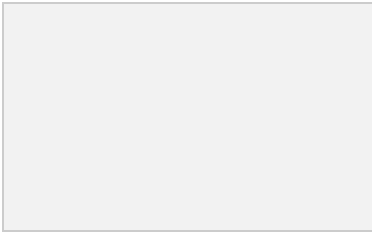


# Cover Sheet



## **Dover Area School District Curriculum Cover Sheet**

**CIP Code: 01.0601**

**CIP Title: Applied Horticulture/Horticultural Operations, General**

**Planned Hours: 980**

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### **CIP Description:**

A program that focuses on the general production and processing of domesticated plants, shrubs, flowers, foliage, trees, groundcovers, and related plant materials; the management of technical and business operations connected with horticulture services; and the basic scientific principles needed to understand plants and their management and care. Landscaping basics are also included.

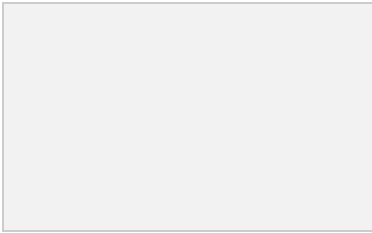
### **Component Courses:**

#### **859 - Honors Agriscience (120 hours) ⑤**

Honors Agriscience focuses on a variety of agricultural topics using advancing technology. The class will cover the historical relevance of agriculture, natural resource management and an introduction to the National FFA Organization, a student leadership organization. Additional topics will include animal and plant science systems as well as measuring skills and a study of emerging technology resources. In addition to the curriculum for Agriscience, students will devote a greater degree of time to completing laboratory experiments, critical thinking about scientific concepts, and communicating experimental findings. This course is intended for students who have a strong interest in science and wish to pursue a career in the agricultural sciences or another scientific research-related career field.

#### **860 - Agriscience (120 hours) ⑤**

Agriscience focuses on a variety of agricultural topics using advancing technology. The class will cover the historical relevance of agriculture, natural resource management, and an introduction to the National FFA Organization, a student leadership organization. Additional topics will include animal and plant science systems as well as measuring skills and a study of emerging technology resources. This course is designed to help students discover their interests as they relate to agricultural courses as well as developing scientific skills and procedures.



## **Dover Area School District**

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#### **870- Plant Science/Botany (120 hours) ⑤**

This laboratory-intensive course provides a comprehensive introduction to botany and plant physiology, satisfying a high school Science graduation requirement. The curriculum focuses on plant taxonomy, cellular structure, anatomy, and the physiological processes of growth and development, including photosynthesis, respiration, and transpiration. Students will bridge the gap between scientific theory and practical application through extensive fieldwork in the school greenhouse, where they will manage plant life cycles, analyze soil composition, and experiment with environmental controls. This course is highly recommended for students interested in post-secondary studies in biology, environmental science, horticulture, or agronomy.

#### **874 - Agricultural Business & Marketing (120 hours)**

This course includes an extensive study of agricultural and small-business financial principles, including marketing, agricultural business structure, advanced recordkeeping, computer-based business analysis, and basic taxes. Career development, including workplace skills, will be discussed. Students completing the Agriculture General, Applied Horticulture, and Agriculture Mechanization Programs would benefit from this course.

#### **876 - Horticulture II (120 hours)**

**REQUIRED: Successful Completion of Plant Science/Botany and Horticulture & Greenhouse Operations**

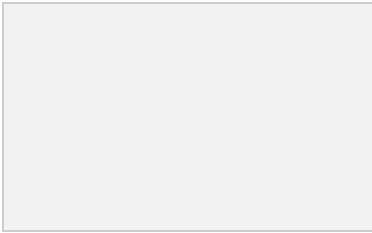
This course is an extension of horticulture topics covered in Horticulture & Greenhouse Operations. Specific topics include advances in plant propagation, hydroponics, and advanced lab experiments. Turfgrass care will be included. Research labs utilizing the scientific method of investigation in horticulture will be required.

#### **878 - Landscape Design & Maintenance (120 hours)**

Students will focus on major principles of landscape design necessary to develop a layout for a home landscape project. Emphasis will include site selection, plant and tree identification, hardscaping materials, project planning, and cost analysis.

#### **887 - Natural Resources Management (120 hours) ⑤**

This course will prepare students for careers bridging human and environmental systems. We will discuss sustainability, energy sources, wildlife, conservation methods, and more. In a combination of classroom and hands-on learning, students will gain the knowledge needed to manage human interactions with the natural world in parks and protected areas. Those



## **Dover Area School District**

### **Curriculum Cover Sheet**

interested in careers involving wildlife, fish and game, research, environmental science and more will benefit from this course.

#### **888 - Construction (120 hours)**

**Prerequisite: Successful Completion or Concurrent Scheduling of Agricultural Mechanics I**

In this course, students will learn about building layout, planning, and framing, along with practical theories of electricity, with emphasis on proper wiring techniques. Students will complete a series of labs focused on circuits commonly found in the home, including receptacles and switches. Students will learn to read and produce building plans. Shop work will include a required project and or a major agriculture building construction project. A masonry project will be included. Students will learn basic land surveying.

#### **890 - Supervised Agricultural Experience (120 hours)**

**REQUIRED: TEACHER MUST APPROVE**

In this course, agricultural students will receive detailed help with the initial development and implementation of their Supervised Agricultural Experience project or SAE. Coursework will include an emphasis on project development and record-keeping skills. Students will use the Agriculture Experience Tracker (AET), an online program, to record data about the time and money they devote to their project.

#### **891 - Agricultural Work Experience (120 hours) (Fall)**

#### **892 - Agricultural Work Experience (120 hours) (Fall)**

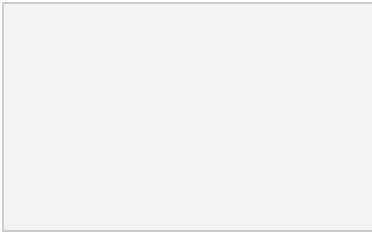
#### **893 - Agricultural Work Experience (120 hours) (Spring)**

#### **894 - Agricultural Work Experience (120 hours) (Spring)**

**MUST ALSO BE ENROLLED IN 874 (AG BUSINESS & MARKETING)**

Seniors who meet the prescribed requirements are given the opportunity to obtain on-the-job vocational work experience. All students who elect this course must be on the path to being an AG General Program completer. Students will be permitted to leave school one or two periods per day in order to report to their job.

Agricultural Work Experience is designed to provide senior students with an in-depth “real world” career experience. This program, approved for credit by the Pennsylvania Department of Education, connects school-based classroom/laboratory instruction with career and technical knowledge learned on a work site. It provides students with on-the-job training that is directly related to their future career objectives. The Capstone Seminar experience is often viewed as



## **Dover Area School District Curriculum Cover Sheet**

the completing element of secondary career and technical educational experience. It provides a valuable connection when the student graduates and continues with post-secondary education or enters directly into the workforce. The paid employment shall be within careers related to students' Ag-General Program of Study and vocational plan, or a combination thereof. This class is only for the CTE Ag-General program of study completers. Students must be accepted to become a program of study completer to schedule this class. Students must be at least 16 years of age and must accept full responsibility for transportation to/from the workplace. The district and its agents are not liable for transportation and any related injury or loss.

### **895 - Intro to Ornamental Horticulture & Greenhouse Operations (CHS) (120 hours)**

#### **REQUIRED: Successful Completion of Plant Science/Botany**

This course combines the *Introduction to Ornamental Horticulture (CHS)* class offered in partnership with Penn College with additional hands-on work in the greenhouse. College credit is free for this course. Students will learn about the diverse ornamental horticulture industry, including the worldwide scope and economic impact of the industry in today's marketplace. Emphasis on information access through the Internet, trade journals, trade organizations, the horticulture industry, guest speakers, and visitations to various horticultural businesses. Exploration includes products, services, and information used in the industry; production and marketing (wholesale and retail) of horticultural products and services; and traditional and non-traditional career paths within the industry. Through a combination of classroom instruction and laboratory experience, students will master the techniques of sexual and asexual propagation, soil and media composition, and plant nutrition. Students will learn to operate greenhouse environmental systems, including irrigation, lighting, and temperature controls. The course strictly adheres to industry safety standards and offers training in chemical handling and Integrated Pest Management (IPM). Students will also develop a business plan for a retail crop cycle, covering cost analysis, marketing strategies, and customer service.

# Pacing Guide

## PACING GUIDE

| <b>859 / 860 - Honors Agriscience (120 hours)</b>                                                                                                                                                                  | <b>Associated Tasks</b>             | <b>120 Hours</b> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------|
| Circles of Ag Education                                                                                                                                                                                            | N/A                                 | 15 hours         |
| Communication                                                                                                                                                                                                      | N/A                                 | 15 hours         |
| Science of Agriculture                                                                                                                                                                                             | 101, 103, 105, 302, & 501           | 15 hours         |
| Natural Resources                                                                                                                                                                                                  | 101, 103, 105, & 501                | 25 hours         |
| Plants and Animals                                                                                                                                                                                                 | 103, 302, 303, 305, 501, 502, & 902 | 35 hours         |
| Ag Power and Technology                                                                                                                                                                                            | 101, 103, 105, & 501                | 10 hours         |
| Agriculture in the Future                                                                                                                                                                                          | N/A                                 | 5 hours          |
| <b>Honors Component Description</b><br><i>Students in the Honors Class will complete at least two additional projects, labs, and/or lab reports per unit to enrich their experience with the associated tasks.</i> |                                     |                  |

| <b>870- Plant Science/Botany</b>      | <b>Associated Tasks</b>                       | <b>120 Hours</b> |
|---------------------------------------|-----------------------------------------------|------------------|
| Plant Naming, Classification, & Use   | 201, 213, & 901                               | 7 hours          |
| Plant Anatomy                         | 203 & 204                                     | 15 hours         |
| Growth & Development                  | 206, 207, 211, & 214                          | 15 hours         |
| Photosynthesis & Cellular Respiration | 205                                           | 15 hours         |
| Soil & Plant Nutrients                | 206, 301, 302, 303, 304, 305, 306, 307, & 308 | 15 hours         |
| Plant Pathogens                       | 209, 210                                      | 10 hours         |
| IPM                                   | 209, 210                                      | 20 hours         |
| Plant Reproduction                    | 208, 214                                      | 11 hours         |
| Biotechnology                         | 212, 801, 802, & 803                          | 12 hours         |

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| <b>874 - Agricultural Business &amp; Marketing</b> | <b>Associated Tasks</b> | <b>120 Hours</b> |
|----------------------------------------------------|-------------------------|------------------|
| Business Start-Up                                  | 407, 409, & 804         | 15 hours         |
| Managing Finances                                  | 404 & 409               | 25 hours         |
| Managing Risk                                      | 404 & 409               | 30 hours         |
| Business Planning                                  | 409                     | 20 hours         |
| Marketing                                          | 409                     | 20 hours         |
| NOCTI Preparation and Completion                   | All Listed Above        | 10 hours         |

| <b>876 - Horticulture II</b>             | <b>Associated Tasks</b>                  | <b>120 Hours</b> |
|------------------------------------------|------------------------------------------|------------------|
| Plant Identification-Common & Scientific | 904                                      | 7 hours          |
| OSHA 30 Training                         | 101, 102, 103, & 105                     | 31 hours         |
| Pesticide Applicator Certification       | 101, 102, 103, 104, 105, 201, 206, & 209 | 15 hours         |
| Plant Growth Requirements                | 309, 310, 311, & 512                     | 20 hours         |
| Fertilization Calculations & Application | 203 & 310                                | 12 hours         |
| Greenhouse Management Techniques         | 512, 1107 & 1110                         | 5 hours          |
| Plant Sale Business & Marketing Plans    | 403, 404, & 406                          | 15 hours         |
| NOCTI Preparation and Completion         | All Listed Above                         | 15 hours         |



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| <b>878 - Landscape Design &amp; Maintenance</b>                     | <b>Associated Tasks</b>             | <b>120 Hours</b> |
|---------------------------------------------------------------------|-------------------------------------|------------------|
| Introduction to Horticulture & Career Development                   | 804, 1001, 1002, 1003 & 1004        | 5 hours          |
| Plant Health Care & Safety                                          | 101, 102, 103, 201, 202, 205, & 305 | 10 hours         |
| Soils, Fertility, & Turfgrass Management                            | 501, 502, 503, 507, 508, & 1107     | 10 hours         |
| Irrigation & Water Management                                       | 305, 1101, & 1102                   | 10 hours         |
| Site Analysis, Mapping, & Landscape Drafting                        | 1103 & 1104                         | 15 hours         |
| Landscape Design Principles & Architectural Features                | 1101 & 1102                         | 15 hours         |
| Plant Identification & IPM                                          | 205, 206, 309, & 904                | 10 hours         |
| Sustainable Landscaping & Environmental Stewardship                 | 512, 601, 602, & 603                | 10 hours         |
| Client Relations, Business Operations, & Professional Communication | 403, 404, 406, 407, & 801           | 10 hours         |
| Urban Landscapes & Emerging Technologies                            | 104, 601, 602, 603, 701, & 704      | 10 hours         |
| Capstone Project                                                    | All Listed Above                    | 15 hours         |

| <b>887 - Natural Resources Management</b> | <b>Associated Tasks</b> | <b>120 Hours</b> |
|-------------------------------------------|-------------------------|------------------|
| Sustainability                            | 701, 708, 710           | 15 hours         |
| Biodiversity & Extinction                 | 707, 711                | 15 hours         |
| Habitats                                  | 704, 705, 707           | 15 hours         |
| Invasive Species                          | 704 & 706               | 15 hours         |
| Pollution                                 | 703 & 707               | 15 hours         |
| Renewable & Nonrenewable Energy           | 702 & 709               | 15 hours         |
| Wildlife Management                       | 704 & 705               | 15 hours         |

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|                |                |          |
|----------------|----------------|----------|
| Climate Change | 704, 707 & 709 | 15 hours |
|----------------|----------------|----------|

| <b>888 - Construction</b>                   | <b>Associated Tasks</b> | <b>120 Hours</b> |
|---------------------------------------------|-------------------------|------------------|
| Zoning and Permitting                       | 407                     | 8 hours          |
| General Industry Safety                     | 103 & 105               | 7 hours          |
| Construction Codes & Engineering Principles | 105 & 407               | 10 hours         |
| Framing                                     | 105                     | 15 hours         |
| Concrete                                    | 103 & 105               | 15 hours         |
| Electrical                                  | 105                     | 15 hours         |
| Plumbing                                    | 103 & 105               | 15 hours         |
| Heavy Machine Operation                     | 104 & 105               | 10 hours         |
| Authentic Construction Build                | 103, 105, & 407         | 25 hours         |

| <b>895 - Intro to Ornamental Horticulture &amp; Greenhouse Operations (CHS)</b> | <b>Associated Tasks</b>      | <b>120 Hours</b> |
|---------------------------------------------------------------------------------|------------------------------|------------------|
| Introduction to Greenhouse Industry & Career Development                        | 804, 1001, 1002, 1003 & 1004 | 10 hours         |
| Greenhouse Safety & Equipment Operation                                         | 101, 102, 103, 104, & 105    | 10 hours         |
| Greenhouse Structures & Environmental Controls                                  | 304, 305, 307, & 310         | 14 hours         |
| Growing Media, Soils, & Fertility Management                                    | 501, 502, 503, 505, & 507    | 12 hours         |
| Plant Propagation Techniques                                                    | 306, 701 & 704               | 18 hours         |
| Irrigation Systems & Water Management                                           | 305, 1101, & 1102            | 12 hours         |
| Greenhouse Crop Production & Scheduling                                         | 305, 311, 902, & 1108        | 16 hours         |
| Integrated Pest Management                                                      | 205 & 206                    | 10 hours         |

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|                                                          |                                |          |
|----------------------------------------------------------|--------------------------------|----------|
| Sustainable Greenhouse Practices & Emerging Technologies | 512, 601, 602, & 603           | 8 hours  |
| Greenhouse Management & Marketing                        | 203, 403, 404, 406, 407, & 409 | 10 hours |

# **Task List (Update from KUD Sheet)**

## Competency Task List

Applied Horticulture/Horticultural Operations, General CIP 01.0601

High School Graduation Years 2022, 2023, 2024, 2025, 2026

### 100 Safety

| Item | Task                                                                                                         | Secondary Course Crosswalk       | Know                                                                                                                      | Understand                                                                                                                                                                                                                                                                                                                                              | Do                                                                                                                                                                                                   | Assessment                     |
|------|--------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| 101  | Follow all general safety, laboratory safety and field-site safety practices and procedures in horticulture. | Agriscience Botany/Plant Science | Students will know:<br>the basics of first aid, how to read SDS's, and properly and safely use the horticulture equipment | Students will understand:<br>Safe work practices reduce the risk of injury, illness, and property damage in horticultural settings, safety procedures must be followed consistently in laboratories, greenhouses, landscapes, and field sites, & personal responsibility and awareness are essential components of maintaining a safe work environment. | Students will be able to:<br>demonstrate all laboratory safety, general safety, and field-site safety practices & procedures, write new SDS's for horticulture products, and perform basic first aid | Quiz and Practical Application |
| 102  | Follow all OSHA safety standards for the horticulture services industry.                                     | Horticulture II                  | Students will know:<br>the basics of first aid, how to read SDS's, and properly and safely use the horticulture equipment | Students will understand:<br>OSHA standards are designed to protect workers from workplace hazards and injuries, employers and employees share responsibility for maintaining a safe and healthy work environment, & compliance with OSHA regulations promotes                                                                                          | Students will be able to:<br>demonstrate all laboratory safety, general safety, and field-site safety practices & procedures, write new SDS's for horticulture products, and perform basic first aid | Quiz and Practical Application |

|     |                                                                              |                                                                          |                                                                                                                                                                                                 |                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                   |                                |
|-----|------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
|     |                                                                              |                                                                          |                                                                                                                                                                                                 | professionalism and reduces workplace accidents and liability.                                                                                                                                                                                  | Students will understand: SDS's provide critical information about the safe handling, storage, and disposal of chemicals, understanding SDS information helps prevent chemical-related injuries and environmental contamination, & following SDS procedures ensures compliance with workplace safety regulations and industry standards. | Students will be able to: demonstrate all laboratory safety, general safety, and field-site safety practices & procedures, write new SDS's for horticulture products, and perform basic first aid | Quiz and Practical Application |
| 103 | Follow procedures written in the Safety Data Sheet (SDS) information system. | Botany/Plant Science Construction Intro to Ornamentals & Greenhouse Mgmt | Students will know: the basics of first aid, how to read SDS's, and properly and safely use the horticulture equipment                                                                          |                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                   |                                |
| 104 | Operate horticulture equipment.                                              | Landscape Design & Maintenance Construction                              | Students will know: how to properly and safely use the horticulture equipment, parts and functions of common greenhouse and landscape tools, & maintenance and storage procedures for equipment | Students will understand: improper equipment use can create safety hazards and damage materials, routine maintenance increases equipment lifespan and efficiency, & selected the proper tool improves work quality and productivity             | Students will be able to: safely operate horticultural hand and power equipment, inspect tools prior to operation, perform basic maintenance and cleaning procedures, & select appropriate equipment for specific horticultural tasks                                                                                                    | Use of Machinery                                                                                                                                                                                  |                                |
| 105 | Select the proper protective clothing and equipment.                         | Botany/Plant Science Construction Intro to Ornamentals & Greenhouse Mgmt | Students will know: the basics of first aid, how to read SDS's, and properly and safely use the horticulture equipment                                                                          | Students will understand: different horticultural tasks require specific personal protective equipment (PPE) to minimize hazards, properly selected and maintained PPE reduces the risk of injury and exposure to harmful substances, & wearing | Students will be able to: demonstrate all laboratory safety, general safety, and field-site safety practices & procedures, write new SDS's for horticulture products, and perform basic first aid                                                                                                                                        | Practical Application                                                                                                                                                                             |                                |

|  |                |  |   |  |                                                                                                       |  |  |
|--|----------------|--|---|--|-------------------------------------------------------------------------------------------------------|--|--|
|  |                |  |   |  | appropriate protective clothing is an essential professional practice that promotes workplace safety. |  |  |
|  | RESERVED (106) |  | - |  |                                                                                                       |  |  |

## 200 Safe and Proper Plant Health Care Practices

| Item | Task                                        | Secondary Course                                              | Know                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Understand                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Do                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Assessment |
|------|---------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| 201  | Control weeds, insects, and plant diseases. | Landscape Design & Maintenance<br>Natural Resource Management | <p>Define invasive species and understand their characteristics.</p> <p>Identify the ecological and economic impacts of invasive species on native ecosystems.</p> <p>Explore specific examples of invasive species and their effects on biodiversity.</p> <p>Define pest management and understand its significance in agriculture and ecosystems.</p> <p>Explore methods such as cost/benefit analysis, cumulative effects analysis, environmental impact analysis, ethical analysis, and risk analysis used in pest management.</p> <p>Understand the importance of sustainable and ethical pest management practices.</p> | <p>Evaluate the cascading effects of invasive species on native flora and fauna.</p> <p>Critically assess the effectiveness and sustainability of pest management strategies using cost/benefit analysis, cumulative effects analysis, environmental impact analysis, ethical analysis, and risk analysis.</p> <p>Understand the trade-offs involved in different pest management approaches.</p> <p>Understand how invasive species can alter ecosystem dynamics, nutrient cycling, and community structure.</p> | <p>Conduct a comprehensive analysis using cost/benefit, cumulative effects, environmental impact, ethical, and risk analysis.</p> <p>Reflect on the ethical implications of different control methods. Develop a plan to control specific environmental factors in a given scenario (e.g., a greenhouse, agricultural field).</p> <p>Incorporate techniques to regulate temperature, humidity, and soil conditions.</p> <p>Discuss the potential benefits and challenges associated with the proposed environmental control plan.</p> | Quiz       |

|     |                                                                           |                                        |                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                             |                                                      |
|-----|---------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| 202 | Interpret horticulture product labels.                                    | Intro to Ornamentals & Greenhouse Mgmt | Students will know:<br>how to read and interpret product labels, calculate proper mixes for liquid applications, understand the laws for pesticide applications, and analyze site characteristics for horticulture industries | Students will understand:<br>horticulture product labels contain important information that ensures products are used safely, effectively, and legally, following label instructions helps protect people, plants, animals, and the environment from potential harm, & accurate interpretation of product labels is essential for selecting the correct product, determining proper application rates, and achieving desired results. | Students will be able to:<br>read product labels, calculate and mix any type of horticultural product based on test results and mixing procedures, apply pesticides safely and appropriately according to law, and analyze site locations for best criteria | Quiz                                                 |
| 203 | Formulate quantities of horticultural products used in plant health care. | Horticulture II                        | Students will know:<br>how to read and interpret product labels, calculate proper mixes for liquid applications, understand the laws for pesticide applications, and analyze site characteristics for horticulture industries | Students will understand:<br>accurate calculations are critical for safe and effective pesticide and fertilizer applications, improper mixing rates can harm plants, applicators, and the environment, product labels provide legal requirements for application rates and procedures, & mathematical precision ensures compliance with industry standards and regulations.                                                           | Students will be able to:<br>read product labels, calculate and mix any type of horticultural product based on test results and mixing procedures, apply pesticides safely and appropriately according to law, and analyze site locations for best criteria | Product Calculation Worksheet & Mixing Lab Practical |
|     | RESERVED (204)                                                            | -                                      |                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                             |                                                      |



|     |                                                                                                                                           |                                                            |                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                     |                                |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| 205 | Investigate the concept of plant health care, e.g., disease, nutrients.                                                                   | Natural Resource Management<br>Plant Science & Ornamentals | Students will know:<br>about the various career fields within the horticulture industry, major historical events in the field of horticulture, how the horticulture industry impacts our country's economics, why horticulture has a psychological impact, and a basic overview of plant health care | Students will understand: plant health care is a preventative approach that integrates cultural, biological, and chemical management practices, healthy plants are more resistant to pests, diseases, and environmental stressors, plant health care requires continuous monitoring and informed decision-making, & sustainable management practices improve long-term plant vigor and environmental quality. | Students will be able to: identify the various components of plant health care, define the importance of the horticulture industry economically and psychologically | Quiz and Practical Application |
| 206 | Distinguish the components of an integrated pest management program including the effects of chemicals and pesticides on the environment. | Plant Science & Ornamentals                                | Students will know:<br>the various pathogens present in PA, how to sustainably control pests using IPM methods, and how to use sustainable methods of control                                                                                                                                        | Students will understand: IPM emphasizes prevention before treatment, biological, cultural, mechanical, and chemical controls each play a role in pest management, effective IPM minimizes environmental impacts while maintaining plant health, & monitoring and threshold levels guide management decisions.                                                                                                | Students will be able to: create and implement an IPM plan geared toward specific pathogens                                                                         | IPM Case Study                 |
| 207 | Analyze various horticultural pests including their signs and symptoms.                                                                   | Plant Science & Ornamentals                                | Students will know:<br>the various pathogens present in PA, how to sustainably control pests using IPM methods, and how to use sustainable methods of control                                                                                                                                        | Students will understand: accurate identification is necessary for effective control strategies, different pests produce unique damage symptoms, environmental conditions often influence pest                                                                                                                                                                                                                | Students will be able to: create and implement an IPM plan geared toward specific pathogens                                                                         | Pest ID Quiz                   |

|     |                                         |                 |   |                                                                                                                                                                   |                                                                                                                                                                                                                      |                                                                                                                                                                          |                 |
|-----|-----------------------------------------|-----------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
|     |                                         |                 |   |                                                                                                                                                                   | outbreaks, & early detection reduces economic losses and plant damage.                                                                                                                                               |                                                                                                                                                                          |                 |
|     | RESERVED (208)                          |                 | - |                                                                                                                                                                   |                                                                                                                                                                                                                      |                                                                                                                                                                          |                 |
| 209 | Prepare for PA Pesticide Certification. | Horticulture II |   | Students will know: pesticide laws and regulations, pesticide label requirements, environmental and health risks associated with pesticide misuse, IPM strategies | Students will understand: pesticide applicators have legal and ethical responsibilities, proper application reduces environmental contamination and human exposure, & IPM strategies can reduce pesticide dependence | Students will be able to: interpret labels and SDS information, calculate pesticide application rates, ID proper PPE, and apply pesticide safety and handling procedures | Applicator Exam |

### 300 Basic Botany

| Item | Task                                                                                   | Secondary Course Cross-Walk                                | Know                                                                                                                                                                  | Understand                                                                                                                                                                                                                                                                                                                                                                                                               | Do                                                                                                                                                                   | Assessment   |
|------|----------------------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 301  | Describe the process of photosynthesis, respiration, translocation, and transpiration. | Natural Resource Management<br>Plant Science & Ornamentals | Students will know: how the processes of photosynthesis, cellular respiration, translocation & transpiration work in plants, and how these processes sustain all life | Students will understand: photosynthesis, respiration, translocation, and transpiration are interconnected processes that enable plants to grow, survive, and reproduce, plants require energy, water, nutrients, and gases from their environment to carry out essential life processes, & environmental conditions can affect the efficiency of these processes and ultimately influence plant health and productivity | Students will be able to: describe how photosynthesis, cellular respiration, translocation, & transpiration work in plants, and how these processes sustain all life | Quiz and Lab |

