

		Course: Natural Resources Management Year A	
		<b>R14 The Seven Cs of Learning</b> 	
Unit Titles		Length of Unit	
● <i>Urban Forestry</i>		4-6 weeks	
● <i>Tree Pests</i>		3-4 weeks	
● <i>Taxidermy</i>		4-6 weeks	
● <i>Maple Syrup Production</i>		4-6 weeks	
● <i>Woodlot Management</i>		4-6 weeks	
● <i>FFA Proficiency Awards</i>		2 weeks	
● <i>Advanced Beekeeping</i>		2-4 weeks	



Strands	Course Level Expectations
<b>Physical Preparedness</b>	<p>The student needs to come physically prepared to perform field work in all weather conditions. The students will need to walk distances, climb fences and trees, wade rivers and carry weight up to forty pounds.</p>
<b>Equipment Use and Safety</b>	<p>Through the course of the year the class will use equipment to process products, move materials and improve the school grounds for various class needs. Examples include loader operation, chainsaw and sawmill use, and woodworking tool use.</p>
<b>Natural Resources Products Production</b>	<p>The students will use their abilities to produce and package honey, maple syrup, firewood, lumber, and wildlife mounts and pelts.</p>

<b>Unit Title</b>	<b>Urban Forestry</b>	<b>Length of Unit</b>	4-6 weeks
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<b>Inquiry Questions (Engaging &amp; Debatable)</b>	<ul style="list-style-type: none"> <li>● Why is tree climbing important to natural resources?</li> <li>● Is there more than one method in ascending trees?</li> <li>● Why are pruning techniques so important?</li> <li>● How do we prepare ourselves to work outdoors?</li> </ul>
<b>Standards*</b>	<p><b>Natural Resource Systems (NRS) &amp; Plant Systems (PS):</b></p> <p><b>NRS. 02</b> Performance Element: Apply scientific principles to natural resources management activities.</p> <p><b>NRS 02.01</b> Performance Indicator: Develop a safety plan for work with natural resources.</p> <p><b>PS. 01</b> Apply knowledge of plant classification, plant anatomy and plant physiology to the production and management of plants.</p> <p><b>PS 01.02</b> Performance Indicator: Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems.</p>
<b>Unit Strands &amp; Concepts</b>	Rope types, use and care, tree climbing equipment and techniques, safety rules and practices. Acceptable safety practices when working in the tree care industry.
<b>Key Vocabulary</b>	Arboriculture, hazard, efficiency, standards, pruning

\* The agriculture, food and natural resources (AFNR) industry standards

<b>Unit Title</b>	<b>Urban Forestry</b>	<b>Length of Unit</b>	4-6 weeks
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<b>Critical Content: My students will Know...</b>	<b>Key Skills: My students will be able to (Do)...</b>
<ul style="list-style-type: none"> <li>• safety practices when working in an outdoor environment</li> <li>• appropriate vocabulary used in the field</li> <li>• current standards of urban tree care</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrate proper pruning techniques</li> <li>• demonstrate safe use of pruning tools</li> <li>• apply proper rope care techniques</li> <li>• demonstrate appropriate “rope throwing” and knot tying techniques to install the rope in the tree</li> <li>• demonstrate safe and appropriate climbing techniques and movement within the tree</li> </ul>

<b>Assessments:</b>	<ul style="list-style-type: none"> <li>• Performance Assessments</li> <li>• Various Formative and Interim assessments throughout the unit.</li> </ul>
<b>Teacher Resources:</b>	❖ ANSI Z_133 Standards for Tree Operations

<b>Unit Title</b>	<b>Forest Disorders</b>	<b>Length of Unit</b>	3-4 weeks
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<b>Inquiry Questions (Engaging &amp; Debatable)</b>	<ul style="list-style-type: none"> <li>• How do diseases and pests impact a forest?</li> <li>• How do we safely control diseases and pests?</li> </ul>
<b>Standards</b>	<p><b>Natural Resource Systems (NRS)</b>  <b>NRS.02</b> Performance Element: Apply scientific principles to natural resource management activities.  <b>NRS 02.01</b> Performance Indicator: Develop a safety plan to work with natural resources.  <b>NRS. 02</b> Performance Element: Apply scientific principles to natural resources management activities.  <b>NRS 02.03</b> Performance Indicator: Demonstrate natural resource enhancement techniques.  <b>NRS.04</b> Performance Element: Demonstrate techniques used to protect natural resources.  <b>NRS 04.01</b> Performance Indicator: Diagnose plant and wildlife diseases and follow protocol to prevent their spread.  <b>NRS 04.02</b> Performance Indicator: Manage insect infestations of natural resources.</p>
<b>Unit Strands &amp; Concepts</b>	Common Disorders in Connecticut forests. Methods to identify and control these disorders. Identification of abnormalities that can affect the health of trees. Integrated Pest Management (IPM) Physical, chemical, biological and cultural controls of pests.
<b>Key Vocabulary</b>	Pathogen, infectious, non-infectious, IPM, controls

