



Monitor My Maple Project

Guide for K-12 Educators

Monitor My Maple is a citizen science project that engages North Country residents in observing the **phenology**, or timing of seasonal changes, in local maple trees. It is a project for all ages that will contribute to our knowledge of how climate, habitat, and human activities are affecting these cherished local species. This is a general guide for participating in the project; how you integrate it into your curriculum depends on your teaching and learning goals.



Why: Maple trees, and especially sugar maples, have tremendous cultural, ecological, and economic importance in the North Country. Who doesn't love pancakes and local maple syrup? However, in the face of climate change, there is concern about how a warming and increasingly unpredictable climate will affect both sugar maple health and maple syrup production. By creating a network of people observing and recording the dates of seasonal changes in sugar maples, we can learn a wealth of information about tree health. This will help us plan to preserve maple trees and the traditions that surround them.

Grade Level: 4-12. The data collection protocols are simple and feasible for students from late-elementary through high school. You may choose implement the Monitor My Maple project with your students focusing on one of a variety of different topics, including climate change, phenology, forest ecology, data collection, data analysis, graphing, nature writing, and/or scientific inquiry. For example, younger students may focus on making basic measurements and knowing the difference between maple species. More advanced students may craft their own questions and perform analysis of the data collected. An inquiry-based approach encourages students to ask specific questions about the data collected, such as "Does tree size influence maple color change dates?"

Materials:

- A tape measure or cloth measuring tape to measure the circumference of your tree
- A string (if you are using a metal tape measure)
- A paper data sheet or smartphone
- An internet connection (to log observations on natureupnorth.org)

- Tree numbering tags (optional; ask Nature Up North Project Manager for details)

Identifying Sugar Maples: There are five species of maple native to St. Lawrence County - sugar, silver, red, striped, and boxelder. Several other species have been introduced, including Norway and Japanese maples. For this project, we are particularly interested in sugar maples. However, if sugar maples aren't present on your school grounds, we accept data from red, silver, and norway maples, too.

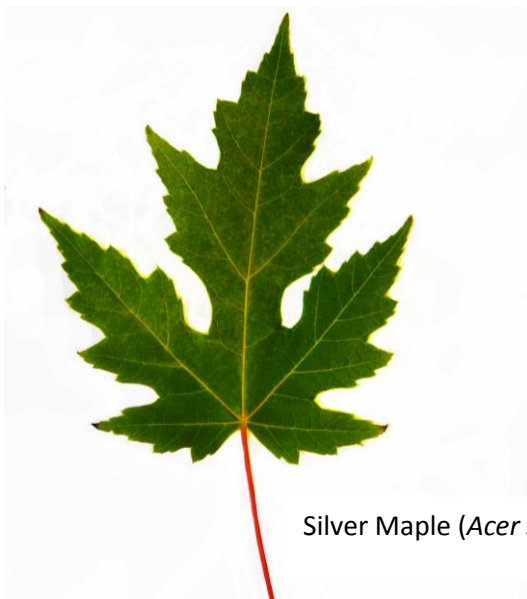
In summer and fall, it is easiest to identify maple trees by their leaves. The **sugar maple** leaf has smooth edges, five major points, called **lobes**, and U-shape spaces between the lobes, called **sinuses**. The sugar maple leaf is represented on the Canadian flag. In contrast, **red maple** leaves have a jagged leaf edge, three or five lobes, and V-shaped sinuses. **Norway maple** leaves are similar to sugar maple, but are often wider, darker, and produce a white, milky sap at the base of the leaf stem when pulled off the tree. If you see a maple tree with deep crimson or maroon leaves, it is most likely a Norway maple cultivar. **Silver maple** leaves have jagged edges and deep, curved sinuses that come to a point at the bottom. See the images below for comparison.



Sugar Maple (*Acer saccharum*)



Red Maple (*Acer rubra*)



Silver Maple (*Acer saccharinum*)



Norway Maple (*Acer platanoides*)

It can be difficult to differentiate between maple species when the leaves are down in winter and early. Look to the buds and bark to determine your maple's identity. Sugar maple buds are brown, slender, and pointed at the tips. The terminal bud (last one on the branch tip) will usually be in a three-pronged arrangement. Red maple buds are red in color, and blunter and more rounded than sugar maple buds. They tend to grow in clusters. Silver maple buds look similar to red maple, but if you scratch the bark and take a whiff, you may notice an unpleasant odor. In comparison to the other three, Norway maple twigs are thick, with large mahogany-brown buds that come to a point at the tip.