|     |                                                           |                             |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                      |              |
|-----|-----------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 302 | Compare plant cell structure, organization, and function. | Plant Science & Ornamentals | Students will know:<br>the difference between the components and structures of a plant cell and an animal cell, and the structures of plant cells and their function                                                                  | Students will understand:<br>the structure of plant cells is directly related to their function and ability to support plant growth and survival, specialized organelles within plant cells perform specific tasks necessary for life processes such as photosynthesis, storage, and transport, & the organization of cells into tissues and organs allows plants to efficiently carry out complex biological functions. | Students will be able to:<br>identify plant components and structures, articulate the functions of plant structures, discuss the differences between a plant cell and an animal cell | Quiz and Lab |
| 303 | Compare plant structures and explain their functions.     | Plant Science & Ornamentals | Students will know:<br>how plant structures directly correlates to its function, what conditions are required for seed germination, identify germination issues, and discuss how to change environmental factors to suit plant needs. | Students will understand:<br>each plant structure has specialized functions that contribute to the plant's growth, reproduction, and survival, the form and structure of plant parts are closely related to their role within the plant, & healthy plant development depends on the interaction and proper functioning of all plant structures.                                                                          | Students will be able to:<br>germinate any seed any time of the year, manipulate growing conditions, explain the anatomy and physiology of plant structures                          | Quiz and Lab |
| 304 | Analyze conditions essential for seed germination.        | Plant Science & Ornamentals | How plant structures directly correlates to its function, what conditions are required for seed germination, identify germination issues, and discuss how to change environmental factors to                                          | Students will understand:<br>seeds require specific environmental conditions, including moisture, oxygen, temperature, and sometimes light, to germinate successfully, variations in environmental                                                                                                                                                                                                                       | Be able to germinate any seed any time of the year, manipulate growing conditions, explain the anatomy and physiology of plant structures                                            | Quiz and Lab |

|     |                                                                                      |                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |
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|     |                                                                                      |                                                                                              | <p>suit plant needs</p>                                                                                                                                                                                                                                                                                                                                                                                            | <p>conditions can affect germination rates and seedling vigor, &amp; understanding germination requirements allows horticulturists to manipulate growing conditions and improve plant production success.</p>                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |
| 305 | Explain the environmental factors that affect the growth and development of a plant. | <p>Plant Science &amp; Ornamentals</p> <p>Agriscience</p> <p>Natural Resource Management</p> | <p>Students will know: key environmental factors affecting plant growth include light, water, temperature, soil composition, and air quality, plants require specific ranges of environmental conditions to carry out photosynthesis, respiration, and nutrient uptake effectively, &amp; biotic and abiotic factors both influence plant health, including pests, competition, and availability of resources.</p> | <p>Students will understand: plant growth and development are directly influenced by environmental conditions, and even small changes can significantly impact plant health and productivity, each plant species has unique environmental requirements and tolerances that determine where it can successfully grow, &amp; managing environmental factors can improve plant performance, reduce stress, and increase yield in both natural and controlled settings.</p> | <p>Students will be able to: identify and analyze how specific environmental factors (light, water, temperature, soil) affect plant growth in real or simulated scenarios, compare plant growth under different environmental conditions and interpret results to determine optimal growing conditions, &amp; recommend adjustments to environmental conditions to improve plant health and development in a given situation (e.g., greenhouse or garden setting).</p> | Quiz and Lab |
| 306 | Distinguish between sexual and asexual plant reproduction.                           | <p>Botany &amp; Plant Science &amp; Ornamentals</p>                                          | <p>How plants reproduce and differentiate between asexual and sexual reproduction</p>                                                                                                                                                                                                                                                                                                                              | <p>Students will understand: plants reproduce through both sexual and asexual methods, each offering different advantages for survival, adaptation, and propagation, sexual reproduction increases genetic diversity, while</p>                                                                                                                                                                                                                                         | <p>Be able to explain the process of sexual and asexual reproduction and create circumstances that allow for maximum reproductive success</p>                                                                                                                                                                                                                                                                                                                          | Quiz         |

|     |                                      |                                                                      |                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                 |      |
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|     |                                      |                                                                      | asexual reproduction produces genetically identical offspring that maintain desirable traits, & horticulturists select propagation methods based on plant characteristics, production goals, and desired outcomes.                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                 |      |
| 307 | Analyze plant nutrient requirements. | Natural Resource Management<br>Botany & Plant Science<br>Ornamentals | Students will know: how to analyze soil and remediate if necessary, identify the 16 plant nutrients, describe nutrient function in plants, identify nutrient deficiencies, explain how soil forms, and what components make up soil                                                      | Students will understand: plants require essential macro- and micronutrients to support growth, development, reproduction, and overall health, nutrient deficiencies or excesses can negatively affect plant appearance, productivity, and survival, & proper nutrient management promotes healthy plant growth while supporting sustainable horticultural practices and environmental stewardship. | Students will be able to: identify essential macro- and micronutrients required for healthy plant growth, & diagnose nutrient deficiency and toxicity symptoms in plants.                                                                                                                                       | Test |
| 308 | Describe the nutrient cycles.        | Botany & Plant Science & Ornamentals                                 | Students will know: nutrient cycles include key processes such as the carbon, nitrogen, phosphorus, and water cycles that move essential elements through ecosystems, nutrients are recycled between living organisms (plants, animals, microbes) and nonliving components (soil, water, | Students will understand: nutrient cycles are essential for sustaining life because they continuously recycle elements needed for plant growth and ecosystem function, disruptions to nutrient cycles (such as pollution, deforestation, or overuse of fertilizers) can negatively impact soil health and ecosystem                                                                                 | Students will be able to: diagram and explain the major steps in a nutrient cycle (carbon, nitrogen, phosphorus, or water), analyze how nutrients move through an ecosystem and identify where they may be lost or added, & evaluate the impact of human practices (e.g., fertilization, farming, pollution) on | Test |

|     |                                                                     |                                           |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                              |      |
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|     |                                                                     |                                           | air), & soil organisms such as bacteria and fungi play an important role in breaking down organic matter and returning nutrients to the soil. | balance, & human activities can both support and interfere with nutrient cycling, influencing agricultural productivity and environmental quality.                                                                                                                                                                                                                                                                                                                    | nutrient cycling and propose improvements.                                                                                                                   |      |
| 309 | Classify plants and use appropriate binomial taxonomic terminology. | Horticulture II<br>Botany & Plant Systems | Students will know:<br>the levels of taxonomy, Linnaeus' classification system, and the historical and modern uses of plants across the world | Students will understand:<br>plants are classified using a hierarchical taxonomic system that organizes living organisms based on shared characteristics and evolutionary relationships, binomial nomenclature provides a universal naming system using genus and species to accurately identify plants worldwide, & proper classification and scientific naming reduce confusion caused by common names and ensure clear communication in the horticulture industry. | Students will be able to:<br>Identify the levels of taxonomy, Linnaeus' classification system, and the historical and modern uses of plants across the world | Quiz |

|     |                                                                                 |                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                            |                                         |
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| 310 | Describe techniques used to control environmental factors.                      | Horticulture II<br>Natural Resource<br>Management | Students will know:<br>environmental control techniques include irrigation systems, shade structures, heating/cooling systems, ventilation, and greenhouse management practices, key environmental factors that can be controlled include temperature, light intensity, humidity, soil moisture, and air circulation, & tools such as thermostats, timers, sensors, and automated controllers are commonly used to regulate growing conditions. | Students will understand:<br>controlling environmental factors allows growers to create optimal conditions for plant growth regardless of external weather or seasonal changes, different plant species require specific environmental controls, and improper management can lead to stress, reduced growth, or crop loss, & technology and management strategies can improve efficiency, conserve resources, and increase crop quality and yield. | Students will be able to:<br>identify and describe appropriate environmental control techniques for different plant production settings (greenhouse, field, indoor growing), analyze plant growth scenarios and recommend adjustments to environmental controls to improve plant health, & design a basic plan for managing environmental factors in a controlled growing system such as a greenhouse or hydroponic setup. | Quiz &<br>Practical<br>Application      |
| 311 | Describe how weather and climate impact growing conditions and plant selection. | Horticulture II                                   | Students will know: climate zones, & plant hardiness zones, effects of temperature, precipitation, sunlight, humidity, & wind on plants, seasonal growing patterns, & microclimates and their impacts on plant growth                                                                                                                                                                                                                           | Students will understand:<br>weather and climate directly influence plant survival and increased maintenance, & climate conditions influence pest and disease prevention                                                                                                                                                                                                                                                                           | Students will be able to:<br>select plants appropriate for specific climate conditions, analyze weather data to make horticultural decisions, identify environmental stress symptoms in plants, & modify growing environments to improve plant health                                                                                                                                                                      | Project and<br>Practical<br>Application |

## 400 Horticulture Business Operations

| Item | Task                                    | Secondary Course Cross-Walk | Know                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Understand                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Do                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Assessment                          |
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|      | RESERVED (401-402)                      | -                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                     |
| 403  | Develop a horticultural business plan.  | Horticulture II             | Students will know:<br>components of a business plan, startup and operating costs, target markets and customer demographics, & marketing and advertising strategies                                                                                                                                                                                                                                                                                                                                                                   | Student will understand:<br>successful businesses require financial planning & organization, profitability depends on balancing expenses and revenue, & customer demand influences business success                                                                                                                                                                                                                                                                               | Students will be able to:<br>develop a basic horticultural business plan, create a startup budget, identify target audiences and marketing strategies, and present business proposals professionally                                                                                                                                                                                                                                                                | Business Plan and Spring Plant Sale |
| 404  | Analyze pricing and mark-up techniques. | Ag Business & Marketing     | Agribusinesses provide products and services from planning to production to retail.<br>Enterprises incur expenses, such as inputs and noncurrent asset purchases.<br>A balance sheet shows the financial position of a business at a point in time.<br>An income statement summarizes income and expenses over a specific period to calculate net income.<br>Projected cash flow statements are used to anticipate and plan for seasonal fluctuations in income and expenses.<br>Lenders review financial statements to determine the | The products and services provided by agribusinesses need to fit the needs of the community and provide profitable income in order for them to continue to be available.<br>These expenses are necessary in order to generate income for a business.<br>Business managers measure the health of an enterprise by analyzing financial documents.<br>The goal of a financial review by a lender is to minimize their own risk prior to lending money to a business or entrepreneur. | Calculate breakeven and use it to analyze the feasibility of an enterprise.<br>Classify typical business expenses as fixed, variable, or noncurrent asset purchase.<br>Analyze the financial health of business operations.<br>Complete an income statement.<br>Identify seasonal income and expense fluctuations.<br>Complete a projected cash flow statement.<br>Develop a process to analyze the financial position of a business for lender approval of a loan. | Quiz                                |