<b>Unit Title</b>	Forest Disorders	<b>Length of Unit</b>	3-4 weeks
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<b>Critical Content: My students will Know...</b>	<b>Key Skills: My students will be able to (Do)...</b>
<ul style="list-style-type: none"> <li>● understand an insect life cycle.</li> <li>● understand the laws related to pest control.</li> <li>● understand the concepts of Integrated Pest Management.</li> </ul>	<ul style="list-style-type: none"> <li>● identify ways in which trees may be protected.</li> <li>● explain management techniques used to reduce infection and spread of plant diseases in natural resources.</li> <li>● discuss various methods of disease and pest control in the natural environment.</li> <li>● describe techniques used to manage pests of natural resources.</li> </ul>

<b>Assessments:</b>	<ul style="list-style-type: none"> <li>● CT DEEP Pesticide Operator's License Exam</li> <li>● Formative Assessments</li> <li>● Presentation Project</li> </ul>
<b>Teacher Resources:</b>	<ul style="list-style-type: none"> <li>❖ State DEEP Personnel.</li> <li>❖ Various Pesticide Labels.</li> </ul>

<b>Unit Title</b>	<b>Taxidermy</b>	<b>Length of Unit</b>	6-8 weeks
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<b>Inquiry Questions (Engaging &amp; Debatable)</b>	<ul style="list-style-type: none"> <li>• How can wildlife be preserved?</li> <li>• What can we learn from mounted wildlife?</li> </ul>
<b>Standards</b>	<p><b>Animal Systems (AS) &amp; Natural Resource Systems (NRS):</b> Performance Element</p> <p><b>NRS 02:</b> Apply scientific principles to natural resource management activities. <b>NRS. 02.04</b> Performance Indicator: Interpret laws related to natural resource management and protection.</p> <p><b>AS.02</b> Performance Element: Classify, evaluate, select and manage animals based on anatomical and physiological characteristics. <b>AS 02.01</b> Performance Indicator: Classify animals according to hierarchical taxonomy and agricultural use.</p>
<b>Unit Strands &amp; Concepts</b>	The students will learn concepts in taxidermy and wildlife by preserving specimens. Preservation, skinning, forming and positioning.
<b>Key Vocabulary</b>	Taxidermy, mount, posture, specimen, critique, form, policy

<b>Unit Title</b>	Taxidermy	<b>Length of Unit</b>	
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<b>Critical Content: My students will Know...</b>	<b>Key Skills: My students will be able to (Do)...</b>
<ul style="list-style-type: none"> <li>• specific laws and policies pertaining to natural resource systems.</li> <li>• techniques to preserve a specimen</li> <li>• tools and supplies needed to work</li> <li>• animal anatomy and identification</li> </ul>	<ul style="list-style-type: none"> <li>• skin a bird</li> <li>• skin a mammal</li> <li>• make a form for a taxidermy mount</li> <li>• use tools safely</li> <li>• position the mount in an appropriate way</li> <li>• sewing skin</li> <li>• critique a mounted specimen</li> </ul>

<b>Assessments:</b>	<ul style="list-style-type: none"> <li>• Individual Taxidermy Project</li> <li>• Group Taxidermy Project</li> <li>• Various Formative and interim assessments</li> </ul>
<b>Teacher Resources:</b>	❖ Taxidermy supplies



<b>Unit Title</b>	Maple Syrup Production	<b>Length of Unit</b>	Weeks 4-6
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<b>Inquiry Questions (Engaging &amp; Debatable)</b>	<ul style="list-style-type: none"> <li>• What does maple syrup production teach us about natural resources management?</li> </ul>
<b>Standards</b>	<p><b>Natural Resource Systems: (NRS):</b></p> <p><b>NRS.01</b> Performance Element: Explain interrelationships between natural resources and humans necessary to conduct management activities in natural environments. Identify native New England tree species and their products.</p> <p><b>NRS.02</b> Performance Element: Apply scientific principles to natural resources management activities. Demonstrate safety practices when working in an outdoor environment.</p> <p><b>NRS.03</b> Performance Element: Apply knowledge of natural resources to production and processing industries. Process forest products.</p>
<b>Unit Strands &amp; Concepts</b>	The students will apply skills learned in class by producing maple syrup. They will prepare the sap lines, storage tanks, evaporator and bottling equipment. Tap the trees, collect the sap and boil it down to make maple syrup. Tree identification, equipment operation, food processing,
<b>Key Vocabulary</b>	Renewable resources, evaporation, hydrometer, brix, density

<b>Unit Title</b>	Maple Syrup Production	<b>Length of Unit</b>	4-6 weeks
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<b>Critical Content:</b> My students will <b>Know</b> ...	<b>Key Skills:</b> My students will be able to <b>(Do)</b> ...
<ul style="list-style-type: none"> <li>• how to identify a maple tree in winter</li> <li>• the history of the maple industry</li> <li>• ways to test syrup to determine density.</li> </ul>	<ul style="list-style-type: none"> <li>• tap trees for sap</li> <li>• use the history of the maple industry to plan and think about future industry</li> <li>• fire an evaporator</li> <li>• determine if maple syrup is properly finished</li> <li>• bottle maple syrup</li> </ul>

