Sweet Deal

Nº. 12

PRIMARY/JUNIOR

Math | Science | Fine Arts | Social Studies

LESSON SUMMARY

To give students an opportunity to observe and describe the process of how people use sugar maple trees to gather sap to make maple syrup.

FORESTS ONTARIO

Focus on Forests

Activity Information

Estimated Duration: 1 to 2 hours and 2 x 30 minutes

Materials: Pencils, sketch pads, flexible metric tape, stop watch, two identical clear containers (like coffee jars or beakers), Tree Chart and Liquid Measurement Chart

Setting: Outdoors at a sugar bush and indoors

Key Vocabulary: Sap, syrup, bucket, spile, evaporation, temperature, tap, trunk

ACTIVITY

When will it flow? - in the class

1. In late winter start a class chart noting the noon and night temperatures in your area. Predict when sap will start running. Sap starts to flow when nights are cool (temperatures are less than -3 degree C) and are followed by warm days (temperatures greater than +2 degrees C).

2. Have students research the process of maple syrup making and all the different processing techniques used over time. Why have techniques changed over time? Who first discovered the process?

Math on the go - at the sugar bush

3. Have students measure the circumference of the tapped trees and the number of tapped trees. These can be in either cm or defined units set by the class. Discuss what is the largest tree tapped and the smallest tree tapped. Why are the very smallest trees not tapped?

4. Have students record the number of tap holes in each tree. Discuss which ones have the most and least and why.

5. If the sugar bush uses buckets - use a ruler to measure the amount of sap in each bucket and discuss which of the trees produce the most sap and why. Is there a difference in the size location, and general health of that tree?

6. Use a stop watch and time the number of drops that come out of each tree studied. Ask why some trees drip faster than others. Is there a difference in the number of tap holes or height of taps?

7. Compare the sap collected to the product from the evaporation pan. Have students point out the changes in colour and texture. Have the class get 500 ml of sap for experiments back at school.

Sap for show - back in the class

8. Place some sap in a graduated cylinder or clear jar for observation. Place a similar amount of tap water in an identical beaker or glass container so both are the same.

9. Measure and note the height of the liquid in both containers and leave both containers undisturbed for one week. Have students record observations and what they think will happen after one week.

10. Measure and note the height of both liquids at the middle and end of each week the experiment takes place. Note any evaporation or residue. Compare how fast maple sap evaporates with how fast tap water evaporates.

Background information

The sugar in maple syrup is actually the food of the tree. This food is manufactured during the summer when sunlight, working on chlorophyll in the leaves of the sugar maple tree, causes sugar to be produced. This sugar is stored in the tree and is dissolved in the sap as it rises each spring.

The trees are tapped in early spring. This is done by drilling a hole at about chest height (1.40 m) in the tree. Usually, the hole angles downward to drain the flowing sap into a spile. A spile is a cone shaped object that helps drain the sap out of the tree. Originally these were made from wood and later from tin. A hook on the bottom of the spile held a bucket that collected the dripping sap. Modern sugar bushes use plastic spiles connected to long plastic pipelines which are connected to the sugar shack.

The collected sap is boiled in large flat evaporating pans to reduce the amount of water in the sap and concentrate the sugars. The sugars must be concentrated until they form 66 percent of the content. At this point the maple sap is called maple syrup. This ratio of sap to maple syrup is on average 40 liters of sap to 1 liters of syrup.

Extensions

11. What were the native people's techniques for gathering sap? Have students investigate the historical development of maple syrup production.

12. Have students research existing maple syrup legends and re-enact them for the class thru art and or drama.

13. What other uses for trees are there besides lumber and fire wood. Use the weird tree product chart as a starting point for students.

Tree Chart		
Tapped Tree Number	**Circumference of Tapped Tree**	**Number of Holes in the Tree**
1		
2		
3		
4		
5		
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Liquid Measurement Chart

Height of Water Sample	Height of Maple Syrup Sample