# Cover Sheet

# Dover Area School District
## Curriculum Cover Sheet

**CIP Code: 01.0000**

**CIP Title: Agriculture, General**

**Planned Hours: 1320**

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## CIP Description:

Agriculture, General is an instructional program that focuses on the general principles and practices of agricultural research and production and may prepare individuals to apply this knowledge to the solution of practical agricultural problems. This program includes instruction in basic animal, plant, and soil science; animal care and plant cultivation; soil conservation; and agricultural operations such as agriscience, production, and agricultural business.

Students who begin in this program may complete it in full using additional agriculture classes to develop a specialization or they may transfer to Horticulture & Landscaping or Agricultural Mechanics.

## Component Courses:

**859 - Honors Agriscience (120 hours)** Ⓢ

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.

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**860 - Agriscience (120 hours) Ⓢ**

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.

**868 - Honors Small Animal Science & Care (120 hours) Ⓢ**

This course will emphasize the specific knowledge required to work with and care for smaller animals and pets, focusing on the connection between the knowledge expected of pet owners and that expected of professionals in the veterinary science field. Areas of study will include genetic selection for breeding programs, creating the proper housing environment, providing veterinary care, and understanding animal behaviors. Students will have the opportunity to observe and handle live animals. Additional focus will be placed on knowledge of skills and tools used in veterinary science. This course is recommended for any student considering a career related to veterinary medicine or other types of animal care, especially students who plan to seek a college degree and are considering attending a veterinary school. Students in this class will receive preparation to earn their Youth for the Quality Care of Animals certification.

**869 - Exploratory Ag Science ( 120 hours)**

This course explores all aspects of agricultural education and FFA. The course is intended to provide students with a better understanding of the three primary areas within the agricultural program at Dover Area High School: Ag General, Ag Mechanics, and Horticulture & Landscaping.

**870- Plant Science/Botany (120 hours) Ⓢ**

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.

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**872 - Small Animal Science & Care (120 hours) Ⓢ**

This course will emphasize the specific knowledge required to work with and care for smaller animals and pets. Areas of study will include genetic selection for breeding programs, creating the proper housing environment, providing veterinary care, and understanding animal behaviors. Students will have the opportunity to observe and handle live animals. This course is recommended for any student considering a career related to veterinary medicine or other types of animal care. Students in this class will receive preparation to earn their Youth for the Quality Care of Animals certification.

**873 - Large Animal Science & Care (120 hours) Ⓢ**

This course focuses on animals used in agriculture. We will discuss the selection, nutrition, reproduction, and management of horses, beef cattle, goats, chickens, swine, and sheep. Other topics include animal anatomy and physiology, animal diseases, and animal research. We will discuss the federal regulations with regard to meat consumption. We will also experiment with different food science techniques. This class is very hands-on and will include labs and dissections. This is a great course for anyone entering the medical field.

**887 - Natural Resources Management (120 hours) Ⓢ**

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

**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.

**879 - Agricultural Mechanics I (120 hours)**

Students will learn how to safely operate hand and power tools used for working with wood and metal as they produce several required agriculture shop projects. This is a basic entry-level course for Ag Mechanics. Students will receive preparation to earn their 10-hour or 30-hour U.S. Department of Labor OSHA completion card.

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**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 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.

# Pacing Guide

**PACING GUIDE**

| ***859* / 860 - *Honors* Agriscience (120 hours)** | **Associated Tasks** | **120 Hours** |
|---|---|---|
| Circles of Ag Education | 501, 502, 504, 505, 507 | 15 hours |
| Communication | 504, 505, 509 | 15 hours |
| Science of Agriculture | 302, 402, 403, 404, 406, 409 | 15 hours |
| Natural Resources | 402, 403, 404, 409, 703, 707 | 25 hours |
| Plants and Animals | 104, 105, 109, 203, 409, 901, 902, 903, 904, 905, 906 | 35 hours |
| Ag Power and Technology | 302, 402, 403, 404, 409 | 10 hours |
| Agriculture in the Future | 905 | 5 hours |
| *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.* | | |

| ***868* / 872 - *Honors* Small Animal Science & Care** | **Associated Tasks** | **120 Hours** |
|---|---|---|
| Introduction to Small Animal Science | 101, 103 | 15 hours |
| Safety | 102, 109, 110, 112, 402, 403, 404, 409 | 15 hours |
| Pet Ownership | 101, 103, 406 | 15 hours |
| Animal Rights and Animal Welfare | 101, 801, 802, 803 | 15 hours |
| Rabbit Feed Study | 101, 102, 406 | 15 hours |
| Genetics | 107, 406 | 15 hours |
| Small Animal Species | 101, 103 | 15 hours |
| Veterinary Science | 103, 109, 110, 112, 113, 114 | 10 hours |
| Careers and SAE | 507 | 5 hours |
| *Students in the Honors Class will complete at least one additional project per unit to enrich their experience with the associated tasks. There is also an increased emphasis on veterinary skill-building for Honors Students.* | | |

**PACING GUIDE**

| **869 - Exploratory Ag Science** | **Associated Tasks** | **120 Hours** |
|---|---|---|
| FFA & Agriculture | 501, 502, 503, 504, 505, 506, 507, 508 | 15 hours |
| Plant Science | 201, 203, 204, 205, 206, 207 | 15 hours |
| Animal Science | 104, 105, 110 | 20 hours |
| Soil Science | 301, 302 | 10 hours |
| Ag Mechanics | 402, 403, 404, 407 | 30 hours |
| Fiber Science | 110, 204 | 15 hours |
| Energy Sources | 702, 703, 710 | 15 hours |

| **870- Plant Science/Botany** | **Associated Tasks** | **120 Hours** |
|---|---|---|
| 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 |

**PACING GUIDE**

| **873 - Large Animal Science & Care** | **Associated Tasks** | **120 Hours** |
|---|---|---|
| Livestock Terminology | 101 | 5 hours |
| Animal Breeds & Uses | 101, 901 | 12 hours |
| Handling Techniques & Equipment | 102, 111, 113 | 12 hours |
| Animal Health & the Consumer | 110, 112, 114 | 20 hours |
| Science of Blood | 107 | 6 hours |
| Preventative Medicine | 109, 114 | 10 hours |
| Nutrients & Digestion | 108, 115 | 15 hours |
| Animal Anatomy | 104, 105 | 25 hours |
| Food Safety | 903 | 15 hours |

| **874 - Agricultural Business & Marketing** | **Associated Tasks** | **120 Hours** |
|---|---|---|
| Business Start-Up | 501, 507, 508, 601, 602, 603, 604, 607, 608, 609 | 15 hours |
| Managing Finances | 501, 502, 602, 603, 605 | 25 hours |
| Managing Risk | 501, 502, 506, 602, 603 | 30 hours |
| Business Planning | 501, 503, 506, 510, 602, 603, 606 | 20 hours |
| Marketing | 501, 506, 510, 602, 603 | 20 hours |
| NOCTI Preparation and Completion | All Listed Above | 10 hours |

