renewable resources. Focus of instruction will be on the general application of principles to situations that cross all industries in agricultural and environmental systems.

Secondary Benchmarks:

Students enrolled in a specialized workforce development program are expected to address the Environmental Science principles and practices identified in the standard. Students enrolled in Agribusiness and Production Systems, Horticulture, and Natural Resource Management will apply principles of environmental science as they pertain to air, land, water, ecosystems, waste management, and contaminants, commonly used in the industry most closely connected to their workforce development program. It is anticipated that only Natural Resource Management programs would address benchmarks in land use planning, watershed management and protection, water treatment, pollution control, land treatment, wildlife management and recreational use of natural resources.

Post-Secondary Benchmarks:

Students enrolled in post-secondary programs are expected to address the Environmental Science principles and practices identified in the standard. Students will apply principles of environmental safety, health, and the wise use of renewable and non-renewable resources commonly used in the industry most closely connected to their technical program major. Opportunities for in-depth application of knowledge and skills are expected.

Land

Secondary Specialized Benchmark:

Apply soil management practices based on key fundamentals of soils

Post-Secondary Benchmark:

Develop soil management programs using all fundamentals of soils

Indicators:

- 1.1 Determine the physical and chemical properties of soils and growing medium
- 1.2 Inventory soils
- 1.3 Determine land use requirements
- 1.4 Develop soil conservation program
- 1.5 Demonstrate techniques that reduce soil erosion
- 1.6 Evaluate land use limitations (e.g., septic systems, drainage, agriculture, and socioeconomic considerations)

Water

Secondary Specialized Benchmark:

Develop a water quality management plan for a property using basic water quality characteristics

Post-Secondary Benchmark:

Develop a water quality and watershed management program using all water quality characteristics

Indicators:

- 2.1 Determine the chemical and physical properties of water and the biological indicators of water quality
- 2.2 Explain the hydrological cycle
- 2.3 Explain the factors affecting water quality
- 2.4 Monitor water quality and quantity
- 2.5 Define, delineate, and assess watersheds and streams

Ecosystems

Secondary Specialized Benchmark:

Develop an ecosystem management plan for natural resources and the environment

Post-Secondary Benchmark:

Develop an ecosystem management program for natural resources and the environment

Indicators:

- 3.2 Explain plant and animal interactions with the abiotic (non-living) environment
- 3.3 Differentiate between renewable and nonrenewable resources (e.g., socioeconomic impact, entrepreneurial potential)
- 3.4 Contrast/Compare characteristics of different ecosystems (e.g., pond, stream, crop lands, open land, brushlands, woodlands, wetlands)

Contaminants

Secondary Specialized Benchmark:

Identify sources of contaminants

Post-Secondary Benchmark:

Describe potential contaminants and their impact on the environment

Indicators:

- 4.1 Determine types, sources, and impact of contaminants
- 4.2 Explain programs and policies related to contaminants
- 4.3 Demonstrate contaminant control and prevention practices
- 4.4 Monitor levels of contaminants

Air

Secondary Specialized Benchmark:

Develop an air quality management plan for major components (using major elements in air quality)

Post-Secondary Benchmark:

Develop an air quality management program using all components (elements) in air quality

Indicators:

- 5.1 Determine chemical and physical properties of air
- 5.2 Explain chemical cycles of air
- 5.3 Explain factors affecting air quality

- 5.4 Monitor air quality and quantity
- 5.5 Monitor and control noise level

Emergency Response

Secondary Specialized Benchmark:

Identify and comply with all components of an emergency plan

Post-Secondary Benchmark:

Develop components of an emergency response plan

Indicators:

- 7.4 Identify various emergency response plans
- 7.5 Develop an emergency response plan (e.g., agricultural leakage, chemical spills, natural disasters)

Waste Management

Post-Secondary Benchmark:

Apply principles of solid waste management (landfill) to manage safe disposal of all categories of waste

Indicators:

