



4-H Maple Sugaring 101: From Sap, to Syrup, to Sales Instructional Content Guide for Volunteers and Club Leaders

Unit 2: The Sugarhouse

Goals:

1. Provide educational experiences related to converting maple sap to maple syrup for storage and use.
2. Provide experiences rooted in positive youth development for Maine 4-H youth. (See PYD Planning Guide on the last page.)
3. Facilitate the learning and practice of entrepreneurial and workforce skills for non-timber forest-based occupations in northern New England.

Learning Objectives	Activities and Resources (Instruction will be virtual or remote unless noted as an in-person activity) Three Types of Selected Student Resources (SSR) Orange- Activity or Worksheet Black- Informational Resource Purple- Lesson Plan led by an Adult	Citations for All Sources and References
Demonstrate one data collection and record keeping method for recording sap flow	SSR 2A - Weather Patterns and Sap Flow	Cameron, J. (1995). Document file pp.25 & 44 (SSR 2A) Wolfe, L.M. (2019). p.63
Describe how an evaporator processes maple sap	SSR 2B - Evaporator Pan Drawing and Continuous Boil Pan Diagram <i>In-person activity at host site</i>	Vermont Evaporator Company (2023). Document file pp.7 & 19 (SSR B) Wolfe, L.M. (2019). pp.46-48 <i>Host Guide: Week 1-Operating a Sugarhouse, Items #1 & #2</i>

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Recognize the different parts of an evaporator	SSR 2C - Evaporator and Sugarhouse Diagrams SSR 2D - Evaporator and Flue Diagram with Description <i>In-person activity at host site</i>	Berkshire-Pioneer Resource Conservation & Development (2012). pp.8-9. Massachusetts Maple Producers Association (n.d.). (SSR 2C) Wolfe, L.M. (2019). pp.46-48 (TSR 2D) <i>Host Guide: Week 2-Operating a Sugarhouse, Items #1 & #2</i>
Identify a reverse osmosis machine	SSR 2E - Reverse Osmosis Description and Diagram SSR 2F - Images of Reverse Osmosis Machines <i>In-person activity at host site</i>	Wolfe, L.M. (2019). pp.48-49 (SSR 2E) Cornell Maple Program (2020). pp.89-95 (SSR 2F from p.92-95) <i>Host Guide: Week 2-Operating a Sugarhouse, Items #3 & #4</i>
Describe liquid density	SSR 2G - Sugar Concentration and Hydrometers	Cornell Maple Program (2020). pp.99-101 NH Agriculture in the Classroom (2023).

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		<i>Sugar Concentration and Hydrometers (SSR 2G)</i> Optional from Week 1- SSR 1E -How Sweet is Maple Sap
Recognize how a thermometer and hydrometer is used with maple syrup for finishing	SSR 2H - Hydrometer and How to Use It <i>In-person activity at host site</i>	Wolfe, L.M. (2019). pp.51-53 (SSR 2H) Cornell Maple Program (2020). pp.99-101 <i>Host Guide: Week 2-Operating a Sugarhouse, Items #5</i>
Observe an evaporator with a finishing pan create a final syrup	<i>In-person activity at host site</i>	<i>Host Guide: Week 2-Operating a Sugarhouse, Item #6</i>
Recognize different grading qualities of maple syrup	SSR 2I - Flavour Wheel for Maple Products	Agriculture and Agri-food Canada (June 25, 2021). (SSR 2I) Cornell Maple Program (2020). pp.106-113 U.S. Department of Agriculture (March 2, 2015) Wolfe, L.M. (2019). pp.58-62

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Identify different grades of maple syrup	SSR 2J - Maple Syrup Taste Test <i>In-person activity at host site</i>	Cameron, J. (1995). Document file p.124 (SSR 2J). <i>Host Guide: Week 2-Operating a Sugarhouse, Item #7</i>
Demonstrate how to record maple syrup production	SSR 2K - Boiling Record Sheet <i>In-person activity at host site</i>	Wolfe, L.M. (2019). Appendix F p.93 (SSR 2K) <i>Host Guide: Week 2-Operating a Sugarhouse, Item #8</i>
Illustrate how to bottle and store maple syrup for sales and bulk storage	SSR 2L - Filtering and Storing <i>In-person activity at host site</i>	Cornell Maple Program (2020). p.114 Wolfe, L.M. (2019). p.54-56 (SSR 2L) Vermont Evaporator Company (2023). Document file p.17 <i>Host Guide: Week 2-Operating a Sugarhouse, Item #9</i>
Recognize how to shut down and	<i>In-person activity at host site</i>	Wolfe, L.M. (2019). pp.56-57