**PACING GUIDE**

| **879 - Agricultural Mechanics I** | **Associated Tasks** | **120 Hours** |
|---|---|---|
| Shop Safety & Orientation | 401, 402, 403. 404, 408. 409 | 12 hours |
| Measurement, Tools, and Layout | 402, 403, 404, 406, 407 | 15 hours |
| Woodworking Fundamentals | 401, 402, 403, 404, 405, 406, 407, 409, 410 | 22 hours |
| Basic Electricity | 402, 403, 404, 405, 406, 407, 410 | 15 hours |
| Welding Fundamentals | 402, 403, 404, 405, 406, 409, 410 | 26 hours |
| Metal Fabrication & Project Construction | 402, 403, 404, 405, 406, 407, 409, 410 | 30 hours |

| **887 - Natural Resources Management** | **Associated Tasks** | **120 Hours** |
|---|---|---|
| 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 |
| Climate Change | 704, 707, 709 | 15 hours |

| **890 - Supervised Agricultural Experience** | **Associated Tasks** | **120 Hours** |
|---|---|---|
| SAE - Independent Study | 501, 502, 503, 504, 505, 506, 507, 508 | 120 hours |

# Task List (Updates from KUD)

## Agricultural, General CIP 01.0000
## Competency Task List
### 100 Animal Science

| Item | Task | Secondary Course Cross-Walk | Know | Understand | Do | Assessment |
|---|---|---|---|---|---|---|
| 101 | Analyze cultural and societal uses and contributions of animals locally and globally through the lens of function and breed. | Small Animal Science<br>Large Animal Science | Humans use and connect with animals for a variety of purposes (companionship, food, labor, service…).<br>Various breeds of each large animal species and their uses past and present<br>National pet trends exist to determine which pet species are most popular.<br>There are specific benefits of pet ownership. | The use of animals by humans creates differences of opinion on animal rights and animal welfare topics.<br>Each animal species has a documented history and domestication process.<br>There are general expectations for the environment and behavior for all animals. Some species have specific requirements.<br>There are general standards for pet care and more specific ones for each species.<br>There are patterned data trends of animal use and popularity throughout history.<br>Some pet ownership benefits are universal and some are for particular age groups.<br>The Stages of Grief for Pet Loss are always | Be able to identify specific breeds and their use<br>Identify and describe benefits of pet ownership.<br>List the Stages of Grief for Pet Loss in order.<br>Care for animals (rabbits) while working toward an economic gain (feed efficiency). | SA: Unit 1 Quiz & Unit 3 Quiz<br>LA: Animal Use Project and Animal Industry Standards Project |

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| | | | | experienced, but at different paces and severity depending on the situation.<br>Economic gain from animals requires different management strategies while maintaining standards of care. | | |
| 102 | Perform animal handling techniques. | Small Animal Science | How to handle and deal with large animal species and be able to identify various handling equipment<br>Animals perceive the world differently from humans and therefore, behave in different ways.<br>There are approved animal restraint techniques. | There are predictable differences in animal behavior based on their perception.<br>The components of the restraint techniques and the purpose each one serves toward animal and human safety. | Be able to handle most species of livestock, &<br>Be able to choose the proper equipment for the species.<br>Analyze the impact of visual perception on reality and reaction.<br>Demonstrate or describe animal handling using models and stuffed animals.<br>Handle and care for rabbits. | Final Exam<br>Hands-On Practicum |
| | RESERVED (103) | - | | | | - |
| 104 | Identify the external anatomy of animals. | Large Animal Science<br>Agriscience | How the various systems work in livestock, both externally and internally<br>Body parts of animals vary among different species.<br>Animals are selected based upon the quality and correctness of anatomical structure and productive potential. | Some characteristics are more desirable in an animal than others and will impact the value. | Be able to explain how the various systems function and identify the external anatomy<br>Categorize animal names by gender and species.<br>Study and learn the basic anatomical parts of an animal.<br>Develop a poster of the external anatomy of an animal that will be used to teach others.<br>Make decisions based on given priorities and criteria, and analyze objects as they compare to ideal criteria. | LA: Quizzes<br>A: Animal Anthropology Poster |

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| 105 | Connect the functions of the animal body system to their system components. | Large Animal Science<br>Agriscience | How the various systems work in livestock, both externally and internally | Animals have a complex set of systems that must work together. | Be able to explain how the various systems function and identify the external anatomy<br>Make a concept map of the internal body systems and their relationships. | LA: Various Quizzes. Dissections, & Projects<br>A: Animal Body Systems Presentation |
| | RESERVED (106) | - | | | | - |
| 107 | Predict genetic types using monohybrid and dihybrid Punnett square methods. | Small Animal Science | What a punnett square is, and how to set it up<br>How genetics determine blood type<br>Punnett Squares are the tool used to simulate the probability of inheritance within genetics. | Sequence of steps used to construct Punnett Squares and determine probability.<br>The additional gene interaction of Epistasis. | Be able to identify the types of blood, antigens, and antibodies<br>Be able to draw a punnett square and determine genetic probability<br>Construct and solve predictability from monohybrid and dihybrid crosses<br>Apply genetic problem solving<br>Complete predictability calculations for labrador retrievers utilizing Epistasis. | Genetics Unit Test and/or Final Exam<br>Genetics Problem Solving |
| 108 | Explain the significance of the six classes of nutrients for animal growth, performance, maintenance, and reproduction. | Large Animal Science | What the 6 classes of nutrients are. | The 6 classes of nutrients impact the productivity and health of the animal | Be able to identify and explain the importance of the 6 classes of nutrients | Nutrient Quiz and Practicum |
| 109 | Administer medicines according to the label. | Small Animal Science | What the various types of preventative health measures,<br>How do you administer them,<br>How to read medications,& How to calculate dosages | Recommended preventative care schedules exist and differ amongst species. | Be able to discuss the various types of preventative measures, administer dewormers, & administer 3 different types of vaccinations | Final Exam<br>Veterinary Dosage Scenario |

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| 110 | Investigate environmental, food, medicinal, public safety, and biosecurity issues related to animal health. | Small Animal Science<br>Large Animal Science<br>Agriscience | How livestock are cared for,<br>What are the federal requirements for consumption, &<br>What biosecurity measures are in place to protect the food supply | There are known causes, symptoms, treatments, and preventions for animal health issues. | Be able to identify biosecurity measures, debunk common food security misconceptions, discuss USDA's role in animal health, & identify health issues that impact food security | SA: Unit 2 Quiz/Project, Unit 4 Reflective Essay & Final Exam<br>Veterinary Scenario<br>LA: Animal Industry Standards Project<br>A: Unit 5 Lab Activiites & Quizzes |
| 111 | Evaluate the equipment and facilities used in modern animal agricultural production. | Large Animal Science | How livestock are cared for,<br>What are the federal requirements for consumption, &<br>What biosecurity measures are in place to protect the food supply | Correct animal care requires knowledge, understanding, and use of accurate and current information. | Be able to identify biosecurity measures, debunk common food security misconceptions, discuss USDA's role in animal health, & identify health issues that impact food security | Equipment ID Use and Quiz |
| 112 | Examine the impact of pests and diseases in animal production. | Small Animal Science<br>Large Animal Science | Types of Animal Health Issues.<br>Sequence of basic steps for initial Animal First Aid.<br>Sequence of steps for Canine CPR. | There are known causes, symptoms, treatments, and preventions for animal health issues.<br>Purpose behind each step and the sequence for Animal First Aid.<br>Purpose behind each step and the sequence for canine CPR. | Discuss various zoonotic diseases<br>Provide a possible diagnosis when given resources and a summary of presented symptoms.<br>Create education resource materials about animal first aid response.<br>Demonstrate Canine CPR as an individual and with a partner. | SA: Unit 2 Quiz/Project<br>LA: Pathogen Project and Test |
| 113 | Investigate emerging technologies within animal science. | Small Animal Science<br>Large Animal Science | The different types of injections and locations.<br>Veterinarians use specific tools to accomplish their tasks. | Different injection locations are used for different types of medications.<br>The veterinary tool selected needs to match the task to be completed. | Demonstrate correct syringe filling.<br>Identify the veterinary equipment used in the National FFA Veterinary Science CDE based on an assortment of photos. | SA: Unit 2 Project & Unit 4 Essay<br>LA: Equipment Use and Industry Projects |
| | RESERVED (114) | - | | | | - |
| 115 | Analyze the quality | Large Animal | Examples of common feedstuffs. | A balanced diet for an | Be able to identify and explain | Creating Nutrient Label and Quiz on |

