

Colorado AFNR Course Scope and Sequence

Course Name	Colorado Watershed Management		Course Details	Level 4 course in the Natural Resources/Environmental Science Pathway		
			Course = 0.50 Carnegie Unit Credit			
<b>Course Description</b>	A course for students pursuing careers in Natural Resources and Environmental Sciences. This course expands on student learning to the principles of Colorado water and management practices. Students will gain knowledge in career development, leadership, personal development, communications, ecology, Colorado water law, and meteorology.					
<b>Note:</b>	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 #	18549	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 <a href="https://www.cde.state.co.us/standardsandinstruction/essentialskills">https://www.cde.state.co.us/standardsandinstruction/essentialskills</a>						
Unit Number, Title and Brief Description	Suggested % of Instructional Time	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration	
<b>Unit 1: Analyze the different elements in an Ecosystem and the relationship of those interactions in relation to Watersheds</b>	10%	<b>NRS.01.</b> Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.	<b>NRS.01.01.</b> Apply methods of classification to examine natural resource availability and ecosystem function in a particular region. <i><a href="#">ELA: RST.11-12.1</a></i> <i><a href="#">RST.11-12.8</a></i> <i><a href="#">WHST.9-10.2</a></i> <i><a href="#">WHST.11-12.2</a></i> <i><a href="#">WHST.9-10.9</a></i> <i><a href="#">WHST.11-12.9</a></i>	<b>NRS.01.01.01.a.</b> 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.).  <b>NRS.01.01.02.a.</b> Summarize the components that comprise all ecosystems.  <b>NRS.01.01.02.b.</b> Analyze the interdependence of organisms within an ecosystem (e.g., food webs, niches, impact of keystone species, etc.) and		

				<p>assess the dependence of organisms on nonliving components (climate, geography, energy flow, nutrient cycling, etc.).</p> <p><b>NRS.01.01.02.c.</b> Conduct analyses of ecosystems and document the interactions of living species and non-living resources.</p> <p><b>NRS.01.01.03.b.</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><b>NRS.01.01.03.c.</b> 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>	
<p><b>Unit 2: Understanding the specific ecology concepts and principles of water ecosystems</b></p>	12%	<p><b>NRS.01.</b> Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.</p>	<p><b>NRS.01.04.</b> Apply ecological concepts and principles to aquatic natural resource systems.</p> <p><a href="#">ELA: RST.11-12.1</a> <a href="#">RST.11-12.7</a> <a href="#">RST.11-12.8</a> <a href="#">WHST.9-10.7</a> <a href="#">WHST.11-12.7</a></p> <p><a href="#">MATH: MA.HS.N.Q.A</a> <a href="#">MA.HS.S.ID.A</a> <a href="#">MA.HS.S.IC.A</a></p>	<p><b>NRS.01.04.01.a.</b> Summarize the roles and properties of watersheds.</p> <p><b>NRS.01.04.01.b.</b> Assess the function of watersheds and their effect on natural resources.</p> <p><b>NRS.01.04.01.c.</b> Evaluate and defend the importance of watersheds to ecosystem function.</p>	

			<p><i>MA.HS.S.IC.B</i></p> <p><u><i>SCIENCE: SC.HS.3.2</i></u></p>	<p><b>NRS.01.04.02.a.</b> Examine and describe the importance of groundwater and surface water to natural resources.</p> <p><b>NRS.01.04.02.b.</b> Analyze how different classifications of ground and surface water affect ecosystem function.</p> <p><b>NRS.01.04.02.c.</b> Devise and apply strategies to manage, protect, enhance or improve sources of groundwater or surface water based on its properties.</p> <p><b>NRS.01.04.03.a.</b> Compare and contrast riparian zones and riparian buffers based on their unction.</p> <p><b>NRS.01.04.03.b.</b> Assess techniques used in the creation, enhancement and management of riparian zones and riparian buffers.</p> <p><b>NRS.01.04.03.c.</b> Devise and apply strategies for the creation, enhancement and management</p>	
<p><b>Unit 3: Define the importance of water law and government agencies in managing watersheds</b></p>	16%	<p><b>NRS.02.</b> Analyze the interrelationships between natural resources and humans.</p>	<p><b>NRS.02.01.</b> Examine and interpret the purpose, enforcement, impact and effectiveness of laws and agencies related to natural resource management,</p>	<p><b>NRS.02.01.01.a.</b> Distinguish between the types of laws associated with natural resources systems.</p>	

