

# Forestry

## Instructional Framework

An instructional framework provides educators with a list of benchmark statements aligned to Common Core and national content area standards for a given course or program. The Missouri Forestry Instructional Framework lists a sequence of content, organized into distinct units of instruction. Sample activities and potential Common Core related enhancements are provided.

|   | Common Core Standards      | Activities (already in the Curriculum)  | National Standards (AFNR) | Enhancements (if done, would add an additional standard)  |
|---|----------------------------|---|---------------------------|---|
| <b>A. Professional Forestry Careers</b> |                            |   |                           |   |
| 1. Professional Forestry Careers        | RST.11-12.4<br>RST.11-12.9 | Activities in <ul style="list-style-type: none"> <li>• Research forestry related careers</li> <li>• Analyze the sacrifices and satisfaction with conservation careers.</li> </ul> |                           | <ol style="list-style-type: none"> <li>1. Participate in the Forestry CDE/TSA RST.11-12.4, RST.11-12.9, G-MG.1, G-MG.2, G-MG.3, G-GMD.1, N-Q.1, N-Q.2</li> <li>2. Complete a Forestry Proficiency Application WHST.11-12.2</li> <li>3. Attend a MDC Conservation Honors Program or GLADE program</li> <li>4. Write universities seeking information on their undergraduate programs in conservation related fields. Then compare based on expenses, curriculum, location, percentage of graduates finding work, etc. WHST.11-12.2, RST.11-12.9</li> </ol> |

|                                       | Common Core Standards      | Activities (already in the Curriculum)  | National Standards (AFNR) | Enhancements (if done, would add an additional standard)   |
|---------------------------------------|----------------------------|---|---------------------------|--|
| 2. Technical Forestry Careers         | RST.11-12.4<br>RST.11-12.9 | Activities in <ul style="list-style-type: none"> <li>• Research forestry related careers</li> <li>• Analyze the sacrifices and satisfaction with conservation careers.</li> </ul> | Math Modeling             | <ol style="list-style-type: none"> <li>1. Participate in the Forestry CDE/TSA RST.11-12.4, RST.11-12.9, G-MG.1, G-MG.2, G-MG.3, G-GMD.1, N-Q.1, N-Q.2</li> <li>2. Develop SAE working in a conservation field</li> <li>3. Write universities seeking information on their undergraduate programs in conservation related fields. Then compare based on expenses, curriculum, location, percentage of graduates finding work, etc. WHST.11-12.2, RST.11-12.9</li> </ol> |
| <b>B. Forest Plant Identification</b> |                            |   |                           |  |
| 1. Tree Identification                | RST.11-12.4                | Activities in <ul style="list-style-type: none"> <li>• Learning parts of a tree to be able to identify</li> </ul>   |                           | <ol style="list-style-type: none"> <li>1. Collection of pressed leaves, twigs, bark, fruit and flowers</li> </ol>  |
| 2. Introduction to Plant Keying       | S-IC.1<br>RST.11-12.4      | Activities in <ul style="list-style-type: none"> <li>• Estimating total number of plants they can recognize</li> <li>• Plant Classification system</li> </ul>                     |                           |  |
| 3. Silvics                            | RST.11-12.5                | Activities in <ul style="list-style-type: none"> <li>• Understanding different habitats for trees species</li> </ul>  |                           | <ol style="list-style-type: none"> <li>1. Write a detailed report on the silvical characteristics of an individual tree species WHST.11-12.2</li> <li>2. Visit a wooded area to observe the different characteristics. Journal about the observations. WHST.11-12.10</li> </ol>  |

|  | Common Core Standards         | Activities (already in the Curriculum)  | National Standards (AFNR) | Enhancements (if done, would add an additional standard)   |
|--|-------------------------------|---|---------------------------|--|
| 4. Tree Uses                               |                               |   |                           | 3. Collect articles on the greenhouse effect and other issues effecting forest. Give an oral or written report. WHST.11-12.2, SL.11-12<br>4. Collect and sell black walnuts. N-Q.1 |
| 5. Missouri Forest Types                   | RST.11-12.9                   | Activities in <ul style="list-style-type: none"> <li>Compare and Contrast bottomland and understory trees. (Northern, Upland Central, and Southern Hardwoods)</li> </ul>  |                           |  |
| <b>C. Forest Measurement</b>               |                               |   |                           |  |
| 1. Aerial Photographs and Topographic Maps | RST.11-12.4<br>N-Q.1<br>N-Q.2 | Activities in <ul style="list-style-type: none"> <li>Reading an aerial map and making the conversation of the scale.</li> <li>Reading a topographic map and the common scale used.</li> <li>Converting square inches to acres</li> <li>Determining elevation</li> </ul> |                           |  |
| 2. Legal Land Descriptions                 | RST.11-12.4<br>N-Q.1          | Activities in <ul style="list-style-type: none"> <li>Determining legal land descriptions</li> <li>Reading a county plat book</li> <li>Locating property based on a legal land description</li> <li>Determine number of acres in a given area</li> </ul>                 |                           |  |

