

# Sustainable Syrup

## A mini lesson for grade 9 biology

### Time required:

2+ class periods

### Materials:

- Computers for research
- Visuals of sugar maple leaves, twigs and bark

### Identification:



Leaf



Bark



Twig

Learning about key identification features can help you learn about the biodiversity in your own backyard!

### Curriculum Connections:

#### **Grade 9 Biology: Sustainable Ecosystems (Academic, SNC1D)**

**B2.1** use appropriate terminology related to sustainable ecosystems

**B3.5** identify various factors related to human activity that have an impact on ecosystems and explain how these factors affect the equilibrium and survival of ecosystems

#### **Grade 9 Biology: Sustainable Ecosystems and Human Activity (Applied, SNC1P)**

**B2.1** use appropriate terminology related to sustainable ecosystems and human activity

**B3.5** identify some factors related to human activity that have an impact on ecosystems and explain how these factors affect the equilibrium and survival of populations in terrestrial and aquatic ecosystems

### Background:

It's the time of year where we enter the final stretch of winter; the days get warmer...it's syrup season! Collecting the maple sap from maple trees is a process that has been practiced for centuries. Maple syrup production is something our country is known for around the globe. Ontario is the second largest maple syrup producer in Canada, second only to Quebec. Not all species of maple tree produce the sweet sap that we will pour on our pancakes. Only the suggestively named sugar maple (*Acer saccharum*), with its massive sap flow and high sugar content, is tapped to produce maple syrup. To start this mini lesson, discuss: key identification features of a sugar maple, the leaves, twigs and bark. Investigate: how the sap is produced by the tree, learn about the tree's anatomy and where the phloem is located.

#### Activity 1 - Understanding 'Sustainable'

Maple syrup operations are often thought of as one of the most sustainable forms utilizing a forest resource. There are many aspects of maple syrup harvest that allow it to be considered a sustainable practice; however, there are always environmental risks with any type of resource extraction.

- Discuss: What does 'sustainable' mean to you? Come up with a definition for sustainable, and list factors that affect sustainability in one way or another.
- With the class, consider the positive and negative impacts of maple syrup harvest. Consider positives including forest protection and production of habitat. Consider negatives including the transportation methods used to travel the property and the potential pollution that the sap boiling process could produce. Do the positives outweigh the negatives? What are three things maple syrup operations do to practice sustainability? This could include following established guidelines for minimum tree diameter and tap maximum per tree.

#### Activity 2 - Maple Syrup Scenario

The general rule for tapping trees is that only those that are greater than 30cm in diameter should be tapped. Trees ranging from 53-68cm in diameter can hold two taps and trees greater than 68cm in diameter can hold three taps. In the following scenario, students (individually or in groups) will assess the positive and negative impacts of a maple syrup operation, and come up with a management plan to ensure the sustainable production of maple syrup.

**Scenario:** A 12 hectare sugar bush exists just outside of Peterborough, ON with 1500 trees on the property. Of those 1500 trees there are 1100 sugar maples; however, only 950 of those trees are large enough to have taps. There are 770 large enough to hold 1 tap, 100 that can hold two taps and 80 trees that can hold three taps. **Report:** Outline on how you would access all 12 hectares, what kind of system and structure you would use to boil the sap and how often you would tap the various sized trees.