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| | of common feedstuffs. | Science | | animal consists of multiple feedstuffs to accumulate the needed amounts of nutrients. | the importance of the 6 classes of nutrients | Pearson Square |

## 200 Plant Science

| Item | Task | Secondary Course Cross-Walk | Know | Understand | Do | Assessment |
|---|---|---|---|---|---|---|
| 201 | Classify plants. | Botany & Plant Systems | The levels of taxonomy, Linnaeus' classification system, and the historical and modern uses of plants across the world | The levels of taxonomy, Linnaeus' classification system, and the historical and modern uses of plants across the world | Be able to utilize and create a dichotomous key, identify common plants in PA, articulate the importance of plants in most materials and medicine | Quizzes |
| | RESERVED (202) | - | | | | - |
| 203 | Connect plant structure to plant function. | Botany & Plant Systems Agriscience | Plants have roots, stems, leaves, and flowers. | Each plant part is responsible for specific functions vital to plant survival. | Describe the functions of plant parts. | Project and Quiz |
| 204 | Identify products and uses of plant species in the industry. | Botany & Plant Systems | The levels of taxonomy, Linnaeus' classification system, and the historical and modern uses of plants across the world | The levels of taxonomy, Linnaeus' classification system, and the historical and modern uses of plants across the world | Be able to utilize and create a dichotomous key, identify common plants in PA, articulate the importance of plants in most materials and medicine | Plant Use Project |
| 205 | Explain the process of photosynthesis/respiration and their importance to life. | Botany & Plant Systems | Students will know: how the processes of photosynthesis, cellular respiration, translocation & transpiration work in plants, and how these processes sustain all life | The connected interactions between photosynthesis and respiration. | 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 |
| 206 | Analyze the functions of the essential nutrients | Botany & Plant Systems | How to analyze soil and remediate if necessary, identify the 16 plant nutrients, describe | The impacts of nutrients (and their deficiency) on plant grown. | Be able to perform soil tests, calculate appropriate fertilizer amounts, remediate soil using | Nutrient Project and Plant Analysis |

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| | for plant development. | | nutrient function in plants, identify nutrient deficiencies, explain how soil forms, and what components make up soil | | sustainable methods, identify nutrient deficiencies, and perform soil analysis utilizing NRCS | |
| 207 | Assess the environmental factors that affect the development and maintenance of a plant. | Botany & Plant Systems | Students will know: the common plant pests in PA, identify pathogens that impact plant populations, how pathogens impact plant growth and function, and how to eradicate pests | Environmental factors need to be monitored and controlled, when possible, to provide ideal conditions. | Students will be able to: identify common plant pathogens and discuss their impact on productivity | Quiz and Lab |
| 208 | Demonstrate sexual and asexual plant reproduction. | Botany & Plant Systems | Students will know: how plants reproduce and differentiate between asexual and sexual reproduction | Reproduction within plants is consistent within plant species. | Students will be able to: explain the process of sexual and asexual reproduction and create circumstances that allow for maximum reproductive success | Propagation Lab |
| 209 | Design an integrated pest management (IPM) plan. | Botany & Plant Systems | Students will know: what IPM is and its overall goal, how to protect important insect species while eradicating pests, and what the negative implications of chemicals are on water and soil | IPM is necessary for successful plant production. | Students will be able to: identify the methods of IPM, develop an IPM plan, distinguish between good and bad insects, calculate economic injury level and economic threshold, and employ IPM methods | IPM Project |
| 210 | Examine the impact of pests and diseases in plant production. | Botany & Plant Systems | Students will know: the common plant pests in PA, identify pathogens that impact plant populations, how pathogens impact plant growth and function, and how to eradicate pests | IPM is necessary for successful plant production. | Students will be able to: identify common plant pathogens and discuss their impact on productivity | EIL & ET Quiz |
| 211 | Connect the role of plant pollinators to food production. | Botany & Plant Systems | Students will know: what IPM is and its overall goal, how to protect important insect species while eradicating pests, and what the negative implications of | Plant pollinators are a necessary component of continued plant growth and food production. | Students will be able to: identify the methods of IPM, develop an IPM plan, distinguish between good and bad insects, calculate | Anatomy Quiz |

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| | | | chemicals are on water and soil | | economic injury level and economic threshold, and employ IPM methods | |
| 212 | Investigate emerging technologies within plant science. | Botany & Plant Systems | 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 | Impacts of emerging technologies on plant growth and production. | 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 | Unit 7 Quiz and Project |
| 213 | Evaluate and critique designs in the horticultural industry using the principles of design. | Botany & Plant Systems | Design examples and types. | Benefits and drawbacks to each design. | Create examples of designs. | Floral Arrangement Project |
| 214 | Demonstrate the use of common horticultural tools. | Botany & Plant Systems | Tool names, identification, and uses. | All tools should be used safely for their intended purpose(s) | Use horticulture tools correctly and safely in a variety of settings. | ID Quiz and Use throughout |

## 300 Soil Science

| Item | Task | Secondary Course Cross-Walk | Know | Understand | Do | Assessment |
|---|---|---|---|---|---|---|
| 301 | Explain the processes of soil formation. | Botany & Plant Systems<br>Agriscience | Mineral matter, air, water, and organic matter are found in different proportions within a soil. | Geographical features and environmental factors influence the formation process of soils and impact soil quality. | Determine the texture, structure, and color of each horizon within a soil profile. | B: Quiz and Lab<br>A: Unit 4 Quiz |

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| 302 | Identify and describe physical, chemical, and biological soil characteristics. | Botany & Plant Systems<br>Agriscience | Miner soils consist of three different soil particle sizes; specifically sand, silt, and clay.Sand, silt, and clay are three sizes of mineral particles that comprise soil texture.The texture, structure, and color of each layer of soil within a profile are used to identify specific horizons.Soil erosion results in the loss of quality top soil.All property is legally defined and recorded based on a standardized regulatory system.Global Positioning System (GPS) is a method used to determine an exact location of a point on the earth using a coordinate system based on longitude and latitude readings. | Geographical features and environmental factors influence the formation process of soils and impact soil quality.Soil structure and soil texture are elements that affect soil function.Soils form in layers that have distinguishing characteristics from other layers in a soil profile.Soil erosion is a concern in the study of mineral soils.Systems for property definitions differ throughout the United States based on geographic and historic factors.Applications of GPS and Geographic Information System (GIS) are used in all disciplines of agriculture and natural resource systems to improve agricultural production efficiencies and environmental quality. | Conduct a sediment test to determine the particle sizes of the mineral matter and the presence of organic matter in a sample of soil.Test soil permeability to understand the relationship between soil particle size and rate of water filtration.Conduct tests to determine soil texture by feel.Determine the texture, structure, and color of each horizon within a soil profile.Conduct an investigation of soil deposition caused by water.Describe parcels of land using the rectangular survey system and the metes and bounds system.Use three points to triangulate a location. | Lab 4.1.1<br>4.1.1 Lab Report<br>Lab 4.1.2<br>4.1 Notebook Check |
| 303 | Perform soil sampling techniques. | Botany & Plant Systems | Steps for soil sampling. | Purpose of each step in soil sampling. | Collect a soil sample using correct technique. | Unit 4 Project/Lab |
| 304 | Analyze and interpret the results of a soil test. | Botany & Plant Systems | Types of soil test reports. | Information provided on soil test reports. | Use information on a soil test report for decision making. | Unit 4 Project/Lab |

