

Lesson Plan - Tubing versus Buckets

Grade Level: Grade Three

Learning Objectives:

- to discuss the history of maple syrup production
- to have the opportunity to compare current techniques with old techniques
- have the opportunity to work in groups

Expectations: Heritage and Citizenship: Pioneer Life

- Compare past and present techniques of processing products (i.e. production of maple syrup)

Materials:

Following books for students to use:

A sample bucket

A sample portion of tubing

Access to the Internet

Access to the school library

Procedure/activities:

1. Find out what prior knowledge students have of Maple Syrup
2. Go into the history of maple syrup to reveal to students when buckets were first used. Show an example of a bucket.
3. Referring to the history of maple syrup, review the process of tubing that takes place now. Show them an example of tubing.
4. Have students split up into small groups.
5. Provide books that can help them brainstorm. As well provide access to the internet and school library
6. Encourage them to discuss the pros and cons of both systems. Give them approximately an hour to find research
7. The next day have them report findings to the rest of the class. To make sure the students touch on some of the important points refer to Tubing versus Buckets information page on the OMSPA website.
8. After every group has provided input, have the students answer these questions in their book. a) What are some of the major changes in the maple syrup industry over the past century? b) What are some of the advantages and disadvantages of the change in technology in the maple syrup industry

Assessment:

Peer Evaluation

Self Evaluation

Response to questions in workbook

Extension Activities:

- take them on a trip to the sugar bush to see both the process of using buckets and tubing
- give them the opportunity to watch the video, Tasting the Trees, available from the Ontario Maple Syrup Producers Association website

Peer Assessment – Tubing vs. Buckets

Date: _____

Your Name : _____

Group Members

1. _____

2. _____

3. _____

Decide on a letter that best describes each of your team members based on the guidelines listed below

A	B	C	D
All the time	Almost all the time	Sometimes	Never

Guidelines	Group Member 1	Group Member 2	Group Member 3
Was open to the ideas of others			
Supplied valid input			
Encouraged and listened to the other group members			
Provided positive feedback and constructive criticism			

SELF-ASSESSMENT – TUBING VS. BUCKETS?

NAME: _____

DATE : _____

	1 NOT AT ALL	2 A LITTLE	3 ALMOST ALWAYS	4 ALL THE TIME
I PROVIDED INPUT TO MY GROUP				
I ENCOURAGED MY GROUP MEMBERS TO PROVIDE INPUT				
I LISTENED ATTENTIVELY AND WITHOUT INTERRUPTION				
I PROVIDED POSITIVE FEEDBACK				
MY GROUP STAYED FOCUSED				
MY GROUP WORKED WELL TOGETHER				

WHAT WAS YOUR ROLE IN THE GROUP?

WHAT DID YOU LEARN MOST WORKING TOGETHER WITH YOUR GROUP?

WHAT DO YOU THINK YOUR GROUP COULD HAVE DONE DIFFERENTLY?

Tubing Versus Buckets

Advantages

Tubing

- more hygienic
- gravity is utilized
- is flexible and can run from each individual tree and meet up into larger lines that eventually go to the collection tank
- allows for more trees to be tapped
- allow for the decrease in labour and labour costs
- time efficient
- vacuum pumps are used that apply suction and increase the yield from each tree

Buckets

- Maple syrup producers are able to better monitor the health of the trees, as they can see which trees are producing the most sap and which trees may not be producing any sap
- Easier to control temperature - cold temperatures at night freeze the sap in the buckets and the next day, when the temperature rises and the sap flows, the frozen sap keeps the new sap dripping in chilled
- Has a higher quality than sap collected through sap lines

Disadvantages

Tubing

- sometimes it's hard to find a leak, if there is one
- squirrels can bite through the tubing to get a drink of sap
- airlocks can form in the tubing and sap won't flow until the airlock is removed
- the sun shining on the tubes can warm the sap, which can cause the quality of the sap to decrease

Buckets

- have to constantly be kept clean
- hard to scrub the buckets
- lots of labour takes place (emptying pails, carrying pails) and people need to be paid for this labour
- very tedious and time consuming

The History of Maple Syrup - From Past to Present

Before Europeans came to Canada, Native people were tapping maple trees. An Iroquois legend states that maple syrup was discovered by a young boy. The young boy watched a squirrel bite off a twig from a sugar maple tree and drink the sap that leaked out of it. He then tried it himself and realized how sweet and tasty the sap really was.

Observing the method of sap collection among the Natives, it is easy to see how the European Settlers adopted many of the ideas they had which later became the bucket system that we have come to know and is a tradition among Canadians. Natives extracted the sap from the tree by making a V-shaped gash in the trunk of a sugar maple tree. They then inserted curved pieces of wood or bark, which is a primitive form of the presently used spile. The sap then dripped out of the tree into buckets made out of birch bark, hollowed out logs or even clay pots. The sap was usually left for several nights and therefore froze. The Natives would then remove the ice and reduce the water content in the sap. They would then add heated stones into the containers steaming off the remaining water. By doing this repeatedly, they would be left with maple sugar. The discovery of maple syrup by the Natives was also the beginning of finding a cure for scurvy. Scurvy was an illness that was known as the "Spring Sickness" Scurvy made the Natives ill each year as they suffered from a lack of vitamin C during the winter. The reason for this was that it was hard to store fresh fruit and vegetables during the cold winter. Through the discovery of sap and its high content of Vitamin C, the Native boy also discovered the cure for the "Spring Sickness".

This sugaring-off process was observed by the Early Settlers. They would drill holes in the trees and push in hollowed stems to extract the sap. The sap was collected in buckets and carried by horse drawn sleighs to a sugar camp. At the Sugar camp, the sap would be boiled in large cast-iron pots. This method is still used at some maple syrup producers. Most of the maple sugar bushes do use evaporators, plastic tubes and vacuum pumps in the process of making maple syrup. The old way is often only used to show people what the tradition of maple syrup production was. Today producers use a sap collecting system in which plastic spiles are inserted into the trees and connected through a "closed system" of plastic tubing. The tubes are then attached to a larger network of tubes that meet up with larger lines and eventually empty out into a collection tank. Vacuum pumps are used with the tubing system, applying suction to increase the amount of sap from each tree. Both the 'old' way and the 'new' way have positive and negative aspects and play an important role in the production as well as the history of maple syrup.