

Course Name	Pollinator Conservation (A)		Course Details	Level 3 course in Agriculture Natural Resources pathway and in Natural Resources, Environmental Science and Sustainability pathway.	
			Course = 0.50 Carnegie Unit Credit		
Course Description	A course for students pursuing careers in Natural Resources, Plant Science, and Environmental Sciences. This course expands student learning in the principles of pollinator conservation and ecosystem sustainability. Students will gain knowledge in pollinator biology, plant–pollinator relationships, habitat management, environmental stewardship, human impacts on ecosystems, and conservation practices that support agricultural and natural systems.				
Note:	This is a suggested scope and sequence for the course content. The content will work with any textbook or instructional resource. If locally adapted, make sure all essential knowledge and skills are covered.				
SCED Identification #		Schedule calculation based on 60% of a semester instructional time. Scope and sequence allows for additional time for guest speakers, student presentations, field trips, remediation, or other content topics.			
All courses taught in an approved CTE program must include Essential Skills embedded into the course content. The Essential Skills Framework for this course can be found at https://www.cde.state.co.us/standardsandinstruction/essentialskills					
Unit Number, Title and Brief Description	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration	
Unit 1: Exploring pollinators and their habitat.	NRS.01. Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.	NRS.01.01. Apply methods of classification to examine natural resource availability and ecosystem function in a particular region. NRS.01.02. Classify different types of natural resources in order to enable protection, conservation, enhancement and management in a particular geographical region. NRS.01.03. Apply ecological concepts and principles to atmospheric natural resource systems. NRS.02.01. Analyze the interrelationships between natural resources and humans. NRS.02.02. Assess the impact of human activities on the	NRS.01.01.02.a. Summarize the components that comprise all ecosystems. NRS.01.01.03.a. Summarize and classify different kinds of living species based on evolutionary traits. NRS.01.01.03.b. Analyze how biodiversity develops through evolution, natural selection and adaptation; explain the importance of biodiversity to ecosystem function and availability of natural resources. NRS.01.01.03.c. Evaluate biodiversity in ecosystems and devise strategies to enhance the function of an ecosystem and the availability of natural resources by increasing the level of biodiversity. NRS.01.02.03.a. Research and examine the characteristics used to identify wildlife and insects.		

		availability of natural resources. NRS.02.03. Analyze how modern perceptions of natural resource management, protection, enhancement and improvement change and develop over time. NRS.02.05. Communicate information to the public regarding topics related to the management, protection, enhancement, and improvement of natural resources. HS-LS2-6 HS-LS2-7 <u>HS-ESS3-1</u> HS-ESS3-4 SC.HS.2.1 SC.HS.2.2 SC.HS.2.4 HS-ESS3-3 SC.HS.3.2 HS-LS2-2 SC.HS.3.3 HS-LS4-6	NRS.01.03.02.a. Research and summarize how climate factors influence natural systems. NRS.02.02.01.a. Summarize the relationship between natural resources, ecosystems and human activity. NRS.02.02.02.a. Categorize the primary causes of extinction of living species due to human activity (e.g., overharvesting, habitat loss, invasive species, pollution, etc.). NRS.02.02.03.a. Examine and describe the manner in which modern lifestyles are related to the depletion of natural resources. NRS.02.03.01.a. Summarize and categorize the different social considerations in regard to the use of natural resources (e.g., public versus private, laws and regulations, economics, green technology, etc.). NRS.02.05.03.a. Examine and describe how communication can be used to influence behavior, call people to action and instill a sense of civic behavior related to the conservation, management, enhancement and improvement of natural resources. NRS.02.05.03.b. Analyze and summarize examples of how communication can be used to influence behavior, call people to action and instill a sense of civic behavior related to the conservation, management, enhancement and improvement of natural resources. NRS.02.05.03.c. Create a communication plan to influence the behavior of people, call people to action and instill a sense of civic behavior related to the conservation, management, enhancement and improvement of natural resources.	
Unit 2: Exploring Pollinators and the	ESS.01. Use analytical procedures and instruments	ESS.01.01. Analyze and interpret laboratory and field samples in environmental service systems.	ESS.01.01.a. Identify sample types and sampling techniques used to collect laboratory and field data. ESS.03.05.01.a. Research the	

