CLIMATE WISCONSIN
STORIES FROM A STATE OF CHANGE

Sugaring
Educator Guide

About this Story

Who is featured: Kat Becker and Tony Schultz

Location in Wisconsin: Athens

Key Concepts / Keywords: changing of seasons, family farm, maple syrup production, sap and maple syrup, temperature change, traditions, tree sugars in roots

Standards Supported:

NGSS: MS-LS2-3, MS-LS2-4, MS-ESS3-5

Wisconsin Enviro Lit & Sustainability: ELS.C1.B.m, ELS.EX4.B.m, ELS.C1.C.m

Wisconsin Science: SCI.CC2.m, SCI.LS2.A.m, SCI.LS2.C.m, SCI.LS2.D.m, SCI.ETS2.B.m

ELA: R.6.6 (RI), R.6.9, SL.6.2

PLEASE NOTE: The story and the information in this guide are geared towards grades 6-8, with some options for adapting for older learners and expanding learning opportunities.

Story Summary

In early spring, forests of sugar maple, Wisconsin's state tree, are tapped by the hundreds at many commercial and family-run "sugarbushes," or wooded areas managed for maple syrup production, across the state. Research about climate change points to state and local climate impacts on the production of this much-loved syrup.

Questions to Consider

Share these questions with learners before viewing and return to them for conversation to check for understanding, or to spark continued investigation after viewing the video. Abbreviated questions are also available as a single-page resource at the end of this guide for easy printing.

1. Have you ever tasted maple syrup made in Wisconsin? Have you ever participated in the collection of sap to make maple syrup? What stands out to you about the process for collecting sap Kat describes?
    a. Expand the conversation by asking learners about how maple trees make sap and what environmental conditions are associated with maple syrup season. How does the process of trees making sap relate to other natural processes you've learned about?

2. What is done to the sap to make maple syrup? How much sap do you need to make a gallon of syrup? Is that what you would have expected before learning about it? Why or why not?
    a. For older learners and/or to expand the conversation, share the entry on the Milwaukee Public Museum's website describing how First Nations communities in the region have made maple sugar from sap and imagery shared as part of the "Ojibwe Lifeway: Maple Sugaring

and Birch Bark Harvesting ("Ziigwan - Spring") page on the Gikinoo'wizhiwe Onji Waaban site. Prompt learners to consider how the processes are similar to and different from the process in the video. What tools are used? How is the sugar/syrup described and treated by the people who interact with it?

3. What does an earlier or shorter sap season mean for producers and consumers? How might the availability of maple syrup change, or the price?
    a. If possible, visit one or more stories (or do some online research) to see what maple syrup options may be available near you to purchase, and how much it costs. How easy or difficult is it to find options for maple syrup to purchase near you? Compare real maple syrup prices with other products that are not made from maple sap. What do you notice?

Extend the Exploration

Use these activity ideas and questions with learners after viewing the video:

1. Learn more about how climate change and maple sugar production are related in your investigation.
    a. Start by doing some research to learn about the sugar maple tree. What are its notable features? Where does it grow? What does it need to thrive? How much sap can be collected from a tree during a harvest season?
    b. Next, use resources like the National Centers for Environmental Information, Wisconsin State Climatology Office, and others to access records of temperature, rainfall, and other climate measurements collected over the past five, or even 10 years in the areas of Wisconsin where sugar maples grow.

c. Look for patterns in the data. Then think about how the patterns and sugar maple trees' needs are related.
d. Use the data to predict what will happen to maple sugar production in the next five or 10 years.
e. Write your prediction and share it with your class to see if you reached similar or different predictions and why.

2. Watch the video two more times:
    a. The first time just listen to the audio (do not look at the images) and write down words or phrases that describe what you hear.
    b. The second time, just watch (with no sound) and write down words or phrases that describe what you're seeing.
    c. After, compare the two lists of words and phrases. Use one or both to create a word cloud or poem that captures the story of maple syrup harvesting as told in the video.

Background Information Essay

Written by Erik Olson and edited by PBS Wisconsin Education

Maple syrup, a common breakfast condiment, is produced by concentrating the sugar maple sap, *Acer saccharum*. In early spring, forests of sugar maple, Wisconsin's state tree, are tapped by the hundreds at many commercial and family-run "sugarbushes," or wooded areas managed for maple syrup production, across the state. Many family farms in Wisconsin and elsewhere across northeastern states and eastern Canada produce maple syrup for extra income, gifts, or family use. Considering that many producers are family-run businesses that have been producing syrup for up to four generations, maple syrup production undoubtedly has an important cultural significance in Wisconsin. Even small-scale non-commercial sugarbushes involve many people, often extended

family or close friends, collecting and boiling sap. In many school districts in northern Wisconsin, students are taken to local sugarbushes to learn how to collect and process sap. In addition, the Ojibwe of Wisconsin have harvested sap for cultural subsistence for centuries.

Any family who runs a sugarbush can tell you that weather plays a critical role in maple syrup production. Although little scientific research has been done, producers will argue that temperature variation, fall soil moisture, wind, spring soil moisture, or humidity can impact a sugarbush's success. The best conditions for sugaring are cool nights, just below freezing, and fairly warm days, in the upper 40s °F. This temperature change causes shifts in pressure outside the tree that send sap flowing throughout the tree and out any open wounds, like a hole for a tap. Years of poor production are most often tied directly to environmental conditions. Because maple syrup production happens over about one month and is weather-dependent, changes in climate could significantly impact the statewide production of maple syrup.

Sugar maples are usually found in moist and nutrient-rich environments and are more common in northeastern states. Researchers at the University of Wisconsin–Madison have used climate models to predict the future distributions of the sugar maple and have found that it is expected to reduce in abundance in Wisconsin. Gradually, we can expect that sugar maples will become more stressed and prone to insect damage as state average temperatures, especially as winter temperatures continue to increase.

Warm daily temperatures following periods of high sap production can cause sap to sour before it can be processed. Additionally, the responses of the local climate to regional climate change could impact wind speed, frequency, and direction, which are all considered important factors in maple syrup production.

Resources for More Information

Datasets Search | National Centers for Environmental Information (NCEI)

GWOW Sugar Maple & Paper Birch → Connect Culture

Maple Sugar | Milwaukee Public Museum

Waadookodaading – The Ways – PBS Wisconsin Education

Wisconsin Extension Maple Syrup Program

Wisconsin Seasons | Wisconsin State Climatology Office

CLIMATE WISCONSIN
STORIES FROM A STATE OF CHANGE

Sugaring

Discussion Guide

Discussion Questions:

1. Have you ever tasted maple syrup made in Wisconsin? Have you ever participated in the collection of sap to make maple syrup? What stands out to you about the process for collecting sap Kat describes?
    a. Expand the conversation by asking learners about how maple trees make sap and what environmental conditions are associated with maple syrup season. How does the process of trees making sap relate to other natural processes you've learned about?

2. What is done to the sap to make maple syrup? How much sap do you need to make a gallon of syrup? Is that what you would have expected before learning about it? Why or why not?

3. What does an earlier or shorter sap season mean for producers and consumers? How might the availability of maple syrup change, or the price?
    a. If possible, visit one or more stories (or do some online research) to see what maple syrup options may be available near you to purchase, and how much it costs. How easy or difficult is it to find options for maple syrup to purchase near you? Compare real maple syrup prices with other products that are not made from maple sap. What do you notice?

Educator Notes: