



MAPLE EDUCATION PROJECT

Lesson Title: Where's The Maple in New Hampshire?

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Grade Level: Upper Elementary (3rd – 5th)

What National Agriculture Literacy Outcomes does your lesson address?

T.1.3-5.d: Identify the major ecosystems and agro-ecosystems in their community or region.

T.1.3-5.e: Recognize the natural resources used in agricultural practices to produce food, feed, clothing, landscaping plants, and fuel.

T.5.3-5.b: Discover that there are many jobs in agriculture.

T.5.3-5.f: Understand the agricultural history of an individual's specific community and/or state.

What Common Core Standards does your lesson address?

CCSS.ELA.Literacy.SL.4.2: Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

CCSS.ELA.Literacy.SL.4.4: Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

SS:GE:4:5.2: Examine the ways in which the physical environment provides opportunities or limitations, e.g., natural resources that first attracted settlers or natural hazards that threaten life.

SS:GE:4:1.2: Display spatial information on maps and other geographic representations, e.g., home-to-school routes or settings in appropriate children's literature.

Brief description of your lesson plan:

The teacher can begin to engage students in the process of maple sugaring by reading *Maple Syrup Season* by Ann Purmell and completing a chronology activity. Then, students can be guided through an ArcGIS Online activity that shows them why New Hampshire has business based on maple sugar and allows them to map and explore sugarhouses in New Hampshire.

Time:

Activity 1: 35+ minutes

Activity 2: 45+ minutes

Materials:

- Copy of *Maple Syrup Season* by Ann Purmell (can substitute *Sugarbush Spring* by Marsha Wilson Chall or *At Grandpa's Sugarbush* by Margaret Carney)
- White/chalk board or large poster paper

- Computer(s) with Internet access to <http://arcg.is/2efWHB2>

Vocabulary:

Activity 1:

Evaporator- an apparatus for removing water from maple sap. Sap is poured into the evaporator's long, shallow pans and the fire underneath heats the sap until it boils. When enough water boils off and the liquid thickens it is maple syrup (Purmell 2008).

Gathering tank- a large barrel that holds sap from the gathering buckets. It is very heavy and can be hauled to the sugarhouse on a sled, wagon, pickup truck, or tractor (Purmell 2008).

Hydrometer- an instrument that floats in the maple syrup and measure its density. If the liquid is too thin it will ferment and taste sour. If it is too thick it will form sugar crystals in the storage container (Purmell 2008).

Sap- the thin, sweet liquid a sugar maple tree makes to provide energy so it can grow. Only a very small amount of the sap a tree needs is tapped so its growth is not harmed (Purmell 2008).

Sheeting- the moment when sap becomes syrup. The syrup falls slowly from a spatula or ladle in a sheetlike stream and not in the quick, small, individual drops when it is thin (Purmell 2008).

Activity 2:

ArcGIS Online- an online map program that allows people to upload data that can be added to a map so people can learn from it.

Layer- data, or information, that can be displayed as an image on the map.

Legend- explains what all symbols or colors on the map mean.

Climate- Weather conditions and trends that are present consistently in a defined region over a large period.

Point Density- Summary. Calculates a magnitude-per-unit area from point features that fall within a neighborhood around each cell.

Background: Agricultural Connections

This lesson combination will aim to recognize the importance of the presence of naturally existing maple trees within the state of New Hampshire. In the process of maple sugaring, it is important to understand that the only species of tree that produces the type of sap that can be converted to syrup are sugar maple trees. Once the students understand this concept, they will also observe the only climate zones that support the maple sugar industry. This will further enhance the understanding that New Hampshire has unique natural qualities that allow for certain agricultural processes to occur and to thrive within the state. This also may explain as to why New Hampshire has such a history with maple production. Through looking at literature about the processes behind the maple industry, students can also have a better understanding of the vast types of jobs that exist within the agricultural industry as a whole.

Interest Approach: Engagement

To begin this lesson in an engaging way, the teacher can read students the story *Maple Syrup Season* by Ann Purmell. It is a picture storybook that contains an accurate depiction of the process of sugaring and has a glossary of terms in the back. If time and budget allows, the teacher can have students try samples of different grades of maple syrup to compare the different tastes. The students can also stay engaged by learning through using an online mapping application.

Procedures:

Before starting the first activity, the teacher can create a "K, W, L" (know, want to know, learned) chart for the word **maple**. This will engage the students to think about what they already may know or associate with the word maple. Examples could be trees, leaves, sugar, candy, and syrup. They can also get broader, like

associations with Canada or Vermont, which are often recognized as places associated with maple leaves and syrup. Then you can see what they may want to know more about, which may help guide further research later on.

Activity 1: *Maple Syrup Season* by Ann Purmell

This is a 32-page picture storybook that will engage students in the process of maple sugaring. It depicts a family that works together to produce their own maple syrup and introduces students to the terminology and process.

After completing the story, the teacher can ask students to recall the different aspects of the process discussed in the story to create a flowchart or timeline of maple sugaring. This can be done in a whole class setting on a white/chalkboard or on a large sheet of paper. The completed process should be as follows:

- drilling into a maple sugar tree,
- hammering in a spout,
- hanging a bucket,
- putting hats on the buckets,
- waiting for the buckets to fill with sap,
- collecting the sap in gathering buckets,
- bringing the sap to the sugarhouse,
- pouring the sap into the storage tank and evaporating pans,
- heating the sap to a boil,
- skimming the sap to remove dirt and bark,
- waiting until the temperature reaches 218 degrees Fahrenheit,
- filtering the syrup,
- and pouring it into jars to grade it.

At the conclusion of this activity, if time and budget allows, the teacher could have different grades of New Hampshire maple syrup for students to taste and compare.

Activity 2: ArcGIS Online

The teacher will distribute the attached activity to all students. Each student, or pair of students, will need to have access to a computer with internet.

After completion of both activities, the students can recall what they learned from this by filling out the "Learned" section of the "K, W, L" chart. As a way for the teacher to add even more cool facts about maple syrup, some facts are provided below.

Did you know? (Ag Facts):

- Legend has it that Native Americans first discovered maple syrup by accidentally pouring sap into a pot over the fire. Eventually it boiled off the water and became syrup!
- Native Americans taught the early settlers how to make maple syrup.
- It takes about 40 gallons of sap to make one gallon of maple syrup.
- Before the Civil War, sap was boiled longer to make maple sugar as it does not need refrigeration. This is where the term sugarhouse came from.
- Maple syrup does not freeze.
- The sugar content in maple syrup remains the same in different grades only the color and flavor change. These changes occur in the tree itself as a chemical reaction to the changing outside temperatures.

Sources/Credits:

Name: **Maple Sugaring in New Hampshire**

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<http://arcg.is/2jqs8u7>

Purmell, Ann, and Jill Weber. *Maple Syrup Season*. New York: Holiday House, 2008. Print.

<http://www.sugarbushhill.com/all-about-maple/interesting-facts-about-maple-syrup/>

<http://gec.cr.usgs.gov/data/little/>