- 12.4 Describe the process of waste decomposition
- 12.6 Describe waste management methods (e.g., composting facility, waste incineration, recycling)

Hazardous Materials Management

Secondary Specialized Benchmark:

Use, store, and dispose of non-restricted hazardous materials

Post-Secondary Benchmark:

Apply hazardous materials management principles to assure a safe facility and to comply with applicable regulations

Indicators:

- 15.1 Describe health and safety practices to reduce risks from hazardous materials (i.e., MSD forms, employer notification forms)
- 15.4 Demonstrate safe handling procedures for hazardous materials and hazardous waste
- 15.8 Prepare hazardous materials for transportation and storage in accordance with regulations
- 15.10 Maintain hazardous material handling documentation

Wetlands Management

Post-Secondary Benchmark:

Discuss properties, classifications and functions in order to understand wetland principles

Indicators:

- 16.1 Identify properties of wetlands
- 16.2 Explain wetlands classification
- 16.3 Explain the function of wetlands

Plant Science

Standard Statement:

Applying principles of anatomy and physiology, nutrition, reproduction, and genetics to all phases in the production and/or management of plants in both a domesticated and a natural environment. Planning, implementing, managing, and/or providing support services to the identification, selection, breeding, planting, fertilization, health, maintenance, and harvesting of plants and plant products.

Foundation Benchmarks:

Students enrolled in a foundation program are expected to address all plant science principles and management practices identified in the standard. They will learn principles and management practices for recognized groups of plants found in agriculture, horticulture, forestry, and natural resources. The focus of instruction should be on those overarching principles and management practices related to the production and management of crops, landscapes, and forest and native plant populations.

Secondary Benchmarks:

Students enrolled in a specialized workforce development program are expected to address the plant science principles and management practices identified in the standard. Students will apply the knowledge and skills to those plants addressed in their workforce development program. Students in Agricultural Business and Production Systems would learn and apply knowledge and skills to grain and oil crops, forages, and specialty crops. Students in Natural Resource Management would focus their studies on forest and native plant population management.

Students in Horticulture would focus their studies on the production management, and application of nursery crops, turfgrasses, and ornamental plants. Instructional activities would focus on the principles and practices that cross all groups in the program rather than an in-depth focus on individual plant species.

Post-Secondary Benchmarks:

Students enrolled in a post-secondary program are expected to address the plant science principles and management practices identified in the standard. Students will apply the knowledge and skills to specific plant species that are addressed in their major. For example, a crop science major would study principles and practices that cross all major crops (nutrition, reproduction, management, etc.) as well as the management practices related to specific crops such as soybeans, corn, alfalfa, etc.

Plant Nutrition

Secondary Specialized Benchmark:

Analyze and evaluate nutritional requirements and environmental conditions to develop and implement a fertilization plan

Post-Secondary Benchmark:

Develop and evaluate a fertilizer program using nutrient analysis techniques

Indicators:

- 1.1 Describe nutrient sources
- 1.2 Determine plant nutrient requirements and functions for optimum growth
- 1.3 Determine the environmental factors that influence and optimize plant growth
- 1.4 Describe nutrient application methods and appropriate practices
- 1.5 Apply nutrients to plants for economic growth
- 1.6 Collect and test soil and/or plant tissue
- 1.7 Interpret tests of soil and plant tissue

Reproduction

Secondary Specialized Benchmark:

Select, implement, and evaluate basic methods for reproducing and propagating plants

Post-Secondary Benchmark:

Analyze and evaluate reproduction methods using a full range of techniques

Indicators:

- 2.1 Determine the role of genetics in plants
- 2.2 Describe the functions of plant reproductive parts
- 2.3 Identify and practice methods of asexual and sexual plant propagation
- 2.4 Describe the principles of plant micropropagation
- 2.5 Apply principles and practices of biotechnology to plant propagation

Plant Integrated Pest Management

Secondary Specialized Benchmark:

Develop and use a basic integrated pest management plan (i.e., prevention, treatment, control)

Post-Secondary Benchmark:

Evaluate an integrated pest management program

Indicators:

- 3.1 Identify plant pests (e.g., insects, diseases, weeds, rodents)
- 3.2 Determine pest management safety practices
- 3.3 Determine pest management methods
- 3.4 Develop pest management plans based on pest life cycles
- 3.5 Implement pest control plan with appropriate treatments
- 3.6 Evaluate pest control plan
- 3.7 Prevent, identify, and manage pest resistance

Anatomy and Physiology

Secondary Specialized Benchmark:

Explain plant anatomy and physiology

Post-Secondary Benchmark:

Identify and explain the purpose and functions of plant anatomy and physiological systems

Indicators:

- 4.1 Identify plant structures (e.g., roots, stems, flowers, leaves, fruits, seeds)

- 4.2 Describe physiological functions of plants
- 4.3 Classify plants for taxonomic or other classifications

Growth and Production Management

Secondary Specialized Benchmark:

Plant and manage growth of crops/plants

Post-Secondary Benchmark:

Evaluate and implement management and production procedures

Indicators:

- 5.1 Identify and select seeds and plants
- 5.2 Manipulate and evaluate environmental conditions (e.g., irrigation, mulch, shading) to foster plant germination, growth and development
- 5.3 Evaluate and demonstrate planting practices (e.g., population rate, germination/seed vigor, inoculation, seed and plant treatments, cuttings, and pot in pot)
- 5.4 Evaluate and demonstrate transplanting practices
- 5.5 Prepare soil/media for planting
- 5.6 Control plant growth (e.g., pruning, pinching, chemical, disbudding)
- 5.7 Determine maintenance schedule

Floral Design

Secondary Specialized Benchmark:

Create a floral arrangement using basic design elements

Post-Secondary Benchmark:

Create a floral design for a specific occasion

Indicators:

- 6.1 Identify plant products used in design
- 6.2 Demonstrate basic design principles
- 6.3 Identify and demonstrate line and mass floral designs
- 6.4 Demonstrate conditioning techniques to increase cut flower/foilage vase life
- 6.5 Identify hard goods, supplies, and tools used in floral design

Landscape

Secondary Specialized Benchmark:

Design a landscape using basic design fundamentals

Post-Secondary Benchmark:

Design interior and exterior landscapes using all fundamentals

Indicators:

- 7.1 Conduct a site evaluation for physical conditions, design needs, and implications
- 7.2 Apply elements of design (e.g., line, form, texture, color)
- 7.3 Incorporate principles of design (e.g., space, scale, proportion, order)
- 7.4 Use landscape design drawing tools including Computer Aided Design (CAD) and industry-specific software

Storage and Harvesting

Secondary Specialized Benchmark:

Harvest plants, store plant products, and analyze yields

Post-Secondary Benchmark:

Analyze and evaluate storage and harvesting methods and yields

Indicators:

- 8.1 Determine crop maturity
- 8.2 Identify harvesting practices and environmental conditions relative to harvesting
- 8.3 Demonstrate common harvesting techniques
- 8.4 Calculate yield and loss

General Safety Precautions:

Maintain safe work environment

- Read, comprehend, and follow safety instructions
- Organize and maintain clean and safe work area
- Identify hazardous materials and location of material safety data sheets (MSDSs)
- Comply with shop and equipment safety rules

Demonstrate safe work habits

- Read and follow label information
- Wear protective clothing and equipment
- Use safe lifting and carrying methods
- Observe safety precautions when applying chemicals and fertilizer
- Observe safety precautions when storing chemicals and fertilizer
- Follow personal cleanup procedures after handling chemicals and fertilizer
- Dispose of chemicals and chemical containers according to manual specifications and/or government regulations
- Observe safety precautions when handling chemical or fertilizer spill

Operate and maintain equipment

- Follow safety rules for equipment operation and maintenance

Turf and Landscape Operations:

Demonstrate understanding of turf and landscape industry

Examine plant physiology and growth

- Identify woody and herbaceous plants
- Identify plant parts
- Identify photosynthesis process
- Identify functions of roots, stems, and leaves
- Identify requirements for healthy plant growth
- Identify taproot and fibrous root systems
- Identify differences between evergreen and deciduous plants

Identify and classify plants

- Classify turf and landscape plants as annuals, biennials, or perennials
- Identify outdoor bulbs
- Identify annual flowers
- Identify perennial flowers
- Identify shade trees
- Identify ornamental trees
- Identify shrubs
- Identify ground covers

- Identify conifers
- Identify turf and landscape plants according to scientific name
- Identify environmental plant preferences
- Classify turf and landscape plants according to growth habit
- Identify vines

Plan landscape designs

- Analyze site conditions
- Identify and use drafting equipment
- Use color to enhance finished plans
- Design public area planting
- Design outdoor privacy area
- Design theme gardens
- Design service area
- Design residential planting
- Design commercial planting
- Design athletic fields
- Coordinate plant requirements to environmental conditions
- Select plant and seed varieties
- Draw landscape symbols
- Draw plan to scale
- Evaluate landscape model

Test soil and plant tissues

Prepare for landscape and turf installation

- Follow general safety precautions
- Determine planting rates
- Determine planting depth
- Determine planting time
- Interpret seed and bulb tag information
- Read landscape plan
- Convert scale to site
- Determine material quantities
- Identify underground utilities

Prepare landscape and turfgrass area

- Follow general safety precautions
- Define areas
- Establish rough grade
- Create contour
- Incorporate soil amendments
- Establish finish grade

Receive and deliver landscape and turfgrass products

- Follow general safety precautions
- Unload products
- Unpack products
- Load products
- Secure load
- Monitor quality control

Establish turf and landscape

- Follow general safety precautions
- Plant seeds
- Plant bulbs
- Plant shrubs
- Plant ground covers
- Plant annual and perennial plants
- Plant trees
- Wrap, stake, and guy trees
- Water-in plant material
- Lay sod
- Apply mulch

Fertilize plants

- Follow general safety precautions
- Interpret manufacturer's fertilization-rate charts
- Interpret fertilizer labels
- Identify application methods
- Calibrate fertilizer application equipment
- Mix fertilizer solutions
- Apply liquid fertilizer
- Apply dry fertilizer
- Determine application pattern

Maintain landscape plants

- Follow general safety precautions
- Pinch plants
- Cultivate plants
- Water plants
- Apply mulches
- Prune trees
- Prune shrubs
- Transplant bulbs, corms, and tubers
- Treat tree wounds
- Remove fallen leaves
- Remove old flowers

Plan integrated pest management (IPM) control program

- Follow general safety precautions
- Identify insects, diseases, and weeds
- Recognize pest damage
- Calculate area to be covered
- Complete certification requirements for prescribed chemical application
- Evaluate chemical/cultural/biological control options

Apply pest-control treatments

- Follow general safety precautions
- Calibrate application equipment
- Mix chemicals and load application equipment
- Use application equipment
- Follow proper cleaning procedures
- Maintain application record
- Identify pest baits
- Determine application pattern

Equipment Maintenance:

Maintain equipment

Service engine lubrication systems

Service small-engine fuel and air systems

Maintain and service small-engine electrical systems

Service wheels and tires

Service hydraulic systems

Perform pre-departure functions

Operate equipment and vehicles

Operate power equipment

- Follow general safety precautions
 - Use spreader
 - Use rotary tiller
 - Use edger
 - Use blower
 - Use roller
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- Use trimming equipment

- Use chain saw
- Use spray equipment
- Use hand-held augers

Clean and store equipment

Use and maintain hand and power tools

- Follow general safety precautions
- Follow operation instructions
- Identify tools
- Select tools
- Set up and adjust tools
- Clean and lubricate tools
- Recondition tools
- Sharpen tools
- Store tools

