

Colorado CTE Course – Scope and Sequence

Course Name	Range Ecology		Course Details	Level 3 course in the Natural Resources / Environmental Science pathway.	
			Course = 0.50 Carnegie Unit Credit		
Course Description	An introductory course for agriculture education students pursuing careers in Natural Resources and Environmental Sciences. This course expands student learning to the principals of rangeland ecology. Students will gain knowledge in career development, leadership, personal development, communications, ecology, and resource management.				
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 #	18505	Schedule calculation based on 60 calendar days of a 90-day semester. Scope and sequence allows for additional time for guest speakers, student presentations, field trips, remediation, or other content topics.			
Unit Number, Title and Brief Description	Suggested % of Instructional Time	Competency / Performance Indicator	Outcome / Measurement	CTE or Academic Standard Alignment	CTSO Integration
Analyze the different elements in an Ecosystem and the relationship of those interactions in relation to Rangeland.	8	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.01.01.01.a. Summarize and classify the different kinds of natural resources using common classification schemes (e.g., living versus non-living, renewable versus nonrenewable, native versus introduced, etc.). NRS.01.01.02.a. Summarize the components that comprise all ecosystems.	

				<p>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.).</p> <p>NRS.01.01.02.c. Conduct analyses of ecosystems and document the interactions of living species and non-living resources.</p> <p>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.</p> <p>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.</p>	
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<p>Identifying different types of range plants and how the impact on range health.</p>	<p>12</p>	<p>NRS.01. Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.</p> <p>NRS.04. Demonstrate responsible management procedures and techniques to protect, maintain, enhance, and improve natural resources.</p>	<p>NRS.01.02. Classify different types of natural resources in order to enable protection, conservation, enhancement and management in a particular geographical region.</p> <p>NRS.04.01. Demonstrate natural resource protection, maintenance, enhancement and improvement techniques.</p>	<p>NRS.01.02.02.a. Research and examine the characteristics used to identify herbaceous plants.</p> <p>NRS.01.02.02.b. Apply identification techniques to determine the species of an herbaceous plant.</p> <p>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.).</p> <p>NRS.04.01.04.a. Identify and categorize characteristics of healthy rangeland.</p> <p>NRS.04.01.04.b. Assess and apply methods of rangeland improvement.</p> <p>NRS.04.01.04.c. Evaluate and revise a rangeland management plan.</p>	
<p>Understanding the relationship with Soils and the biogeochemical cycles impact on range land.</p>	<p>12</p>	<p>NRS.01. Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions</p>	<p>NRS.01.02. Classify different types of natural resources in order to enable protection, conservation, enhancement and management in a</p>	<p>NRS.01.02.05.a. Research and examine the characteristics used to identify non-living resources (e.g., soil types, climate, geography, etc.).</p>	

		to natural resource issues and goals.	particular geographical region.	<p>NRS.01.02.05.b. Apply identification techniques to determine the types of non-living resources in an area.</p> <p>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.</p> <p>NRS.01.03.01.a. Classify different kinds of biogeochemical cycles and the role they play in natural resources systems.</p> <p>NRS.01.03.01.b. Assess the role that the atmosphere plays in the regulation of biogeochemical cycles.</p> <p>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.</p>	
Understanding soil management and the relationship to the types successions.	8	NRS.01. Plan and conduct natural resource management activities that apply logical, reasoned and	NRS.01.05. Apply ecological concepts and principles to terrestrial natural resource systems.	NRS.01.05.01.a. Research and describe the stages of ecological succession.	

		scientifically based solutions to natural resource issues and goals.		<p>NRS.01.05.01.b. Analyze and summarize examples of stages of succession.</p> <p>NRS.01.05.01.c. Evaluate the stages of succession present in an ecosystem and predict which species will become more prevalent through future stages of succession.</p> <p>NRS.01.05.04.a. Compare and contrast techniques associated with soil management (e.g., soil survey and interpretation, erosion control, etc.).</p> <p>NRS.01.05.04.b. Analyze a plot of land in order to determine which soil management techniques would be most applicable.</p> <p>NRS.01.05.04.c. Devise a soil management plan to minimize erosion and maximize biodiversity, plant productivity, and the formation of topsoil.</p>	
Discuss the challenge of invasive species and the relationship	8	NRS.01. Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions	NRS.01.06. Apply ecological concepts and principles to living organisms in natural resource systems.	NRS.01.06.02.a. Research and summarize examples of invasive species.	

<p>of the economic effects on Rangeland</p>		<p>to natural resource issues and goals.</p> <p>NRS.02. Analyze the interrelationships between natural resources and humans.</p>	<p>NRS.02.04. Examine and explain how economics affects the use of natural resources.</p>	<p>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.</p> <p>NRS.01.06.02.c. Evaluate the presence and impact of invasive species on natural resources in a given area and devise a plan to prevent, control or eliminate invasive species from that habitat.</p> <p>NRS.02.04.01.b. Assess whether economic value increases or decreases the conservation, protection, improvement and enhancement of natural resources.</p> <p>NRS.02.04.01.c. Devise a plan to improve the conservation, protection, improvement and enhancement of natural resources based on economic value and practices.</p>	
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<p>Analyze the impacts of humans on Rangelands.</p>	<p>12</p>	<p>NRS.02. Analyze the interrelationships between natural resources and humans.</p>	<p>NRS.02.02. Assess the impact of human activities on the availability of natural resources.</p>	<p>NRS.02.02.01.a. Summarize the relationship between natural resources, ecosystems and human activity.</p> <p>NRS.02.02.01.b. Assess and explain how different kinds of human activity affect the use and availability of natural resources (i.e., agriculture, industry, transportation, etc.).</p> <p>NRS.02.02.01.c. Evaluate how the availability of natural resources can be improved through changes to human activity.</p> <p>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.).</p> <p>NRS.02.02.02.b. Assess causes of extinction and describe how those causes related to loss of biodiversity</p>	
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<p>Develop management plans to increase Range Health.</p>	5	<p>NRS.04. Demonstrate responsible management procedures and techniques to protect, maintain, enhance, and improve natural resources.</p>	<p>NRS.04.03. Prevent or manage introduction of ecologically harmful species in a particular region.</p>	<p>NRS.04.03.02.a. Identify and classify invasive species common to a particular region.</p> <p>NRS.04.03.02.b. Analyze signs of the spread of invasive species, identify if it needs to be reported to authorities and determine which authorities it should be reported to.</p>	

			<p>NRS.04.04. Manage fires in natural resource systems.</p>	<p>NRS.04.03.02.c. Create a management plan to reduce spread of harmful invasive species in natural resource systems.</p> <p>NRS.04.04.01.a. Differentiate between desirable and undesirable fires and research the role fire plays in a healthy ecosystem.</p> <p>NRS.04.04.01.b. Assess and apply techniques used to fight wildfires, manage prescribed fires and ensure human safety.</p> <p>NRS.04.04.02.a. Research and summarize how fire management techniques have evolved.</p> <p>NRS.04.04.02.b. Assess the effectiveness of techniques previously and currently used to prevent harmful fires.</p>	