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| 305 | Calculate fertilizer rates to maintain proper plant nutrition. | Botany & Plant Systems | Students will know:<br>the uses of lawn & turf areas, types of grasses, soil properties, site evaluation, ground preparation, and maintenance | Fertilizer rates are a standard that should be followed. | Students will be able to:<br>identify grasses and seeds, collect and analyze soil samples, determine grade and level of sites, sod, till, cultivate, and maintain lawn and turfgrass | Unit 4 Project/Lab |
| 306 | Draw conclusions from a soil survey to determine land uses, capability factors, and land capability classes. | Botany & Plant Systems | Soil surveys, land uses classes, capability factors. | The quality and characteristics of land determine how is it best used within society. | Evaluate soil survey information to make decisions about land use. | Unit 4 Project/Lab |
| 307 | Evaluate soil conservation practices and soil management techniques and soil health. | Botany & Plant Systems | Examples of practices. | Benefits and drawbacks of processes. | Use information about soil conservation to make planning decisions for soil use. | Unit 4 Project/Lab |
| 308 | Investigate emerging technologies within soil science. | Botany & Plant Systems | Examples of new technologies. | Benefits and drawbacks of new technologies. | Determine improvements caused by emerging technologies. | Unit 4 Project/Lab |

## 400 Mechanical Technology and Mechanization

| Item | Task | Secondary Course Cross-Walk | Know | Understand | Do | Assessment |
|---|---|---|---|---|---|---|
| 401 | Identify the progression of technological advancements and their potential impacts in the | Ag Mechanics I | Historical impacts of technology<br>New technologies currently in use | How every action that we take to create solutions for problems has an impact<br>Resources can often be | Identify the potential impact of global applications and emerging technologies | Intro to Ag Mech<br>Lumber Milling |

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| | agricultural industry. | | | limited based off of use | towards sustainability. | |
| 402 | Demonstrate safety rules and regulations. | All Courses | Laboratory equipment has specific uses in scientific experiments. | Reading and understanding laboratory procedures are essential to conducting a laboratory experiment safely. | Identify and describe the use of common laboratory equipment.<br>Follow written procedures to complete a laboratory exercise.<br>Use equipment to collect data for an experiment.<br>Demonstrate the correct use of a microscope. | Lab Grades |
| 403 | Wear personal protective equipment. | All Courses | Laboratory equipment has specific uses in scientific experiments. | Purpose behind each PPE item that is worn. | Identify and describe the use of common laboratory equipment.<br>Follow written procedures to complete a laboratory exercise.<br>Use equipment to collect data for an experiment.<br>Demonstrate the correct use of a microscope. | AM: Clean up Activities<br>A: Unit 6 Lab Activiites (if reach this item) |
| 404 | Exhibit positive safety attitudes and responsibilities. | All Courses | Laboratory equipment has specific uses in scientific experiments. | Reading and understanding laboratory procedures are essential to conducting a laboratory experiment safely. | Identify and describe the use of common laboratory equipment.<br>Follow written procedures to complete a laboratory exercise.<br>Use equipment to collect data for an experiment.<br>Demonstrate the correct use of a microscope. | |

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| 405 | Maintain and service mechanical systems. | Ag Mechanics I<br>Agriscience | Components of systems, connections, and overall safety. | Mechanical systems must work together in specific ways and require regular maintenance in order to function correctly. | Maintain and service mechanical systems and/or lab equipment as appropriate. | |
| 406 | Perform calculations and measurements used in agricultural technology | Ag Mechanics I | Mass, volume, temperature, and density are common laboratory measurements. | Proper and accurate measurement is important for laboratory investigation. | Measure distance, volume, mass, temperature, and density using the appropriate tools and scale. | Dial Caliper Measurement for Belt Buckle |
| 407 | Interpret project plans, blueprints, or schematics. | Ag Mechanics I | Symbols and measurements. | Directions are often provided in various formats that must be combined for successful use. | Read and use project plans of various kinds to complete projects. | Belt Buckle Instructions |
| 408 | Investigate emerging technologies of agricultural mechanization. | All Courses | Examples of technological advancements from various times. | Technology is always changing. | Learn, discuss, and use emerging technologies as approved. | Lab and Project Grades |
| 409 | Apply concepts on Safety Data Sheets (SDS). | All Courses | Types of information compared on Safety Data Sheets (SDS). | Importance of SDS information and organization systems for document housing. | Dispose of chemicals samples according to directions from SDS after each lab. | Lab Grades |
| 410 | Utilize a variety of technical sources (e.g., owner/operator manuals, internet resources, and journals within applications of mechanical technology). | Ag Mechanics I | Gauge scale<br>Current and Voltage Theory<br>Continuity | Technical specifications are essential for power equipment to perform according to manufacturer's recommendations. | Demonstrate accurate readings on cylinder tanks and pressure valves<br>Use a digital multimeter to read voltage and current traveling through a circuit | In class based projects |

**500 Leadership and Supervised Agricultural Experience (SAE)**

| Item | Task | Secondary | Know | Understand | Do | Assessment |
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| | | Course Cross-Walk | | | | |
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| 501 | Maintain accurate program plans and records (e.g., SAE). | All Courses | 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. | SAE Grades |
| 502 | Analyze records to determine areas of growth (e.g., SAE). | All Courses | 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 | 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 | 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. | SAE Grades |

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| | | | 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 viability of a business when reviewing a loan application. | 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. | Complete a projected cash flow statement.<br>Develop a process to analyze the financial position of a business for lender approval of a loan. | |
| 503 | Create short- and long-term SMART (Specific, Measurable, Attainable, Realistic/Results-based, and Timely) goals. | Ag Business & Mktg | SMART Goals are specific, measurable, attainable, realtistic, and timebound. | SMART goals help to monitor progress in a business plan. | Develop SMART goals and a timeline for a business plan. | Business Plan Timeline and Goals Project |
| 504 | Serve in a community or civic organization (e.g., Future Farmers of America (FFA)). | All Courses | The National FFA Organization offers members many opportunities to build necessary employment and life skills, such as leadership, personal character, and career options. | Every student who takes an agricultural course has the opportunity to participate in FFA. | Explore educational and personal growth opportunities available through FFA membership. | PA FFA Affiliate Membership |