			<p>protection, enhancement and improvement (e.g., water regulations, game laws, historic preservation laws, environmental policy, etc.).</p> <p><b>NRS.02.03.</b> Analyze how modern perceptions of natural resource management, protection, enhancement and improvement change and develop over time.</p>	<p><b>NRS.02.01.01.b.</b> Analyze the structure of laws associated with natural resources systems.</p> <p><b>NRS.02.01.01.c.</b> Evaluate the impact of laws associated with natural resources systems (e.g., mitigation, water regulations, carbon emissions, game limits, invasive species, etc.).</p> <p><b>NRS.02.01.02.a.</b> Distinguish between the types of agencies associated with natural resources systems.</p> <p><b>NRS.02.01.02.b.</b> Analyze the specific purpose of agencies associated with natural resources systems.</p> <p><b>NRS.02.01.02.c.</b> Evaluate the impact and effectiveness of agencies associated with natural resources systems (e.g., regulation of consumption, prevention of damage to natural resource systems, management of ecological interactions etc.)</p> <p><b>NRS.02.03.01.a.</b> Summarize and categorize the different social considerations in regards to the use of natural resources (e.g., public versus private, laws and</p>	
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				<p>regulations, economics, green technology, etc.).</p> <p><b>NRS.02.03.01.b.</b> Analyze how social considerations can affect the use and sustainability of natural resources.</p>	
<p><b>Unit 4: Evaluate outdoor recreation impacts on water availability and quality</b></p>	12%	<p><b>NRS.02.</b> Analyze the interrelationships between natural resources and humans.</p>	<p><b>NRS.02.02.</b> Assess the impact of human activities on the availability of natural resources.</p> <p><i>ELA: RST.11-12.1</i> <i>RST.11-12.2</i> <i>RST.11-12.7</i> <i>RST.11-12.8</i> <i>WHST.9-10.2</i> <i>WHST.11-12.2</i> <i>WHST.9-10.7</i> <i>WHST.11-12.7</i></p> <p><i>MATH: MA.HS.N.Q.A</i></p> <p><i>SCIENCE: SC.HS.2.6</i> <i>SC.HS.3.9</i> <i>SC.HS.3.11</i> <i>SC.HS.3.12</i></p>	<p><b>NRS.02.02.01.a.</b> Summarize the relationship between natural resources, ecosystems and human activity.</p> <p><b>NRS.02.02.01.b.</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><b>NRS.02.02.01.c.</b> Evaluate how the availability of natural resources can be improved through changes to human activity.</p> <p><b>NRS.02.02.03.a.</b> Examine and describe the manner in which modern lifestyles are related to the depletion of natural resources.</p> <p><b>NRS.02.02.03.b.</b> Identify solutions to improve the sustainability of modern lifestyles.</p>	

		<p><b>NRS.03.</b> Develop plans to ensure sustainable production and processing of natural resources.</p> <p><b>NRS.04.</b> Demonstrate responsible management procedures and techniques to protect, maintain, enhance, and improve natural resources.</p>	<p><b>NRS.03.01.</b> 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.). <i>ELA: RST.11-12.8</i> <i>SCIENCE: SC.HS.3.9</i> <i>SC.HS.3.1</i></p> <p><b>NRS.04.01.</b> Demonstrate natural resource protection, maintenance, enhancement and improvement techniques. <i>ELA: RST.11-12.8</i> <i>RW.H2.1.2</i> <i>SCIENCE: SC.HS.3.9</i> <i>SC.HS.3.11</i></p>	<p><b>NRS.02.02.03.c.</b> Evaluate how modern lifestyles affect resource consumption and energy use and devise a strategy to prevent the complete loss of a natural resource.</p> <p><b>NRS.03.01.07.a.</b> Research and summarize how recreational uses of natural resources can be changed to improve sustainability.</p> <p><b>NRS.03.01.07.b.</b> Assess different options for improving the sustainability of outdoor recreation based on its impact on natural resources and likelihood of acceptance.</p> <p><b>NRS.03.01.07.c.</b> Evaluate an example of outdoor recreation and develop suggestions for how that activity can be made more sustainable in a manner that is acceptable to those who take part in that activity.</p> <p><b>NRS.04.01.01.a.</b> Identify and categorize different kinds of streams.</p> <p><b>NRS.04.01.01.b.</b> Assess and explain indicators of the biological health of a stream. <b>NRS.04.01.01.c.</b> Create an enhancement plan for a stream.</p>	
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<p><b>Unit 5: Create a communication plan to promote water conservation</b></p>	<p>12%</p>	<p><b>NRS.02.</b> Analyze the interrelationships between natural resources and humans.</p>	<p><b>NRS.02.05.</b> Communicate information to the public regarding topics related to the management, protection, enhancement, and improvement of natural resources.</p>	<p><b>NRS.02.05.01.a.</b> Examine and describe ways in which a message regarding natural resources may be communicated to the public through standard media sources (e.g., press, radio, TV, public appearances, etc.).</p> <p><b>NRS.02.05.01.b.</b> Assess the effectiveness of different methods for communicating natural resource messages.</p> <p><b>NRS.02.05.01.c.</b> Devise and implement a strategy for communicating a natural resources message through media.</p> <p><b>NRS.02.05.02.a.</b> Research and summarize how social media and the Internet have changed how people perceive and utilize natural resources (e.g., greater awareness of conservation issues, calls to action, etc.).</p> <p><b>NRS.02.05.02.b.</b> Assess how to most effectively communicate a message about the conservation, management, enhancement and improvement of natural resources via social media and the Internet.</p> <p><b>NRS.02.05.02.c.</b> Anticipate and predict how messages</p>	
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about the conservation, management, enhancement and improvement of natural resources will change because of social media and the Internet.