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|     |                                                                  |                                      | viability of a business when reviewing a loan application.                                                                                                                                                               |                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                          |                                     |  |
|     | RESERVED (405)                                                   | -                                    |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                          |                                     |  |
| 406 | Research vendors to obtain product information.                  | Horticulture II                      | Students will know: sources of horticultural products and services, product specifications and quality standards, vendor pricing structures and purchasing options, & methods for comparing suppliers.                   | Students will understand: vendor selection impacts profitability and product quality, reliable suppliers contribute to successful business operations, cost comparisons should include quality, availability, and service, & research supports informed purchasing decisions. | Students will be able to: compare multiple vendors, evaluate product specifications and pricing, request and interpret product information, & recommend vendors based on business needs.                                                                                                                                 | Vendor Research & Comparison Report |  |
| 407 | Perform appropriate customer and client relationship attributes. | Ag Business & Marketing Construction | Students will know: key talking points when discussing designs with clients, how to present projects and proposals, and know the components of a proposal<br>Products and services are developed to meet consumer needs. | Entrepreneurs anticipate the interests of consumers by researching trends. Competition and marketing influence consumers choosing similar goods and services.                                                                                                                 | Students will be able to: create proposals, estimate costs, and present proposals to clients<br>List consumed need and want items and identify source(s) for each.<br>Conduct market research and analyze data collected from a survey to discover a product or service to offer related to an agribusiness of interest. | Practical Application               |  |
|     | RESERVED (408)                                                   | -                                    |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                          |                                     |  |

| 409                             | Analyze record keeping systems to determine best management practices. | Ag Business & Marketing                                                   | Farms and ranches are businesses and must be managed in an organized, intentional manner.<br>Interest paid on loan principal is a business expense.<br>The decrease in asset value due to depreciation is a business expense.<br>Businesses measure profitability in two ways, net income and return on assets (ROA).<br>The breakeven point of an enterprise occurs when the expenses match the income.<br>Decision-makers use financial documents to plan and manage a business. | Specific types of organizational systems exist and are commonly used for particular purposes in the industry.<br>Business managers use graphs and calculators developed in spreadsheet software to make management decisions. | Implement an organizational system to file course documents.<br>Calculate interest for business scenarios.<br>Calculate depreciation using straight-line method.<br>Calculate and analyze net income and return on assets for business scenarios.<br>Identify income and expenses from raw enterprise records.<br>Make a graph using spreadsheet software illustrating the portion of income compared to expenses for an enterprise.<br>Build common financial calculators in spreadsheet software for use throughout the course. | Practical Application & Project |
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|                                 | RESERVED (410)                                                         | -                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                 |
| <b>500 Soils and Fertilizer</b> |                                                                        |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                 |
| Item                            | Task                                                                   | Secondary Course Cross-Walk                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                 |
| 501                             | Compare soil/media characteristics.                                    | Plant Science & Ornamentals<br>Agriscience<br>Natural Resource Management | Students will know: the physical and chemical properties of soil and growing media, including texture, structure, porosity, drainage, aeration, water-holding capacity, and                                                                                                                                                                                                                                                                                                        | Students will understand: soil and growing media characteristics directly influence plant growth, root development, and nutrient availability, different plants require different soil and                                    | Students will be able to: compare and contrast the characteristics of different soil types and growing media, evaluate soil and media suitability for specific horticultural applications,                                                                                                                                                                                                                                                                                                                                        | Quiz                            |

|     |                                      |                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                         |                                         |
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|     |                                      | <p>pH, the components of common growing media such as sand, silt, clay, peat moss, perlite, vermiculite, bark, and compost, &amp; the advantages and disadvantages of various soil and media types for horticultural production</p>                                                                                                                      | <p>media conditions to achieve optimal growth and productivity, physical and chemical properties of soil affect water movement, aeration, and plant health, &amp; selecting the appropriate soil or growing medium is essential for successful horticultural production.</p>                                                                                                                                                                                | <p>identify soil and media components and describe their functions, &amp; recommend appropriate growing media based on plant and production requirements.</p>                                                                                                                                           |                                         |
| 502 | Analyze soil and/or plant nutrients. | <p>Plant Science &amp; Ornamentals<br/>Agriscience<br/>Natural Resource Management</p> <p>Students will know: the essential macro- and micronutrients required for plant growth, the functions of individual nutrients within plants, common nutrient deficiency and toxicity symptoms, &amp; soil testing methods and nutrient analysis procedures.</p> | <p>Students will understand: plants require specific nutrients in appropriate amounts to support growth, development, and reproduction, nutrient deficiencies and excesses can negatively impact plant health, quality, and productivity, soil and plant analysis provide valuable information for making nutrient management decisions, &amp; proper nutrient management promotes sustainable plant production while minimizing environmental impacts.</p> | <p>Students will be able to: identify essential plant nutrients and describe their functions, interpret soil and plant nutrient analysis reports, diagnose nutrient deficiencies and toxicities in plants, &amp; recommend fertilizer and nutrient management strategies based on analysis results.</p> | <p>Quiz &amp; Practical Application</p> |
| 503 | Describe soil management techniques. | <p>Natural Resource Management</p> <p>Students will know: common soil management practices including tillage, mulching, cover cropping, composting, erosion control, and soil amendment applications, factors that contribute to soil health and productivity,</p>                                                                                       | <p>Students will understand: effective soil management improves soil health, plant growth, and long-term productivity, soil conservation practices help reduce erosion, nutrient loss, and environmental degradation, sustainable</p>                                                                                                                                                                                                                       | <p>Students will be able to: evaluate soil conditions and identify management needs, recommend appropriate soil management practices for specific situations, apply soil amendments and conservation practices to</p>                                                                                   | <p>Quiz</p>                             |

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|     |                                                                  |                                                        | <p>&amp; sustainable practices used to improve soil quality and fertility.</p>                                                                                                                           | <p>soil management supports healthy ecosystems and responsible resource use, &amp; soil management decisions influence water quality, nutrient availability, and overall plant performance.</p>                                    | <p>improve soil quality, &amp; develop soil management plans that support sustainable horticultural production.</p>                                                                                         |                                    |
| 504 | Conduct proper soil sampling techniques.                         | Intro to Ornamentals & Greenhouse Mgmt Horticulture II | <p>Students will know: proper soil sampling methods &amp; procedures, factors that influence soil quality, tools used for soil collection, and importance of representative sampling</p>                 | <p>Students will understand: accurate soil samples lead to reliable soil test results, improper sampling can produce misleading recommendations, &amp; soil characteristics vary across landscapes</p>                             | <p>Students will be able to: collect representative soil samples, use soil sampling tools correctly, label and prepare samples for analysis, &amp; follow proper soil sampling protocols</p>                | Conducting Soil Samples & Analysis |
| 505 | Test soil for pH, texture, macronutrients, and soluble salts.    | Intro to Ornamentals & Greenhouse Mgmt Horticulture II | <p>Students will know: soil testing procedures and equipment, importance of pH and nutrient availability, soil texture classifications, &amp; effects of soluble salts on plant growth</p>               | <p>Students will understand: soil properties directly impact plant health and productivity, nutrient imbalances can limit plant growth, &amp; different plants require different soil conditions</p>                               | <p>Students will be able to: perform soil pH and nutrient tests, identify soil texture by feel and analysis, interpret soluble salt measurements, &amp; recommend corrective soil amendments</p>            | Conducting Soil Tests & Analysis   |
| 506 | Interpret commercial soil test reports.                          | Intro to Ornamentals & Greenhouse Mgmt Horticulture II | <p>Students will know: components of commercial soil test reports, nutrient recommendations and fertilizer analysis, soil amendment recommendations, &amp; terminology used in soil analysis reports</p> | <p>Students will understand: soil test reports guide nutrient management decision, improper fertilizer application can harm plants and the environment, &amp; data interpretation supports sustainable horticultural practices</p> | <p>Students will be able to: analyze soil test reports, identify nutrient deficiencies and excesses, recommend fertilizers and amendments, &amp; explain soil test results using scientific terminology</p> | Quiz & Analyzing Soil Reports      |
| 507 | Describe criteria for selecting fertilizers and soil amendments. | Intro to Ornamentals & Greenhouse Mgmt Horticulture II | <p>Students will know: the differences between fertilizers and soil amendments and their</p>                                                                                                             | <p>Students will understand: fertilizers and soil amendments serve different functions but both</p>                                                                                                                                | <p>Students will be able to: differentiate between fertilizers and soil amendments and explain</p>                                                                                                          | Quiz and Practical Application     |

|     |                                                      |                             |                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |
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|     |                                                      |                             | <p>purposes in horticultural production, types of fertilizers, including organic, inorganic, slow-release, and water-soluble fertilizers, common soil amendments such as compost, lime, sulfur, gypsum, peat moss, and organic matter, &amp; factors that influence fertilizer and amendment selection, including soil test results, plant nutrient requirements, soil pH, soil texture, and environmental conditions.</p> | <p>contribute to healthy plant growth and soil quality, soil test results provide important information for selecting appropriate fertilizers and amendments, plant species, growth stage, and environmental conditions influence nutrient and soil amendment needs, &amp; proper selection and use of fertilizers and soil amendments promotes plant health, improves soil quality, and minimizes environmental impacts.</p> | <p>their functions, interpret soil test results to determine fertilizer and amendment needs, select appropriate fertilizers and soil amendments based on plant requirements and site conditions, calculate and recommend application rates for fertilizers and amendments, evaluate the environmental and economic impacts of fertilizer and amendment choices, &amp; develop nutrient and soil management recommendations for horticultural production systems.</p> |                                |
| 508 | Describe factors influencing fertilizer application. | Natural Resource Management | <p>Students will know:<br/>fertilizer types and application methods, plant nutrient requirements, environmental factors affecting fertilizer efficiency, &amp; timing and rates of fertilizer application</p>                                                                                                                                                                                                              | <p>Students will understand:<br/>overapplication can contribute to pollution and plant injury, environmental conditions affect nutrient uptake, &amp; proper fertilization promotes sustainable plant growth</p>                                                                                                                                                                                                              | <p>Students will be able to:<br/>calculate fertilizer application rates, select appropriate fertilizers for specific situations, evaluate environmental risks associated with fertilizer use, &amp; develop fertilizer management plans</p>                                                                                                                                                                                                                          | Quiz and Practical Application |
|     | RESERVED (509-511)                                   | -                           |                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |

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| 512 | Compare current issues regarding plant and soil management that impacts agronomic and horticultural practices. | Horticulture II<br>Natural Resource<br>Managment | Students will know: current issues affecting plant and soil management, including soil degradation, erosion, nutrient runoff, water quality concerns, invasive species, pesticide use, climate change, and soil health, sustainable and conventional management practices used in agronomic and horticultural systems, the role of technology, regulations, and environmental stewardship in plant and soil management, & the economic, environmental, and social impacts of plant and soil management decisions. | Students will understand: plant and soil management practices have significant impacts on agricultural productivity, environmental quality, and long-term sustainability, current issues such as nutrient management, soil conservation, water quality, and climate change require informed decision-making and adaptive management practices, sustainable management practices can improve soil health, conserve natural resources, and reduce negative environmental impacts while maintaining productivity, & agronomic and horticultural producers must balance economic goals, environmental stewardship, and regulatory requirements when making management decisions. | Students will be able to: research and evaluate current issues affecting plant and soil management, compare the advantages and disadvantages of conventional and sustainable management practices, analyze the environmental, economic, and social impacts of various plant and soil management decisions, interpret case studies related to soil conservation, nutrient management, water quality, and plant production, & recommend management strategies that address current challenges while promoting sustainable production. | Case Study |
| 513 | Analyze microbial life and its effects on soil.                                                                | Plant<br>Science/Botany<br>Agriscience           | Students will know: types of beneficial and harmful soil microorganisms, microbial roles in nutrient cycling and decomposition, relationships between microbes and plant roots, & environmental factors affecting microbial activity                                                                                                                                                                                                                                                                              | Students will understand: microorganisms are essential for healthy soil ecosystems, microbial activity influences nutrient availability and soil structure, & human activities can positively or negatively impact soil biology                                                                                                                                                                                                                                                                                                                                                                                                                                              | Students will be able to: identify beneficial and harmful soil microorganisms, analyze soil conditions affecting microbial activity, explain nutrient cycling processes, & recommend practices that support soil health                                                                                                                                                                                                                                                                                                             | Test       |

## 600 Sustainable Horticulture

| Item | Task                                                                                | Secondary Course Cross-Walk                                      | Know                                                                                                                                                                                                                                                                                                                                                                                  | Understand                                                                                                                                                                                                                                                                                                                                                                    | Do                                                                                                                                                                                                                                                                                                                                                 | Assessment                     |
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| 601  | Investigate different methods of sustainable horticulture.                          | Natural Resource Management Botany/Plant Science Horticulture II | Students will know: various sustainable horticultural practices, including integrated pest management (IPM), composting, cover cropping, water conservation, and resource-efficient landscaping, the principles of sustainability and environmental stewardship in horticultural production systems, & the benefits and challenges associated with sustainable horticultural methods. | Students will understand: sustainable horticultural practices help conserve natural resources while maintaining plant productivity and health, environmental stewardship is an important responsibility of horticultural professionals, & sustainable practices can reduce negative environmental impacts while supporting long-term economic viability.                      | Students will be able to: identify and describe various sustainable horticultural practices, evaluate the effectiveness of sustainable methods in different horticultural settings, & recommend sustainable practices that improve resource conservation and environmental quality.                                                                | Quiz                           |
| 602  | Compare sustainable watering and fertilizing techniques to conventional techniques. | Natural Resource Management Botany/Plant Science Horticulture II | Students will know: common sustainable watering and fertilizing techniques, including drip irrigation, fertigation, rainwater harvesting, soil moisture monitoring, and slow-release fertilizers, conventional watering and fertilizing practices used in horticultural production, & factors that influence water and nutrient use efficiency.                                       | Students will understand: water and nutrient management practices directly impact plant health, resource conservation, and environmental quality, sustainable watering and fertilizing techniques can reduce waste, pollution, and production costs, & the effectiveness of watering and fertilizing practices depends on site conditions, plant needs, and management goals. | Students will be able to: compare the advantages and disadvantages of sustainable and conventional watering and fertilizing methods, evaluate the environmental and economic impacts of different irrigation and fertility practices, & recommend appropriate watering and fertilizing strategies based on plant requirements and site conditions. | Quiz and Practical Application |

|     |                                                                              |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |
|-----|------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| 603 | Compare sustainable plant material selection to conventional plant material. | Natural Resource Management Botany/Plant Science Horticulture II | Students will know: characteristics of sustainable plant materials, including native, adapted, drought-tolerant, and pollinator-friendly species, characteristics of commonly used conventional plant materials, & factors that influence plant selection, including climate, site conditions, maintenance requirements, and intended use.                                                                                                                                       | Students will understand: plant selection decisions affect resource use, maintenance requirements, biodiversity, and environmental sustainability, sustainable plant materials often require fewer inputs such as water, fertilizer, and pesticides than conventional selections, & choosing the right plant for the right location improves plant performance and supports long-term landscape sustainability.                               | Students will be able to: compare sustainable and conventional plant materials based on environmental, economic, and aesthetic considerations, evaluate plant materials for suitability in specific landscape or production scenarios, & recommend plant selections that support sustainable horticultural practices and site-specific goals.                                                                                                                                                                 | Sustainable Landscape Design Project |
| 604 | Recycle horticultural waste.                                                 | Plant Science/Botany Agriscience Natural Resource Management     | Students will know: define management and planning of resources in agriculture, identify the importance of management and planning of resources in agriculture, critique the sustainability of various agriculture practices, explain the concept of reduce, reuse, and recycle in agriculture, analyze how agricultural sciences and technologies strive to increase efficiency, & evaluate the balance between the needs of society and the conservation of natural resources. | Students will understand: explain how sustainable agriculture practices can support food security, describe the potential environmental impacts of unsustainable agriculture practices, evaluate the effectiveness of reduce, reuse, and recycle practices in agriculture, analyze the benefits and drawbacks of different agricultural technologies, & explain how sustainable agriculture practices can benefit both farmers and consumers. | Students will be able to: develop a management plan for a hypothetical farm, considering resource efficiency and sustainability, critique and propose improvements to a current agricultural practice, conduct an experiment to demonstrate the effectiveness of a reduce, reuse, or recycle technique in agriculture, analyze data to evaluate the efficiency of a particular agricultural technology, & develop a presentation or report on the importance of sustainable agriculture practices in society. | Practical Application                |



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|  | RESERVED (605) | - |  |  |  |  |
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## 700 Horticulture Technology

| Item | Task                                                         | Secondary Course Cross-Walk | Know                                                                                                                                                                                                                                                                                  | Understand                                                                                                                                                                                                                                                                     | Do                                                                                                                                                                                                                                                                                                                                                                | Assessment       |
|------|--------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 701  | Explain the uses of technologically altered plants.          | Plant Science/Botany        | Students will know: what biotechnology is and the recent advancements, how biotechnology has impacted both producers and consumers, how to ethically and morally create GMO's while maintaining human health, and how we manipulate environmental conditions to increase plant yields | Students will understand: biotechnology can improve crop yield, quality, and disease resistance, genetically modified plants create ethical, environmental, and economic debates, & technological advancements continue to shape modern agriculture                            | Students will be able to: define and describe biotechnology and its recent developments, discuss the research and trial phase of GMO's, and manipulate environmental conditions to enhance quality and quantity                                                                                                                                                   | Test             |
|      | RESERVED (702-703)                                           | -                           |                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                   |                  |
| 704  | Research advanced and emerging technologies in horticulture. | Botany/Plant Science        | Define resource management and planning. Identify the goals and objectives of resource management. Understand the importance of sustainable resource management for long-term environmental and economic well-being. Define natural cycles in the context of environmental processes. | Understand the consequences of inadequate or unsustainable resource planning. Understand the role of energy efficiency in promoting sustainability within the agricultural sector. Understand the interconnectedness of natural cycles and their impact on climate regulation. | Evaluate how human activities interrupt natural cycles and contribute to climate change. Analyze the environmental impact of conventional energy sources (e.g., fossil fuels) on climate change, air quality, and ecosystems. Create an educational campaign to raise awareness about the consequences of interrupting natural cycles and its relation to climate | Research Project |

|     |                                            |                 |                                                                                                                                                        |                                                                                                                                                                                                           |                                                                                                                                                                           |                                                        |
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|     |                                            |                 |                                                                                                                                                        |                                                                                                                                                                                                           | change.                                                                                                                                                                   |                                                        |
| 705 | Perform a point of sale (POS) transaction. | Horticulture II | Students will know:<br>components of POS systems, customer service expectations, inventory tracking procedures, & sales tax and transaction procedures | Students will understand:<br>accurate transactions support business success and customer trust, professionalism influences customer satisfaction, & inventory systems help businesses track profitability | Students will be able to:<br>operate a POS system, complete sales transactions accurately, provide professional customer service, & manage receipts and inventory records | Spring Plant Sale Transactions (Practical Application) |