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| 505 | Perform leadership tasks associated with citizenship (e.g., Future Farmers of America (FFA)). | All Courses | People utilize multiple forms of verbal and nonverbal communication.Speeches may be informative, persuasive, or special occasion.People develop goals in order to achieve their dreams. | Voice and use of visual aids are tools used in communicating effectively.Teamwork is essential when solving many problems and completing group tasks. | Demonstrate verbal and non-verbal forms of communication in a charades-like game.Prepare and present a formal introduction.Practice effective public speaking characteristics.Develop and present an informative speech.Write a vision statement and develop personal goals.Work collaboratively to complete team building challenges.Develop and present a group Visual Media (ex: Google Slides) presentation about agricultural careers to an audience. | |
| 506 | Demonstrate oral, written, and verbal skills necessary for employment. | Ag Business & Mktg | Entrepreneurs use resumes to communicate their experience and skills when planning a business.<br>A business pitch includes specific elements about the plans for a business. | Resumes can have multiple formats, but some are more effective than others.<br>Business pitches are intended to explain a business plan and entice investors to give their financial support. | Catalog skills and experience in a professional resume format.<br>Pitch the business and marketing plans to stakeholders including potential investors and advisors. | 2.2.3 “Teaming Up” Presentation |
| 507 | Research career opportunities in agriculture. | All Courses | Basic information about agriculture careers. | Careers have educational requirements that individuals should plan for in advance in order to be qualified. | Complete at least one Supervised Agricultural Experience (SAE) and document records about it in AET (Ag Experience Tracker). | Agricultural Career Assignments |

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| 508 | Create a plan to achieve career goals and priorities. | Ag Business & Mktg | Money is needed in order to acquire the necessities of life. | The amount of income needed to live is different across different geographic locations. | Determine adequate income needed to meet average living expenses. | Business Plan Resume Project, Timeline and Goals Project |
| 509 | Conduct and/or actively participate in a meeting. | Agriscience | Parliamentary procedures are used to conduct orderly meetings. | There is a correct system and process for every element of Parliamentary Procedure that can be used to actively participate in meetings in order to share your viewpoints. | Use proper parliamentary procedures to voice an opinion. Demonstrate the proper procedures for making a main motion and an amendment. | Parliamentary Procedure Scenario Activity |
| 510 | Use social media as a professional business tool. | Ag Business & Mktg | Entrepreneurs promote their business plan to gain support. | There are multiple options for promotion and advertising to be considered. | Develop a marketing plan for the business plan. | Business Plan and/or Marketing Plan Presentations |

## 600 Agribusiness

| Item | Task | Secondary Course Cross-Walk | Know | Understand | Do | Assessment |
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| 601 | Describe the role agriculture plays in local, state, national, and global economies. | Ag Business & Mktg | A supply chain exists and covers: production, services/supplies, processing, transportation, and marketing. | 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. | Find evidence of steps in the supply chain for a food item | Unit 1 Quiz |
| 602 | Identify functions, roles, and purposes of management in a business. | Ag Business & Mktg | Farms and ranches are businesses and must be managed in an organized, intentional manner.<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>Time invested in starting a business reduces potential income from outside | Implement an organizational system to file course documents.<br>Determine how much money a business owner's time is worth.<br>Calculate the value of student time spent on a job. | Unit 1 Quiz |

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| | | | Budgets provide information about what funds will be needed and available in the future. | employment. | Compare labor expenses paid to an entrepreneur to the return to labor and management for the business. | |
| 603 | Maintain accurate business and financial records. | Ag Business & Mktg | 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. | 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. | 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. | |
| 604 | Research nontraditional agricultural markets. | Ag Business & Mktg | Commodities represent the raw item available directly from the producer while products have gone through processing. | The value of an item changes as additional steps are needed to prepare the good or service for the public. | Find evidence of steps in the supply chain for a food item | Introductory Project |
| 605 | Calculate net worth statement. | Ag Business & Mktg | Financial entries are classified based on if they are owned or owed and timeframe.Net worth is a standard that allows for businesses to be compared.Net worth is a standard that allows for businesses to be compared.Liquidity | Assets are items owned and liabilities are items owed.Current items are within a year while noncurrent items are beyond a year.Current items are within a year while noncurrent items are beyond a year.There are multiple standard formulas that are used to calculate liquidity and solvency. | Categorize sample balance sheet entries as current or noncurrent assets or liabilitiesCompare the net worth for two businesses.Compare the net worth for two businesses. | Unit 2 Quiz/Project |

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| | | | measures short-term or current business health and solvency looks at the long-term, total picture. | | | |
| 606 | Construct a basic business plan. | Ag Business & Mktg | Starting an entrepreneurial enterprise requires a business plan.Opportunity costs are associated with risk.Financial risk is not the same at all times in a business.Risks and risk management strategies both exist.Awareness of potential risks allows for a plan to mitigate them.Risk potential impacts financial decisions about an investment.Entrepreneurs compare opportunities by calculating returns to investments such as labor, management, assets, and equity.Entrepreneurs must be aware of their competition. | A business plan includes information an investor, banker, or other stakeholder would need to promote, endorse, or support a new business.Labor and management inputs in a business have opportunity costs.Entrepreneurs determine whether opportunity costs of starting and owning a business outweigh the risks.Businesses experience time periods of higher and lower risk based on their cash flow.Different risk management strategies can be used at different times.Awareness of potential risks allows for a plan to mitigate them.Risk potential impacts financial decisions about an investment.All items that can be identified in other businesses should be considered by an entrepreneur when starting their own business and should be reflected in their business plan. | Start a business plan by describing a planned business.Develop SMART goals and a timeline for the business plan.Compile all artifacts for all sections for the course-long business plan.Research various types of risk.Make current borrowing and repayment recommendations to avoid financial risk.Research common risk management strategies and make recommendations for a business.Develop a risk management plan.Simulate investment scenarios in various risk environments.Develop a balance sheet and budget for the business plan.Project cash flow for a business plan.Investigate loan and grant opportunities for the business plan.Calculate and analyze return to labor, management, assets, and equity for businesses.Describe, assign financial value to, and analyze capital, labor, and management opportunities for the business plan.Develop a competitive analysis for the business plan. | Business Plan Project |

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| 607 | Differentiate between products and commodities in the marketplace. | Ag Business & Mktg | Commodities represent the raw item available directly from the producer while products have gone through processing. | The value of an item changes as additional steps are needed to prepare the good or service for the public. | Find evidence of steps in the supply chain for a food item. | Unit 4 Quiz |
| 608 | Apply concepts of supply and demand in agricultural industry. | Ag Business & Mktg | Agricultural businesses face risk in operations. | Businesses utilize strategies such as diversification, insurance, borrowing money, and value-added products, to mitigate risk. | Evaluate and select alternative inputs or business plans.<br>Determine the complimentary and competitive products or services that pose a risk for a business. | Market Research Survey & Business Plan Project Topic Selection |
| 609 | Investigate types of ownership and structures of agricultural businesses. | Ag Business & Mktg | There are five common business structures: sole proprietor, partnership, LLC, cooperative, and corporation. | Each business structure has key differences based on who makes decisions and who receives funds.<br>There are both positive and negative aspects to each business structure that need to be considered. | Classify businesses according to five common business structures used in agriculture. | Unit 1 Quiz |