Role of Invertebrates	to manage environmental service systems. ESS.03. Develop proposed solutions to environmental issues, problems and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry and ecology. NRS.01. Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.	ESS.03.05. Apply ecology principles to environmental service systems. NRS.01.02. Classify different types of natural resources in order to enable protection, conservation, enhancement and management in a particular geographical region. NRS.01.06. Apply ecological concepts and principles to living organisms in natural resource systems. HS-ETS1-1 HS-LS2-2 HS-LS2-6 HS-LS2-7 HS-LS2-8 HS-LS4-2 HS-LS4-4 HS-LS4-6 SC.HS.2.1 SC.HS.2.2 SC.HS.2.6 SC.HS.3.2 SC.HS.3.5	role that biodiversity plays in environmental service systems and how biodiversity measured. ESS.03.05.01.b. Calculate the amount of biodiversity in a given area using an appropriate method (e.g., quadrat assessment, transect measurements, etc.). NRS.01.02.03.a. Research and examine the characteristics used to identify wildlife and insects. NRS.01.02.03.b. Apply identification techniques to determine the species of wildlife or insect. NRS.01.02.05.a. Research and examine the characteristics used to identify non-living resources (e.g., soil types, climate, geography, etc.). NRS.01.02.06.a. Research the purpose and value of resource inventories and population studies. ps.0 NRS.01.02.06.b. Apply procedures for conducting resource inventories and population studies. NRS.01.02.06.c. Conduct an assessment of the resource inventories or population in a given area. NRS.01.06.01.a. Differentiate between population ecology, population density and population dispersion and describe the importance of these concepts to natural resource systems.	
Unit 3: Exploring Horticulture: Plant Lifecycle and Pollinator Habitats	NRS.01. Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.	NRS.01.01. Apply methods of classification to examine natural resource availability and ecosystem function in a particular region.	NRS.01.01.03.a. Summarize and classify different kinds of living species based on evolutionary traits. NRS.01.01.03.b. Analyze how biodiversity develops through evolution, natural selection and adaptation; explain the importance of	

NRS.04. Demonstrate responsible management procedures and techniques to protect, maintain, enhance, and improve natural resources.

PS.02. Apply principles of classification, plant anatomy, and plant physiology to plant production and management.

PS.03. Propagate, culture and harvest plants and plant products based on current industry standards.

NRS.01.02. Classify different types of natural resources in order to enable protection, conservation, enhancement and management in a particular geographical region.

NRS.04.01. Demonstrate natural resource protection, maintenance, enhancement and improvement techniques.

PS.02.02. Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems.

PS.03.01. Demonstrate plant propagation techniques in plant system activities.

PS.03.03. Develop and implement a plan for integrated pest management for plant production.

PS.03.04. Apply principles and practices of sustainable agriculture to plant production.

HS-ESS3-1
HS-ESS3-3
HS-ESS3-4
HS-LS1-1
HS-LS1-2
HS-LS1-5
HS-LS1-6
HS-LS2-6
HS-LS2-7
HS-LS2-8
HS.SC.2.2
SC.HS.1.1
SC.HS.2.1
SC.HS.2.2
SC.HS.3.2

biodiversity to ecosystem function and availability of natural resources.

NRS.01.01.03.c. Evaluate biodiversity in ecosystems and devise strategies to enhance the function of an ecosystem and the availability of natural resources by increasing the level of biodiversity.

NRS.01.02.02.c. Evaluate the species of herbaceous plants present to assess the health of an ecosystem (e.g., presence of native versus invasive plants, biodiversity, etc.).

NRS.01.02.03.c. Evaluate the species of wildlife and insects present to assess the health of an ecosystem.

NRS.01.02.05.a. Research and examine the characteristics used to identify non-living resources (e.g., soil types, climate, geography, etc.).

NRS.01.02.05.b. Apply identification techniques to determine the types of non-living resources in an area.

NRS.01.02.05.c. Evaluate the non-living resources present in an area to determine the best practices for improving, enhancing and protecting an ecosystem.

NRS 04.01.03.a. Identify and categorize characteristics of a healthy wildlife habitat.

PS.02.02.01.a. Identify structures in a typical plant cell and summarize the function of plant cell organelles.

PS.02.02.02.a. Identify and summarize the components, the types and the functions of plant roots.

PS.02.02.03.a. Identify and summarize the components and the functions of plant stems.