<b>Assessments:</b>	<ul style="list-style-type: none"> <li>• Interim and Formative Assessments</li> <li>• Performance Assessment</li> </ul>
<b>Teacher Resources:</b>	<ul style="list-style-type: none"> <li>❖ NHS Sugarbush</li> <li>❖ North American Maple Syrup Producers Manual</li> </ul>

<b>Unit Title</b>	Woodlot Management	<b>Length of Unit</b>	4-6 weeks
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<b>Inquiry Questions (Engaging &amp; Debatable)</b>	<ul style="list-style-type: none"> <li>• How can we make the forest sustainable?</li> <li>• What are some management decisions we can make about our woodlots?</li> </ul>
<b>Unit Strands &amp; Standards</b>	<p><b>Natural Resource Systems (NRS):</b>  <b>NRS.01</b> Performance Element: Explain interrelationships between natural resources and humans necessary to conduct management activities in natural environments.  <b>NRS 01. 01.</b> Performance Indicator: Classify measure and survey natural resources to create planning data.  <b>NRS.02</b> Performance Element: Apply scientific principles to natural resources management activities.  <b>NRS 02.01</b> Performance Indicator: Develop a safety plan for work with natural resources.  <b>NRS.03</b> Performance Element: Apply knowledge of natural resources to production and processing industries.  <b>NRS 03.01</b> Performance Indicator: Produce, harvest, and process and use natural resource products.</p>
<b>Unit Strands &amp; Concepts</b>	The students will study an area of forest, determine its best use and apply forestry techniques in management of this area, tree identification, economics, growth rates, measuring
<b>Key Vocabulary</b>	Silviculture, management, sustainable yield

<b>Unit Title</b>	Woodlot Management	<b>Length of Unit</b>	4-6 weeks
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<b>Critical Content:</b> My students will <b>Know</b> ...	<b>Key Skills:</b> My students will be able to <b>(Do)</b> ...
<ul style="list-style-type: none"> <li>• various types of forest products</li> <li>• types of jobs in the forest industry</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrate safe practices in a forest harvesting situation</li> <li>• process forest products</li> <li>• measure the forest for products</li> <li>• maintain forest harvesting equipment</li> </ul>

<b>Assessments:</b>	<ul style="list-style-type: none"> <li>• Formative and Interim Assessment</li> <li>• Performance Assessment</li> </ul>
<b>Teacher Resources:</b>	❖ Industry Resources

<b>Unit Title</b>	Advanced Beekeeping	<b>Length of Unit</b>	4 weeks
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<b>Inquiry Questions (Engaging &amp; Debatable)</b>	<ul style="list-style-type: none"> <li>• How are honeybees an important natural resource?</li> <li>• How can we manipulate honeybees to maximize their productivity?</li> </ul>
<b>Standards</b>	<p><b>Natural Resource Systems (NRS) and Animal Systems (AS):</b>  <b>NRS.04</b> Performance Element: Demonstrate techniques used to protect natural resources. <b>NRS 04.02</b> Performance Indicator: Manage insect infestations of natural resources.  <b>AS.03</b> Performance Element: Provide for the proper health care of animals (honey bees).  <b>AS 03.01</b> Performance Indicator: Prescribe and implement a prevention and treatment program for animal diseases, parasites and other disorders.  <b>AS.08</b> Performance Element: Analyze environmental factors associated with animal production.  AS 08.02 Performance Indicator: Evaluate the effects of environmental conditions on animals (honey bees). <b>AS 10.01</b> Performance Indicator: Implement hazard analysis and critical control points (HACCP) procedures to establish operating parameters.</p>
<b>Unit Strands &amp; Concepts</b>	<p>Students will manage honeybees to learn concepts in maximizing their productivity. Population growth and its effects on production, pests of the honeybee and their control, management techniques with honeybees, damaged hives, mites</p>
<b>Key Vocabulary</b>	<p>Insect life stages, honey, nectar, propolis, beeswax, castes, smoker</p>

<b>Unit Title</b>	Advanced Beekeeping	<b>Length of Unit</b>	4 weeks
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<b>Critical Content:</b> My students will <b>Know</b> ...	<b>Key Skills:</b> My students will be able to <b>(Do)</b> ...
<ul style="list-style-type: none"> <li>• honeybee life stages</li> <li>• parts of a hive</li> <li>• identification of bee pests</li> </ul>	<ul style="list-style-type: none"> <li>• identify bee castes (queen, drone, worker)</li> <li>• light a smoker</li> <li>• inspect a hive</li> <li>• test for varroa mites</li> <li>• repair damaged hives</li> </ul>

<b>Assessments:</b>	<ul style="list-style-type: none"> <li>• Performance assessment</li> <li>• Unit Formative Assessments</li> </ul>
<b>Teacher Resources:</b>	<ul style="list-style-type: none"> <li>❖ Nonnewaug Apiary</li> <li>❖ Industry Videos</li> <li>❖ The Beekeepers Handbook 4th edition by Apiphonse, Avitabile and Sammataro</li> </ul>