## 700 Natural Resource Management

| Item | Task | Secondary Course Cross-Walk | Know | Understand | Do | Assessment |
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| 701 | Research the history of conservation in Pennsylvania. | Natural Resource Mgmt | Identify the importance of biodiversity to the environment<br>"Understand the key events, policies, and individuals that have shaped the history of conservation in Pennsylvania.<br>Identify major conservation initiatives and their impact on the | Examine the effects of limiting factors on population dynamics<br>Explain the concept of carrying capacity in an ecosystem<br>Analyze possible causes of population fluctuations<br>Describe how limiting factors cause organisms to become extinct<br>Analyze the relationship | Describe how organisms become classified as threatened or endangered<br>Research practices that impact biodiversity in specific ecosystems<br>Analyze the effects of new and emerging technologies on biodiversity in specific ecosystems<br>Evaluate the impact of laws and regulations on reducing | Unit 1: Quiz |

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| | | | state's natural resources.<br>Explore the role of wildlife and forestry in maintaining ecological balance.<br>Understand how effective natural resources management contributes to overall environmental health.<br>Recognize the economic and recreational importance of wildlife and forestry.<br>Define biodiversity and its significance in sustaining ecosystems.<br>Understand the impact of human activities on biodiversity.<br>Recognize the importance of biodiversity for ecosystem resilience and overall environmental health."<br>Explain the concept of carrying capacity in an ecosystem<br>Describe how organisms become classified as threatened or endangered<br>Describe how limiting factors cause organisms to become extinct<br>Analyze possible causes of population fluctuations<br>Research practices that impact biodiversity in | between habitat changes to plant and animal population fluctuations<br>Evaluate the impact of laws and regulations on reducing the number of threatened and endangered species<br>Examine the concepts of primary and secondary succession and desertification.<br>Understand how human activities can accelerate or disrupt natural changes in ecosystems.<br>Analyze case studies or examples illustrating human influence on ecosystem patterns.<br>Explore and evaluate various solutions to mitigate human impacts on ecosystems.<br>Understand the role of conservation practices, sustainable resource management, and biodiversity preservation in addressing these impacts.<br>Analyze the effectiveness of different solutions through case studies or real-world examples. | the number of threatened and endangered species<br>"Justify the chosen solutions based on scientific evidence and real-world applicability.<br>Research and present a detailed case study illustrating how human activities have affected biodiversity in a specific ecosystem.<br>Analyze the consequences of these impacts and propose potential solutions." | |

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| | | | specific ecosystems<br>Analyze the relationship between habitat changes to plant and animal population fluctuations<br>Analyze the effects of new and emerging technologies on biodiversity in specific ecosystems<br>Evaluate the impact of laws and regulations on reducing the number of threatened and endangered species | | | |
| 702 | Differentiate between renewable and non-renewable natural resources. | Natural Resource Mgmt | Define conventional and alternative energy sources.<br>Identify common examples of each type of energy source. Define resource management and planning.<br>Identify the goals and objectives of resource management. Define renewable and nonrenewable natural resources.<br>Identify examples of each type of resource. | Understand the key characteristics that distinguish renewable from nonrenewable resources. Understand the importance of sustainable resource management for long-term environmental and economic well-being.<br>Understand the environmental impacts associated with conventional and alternative energy sources.<br>Recognize the role of energy sources within the agricultural industry. Understand the consequences of overexploitation and depletion of nonrenewable resources<br>Understand the role of energy efficiency in promoting sustainability within the agricultural sector. | Consider the sustainable use of renewable resources and the responsible management of nonrenewable resources. Evaluate the potential benefits and drawbacks of alternative energy sources (e.g., solar, wind, bioenergy) within the context of agriculture. Analyze case studies to deepen understanding of effective resource management practices. Choose a specific conventional or alternative energy source and conduct a case study analyzing its environmental and agricultural impacts. | Unit 7: Debate |

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| 703 | Investigate point and non-point pollution impacts on environment. | Natural Resource Mgmt<br>Agricscience | Water pollution is caused by point and non-point sources.<br>Define point and non-point sources of pollution.<br>Understand the differences between these sources and how they contribute to environmental degradation.<br>Identify common examples of point and non-point pollution in various ecosystems.<br>Define air quality and recognize common pollutants Define waste management and understand its importance for ecosystem health. | The quality of water sources, such as streams and drinking water, can be determined by measuring factors such as temperature, turbidity, dissolved oxygen, and total dissolved solids. Understand the differences between these sources and how they contribute to environmental degradation. Understand the impact of pollutants on water quality. Understand the sources and impacts of air pollution on ecosystems. | Determine the spread of pollution from point and non-point sources<br>Perform tests to determine water quality using the factors of temperature, pH, turbidity, dissolved oxygen, and total dissolved solids.<br>Design an experiment determining the quality of drinking water and conduct the experiment to determine its validity.<br>"Design and conduct a water quality analysis using local water sources.<br>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.<br>Propose strategies to address identified air quality issues." | NRM: Unit 5 Quiz<br>A: Unit 4 Lab Activities |
| 704 | Explain the importance of management and planning of resources. | Natural Resource Mgmt | "Define management and planning of resources in agriculture.<br>Identify the importance of management and planning of resources in agriculture.<br>Critique the sustainability of various agriculture practices. | Explain how sustainable agriculture practices can support food security.<br>Describe the potential environmental impacts of unsustainable agriculture practices.<br>Evaluate the effectiveness of reduce, reuse, and recycle practices in agriculture. | Develop a management plan for a hypothetical farm, considering resource efficiency and sustainability.<br>Critique and propose improvements to a current agricultural practice.<br>Conduct an experiment to demonstrate the effectiveness of a reduce, | All throughout-Quizzes and Projects |

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| | | | Explain the concept of reduce, reuse, and recycle in agriculture.<br>Analyze how agricultural sciences and technologies strive to increase efficiency.<br>Evaluate the balance between the needs of society and the conservation of natural resources."<br>"Define conventional and alternative energy sources.<br>Identify common examples of each type of energy source. Define resource management and planning.<br>Identify the goals and objectives of resource management. Define renewable and nonrenewable natural resources.<br>Identify examples of each type of resource."<br>"Understand the key characteristics that distinguish renewable from nonrenewable resources. Understand the importance of sustainable resource management for long-term environmental and economic well-being. | Analyze the benefits and drawbacks of different agricultural technologies.<br>Explain how sustainable agriculture practices can benefit both farmers and consumers.<br>"Understand the key characteristics that distinguish renewable from nonrenewable resources. Understand the importance of sustainable resource management for long-term environmental and economic well-being.<br>Understand the environmental impacts associated with conventional and alternative energy sources.<br>Recognize the role of energy sources within the agricultural industry. Understand the consequences of overexploitation and depletion of nonrenewable resources<br>Understand the role of energy efficiency in promoting sustainability within the agricultural sector." | reuse, or recycle technique in agriculture.<br>Analyze data to evaluate the efficiency of a particular agricultural technology.<br>Develop a presentation or report on the importance of sustainable agriculture practices in society.<br>Consider the sustainable use of renewable resources and the responsible management of nonrenewable resources.<br>Evaluate the potential benefits and drawbacks of alternative energy sources (e.g., solar, wind, bioenergy) within the context of agriculture. Analyze case studies to deepen understanding of effective resource management practices. Choose a specific conventional or alternative energy source and conduct a case study analyzing its environmental and agricultural impacts. | |