			PS.03.01.01.a. Identify examples of a summarize pollination, cross-pollination and self-pollination of flowering plants. PS.03.03.03.a. Identify and summarize pest control strategies associated with integrated pest management and the importance of determining economic threshold. PS.03.03.04.a. Distinguish between risks and benefits associated with the materials and methods used in plant pest management. PS.03.04.01.a. Compare and contrast the alignment of different production systems (conventional and organic) with USDA sustainable practices criteria. PS.03.04.01.b. Analyze the alignment of modern technologies used in production systems (e.g., precision agriculture, GE crops, etc.) with USDA sustainable practices criteria. PS.03.04.01.c. Research, prepare and defend plans for a plant systems enterprise that aligns with USDA sustainable practices criteria.	
Unit 4: Cultivating Habitat-Friendly Soil Practices	ESS.02. Evaluate the impact of public policies and regulations on environmental service system operations. ESS.03. Develop proposed solutions to environmental issues, problems and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry and ecology. NRS.01. Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions	ESS.02.02. Compare and contrast the impact of current trends on regulation of environmental service systems (e.g., climate change, population growth, international trade, etc.). ESS.03.03. Apply chemistry principles to environmental service systems. ESS.03.04. Apply microbiology principles to environmental service systems. NRS.01.03. Apply ecological concepts and principles to atmospheric natural resource systems. HS-ESS2-2	ESS.02.02.02.b. Differentiate rock types and relate the chemical composition of mineral matter in soils to the parent material. ESS.03.02.03.a. Examine and explain how the physical qualities of the soil influence the infiltration and percolation of water. ESS.03.03.01.a. Examine and summarize how chemistry affects soil structure and function (e.g., pH, cation-exchange capacity, filtration capability, flooding likelihood, etc.). ESS.03.03.01.b. Analyze the soil chemistry of a sample. ESS.03.03.01.c. Evaluate a sample's soil chemistry and assess how the results may	

to natural resource issues and goals.

HS-ESS2-6
HS-LS2-5
HS-LS2-6
HS-LS2-7
HS-LS2-8
SC.HS.1.1
SC.HS.2.2
SC.HS.3.2
SC.HS.3.3

impact considerations in environment systems.

ESS.03.04.01.a. Describe the microbial biodiversity found in soil and summarize the contribution of microbial biodiversity to the physical and chemical characteristics of soil.

ESS.03.04.01.b. Assess how the activities of microorganisms in soil affect environmental service systems and ecosystem biodiversity.

ESS.05.02.02.c. Evaluate a sample of soil to determine its quality and if it has been contaminated.

NRS.01.03.01.a. Classify different kinds of biogeochemical cycles and the role they play in natural resources systems.

NRS.01.03.01.b. Assess the role that the atmosphere plays in the regulation of biogeochemical cycles.

NRS.01.03.01.c. Evaluate and make recommendations to lessen the impact of human activity on the ability of the atmosphere to regulate biogeochemical cycles.

Course Name	Pollinator Conservation (B)		Course Details	Level 3 course in Agriculture in Natural Resources, Environmental Sustainability pathway.	 CTE [®]	y and
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Course Description	A course for students pursuing careers in Natural Resources, Plant Science, and Environmental Sciences. This course expands student learning in the principles of pollinator conservation and ecosystem sustainability. Students will gain knowledge in pollinator biology, plant–pollinator relationships, habitat management, environmental stewardship, human impacts on ecosystems, and conservation practices that support agricultural and natural systems.					
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Unit Number, Title and Brief Description	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration		
Unit 5: Cultivating a Living Landscape: Habitat Health for the Future	NRS.01. Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals. NRS.02.01. Analyze the interrelationships between natural resources and humans. NRS.03. Develop plans to ensure sustainable production and processing of natural resources.	NRS.01.02. Classify different types of natural resources in order to enable protection, conservation, enhancement and management in a particular geographical region. NRS.01.04. Apply ecological concepts and principles to aquatic natural resource systems. NRS.02.02. Assess the impact of human activities on the availability of natural resources. NRS.03.01. Sustainably produce, harvest, process and use natural resource products (e.g., forest products, wildlife, minerals, fossil fuels, shale oil, alternative energy, recreation, aquatic species, etc.). HS-ESS3-1 HS-ESS3-3	NRS.01.02.02.a. Research and examine the characteristics used to identify herbaceous plants. NRS.01.02.03.a. Research and examine the characteristics used to identify wildlife and insects. NRS.01.02.03.b. Apply identification techniques to determine the species of wildlife or insect. NRS.01.02.03.c. Evaluate the species of wildlife and insects present to assess the health of an ecosystem. NRS.01.04.01.a. Summarize the roles and properties of watersheds. NRS.01.04.03.a. Compare and contrast riparian zones and riparian buffers based on their function. NRS.01.04.03.b. Assess techniques used in the creation, enhancement and management of riparian zones and riparian buffers.			