|   | Common Core Standards                                | Activities (already in the Curriculum)   | National Standards (AFNR) | Enhancements (if done, would add an additional standard)  |
|---|--|--|---------------------------|---|
| 3. Chaining, Pacing, and Using a Hand Compass | RST.11-12.4<br>N-Q.1<br>N-CN.6<br>G-CO.1             | Activities in <ul style="list-style-type: none"> <li>Measuring Horizontal distance</li> <li>Reading a compass</li> <li>Using a GPS to plot coordinates</li> <li>Operating and transit to set coordinates and check heights.</li> </ul>   |                           | 1. Establish their pace distance by walking off a 100' distance, then measure to determine their accuracy. Practice again with 200' and 300'. N-Q.2, N-CN.6, G-CO.1 |
| 1. Tree Measurement                           | RST.11-12.4<br>G-MG.1<br>G-MG.2<br>G-MG.3<br>G-GMD.1 | Activities in <ul style="list-style-type: none"> <li>Determining breast height and merchantable height of trees with diameter tape, tree calipers, and Biltmore sticks,</li> <li>Determining diameter at breast height and merchantable height estimated with a cruising stick</li> <li>Estimating the basal area</li> </ul> |                           |   |
| 2. Site Index                                 | RST.11-12.4<br>G-MG.1<br>G-MG.2<br>G-MG.3<br>G-GMD.1 | Activities in <ul style="list-style-type: none"> <li>Estimate and apply the site index</li> <li>Determine the average height of a tree</li> <li>Determine the age of the trees in your sample</li> <li>Plot your average height and age of the sample trees in the site index curve.</li> </ul>                              |                           |   |

|                                     | Common Core Standards                                | Activities (already in the Curriculum)  | National Standards (AFNR) | Enhancements (if done, would add an additional standard) |
|-------------------------------------|--|---|---------------------------|--|
| 3. Stand Density and Stocking Level | RST.11-12.4<br>G-MG.1<br>G-MG.2<br>G-MG.3<br>G-GMD.1 | Activities in <ul style="list-style-type: none"> <li>• Stand density</li> <li>• Timber Stand</li> <li>• Stocking Level</li> <li>• Using a Stocking Chart</li> </ul>   |                           |  |
| 4. Tree Volume Calculations         | RST.11-12.4<br>G-MG.1<br>G-MG.2<br>G-MG.3            | Activities in <ul style="list-style-type: none"> <li>• Determining Tree Volume</li> <li>• Using a Tree Volume Table</li> <li>• Using a Tally Sheet and making the calculations</li> <li>• Calculating total board feet volume</li> </ul>  |                           |  |
| 5. Log Grading                      | RST.11-12.4  | Activities in <ul style="list-style-type: none"> <li>• Identifying tree defects</li> <li>• Identifying the different log use classes</li> </ul>   |                           |  |
| <b>D. Silvicultural Practices</b>   |  |   |                           |  |
| 1. Tree Selection                   | RST.11-12.4  | Activities in <ul style="list-style-type: none"> <li>• Determining the soil characteristics</li> <li>• Defining aspect</li> <li>• Describing how aspect affects trees</li> <li>• Considering disease susceptibility</li> <li>• Identifying markets during tree species selection process</li> </ul> |                           |  |