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| | | | Understand the environmental impacts associated with conventional and alternative energy sources.<br>Recognize the role of energy sources within the agricultural industry.<br>Understand the consequences of overexploitation and depletion of nonrenewable resources<br>Understand the role of energy efficiency in promoting sustainability within the agricultural sector." Consider the sustainable use of renewable resources and the responsible management of nonrenewable resources.<br>Evaluate the potential benefits and drawbacks of alternative energy sources (e.g., solar, wind, bioenergy) within the context of agriculture.<br>Analyze case studies to deepen understanding of effective resource management practices.<br>Choose a specific conventional or alternative energy source and conduct a case study | | | |

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| | | | analyzing its environmental and agricultural impacts. | | | |
| 705 | Identify the importance of wildlife and forestry as it relates to natural resources management. | Natural Resource Mgmt | Identify the importance of biodiversity to the environment<br>"Understand the key events, policies, and individuals that have shaped the history of conservation in Pennsylvania.<br>Identify major conservation initiatives and their impact on the state's natural resources.<br>Explore the role of wildlife and forestry in maintaining ecological balance.<br>Understand how effective natural resources management contributes to overall environmental health.<br>Recognize the economic and recreational importance of wildlife and forestry.<br>Define biodiversity and its significance in sustaining ecosystems.<br>Understand the impact of human activities on biodiversity.<br>Recognize the importance of biodiversity for | Examine the effects of limiting factors on population dynamics<br>Explain the concept of carrying capacity in an ecosystem<br>Analyze possible causes of population fluctuations<br>Describe how limiting factors cause organisms to become extinct<br>Analyze the relationship between habitat changes to plant and animal population fluctuations<br>Evaluate the impact of laws and regulations on reducing the number of threatened and endangered species<br>Examine the concepts of primary and secondary succession and desertification.<br>Understand how human activities can accelerate or disrupt natural changes in ecosystems.<br>Analyze case studies or examples illustrating human influence on ecosystem patterns.<br>Explore and evaluate various solutions to mitigate human impacts on ecosystems. | Describe how organisms become classified as threatened or endangered<br>Research practices that impact biodiversity in specific ecosystems<br>Analyze the effects of new and emerging technologies on biodiversity in specific ecosystems<br>Evaluate the impact of laws and regulations on reducing the number of threatened and endangered species<br>"Justify the chosen solutions based on scientific evidence and real-world applicability.<br>Research and present a detailed case study illustrating how human activities have affected biodiversity in a specific ecosystem.<br>Analyze the consequences of these impacts and propose potential solutions." | Unit 2: Lab and Quiz |

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| | | | ecosystem resilience and overall environmental health."<br>Explain the concept of carrying capacity in an ecosystem<br>Describe how organisms become classified as threatened or endangered<br>Describe how limiting factors cause organisms to become extinct<br>Analyze possible causes of population fluctuations<br>Research practices that impact biodiversity in specific ecosystems<br>Analyze the relationship between habitat changes to plant and animal population fluctuations<br>Analyze the effects of new and emerging technologies on biodiversity in specific ecosystems<br>Evaluate the impact of laws and regulations on reducing the number of threatened and endangered species | Understand the role of conservation practices, sustainable resource management, and biodiversity preservation in addressing these impacts.<br>Analyze the effectiveness of different solutions through case studies or real-world examples. | | |

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| 706 | Assess the impacts of invasive species on ecosystems. | Natural Resource Mgmt | Define invasive species and understand their characteristics.<br>Identify the ecological and economic impacts of invasive species on native ecosystems.<br>Explore specific examples of invasive species and their effects on biodiversity. Define pest management and understand its significance in agriculture and ecosystems.<br>Explore methods such as cost/benefit analysis, cumulative effects analysis, environmental impact analysis, ethical analysis, and risk analysis used in pest management.<br>Understand the importance of sustainable and ethical pest management practices. | Evaluate the cascading effects of invasive species on native flora and fauna. 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.<br>Understand the trade-offs involved in different pest management approaches.<br>Understand how invasive species can alter ecosystem dynamics, nutrient cycling, and community structure. | Conduct a comprehensive analysis using cost/benefit, cumulative effects, environmental impact, ethical, and risk analysis.<br>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).<br>Incorporate techniques to regulate temperature, humidity, and soil conditions.<br>Discuss the potential benefits and challenges associated with the proposed environmental control plan. | Unit 4: Quiz and Ceiling Tile Project |

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| 707 | Analyze and interpret water quality, air quality, and waste management within ecosystems. | Natural Resource Mgmt<br>Agricscience | Land topography describes the shape of the surface of the earth.<br>Define point and non-point sources of pollution.<br>Understand the differences between these sources and how they contribute to environmental degradation.<br>Identify common examples of point and non-point pollution in various ecosystems.<br>Define air quality and recognize common pollutants Define waste management and understand its importance for ecosystem health. | Land topography influences the distribution of water and pollutants.<br>Understand the differences between these sources and how they contribute to environmental degradation.<br>Understand the impact of pollutants on water quality.<br>Understand the sources and impacts of air pollution on ecosystems. | Conduct an experiment that models the flow of water over a landform.<br>"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." | NRM: Chesapeake Bay Foundation Canoe Trip<br>A: Unit 4 Lab Activities & Unit 4 Quiz |

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| 708 | Critique the sustainability of various agriculture practices. | Natural Resource Mgmt | "Define management and planning of resources in agriculture.<br>Identify the importance of management and planning of resources in agriculture.<br>Critique the sustainability of various agriculture practices.<br>Explain the concept of reduce, reuse, and recycle in agriculture.<br>Analyze how agricultural sciences and technologies strive to increase efficiency.<br>Evaluate the balance between the needs of society and the conservation of natural resources." | Explain how sustainable agriculture practices can support food security.<br>Describe the potential environmental impacts of unsustainable agriculture practices.<br>Evaluate the effectiveness of reduce, reuse, and recycle practices in agriculture.<br>Analyze the benefits and drawbacks of different agricultural technologies.<br>Explain how sustainable agriculture practices can benefit both farmers and consumers. | Develop a management plan for a hypothetical farm, considering resource efficiency and sustainability.<br>Critique and propose improvements to a current agricultural practice.<br>Conduct an experiment to demonstrate the effectiveness of a reduce, reuse, or recycle technique in agriculture.<br>Analyze data to evaluate the efficiency of a particular agricultural technology.<br>Develop a presentation or report on the importance of sustainable agriculture practices in society. | Unit 1: Quiz |

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| 709 | Analyze the impact of conventional and alternative energy sources on the environment and within the agricultural industry. | Natural Resource Mgmt | Define conventional and alternative energy sources.<br>Identify common examples of each type of energy source. Define resource management and planning.<br>Identify the goals and objectives of resource management. Define renewable and nonrenewable natural resources.<br>Identify examples of each type of resource. | Understand the key characteristics that distinguish renewable from nonrenewable resources. Understand the importance of sustainable resource management for long-term environmental and economic well-being.<br>Understand the environmental impacts associated with conventional and alternative energy sources.<br>Recognize the role of energy sources within the agricultural industry. Understand the consequences of overexploitation and depletion of nonrenewable resources<br>Understand the role of energy efficiency in promoting sustainability within the agricultural sector. | Consider the sustainable use of renewable resources and the responsible management of nonrenewable resources. Evaluate the potential benefits and drawbacks of alternative energy sources (e.g., solar, wind, bioenergy) within the context of agriculture. Analyze case studies to deepen understanding of effective resource management practices. Choose a specific conventional or alternative energy source and conduct a case study analyzing its environmental and agricultural impacts. | Unit 7: Debate |

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| 710 | Apply concepts of reduce, reuse, and recycle. | Natural Resource Mgmt | "Define management and planning of resources in agriculture.<br>Identify the importance of management and planning of resources in agriculture.<br>Critique the sustainability of various agriculture practices.<br>Explain the concept of reduce, reuse, and recycle in agriculture.<br>Analyze how agricultural sciences and technologies strive to increase efficiency.<br>Evaluate the balance between the needs of society and the conservation of natural resources." | Explain how sustainable agriculture practices can support food security.<br>Describe the potential environmental impacts of unsustainable agriculture practices.<br>Evaluate the effectiveness of reduce, reuse, and recycle practices in agriculture.<br>Analyze the benefits and drawbacks of different agricultural technologies.<br>Explain how sustainable agriculture practices can benefit both farmers and consumers. | Develop a management plan for a hypothetical farm, considering resource efficiency and sustainability.<br>Critique and propose improvements to a current agricultural practice.<br>Conduct an experiment to demonstrate the effectiveness of a reduce, reuse, or recycle technique in agriculture.<br>Analyze data to evaluate the efficiency of a particular agricultural technology.<br>Develop a presentation or report on the importance of sustainable agriculture practices in society. | Unit 1: Quiz |
| 711 | Identify the importance of biodiversity to the environment. | Natural Resource Mgmt | Identify the importance of biodiversity to the environment<br>"Understand the key events, policies, and individuals that have shaped the history of conservation in Pennsylvania.<br>Identify major conservation initiatives and their impact on the state's natural resources.<br>Explore the role of wildlife and forestry in | Examine the effects of limiting factors on population dynamics<br>Explain the concept of carrying capacity in an ecosystem<br>Analyze possible causes of population fluctuations<br>Describe how limiting factors cause organisms to become extinct<br>Analyze the relationship between habitat changes to plant and animal population fluctuations | Describe how organisms become classified as threatened or endangered<br>Research practices that impact biodiversity in specific ecosystems<br>Analyze the effects of new and emerging technologies on biodiversity in specific ecosystems<br>Evaluate the impact of laws and regulations on reducing the number of threatened and endangered species<br>"Justify the chosen solutions | Unit 2: Quiz and Lab |

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| | | | maintaining ecological balance.<br>Understand how effective natural resources management contributes to overall environmental health.<br>Recognize the economic and recreational importance of wildlife and forestry.<br>Define biodiversity and its significance in sustaining ecosystems.<br>Understand the impact of human activities on biodiversity.<br>Recognize the importance of biodiversity for ecosystem resilience and overall environmental health."<br>Explain the concept of carrying capacity in an ecosystem<br>Describe how organisms become classified as threatened or endangered<br>Describe how limiting factors cause organisms to become extinct<br>Analyze possible causes of population fluctuations<br>Research practices that impact biodiversity in specific ecosystems<br>Analyze the relationship between habitat changes | Evaluate the impact of laws and regulations on reducing the number of threatened and endangered species<br>Examine the concepts of primary and secondary succession and desertification.<br>Understand how human activities can accelerate or disrupt natural changes in ecosystems.<br>Analyze case studies or examples illustrating human influence on ecosystem patterns.<br>Explore and evaluate various solutions to mitigate human impacts on ecosystems.<br>Understand the role of conservation practices, sustainable resource management, and biodiversity preservation in addressing these impacts.<br>Analyze the effectiveness of different solutions through case studies or real-world examples. | based on scientific evidence and real-world applicability.<br>Research and present a detailed case study illustrating how human activities have affected biodiversity in a specific ecosystem.<br>Analyze the consequences of these impacts and propose potential solutions." | |

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| | | | to plant and animal population fluctuations<br>Analyze the effects of new and emerging technologies on biodiversity in specific ecosystems<br>Evaluate the impact of laws and regulations on reducing the number of threatened and endangered species | | | |

## 800 Biotechnology

| Item | Task | Secondary Course Cross-Walk | Know | Understand | Do | Assessment |
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| 801 | Describe the use of biotechnology in agriculture. | Botany & Plant Systems | 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 | Biotechnology is not always well received by the general public and is carefully vetted within industry. Consumer eduation and options are essential. | 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 | Unit 7 Project |

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| 802 | Investigate past, current, and emerging applications of biotechnology in agriculture. | Botany & Plant Systems | 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 | Biotechnology is not always well received by the general public and is carefully vetted within industry. Consumer eduation and options are essential. | 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 | Unit 7: Project and Lab |

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| 803 | Explore ethical, legal, and social biotechnology issues. | Botany & Plant Systems | 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 | Biotechnology is not always well received by the general public and is carefully vetted within industry. Consumer eduation and options are essential. | 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 | Unit 7: Project and Lab |
| **900 Food Science** | | | | | | |

| Item | Task | Secondary Course Cross-Walk | Know | Understand | Do | Assessment |
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| 901 | Identify and describe foods derived from animal and plant sources. | Large Animal Science<br>Agriscience<br>Botany & Plant Systems | Food is derived from animal and plant products. | Consumption trends of food have changed over time based on an increase of information about health issues and technological advances. | Document the plant and animal food products consumed in a 24-hour period. | LA: Animal Uses Project<br>A: Unit 5 Quiz<br>B: Unit 2 Quiz |
| 902 | Investigate current consumer food trends. | Agriscience | Food is derived from animal and plant products. | Consumption trends of food have changed over time based on an increase of information about health issues and technological advances. | Determine the percentage of plant and animal food products they consume. | A: Unit 5 Quiz |
| 903 | Demonstrate techniques and procedures for the handling of food products. | Large Animal Science<br>Agriscience | How to properly process, handle, and prepare food for consumption | There are many points where food can be contaminated while en route to the consumer. | Perform proper food handling techniques | LA: Food Preparation Project<br>A: Unit 5 Lab Activities |
| 904 | Interpret and evaluate results of quality assurance tests on food products and examine steps to implement corrective procedures. | Agriscience | Food must be produced, transported, processed, and stored in a safe way. | There are many points where food can be contaminated while en route to the consumer. | Conduct an experiment to determine bacterial levels of meat samples when refrigerated, stored at room temperature, and cooked.<br>Solve a problem related to a foodborne illness outbreak. | Unit 5 Lab Activities & Unit 5 Quiz |
| 905 | Research the impact of state and federal agencies on food supply industries. | Ag Business & Mktg<br>Agriscience | Access to food resources depends on many factors | Agriculture plays an essential role in society and feeding the world. | Write a brief for a presentation proposing a potential solution to world hunger. | AB: Unit 1 Quiz<br>A: Farm to Fork Project |
| 906 | Examine the various paths food products take to get from farm to table. | Ag Business & Mktg<br>Agriscience | Food commodities are sourced from producers. | Some food items are purchased while still in commodity form while others have been processed into a prepared food item for retail. | Processing and Preparing of a whole swine<br>Perform proper food handling techniques<br>Research the path a prepared food item takes from production to processing and present their findings to the class. | AB: Unit 1 Quiz<br>A: Farm to Fork Project |

1 Student Demonstrated Entry-Level Industry Proficiency as Indicated by (X)