Apply protective coatings

Fabricate with metal

Maintain and service spraying equipment

Maintain and service spreaders

Weld with gas

Weld with electric arc and MIG

Construction Skills:

Construct with concrete

Construct with stone and pavers

Construct with wood

Install and maintain electrical systems

Install and maintain water delivery systems

Operate and maintain sprinkler systems

Install and maintain fencing

Apply protective coatings

Plan electrical installations

Design water delivery system

Marketing and Sales:

Enhance company image

Demonstrate presale skills

Prepare estimate

- Calculate square footage and cubic yards
- Use price list
- Estimate total amount of materials needed
- Estimate labor requirements

Conduct sale

- Greet customers
- Use appropriate questioning technique
- Use appropriate selling technique
- Determine customer needs
- Describe services
- Explain extent of guarantee
- Use support services
- Close sale
- Develop telephone skills
- Record sales information
- Address customer complaints

Advertise products and services

Market turf and landscaping services

Use and maintain price lists and catalogs

Price merchandise

Business Management:

Perform general office duties

Control Inventory

Receive merchandise

- Follow general safety precautions
- Verify order

- Unpack merchandise
- Interpret packing slips and invoices
- Check merchandise for shipping discrepancies
- Inspect merchandise for damage
- Distribute merchandise to designated location

Ship merchandise

- Follow general safety precautions
- Follow government regulations
- Record shipments
- Load merchandise
- Secure load
- Prepare shipping packages
- Arrange delivery
- Determine delivery route
- Process special orders

Conduct general banking procedures

Keep customer accounts

Minimize theft

Manage business finances

Employability Skills: Career Development

Investigate interests and aptitudes

Identify career options

Research occupations matching interests and aptitudes

Select career(s) that best match(es) interests and aptitudes

Identify advantages and disadvantages of career options, including nontraditional careers

Develop a career plan

Analyze potential barriers to employment

Employability Skills: Decision Making and Problem Solving

Apply decision-making techniques in the workplace

Apply problem-solving techniques in the workplace

Employability Skills: Work Ethic

Evaluate the relationship of self-esteem to work ethic

Analyze the relationship of personal values and goals to work ethic both in and out of the workplace

Demonstrate work ethic

Employability Skills:
Job-Seeking Skills

Prepare for employment

Design a resume

Complete and process job application forms

Demonstrate interviewing skills

Secure employment

Employability Skills:
Job Retention Skills

Analyze the organizational structure of the workplace

Maintain positive relations with others

Employability Skills:
Technology in the Workplace

Assess the impact of technology in the workplace

Use a variety of technological applications

Employability Skills:
Life-long Learning

Apply life-long learning to individual situations

- Define life-long learning
- Identify factors that cause the need for life-long learning

Adapt to change

Employability Skills:
Economic Education

Analyze global enterprise system
Evaluate personal money management

Employability Skills:
Balancing Work and Family

Analyze the effects of family on work

Analyze the effects of work on family

Employability Skills:
Citizenship in the Workplace

Exercise the rights and responsibilities of citizenship in the workplace

Cooperate with others in the workplace

Employability Skills:
Leadership

Evaluate leadership styles appropriate for the workplace

Demonstrate effective teamwork skills

Utilize effective communication skills

- Identify the importance of listening
- Demonstrate assertive communication
- Recognize the importance of verbal and nonverbal cues and messages
- Give and receive feedback
- Articulate thoughts
- Use appropriate language

Employability Skills:
Entrepreneurship

Evaluate the role of small business in the economy

Examine considerations of starting a business

- Research a business idea
- Compare various ways to become a small business owner
- Investigate factors to consider in financing a new business
- Evaluate entrepreneurship as a career option

Technology Standards

Standard 1: Nature of Technology

Students develop an understanding of technology, its characteristics, scope, core concepts* and relationships between technologies and other fields.