Tree identification can be tricky. Often the leaves are too high to see up close. The texture of bark varies depending on the age of the tree. Red and silver maple buds have many similar characteristics. If you have questions about maple tree identification, please do not hesitate to contact Nature Up North. Other tree identification resources can be found at:

<http://maple.dnr.cornell.edu/pubs/trees.htm>

<http://leafsnap.com/>

<https://www.arborday.org/trees/whattree/>

Monitor My Maple Procedure

Before going out into the field:

1) Create a user account. In order for students to enter maple data on natureupnorth.org, they must be logged in with a verified user account. There are two ways to do this: either create a user account that the entire class will share, or have students create their own accounts*. To create a user account on natureupnorth.org, click "Sign Up/Log In" in the upper right corner of the home page.

****Note:** According to the Children's Online Privacy Protection Rule (COPPA), students under the age of 13 are not permitted to create online user accounts. Teachers with students under the age of 13 will have to create a class account with a single shared password.*

2) Print Data Sheets. PDF versions of the Monitor My Maple datasheet are available from the Educator Resources page under Monitor My Maple. If students have smartphones or tablets with data plans, they may enter the data directly into the online webform.

3) Assign groups. Typically students work in teams of two to monitor a single tree.

In the field:

1) Identify and select trees to monitor. You may select the trees the students will monitor, or allow them to choose their own. Demonstrate data collection protocol for the class on a single tree before sending students to collect data on their trees.

2) Tag trees (optional). We can make tree identification tags available for you to use. These will give each tree a unique ID number, so that we can track individual trees from year to year. Tag trees at 4.5 ft from the uphill side (the same height at which you measure circumference) using the metal ID tags and an aluminum nail. Tap the nail into the trunk just enough so that it is secure, allowing room for the tree to grow around the nail. Do not tag trees smaller than 9 inches in circumference. Check with the grounds manager at your school before tagging trees.

3) Collect location data. See below for details on latitude longitude. The best you can, characterize the tree's habitat and proximity to roads, buildings, and sidewalks by filling out the fields on the data sheet.

4) Measure the circumference. To do this, stand on the uphill side of the tree and measure 4.5 ft from the ground up the trunk. Have one partner hold a finger there to mark the location. Then, wrap the string or measuring tape around the trunk of the tree so that it is perpendicular to the growth of the trunk. Make sure the tape is straight and does not sag or ride up on the backside of the tree. Then measure the distance that the string or tape wrapped around the trunk. Record this number so that you do not have to re-measure it during your next observation.

5) Note damages. These may include broken limbs, dead top, shelf fungi on the trunk, prematurely withered leaves, and more.



6) Collect phenology data. These are the “*What is my tree doing now?*” questions. In the fall, collect and record data on when leaves begin to change color, when (and if) fruits form, and when the leaves drop off the tree. In the spring, record the dates when maple buds break, when (and if) the tree flowers, and when their leaves fully form.

7) Revisit your tree at least once a week throughout the spring and fall. The more observations you can record, the better, even if your tree has not changed since the last time you entered data.

Entering Data: Data entry is a crucial step, because a major strength of citizen science is the ability to crowdsource data from a wide geographic area. The more data we have, we will be able to more accurately recognize trends or changes in maple phenology. Students may enter data in the field directly from a smartphone, or record data on paper in the field, and enter it into the webform when they return to the school.

Latitude and Longitude: If you are recording data from a mobile device, use the compass function to determine latitude/longitude. If you are entering data on the computer, visit [google.com/maps](https://www.google.com/maps) to determine your location. When your cursor is directly over the location of your tree, right click and select “What’s Here?” from the dropdown menu. This will reveal the Latitude and Longitude in decimal degrees in the search box in the upper left (they will appear in decimal degrees, such as 44.594168, -75.149756)

Retrieving Data: We will make up-to-date Maple Monitoring data available for download on our website at the end of each season. We can also send maple data at any time upon request.

Thank You

We greatly appreciate your participation in this project. If you have any questions, please don't hesitate to contact:

Jake Malcomb

Nature Up North Project Manager

jmalcomb@stlawu.edu

315-262-7325