		HS-ESS3-4 HS-LS2-6 HS-LS2-7 SC.HS.2.1 SC.HS.2.2 SC.HS.3.2 SC.HS.3.3	NRS.01.04.03.c. Devise and apply strategies for the creation, enhancement and management of riparian zones and riparian buffers. NRS.02.02.01.a. Summarize the relationship between natural resources, ecosystems and human activity. PS.03.01.01.a. Identify examples of and summarize pollination, cross-pollination and self-pollination of flowering plants.	
Unit 6: Understanding Government and Pollinator-Friendly Policy	ESS.02. Evaluate the impact of public policies and regulations on environmental service system operations. NRS.02.01. Analyze the interrelationships between natural resources and humans.	ESS.02.01. Interpret and evaluate the impact of laws, agencies, policies and practices affecting environmental service systems. NRS.02.04. Examine and explain how economics affects the use of natural resources. HS-ESS3-4 SC.HS.2.2 SC.HS.3.3	ESS.02.01.01.a. Distinguish between the types of laws associated with environmental service systems. ESS.02.01.01.b. Analyze the structure of laws associated with environmental service systems. ESS.02.01.01.c. Evaluate the impact of laws associated with environmental service systems for their impact on wildlife, people, the environment and the economy. NRS.02.04. Examine and explain how economics affects the use of natural resources.	
Unit 7: Native Seed Collection and Processing	NRS.01. Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals. NRS.03. Develop plans to ensure sustainable production and processing of natural resources. PS.03. Propagate, culture and harvest plants and plant products based on current industry standards.	NRS.01.01. Apply methods of classification to examine natural resource availability and ecosystem function in a particular region. NRS.03.01. Sustainably produce, harvest, process and use natural resource products (e.g., forest products, wildlife, minerals, fossil fuels, shale oil, alternative energy, recreation, aquatic species, etc.). PS.03.01. Demonstrate plant propagation techniques in plant system activities.	NRS.01.01.02.b. Analyze the interdependence of organisms within an ecosystem (e.g., food webs, niches, impact of keystone species, etc.) and assess the dependence of organisms on nonliving components (climate, geography, energy flow, nutrient cycling, etc.). NRS.01.01.02.c. Conduct analyses of ecosystems and document the interactions of living species and non-living resources. NRS.03.01.02.c. Develop a method for the sustainable harvest of wildlife species. PS.03.01.02.a. Demonstrate sowing techniques for providing favorable conditions to meet the factors of seed germination.	

	PS.04. Apply principles of design in plant systems to enhance an environment (e.g. floral, forest landscape, and farm).	PS.03.02. Develop and implement a management plan for plant production. PS.03.05. Harvest, handle and store crops according to current industry standards. PS.04.01. Evaluating, identifying and preparing plants to enhance an environment. HS-ESS3-3 HS-LS1-1 HS-LS1-2 HS-LS2-6 HS-LS2-7 HS-LS2-8 HS-LS4-4 SC.HS.2.1 SC.HS.2.2 SC.HS.2.4 SC.HS.3.2 SC.HS.3.3	PS.03.01.02.b. Handle seed to overcome dormancy mechanisms and to maintain viability and vigor. PS.03.02.04.a. Observe and record environmental conditions during the germination, growth and development of a crop. PS.03.02.04.b. Monitor the progress of plantings and determine the need to adjust environmental conditions. PS.03.02.04.c. Prepare and implement a plant production schedule based on predicted environmental conditions and desired market target (e.g., having plants ready to market on a specific day such as Mother's Day, organic production, low maintenance landscape plants, etc.). PS.03.05.01.b. Assess the stage of growth to determine crop maturity or marketability and demonstrate proper harvesting techniques. PS.04.01.01.a. Identify and categorize plants by their purpose (e.g., floral plants, landscape plants, house plants, etc.). PS.04.01.01.b. Demonstrate proper use of plants in their environment (e.g., focal and filler plants in floriculture, heat tolerant and shade plants in a landscape design, etc.). PS.04.01.02.a. Summarize the applications of design in agriculture and ornamental plant systems. PS.04.01.02.b. Create a design utilizing plants in their proper environments.	
Unit 8: Site Assessment - Record Keeping and Data Collection for Habitat Conservation	NRS.01. Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions	NRS.01.01. Apply methods of classification to examine natural resource availability and ecosystem function in a particular region.	NRS.01.01.03.c. Evaluate biodiversity in ecosystems and devise strategies to enhance the function of an ecosystem and the availability of natural resources by increasing the level of biodiversity.	

to natural resource issues and goals.

NRS.04. Demonstrate responsible management procedures and techniques to protect, maintain, enhance, and improve natural resources.

PS.04. Apply principles of design in plant systems to enhance an environment (e.g. floral, forest landscape, and farm).

NRS.01.02. Classify different types of natural resources in order to enable protection, conservation, enhancement and management in a particular geographical region.

NRS.01.04. Apply ecological concepts and principles to aquatic natural resource systems.

NRS.01.06. Apply ecological concepts and principles to living organisms in natural resource systems.

NRS.02.01. Analyze the interrelationships between natural resources and humans.

NRS.02.02. Assess the impact of human activities on the availability of natural resources.

NRS.04.01. Demonstrate natural resource protection, maintenance, enhancement and improvement techniques.

NRS.04.03. Prevent or manage introduction of ecologically harmful species in a particular region.

PS.04.01. Evaluating, identifying and preparing plants to enhance an environment.

HS-ESS3-3
HS-LS2-5
HS-LS2-6
HS-LS2-7
HS-LS4-5
SC.HS.2.2
SC.HS.2.4

NRS.01.02.01.c. Evaluate the species present to assess the health of an ecosystem (e.g., presence of native versus invasive species, biodiversity, etc.).

NRS.01.02.02.c. Evaluate the species of herbaceous plants present to assess the health of an ecosystem (e.g., presence of native versus invasive plants, biodiversity, etc.).

NRS.01.02.03.c. Evaluate the species of wildlife and insects present to assess the health of an ecosystem.

NRS.01.02.05.c. Evaluate the non-living resources present in an area to determine the best practices for improving, enhancing and protecting an ecosystem.

NRS.01.02.06.c. Conduct an assessment of the resource inventories or population in a given area.

NRS.01.04.02.c. Devise and apply strategies to manage, protect, enhance or improve sources of groundwater or surface water based on its properties.

NRS.01.06.01.c. Create a management plan for a population of a species in an ecosystem given its population ecology, population density and population dispersion in natural resource systems.

NRS.01.06.02.a. Research and summarize examples of invasive species.

NRS.01.06.02.b. Analyze factors that influence the establishment and spread of invasive species and determine the appropriate steps to prevent or minimize the impact of invasive species.

Academic Standards Alignment

Colorado CTE courses are required to integrate academic and essential skills into course content. The following academic standards have been identified as aligned to this course and should be integrated throughout instruction.

[CO CTE Academic Standards Resources](#) (Rubrics, integration strategies, etc)

[CDE Colorado Academic Standards Online](#) (Online standards lookup tool)

Standard 1: Oral Expression and Listening

Prepared Graduate 1: *Collaborate effectively as group members or leaders who listen actively and respectfully; pose thoughtful questions, acknowledge the ideas of others; and contribute ideas to further the group's attainment of an objective.*

Students collaborate to assess pollinator populations, evaluate habitat quality, develop conservation plans, investigate factors affecting pollinator health, and solve pollinator conservation challenges through field investigations and project-based learning.

Standard 2: Reading for All Purposes

Prepared Graduate 4: *Read a wide range of informational texts to build knowledge and to better understand the human experience.*

Students analyze scientific literature, pollinator conservation plans, habitat assessments, pesticide research, biodiversity studies, species identification guides, and environmental regulations to understand pollinator ecology and conservation practices.

Prepared Graduate 5: *Understand how language functions in different contexts, command a variety of word-learning strategies to assist comprehension, and make effective choices for meaning or style when writing and speaking.*

Students develop and apply specialized vocabulary related to pollinator ecology, biodiversity, native plants, habitat restoration, pollination biology, ecosystem services, integrated pest management, invasive species, and conservation to communicate effectively in pollinator conservation settings.

Standard 3: Writing and Composition

Prepared Graduate 6: *Craft arguments using techniques specific to the genre.*

Students evaluate pollinator conservation strategies, habitat restoration practices, pesticide management approaches, and defend recommendations using scientific evidence, field observations, and ecological data.

Prepared Graduate 7: *Craft informational/explanatory texts using techniques specific to the genre.*

Students develop pollinator habitat plans, conservation proposals, species assessments, and technical reports explaining pollination biology, habitat management practices, and conservation strategies using scientific evidence.

Standard 4: Research Inquiry and Design

Prepared Graduate 10: *Gather information from a variety of sources; analyze and evaluate its quality and relevance; and use it ethically to answer complex questions.*

Students research pollinator species, habitat requirements, plant-pollinator relationships, pollinator declines, pesticide impacts, conservation strategies, native plant communities, and ecosystem services to develop evidence-based plans that protect and enhance pollinator populations and habitats.

Note: *Mathematics and Science standards will be added in the future. Visit the [Colorado Academic Standards](#) page for the most current version.*