Benchmark A: Synthesize information, evaluate and make decisions about technologies.

Benchmark B: Apply technological knowledge in decision-making.

Benchmark C: Examine the synergy between and among technologies and other fields of study when solving technological problems.

Standard 2: Technology and Society Interaction

Students recognize interactions among society, the environment and technology, and understand technology's relationship with history. Consideration of these concepts forms a foundation for engaging in responsible and ethical use of technology.

Benchmark A: Interpret and practice responsible citizenship relative to technology.

Benchmark B: Demonstrate the relationship among people, technology and the environment.

Benchmark C: Interpret and evaluate the influence of technology throughout history, and predict its impact on the future.

Benchmark D: Analyze ethical and legal technology issues and formulate solutions and strategies that foster responsible technology usage.

Benchmark E: Forecast the impact of technological products and systems.

Standard 3: Technology for Productivity Applications

Students learn the operations of technology through the usage of technology and productivity tools.

Benchmark A: Integrate conceptual knowledge of technology systems in determining practical applications for learning and technical problem-solving.

Benchmark B: Identify, select and apply appropriate technology tools and resources to produce creative works and to construct technology-enhanced models.

Standard 4: Technology and Communication Applications

Students use an array of technologies and apply design concepts to communicate with multiple audiences, acquire and disseminate information and enhance learning.

Benchmark A: Apply appropriate communication design principles in published and presented projects.

Benchmark B: Create, publish and present information, utilizing formats appropriate to the content and audience.

Benchmark C: Identify communication needs, select appropriate communication tools and design collaborative interactive projects and activities to communicate with others, incorporating emerging technologies.

Standard 5: Technology and Information Literacy

Students engage in information literacy strategies, use the Internet, technology tools and resources, and apply information-management skills to answer questions and expand knowledge.

Benchmark A: Determine and apply an evaluative process to all information sources chosen for a project.

Benchmark B: Apply a research process model to conduct research and meet information needs.

Benchmark C: Formulate advanced search strategies, demonstrating an understanding of the strengths and limitations of the Internet, and evaluate the quality and appropriate use of Internet resources.

Benchmark D: Evaluate choices of electronic resources and determine their strengths and limitations.

Standard 6: Design

Students apply a number of problem-solving strategies demonstrating the nature of design, the role of engineering and the role of assessment.

Benchmark A: Identify and produce a product or system using a design process, evaluate the final solution and communicate the findings.

Benchmark B: Recognize the role of teamwork in engineering design and of prototyping in the design process.

Benchmark C: Understand and apply research, development and experimentation to problem-solving.

Standard 7: Designed World

Students understand how the physical, informational and bio-related technological systems of the designed world are brought about by the design process. Critical to this will be students' understanding of their role in the designed world: its processes, products, standards, services, history, future, issues and career connections.

Benchmark A: Classify, demonstrate, examine, and appraise energy and power technologies.

Benchmark B: Classify, demonstrate, examine and appraise transportation technologies.

Benchmark C: Classify, demonstrate, examine and appraise manufacturing technologies.

Benchmark D: Classify, demonstrate, examine and appraise construction technologies.

Benchmark E: Classify, demonstrate, examine and appraise information and communication technologies

Benchmark F: Classify, demonstrate, examine and appraise medical technologies.

Benchmark G: Classify, demonstrate, examine and appraise agricultural and related biotechnologies.

Performance Measures/Student Assessment/Instructional Strategies

Assessments/Evaluations

- Observations
- Demonstrations
- Portfolios
- Standardized Tests
- Class Assignment
- Quizzes/Tests/Exams
- Web Exam/Certification

Instructional Strategies

- Teacher-Directed & Student-Centered Activities
- Case Study Problem Solving
- Cooperative Learning
- Project-Based Learning
- Career-Based Learning (Internships/Shadowing/Placement)
- Community-Based Learning (CTSOs and Other)
- Exploratory Learning
- Independent Research
- Team Teaching

Content Specific Strategies