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Close an evaporator		<i>Host Guide: Week 2-Operating a Sugarhouse, Item #10</i>
Identify maple related workplace traits and skills that are transferable to other industries ¹	<i>In-person activity at host site</i>	<i>Host Guide: Week 2-Operating a Sugarhouse, Item #11</i>

¹ This learning objective can lead to instructional alignment with *AFNR Standards: CRP.09.02. Implement personal management skills to function effectively and efficiently in the workplace (e.g., time management, planning, prioritizing, etc.).*

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Sources and Text Resources:

- Agriculture and Agri-food Canada (June 25, 2021). Maple syrup flavour research: Flavour wheel for maple products. <https://agriculture.canada.ca/en/science/story-agricultural-science/scientific-achievements-agriculture/maple-syrup-flavour-research#b>
- Berkshire-Pioneer Resource Conservation & Development (2012). *Massachusetts Farm Energy: Best Management Practices Guide for Maple Sugaring*. Massachusetts Department of Agricultural Resources. Amherst, MA. <https://massfarmenergy.com/wp-content/uploads/2014/03/Maple%20Sugaring%20Best%20Practices.pdf>
- Cameron, J. (1995). *Maple Syrup General Level: Guide for Leaders and Youth Leaders*, Ontario 4-H Council. <https://4-hontario.ca/wp-content/uploads/2022/01/Maple-Syrup-General.pdf>
- Cornell Maple Program. (2020). *Maple Syrup Production Beginner's Notebook*. Cornell University. <https://bpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/7/5773/files/2020/02/beginner-notebook-1st-ed-1.pdf>
- Massachusetts Maple Producers Association (n.d.). *Evaporator and Sugarhouse Diagrams*. <https://www.massmaple.org/web/wp-content/uploads/2017/05/EvaporatorandSugarhouseDiagrams.pdf>
- New Hampshire Agriculture in the Classroom. (2023). *Tapping into Maple Tradition: Lessons and Activities*. https://newhampshire.agclassroom.org/resources/maple_lessons/
- New York State Maple Producers Association. (2017). *Maple Activities-6th Grade*. <https://bpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/7/5773/files/2021/02/6th-grade-worksheets-revised.pdf>
- U.S. Department of Agriculture (March 2, 2015). *United States Standards for Grades of Maple Syrup*. <https://www.ams.usda.gov/sites/default/files/media/MapleSyrupStandards.pdf>
- Vermont Evaporator Company (2023). *Curriculum for Little Kids, Big Kids and Biggest Kids!: For the biggest kids*. <https://vermontevaporator.com/at-school/>
- Wolfe, L.M. (2019). *Maple: A Sap to Syrup Guide-A Manual for Career and Technical Centers of Vermont*. University of Vermont. https://www.uvm.edu/sites/default/files/media/Maple_Mini_Manual.pdf

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Positive Youth Development (PYD) Planning Guide

4-H Maple Sugaring 101

Please list the ways in which you plan to incorporate each of the PYD Objectives (below) into your learning experiences.

<p style="text-align: center;">BELONGING</p> <p><i>Objective: Youth will feel connected to their peers</i></p> <p>How will you create a sense of belonging in your activities and meetings?</p>	<p style="text-align: center;">SPARKS</p> <p><i>Objective: Youth have the opportunity to explore something they care about, their “sparks”</i></p> <p>What “sparks” will you be facilitating in your activities?</p>
<p style="text-align: center;">HANDS-ON</p> <p><i>Objective: Youth will “learn by doing” a hands-on experience</i></p> <p>What hands-on experience will you be facilitating during the on-site visits or at another time?</p>	<p style="text-align: center;">REFLECTION</p> <p><i>Objective: Youth have the opportunity to reflect on their learning experience</i></p> <p>How will you facilitate youth reflection in your activities?</p>

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