## 800 History and Current Status of Horticulture

| Item | Task                                                                 | Secondary Course Cross-Walk | Know                                                                                                                                                                                                                                                                                                 | Understand                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Do                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Assessment          |
|------|----------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 801  | Describe major historical developments in the field of horticulture. | Plant Science/Botany        | Students will know:<br>about the various career fields within the horticulture industry, major historical events in the field of horticulture, how the horticulture industry impacts our country's economics, why horticulture has a psychological impact, and a basic overview of plant health care | Students will understand:<br>horticulture has evolved over time from subsistence-based plant cultivation to a science-driven industry influenced by research, technology, and global trade, major historical developments in horticulture—such as the domestication of plants, the development of irrigation systems, and advances in plant breeding—have significantly increased food production and plant diversity, & modern horticultural practices are shaped by historical innovations and continue to build on past discoveries to | Students will be able to:<br>analyze key historical events and innovations in horticulture and explain how they have influenced modern plant production practices, compare early horticultural methods with modern techniques to determine how plant cultivation, breeding, and management have changed over time, & research and communicate the impact of major horticultural developments on agriculture, food systems, and environmental sustainability. | Quiz and Case Study |

|     |                                                                                       |                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                               |                                |  |
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|     |                                                                                       |                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | improve efficiency, sustainability, and environmental impact.                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                               |                                |  |
| 802 | Compare/contrast the effect human beings have had on various plant species.           | Landscape Design & Maintenance                                | Students will know: human activities such as domestication, selective breeding, deforestation, and habitat alteration directly influence plant diversity and distribution, plant species respond differently to human impact, with some becoming more productive or resilient while others become endangered or extinct, & genetic modification and cultivation practices can change plant traits such as yield, resistance, and growth habits. | Students will understand: human activities have altered plant distribution, genetics, and diversity, selective breeding has improved many horticultural crops, urbanization and land-use changes impact plant communities, & human actions can have both positive and negative ecological consequences.                                                                                        | Students will be able to: compare and contrast how different plant species have been altered by human activity using specific examples, analyze case studies to determine whether human impact on a plant species was beneficial, harmful, or both, & evaluate the ecological consequences of human-driven changes to plant populations and propose management strategies.    | Quiz                           |  |
| 803 | Determine how development of certain plant species has affected cultural development. | Landscape Design & Maintenance<br>Natural Resource Management | Students will know: certain plant species (e.g., wheat, rice, maize, cotton, tea) have played major roles in shaping civilizations and economies, the domestication and improvement of plants have influenced settlement patterns, trade routes, and population growth, & cultural traditions, diets, and industries are often closely tied to locally or regionally important plant species.                                                   | Students will understand: the development of key plant species has directly influenced the growth of societies by providing stable food sources and raw materials, agricultural advances in plant development have contributed to technological innovation, economic systems, and cultural exchange, & plants are not only biological resources but also cultural symbols that shape identity. | Students will be able to: investigate how the development of a specific plant species has influenced a particular culture or civilization, analyze the relationship between plant domestication and the growth of human societies over time, & create a presentation or written analysis explaining how a plant species impacted cultural practices, economy, and daily life. | Research Project/ Presentation |  |

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| 804 | Describe the role horticulture plays in the economy of the state and nation.                    | Ag Business & Marketing<br>Ornamental Horticulture II | <p>Students will know:<br/>about the various career fields within the horticulture industry, major historical events in the field of horticulture, how the horticulture industry impacts our country's economics, &amp; why horticulture has a psychological impact</p> <p>A supply chain exists and covers: production, services/supplies, processing, transportation, and marketing.<br/>Commodities represent the raw item available directly from the producer while products have gone through processing.</p> | <p>Each step of the supply chain is a critical factor in providing goods and services to the public.<br/>Each step of the supply chain has economic value and job opportunities.<br/>The value of an item changes as additional steps are needed to prepare the good or service for the public.</p> | Students will be able to: define the importance of the horticulture industry economically and psychologically, & find evidence of steps in the supply chain for a food item                                                                                                                                          | Quiz                          |
|     | RESERVED (805)                                                                                  | -                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                      |                               |
| 806 | Critique the impact of botanical gardens, public parks, and plants have on people in a society. | Landscape Design & Maintenance                        | <p>Define resource management and planning.<br/>Identify the goals and objectives of resource management.<br/>Understand the importance of sustainable resource management for long-term environmental and economic well-being.<br/>Define natural cycles in the context of environmental processes.</p>                                                                                                                                                                                                            | <p>Understand the consequences of inadequate or unsustainable resource planning. Understand the role of energy efficiency in promoting sustainability within the agricultural sector. Understand the interconnectedness of natural cycles and their impact on climate regulation.</p>               | <p>Evaluate how human activities interrupt natural cycles and contribute to climate change. Analyze the environmental impact of conventional energy sources (e.g., fossil fuels) on climate change, air quality, and ecosystems.<br/>Create an educational campaign to raise awareness about the consequences of</p> | Virtual Botanical Garden Tour |

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|  |  |  | Students will know:<br>Landscape design rules, property value appreciation, site deficiencies, and architectural elements in a landscape design |  | interrupting natural cycles and its relation to climate change.<br>Students will be able to:<br>Describe design rules, identify site deficiencies, and install architectural structures |  |
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## 900 Plant Identification

| Item | Task                                                                                       | Secondary Course Cross-Walk    | Know                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Understand                                                                                                                                                                                                                                                                                                    | Do                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Assessment                 |
|------|--------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 901  | Outline the proper use of plant material in various segments of the horticulture industry. | Landscape Design & Maintenance | Students will know: major categories of plant materials including annuals, perennials, trees, shrubs, vines, turfgrass, houseplants, and specialty crops, the various segments of the horticulture industry including landscape design, greenhouse production, nursery production, floriculture, turfgrass management, interiorscaping, and arboriculture, plant growth requirements including light, water, soil, temperature, and nutrient needs, functional uses of plants such as screening, shade, erosion control, aesthetics, pollinator support, food production, and | Students will understand: different industries require different plant characteristics and functions, proper plant selection improves performance and customer satisfaction, environmental conditions influence plant suitability, & plant materials provide aesthetic, economic, and environmental benefits. | Students will be able to: identify and classify plant materials used in different horticultural industries, select appropriate plant materials based on site conditions and intended use, compare plant characteristics to determine suitability for specific projects, recommend plant materials for landscape, greenhouse, nursery, turfgrass, floriculture, and interiorscape applications, explain the benefits and limitations of selected plant materials, & develop planting plans utilizing appropriate plant materials for a given scenario. | Plant Selection Case Study |

|     |                                                                                                                         |                                                                              |                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                              |                       |
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|     |                                                                                                                         |                                                                              | environmental improvement, & plant characteristics including mature size, growth habit, hardiness, bloom period, and maintenance requirements.                                                                                                                                                                                                                          | Students will understand: environmental factors such as light, temperature, water, and soil conditions directly affect plant growth, health, and productivity. different plant species have unique environmental requirements and tolerances that influence their success in a given location, environmental stress can reduce plant vigor and increase susceptibility to pests, diseases, and other disorders, & understanding environmental factors helps horticulturists make informed decisions about plant selection, placement, and management practices. | Design and conduct a water quality analysis using local water sources. Collect and interpret data on key indicators (e.g., pH, dissolved oxygen, nutrient levels). Conduct an air quality assessment using available resources or air quality monitoring tools. Propose strategies to address identified air quality issues. | Practical Application |
| 902 | Determine the impact of environmental factors on plant materials.                                                       | Landscape Design & Maintenance<br>Natural Resource Management<br>Agriscience | Define point and non-point sources of pollution. Understand the differences between these sources and how they contribute to environmental degradation. Identify common examples of point and non-point pollution in various ecosystems. Define air quality and recognize common pollutants Define waste management and understand its importance for ecosystem health. | Students will know: characteristics of annuals, perennials, biennials, trees, shrubs, vines, and groundcovers, growth habits and life cycles of plant groups, common landscape and greenhouse applications, & botanical                                                                                                                                                                                                                                                                                                                                         | Students will be able to: classify plants by category and growth habit, differentiate woody and herbaceous species, recommend plants based on site conditions and intended use, & use botanical terminology                                                                                                                  | Quiz                  |
| 903 | Analyze characteristics of various plant categories including woody and herbaceous plants in the horticulture industry. | Landscape Design & Maintenance                                               |                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                              |                       |

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|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
|     |                                                                                                                                                                             |                 | terminology used in plant identification.                                                                                                                                                                                                                                                                                        | proper identification improves horticultural success.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | accurately.                                                                                                                                                                                                                                                                                                                                                                    |      |
| 904 | Identify 100 plants used in the horticulture industry by horticultural reference/botanical reference (70 to be deciduous, evergreen, annuals, perennials, and house plants) | Horticulture II | Students will know: the botanical and common names of 100 horticultural plants, characteristics of deciduous trees, evergreen trees and shrubs, annuals, perennials, and houseplants, & key identifying features including leaf arrangement, flower structure, bark characteristics, growth habit, and fruit or seed structures. | Students will understand: accurate plant identification is essential for proper plant selection, care, maintenance, and landscape design, plants are classified into categories such as deciduous trees, evergreen trees and shrubs, annuals, perennials, and houseplants based on their characteristics and growth habits, botanical names provide a universal system for identifying plants and reduce confusion caused by common names, & understanding plant characteristics and uses allows horticulturists to select appropriate plants for specific environmental conditions and landscape purposes. | Students will be able to: correctly identify 100 horticultural plants using both common and botanical names, distinguish between deciduous, evergreen, annual, perennial, and houseplant categories, use plant identification keys, field guides, and horticultural references to identify plants, & recognize and describe key plant characteristics used for identification. | Quiz |

## 1000 Horticultural Careers and Opportunities

| Item | Task                                                                  | Secondary Course Cross-Walk | Know                                                                                     | Understand                                                                                                   | Do                                                                                             | Assessment     |
|------|-----------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------|
| 1001 | Describe careers and working conditions in the horticulture industry. | Botany/Plant Science        | Students will know: major career pathways in horticulture, educational and certification | Students will understand: horticulture careers require technical knowledge and employability skills, working | Students will be able to: research horticulture careers, compare career pathways and salaries, | Career Project |

|      |                                                                   |                                  |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                 |                                                                                                                                                                                                     |                                                           |
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|      |                                                                   |                                  | requirements, workplace expectations and safety requirements, & employment opportunities in the horticulture industry                                                                                                                 | conditions vary among horticulture careers, & the horticulture industry provides significant economic opportunities                                                                                             | identify required certifications and training, & evaluate personal career interests and goals                                                                                                       |                                                           |
| 1002 | Perform job readiness skills needed in the horticulture industry. | Horticulture II                  | Students will know: workplace expectations and professional behavior, communication and teamwork skills, resume and interview techniques, & time management and problem-solving strategies                                            | Students will understand: employability skills are essential for workplace success, professionalism influences advancement opportunities, & communication and teamwork improve workplace efficiency             | Students will be able to: create resumes and cover letters, complete mock interviews, demonstrate workplace professionalism, & communicate effectively in team settings                             | Spring Plant Sale (Practical Application) and AET Project |
| 1003 | Research horticulture industry certifications.                    | Intro to Ornamental Horticulture | Students will know: common industry certifications and licensing opportunities, certification requirements and benefits, organizations offering horticulture credentials, & continuing education expectations                         | Students will understand: certifications increase employability and professional credibility, industry standards support safe and effective practices, & lifelong learning is important in horticulture careers | Students will be able to: research certification programs, compare certification requirements, identify career pathways connected to certifications, & develop professional growth plans            | Career Project                                            |
| 1004 | Explore postsecondary opportunities.                              | Intro to Ornamental Horticulture | Students will know: postsecondary education pathways in horticulture, trade schools, colleges, apprenticeships, and certification programs, financial aid and scholarship opportunities, & admission requirements and career outcomes | Students will understand: postsecondary training can expand career opportunities, different pathways meet different career goals, & education and experience influence career advancement                       | Students will be able to: research postsecondary programs, compare educational pathways, identify admission and financial aid requirements, & develop postsecondary plans aligned with career goals | Career Project                                            |

### 1100 Horticultural Pathways

| Item | Task | Secondary | Know | Understand | Do | Assessme |
|------|------|-----------|------|------------|----|----------|
|------|------|-----------|------|------------|----|----------|



| Course<br>Cross-Walk |                                                                     |                                             |                                                                                                                                                                                    | nt                                                                                                                                                                                                                |                                                                                                                                                                                                                      |                                           |
|----------------------|---------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| 1101                 | Apply concepts of landscape, hardscape, or floral design.           | Landscape Design & Maintenance Construction | Students will know: principles and elements of design, landscape and hardscape materials, floral design techniques and terminology, & client needs and site considerations         | Students will understand: effective designs balance function, aesthetics, and sustainability, design choices impact maintenance and environmental health, & design principles improve visual appeal and usability | Students will be able to: create landscape, hardscape, or floral designs, select appropriate materials and plants, apply design principles to projects, & evaluate designs for functionality and aesthetics          | Landscape Design Project                  |
| 1102                 | Create various horticulture designs.                                | Landscape Design & Maintenance              | Students will know: drafting and design techniques, plant selection principles, design software and drawing tools, & scale and spacing requirements                                | Students will understand: proper planning improves project success, designs must account for environmental and client needs, & plant growth habits influence long-term design success                             | Students will be able to: sketch and create horticultural designs, use design software and drafting tools, calculate plant spacing and material needs, & present completed designs professionally                    | Landscape Design Project                  |
| 1103                 | Calculate measurements, areas, and volumes of horticulture designs. | Landscape Design & Maintenance              | Students will know: formulas for area, perimeter, and volume, measurement tools and units, estimating methods for landscape materials, & mathematical applications in horticulture | Students will understand: accurate measurements reduce waste and costs, calculations support proper material selection and project planning, & estimation errors can negatively impact projects                   | Students will be able to: calculate area, perimeter, and volume, estimate quantities of mulch, soil, gravel, and plant materials, use measurement tools accurately, & apply mathematical concepts to design projects | Landscape Design Project                  |
| 1104                 | Interpret landscape design, symbols, and abbreviations.             | Landscape Design & Maintenance              | Students will know: common landscape design symbols and abbreviations, blueprint terminology and scales, design layout conventions, & drafting standards used in horticulture      | Students will understand: design symbols communicate project information efficiently, accurate interpretation improves project implementation, & landscape plans guide                                            | Students will be able to: read landscape design plans, interpret symbols, scales, and abbreviations, communicate design information accurately, & apply design plans during installation projects                    | Farm Show Landscape Design Implementation |

|      |                                                                                   |                                                        |                                                                                                                                                                                       | installation and maintenance decisions                                                                                                                                                                                    |                                                                                                                                                                                                     |                                |
|------|-----------------------------------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| 1105 | Transplant various types of plant material.                                       | Botany/Plant Science Landscape Design & Maintenance    | Students will know: transplanting procedures and timing, root structure and plant stress responses, watering and aftercare requirements, & tools and materials used for transplanting | Students will understand: improper transplanting can damage roots and reduce survival rates, environmental conditions influence transplant success, & proper handling minimizes transplant shock                          | Students will be able to: transplant containerized and field-grown plants, prepare planting sites properly, provide post-transplant care, & evaluate transplant success and plant health            | Practical Application          |
| 1106 | Prune various types of plant material.                                            | Intro to Ornamentals & Greenhouse Mgmt Horticulture II | Students will know: pruning techniques and tools, plant growth habits and pruning objectives, seasonal pruning requirements, & safety procedures for pruning equipment                | Students will understand: pruning influences plant health, growth, and aesthetics, improper pruning can damage plants and increase disease risk, & pruning practices vary by species and purpose                          | Students will be able to: safely use pruning equipment, perform thinning, heading, and rejuvenation cuts, prune plants according to industry standards, & identify improper pruning practices       | Practical Application          |
| 1107 | Describe the characteristics of lawn/turfgrass installation and maintenance.      | Landscape Design & Maintenance Horticulture II         | Students will know: turfgrass species and growth requirements, site preparation procedures, watering, mowing, and fertilization practices, & common turfgrass pests and disorders     | Students will understand: proper maintenance improves turf health and appearance, environmental conditions influence turfgrass performance, & sustainable practices reduce environmental impacts                          | Students will be able to: prepare sites for turf installation, identify turfgrass species, develop turf maintenance schedules, & diagnose common turf problems                                      | Quiz and Practical Application |
| 1108 | Describe the characteristics and features of various types of growing structures. | Botany/Plant Science Horticulture II                   | Students will know: types of greenhouses and growing structures, environmental control systems, greenhouse materials and construction methods, & safety and maintenance requirements  | Students will understand: growing structures modify environmental conditions for plant production, environmental controls influence crop quality and efficiency, & structure design impacts energy use and sustainability | Students will be able to: identify greenhouse components and systems, monitor environmental conditions, evaluate advantages and disadvantages of different structures, & maintain growing structure |                                |

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|      |                                                                                                                                                                                     |                                                        |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                        | cleanliness and safety                |  |
| 1109 | Prepare plant material for marketing or sales.                                                                                                                                      | Intro to Ornamentals & Greenhouse Mgmt Horticulture II | Students will know: grading and quality standards, packaging and labeling requirements, inventory and display procedures, & customer expectations and marketing techniques                                                                                           | Students will understand: presentation influences customer purchasing decisions, proper handling maintains plant quality during sales,& marketing strategies impact profitability                                      | Students will be able to: prepare and label plants for sale, create attractive displays, evaluate plant quality, & assist customers professionally                                                                                                     | Marketing Project & Spring Plant Sale |  |
| 1110 | Recognize non-traditional growth and propagation of various plant materials. (examples may include but are not limited to: hydroponics, aquaponics, aeroponics, and tissue culture) | Botany/Plant Science Horticulture II                   | Students will know: principles of hydroponics, aquaponics, aeroponics, and tissue culture, equipment and materials used in alternative systems, environmental requirements for controlled systems, advantages and disadvantages of nontraditional production methods | Students will understand: controlled environment systems can improve efficiency and production, nontraditional systems may conserve water and space, & technological advancements are changing modern plant production | Students will be able to: compare alternative growing systems, identify components of hydroponic and aquaponic systems, monitor environmental conditions in controlled systems, evaluate sustainability and efficiency of different production methods | Quiz & Hydroponic Project             |  |