**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.	
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**CAS Academic Standards Alignment:** Online Version: <https://www.cde.state.co.us/apps/standards/>; Download version: <https://www.cde.state.co.us/apps/standards/>

**Reading, Writing, and Communicating:** (RST/WHST are Common Core Standards aligned; <http://www.corestandards.org/ELA-Literacy/RI/introduction-for-6-12/>)

- RW.HS.2.1.2 – Integrate credible, accurate information into appropriate media and formats to meet an audience’s needs.
- RST.11-12.1 – Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
- RST.11-12.2 - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
- RST.11-12.7 – Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
- RST.11-12.8 – Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
- WHST.9-10.2 – Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
- WHST.11-12.2 – Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
- WHST.9-10.7 – Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- WHST.11-12.7 - Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- WHST.9-10.9 – Draw evidence from informational texts to support analysis, reflection, and research.
- WHST.11-12.9 – Draw evidence from informational texts to support analysis, reflection, and research.

### Math:

- MA.HS.S-ID.A – Interpreting Categorical & Quantitative Data: Summarize, represent, and interpret data on a single count or measurement variable.
- MA.HS.S-IC.A - Making Inferences & Justifying Conclusions: Understand and evaluate random processes underlying statistical experiments.
- MA.HS.S-IC.B – Making inferences & Justifying Conclusions: Make inferences and justify conclusions from sample surveys, experiments, and observational studies.
- MA.HS.N-Q.A – Quantities: Reason quantitatively and use units to solve problems.

### Science:

- SC.HS.2.6 – A complex set of interactions determine how ecosystems respond to disturbances.
- SC.HS.3.1 – All stars, including the sun, undergo stellar evolution and the study of stars’ light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from earth.
- SC.HS.3.2 -Explanations of and predictions about the motions of orbiting objects are described by the laws of physics.
- SC.HS.3.9 – Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.

- SC.HS.3.11 – Sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources, including the development of technologies.
- SC.HS.3.12 – Global climate models used to predict future climate change continues to improve our understanding of the impact of human activities on the global climate system.

### **Essential Skills:**

#### Problem Solver:

- **Critical Thinking and Analysis:** The ability to apply a deliberate process of identifying problems, gathering information, and weighing possible solutions, including: making choices rooted in understanding patterns, cause-and-effect relationships, and the impacts that a decision can have on the individual and others.

#### Community Member:

- **Civic Engagement:** The ability to develop and apply knowledge, skills, and habits gained from experiences – within communities of diverse perspectives – to address issues, affect change, and/or solve problems.
- **Global and cultural awareness:** the ability to collaborate with individuals from diverse backgrounds and/or cultures to address national and global issues, and to develop complex, appropriate, and workable solutions.

#### Communicator:

- **Interpersonal Communication:** The ability to establish and maintain healthy and supportive relationships, including: the capacity to communicate clearly by successfully conveying information and feelings, listening actively, setting boundaries, negotiating conflict constructively, and seeking or offering support and help when needed.
- **Data Literacy:** The ability to identify, collect, evaluate, analyze, interpret, present and protect data.

#### Empowered Individual:

- **Self-Management:** The ability to manager one's emotions, thoughts, and behaviors effectively in different situations and to achieve goals and aspirations, including: the capacity to delay gratification, manage stress, stay positive and accountable, and feel motivation & agency to accomplish personal/collective goals.