|                         | Common Core Standards | Activities (already in the Curriculum)  | National Standards (AFNR) | Enhancements (if done, would add an additional standard)                 |
|-------------------------|-----------------------|---|---------------------------|--|
| 2. Site Preparation     | RST.11-12.5           | Activities in <ul style="list-style-type: none"> <li>• Determining site preparation, mechanical site preparation,</li> <li>• Using herbicides</li> <li>• How to conduct a prescribed burn</li> </ul>  |                           |  |
| 3. Forest Tree Planting | RST.11-12.5           | Activities in <ul style="list-style-type: none"> <li>• Identifying Reforestation</li> <li>• Analyzing direct seeding and planting tree seedlings</li> <li>• Purchasing and storing tree seedlings</li> <li>• Planting Methods of trees</li> </ul>   |                           | 1. Plant a tree. RST.11-12.3   |
| 2. Windbreaks           | RST.11-12.4           | Activities in <ul style="list-style-type: none"> <li>• Analyzing windbreaks</li> <li>• Location of windbreaks</li> <li>• Spacing requirements of windbreaks</li> <li>• Common trees / shrubs used in windbreaks</li> <li>• Identifying the types of planting stock</li> <li>• Managing windbreaks</li> <li>• Designing a windbreak</li> </ul> |                           | 1. Work with a local organization and plant a windbreak at a local park. |

|                          | Common Core Standards | Activities (already in the Curriculum)  | National Standards (AFNR) | Enhancements (if done, would add an additional standard)  |
|--------------------------|-----------------------|---|---------------------------|---|
| 3. Natural Regeneration  | RST.11-12.5           | Activities in <ul style="list-style-type: none"> <li>Identifying natural regeneration</li> <li>Sources of forest reproduction</li> <li>Silvicultural systems affecting natural regeneration</li> <li>Inventorying different types of woodland/forested areas</li> </ul> |                           |   |
| 4. Intermediate Cuttings | RST.11-12.4           | Activities in <ul style="list-style-type: none"> <li>Identifying the purpose of intermediate cuttings</li> <li>Determining cull trees</li> <li>Types of intermediate cuttings</li> <li>Deadening trees</li> </ul>   |                           |   |
| 5. Forest Tree Pruning   | RST.11-12.4           | Activities in <ul style="list-style-type: none"> <li>Importance of pruning trees</li> <li>Proper pruning techniques</li> <li>Identifying and using pruning tools</li> </ul>   |                           | 1. Prune trees either around school or at another location to allow students that opportunity for practice. |

|                                      | Common Core Standards | Activities (already in the Curriculum)  | National Standards (AFNR) | Enhancements (if done, would add an additional standard)       |
|--------------------------------------|-----------------------|---|---------------------------|--|
| 2. Chainsaw Pruning                  | RST.11-12.5           | Activities in <ul style="list-style-type: none"> <li>• Identifying proper safety equipment</li> <li>• Preventative maintenance</li> <li>• Starting and refueling a chainsaw</li> <li>• Transporting and storage</li> <li>• Sharpening blade</li> <li>• Adjusting blade tension</li> </ul> |                           | 1. Provide students with the opportunity to operate a chainsaw |
| <b>E. Forest Resource Protection</b> |                       |   |                           |  |
| 1. Forested Watersheds               | RST.11-12.5           | Activities in <ul style="list-style-type: none"> <li>• Determining what is a watershed</li> <li>• Protection of watersheds</li> <li>• Using Forested stream corridors</li> <li>• Analyzing leaf litter</li> </ul>   |                           |  |
| 2. Forest Fires                      | RST.11-12.5           | Activities in <ul style="list-style-type: none"> <li>• Identifying causes of forest fires</li> <li>• Analyzing effects of forest fires</li> <li>• Jobs in fire suppression</li> <li>• Identifying fire behavior</li> <li>• Fighting forest fires</li> </ul>                               |                           |  |

|                                   | Common Core Standards      | Activities (already in the Curriculum)  | National Standards (AFNR) | Enhancements (if done, would add an additional standard)  |
|-----------------------------------|----------------------------|---|---------------------------|---|
| 3. Forest Insect and Diseases     | RST.11-12.4<br>RST.11-12.9 | Activities in <ul style="list-style-type: none"> <li>Identifying common forest insects and their damage</li> <li>Identifying common forest diseases and their damage</li> <li>Control methods for diseases and insects</li> <li>Comparing different samples of insect/disease damage</li> </ul> |                           | 1. Collect leaf, bark, and wood with insect and diseases to compare and for students to further identify. RST.11-12.9 |
| 2. Forest Management and Wildlife | RST.11-12.5                | Activities in <ul style="list-style-type: none"> <li>Understanding Livestock's effect on forest and wildlife habitat</li> <li>Planning TSI to improve wildlife habitat</li> <li>Using snag and den trees</li> <li>Impact of timber harvesting</li> </ul>  |                           |   |
| 3. Effects of Forest Recreation   | RST.11-12.5                | Activities in <ul style="list-style-type: none"> <li>Identifying recreational activities</li> <li>Planning forest recreation</li> <li>Minimizing forest damages by recreation</li> </ul>  |                           | 1. Participate in Forest Recreation Activities  |
| <b>F. Forest Management Plan</b>  |                            |   |                           |   |

|  | Common Core Standards   | Activities (already in the Curriculum)   | National Standards (AFNR) | Enhancements (if done, would add an additional standard) |
|--|---|--|---------------------------|--|
| 1. Forestry Assistance   | RST.11-12.5   | Activities in <ul style="list-style-type: none"> <li>Identifying forestry assistance, if available, from government agencies, private consultants, nonprofit associations,</li> <li>Using programs of the MDC</li> </ul> |                           |  |
| 2. Forest Management Plan  | RST.11-12.4<br>RST.11-12.9<br>G-MG.1<br>G-MG.2<br>G-MG.3<br>G-GMD.1 | Activities in <ul style="list-style-type: none"> <li>Developing a forest management plan</li> </ul>  |                           |  |
| <b>G. Leadership and Personal Development for Advanced Students</b>                    |   |  |                           |  |
| 1. Develop a resume and complete a job application                                     | L.11-12.1<br>L.11-12.2<br>W.11-12.10                                | <ul style="list-style-type: none"> <li>Develop a Resume</li> <li>Complete Sample Job Application</li> </ul>  |                           |  |
| 2. Develop a plan for finding a job  | W.11-12.4   | <ul style="list-style-type: none"> <li>Take a Career Interest Survey</li> <li>Write a cover letter</li> </ul>  |                           |  |
| 3. Describe how to apply and interview for a job                                       | SL.11-12.6  | <ul style="list-style-type: none"> <li>Conduct Sample Job Interviews</li> </ul>  |                           |  |
| 4. Describe the characteristics needed to develop desirable personal and social skills | SL.11-12.1  | <ul style="list-style-type: none"> <li>Verbal and Nonverbal Communication</li> <li>Role Playing</li> </ul>   |                           |  |
| 5. Describe the importance and process of developing better human relationships        | SL.11-12.1  | <ul style="list-style-type: none"> <li>Role Playing</li> <li>Group Discussion</li> </ul>   |                           | 1. Community Service Project                             |

|  | Common Core Standards | Activities (already in the Curriculum)   | National Standards (AFNR) | Enhancements (if done, would add an additional standard) |
|--|-----------------------|--|---------------------------|--|
| UNIT: Explore a career area by investigating entry-level job opportunities at a local agricultural business and writing a résumé and letter of application for a position. |                       |  |                           |  |
| <b>H. Using the <i>Missouri Agricultural Record Book for Secondary Students</i></b>  |                       |  |                           |  |
| 1. Complete forms needed to open the Missouri Agricultural Record Book for Secondary Students  |                       | Form 100/101 (SAE Enterprises/Agreement)   |                           |  |
| 2. Complete a budget for the SAE program   | N-Q.1                 | Complete Form 103 (Budget)   |                           |  |
| 3. Complete inventory and financial statement forms for the Missouri Agricultural Record Book for Secondary Students   | N-Q.1                 | Complete Forms 6, 7, 8, 9, 10, 11, 12 (Financials)   |                           |  |
| 4. Complete receipt and expenditure forms in the Missouri Agricultural Record Book for Secondary Students  | N-Q.1                 | Forms 1, 2, 3, 4, 5 (Income, Expenses, Cash Flow)  |                           |  |
| 5. Complete additional forms in the Missouri Agricultural Record Book for Secondary Students   | N-Q.1                 | Supplemental (102, 104, 105, 106, 107)<br>Leadership Pages (108, 109, 110, 111)<br>Directed Lab<br>Community Service Hours Log |                           |  |

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|--|-----------------------|--|---------------------------|--|
| UNIT: Demonstrate the ability to use selected forms in the <i>Missouri Agricultural Record Book for Secondary Students</i> by using a list of sample entries to complete the applicable forms in the book. |                       |  |                           |  |

**Codes for Common Core Mathematics are:**

- N = Number and Quantity
- A = Algebra
- F = Functions
- G = Geometry
- S = Statistics and Probability

**Codes for Common Core English Language Arts and Literacy are:**

- RL = Reading for Literature
- RI = Reading for Informational Text
- RST = Reading for Literacy in Science and Technical Subjects
- RH = Reading for Literacy in History/Social Studies
- W = Writing
- WHST = Writing for Literacy in History/Social Studies, Science, and Technical Subjects
- SL = Speaking and Listening
- L = Language