



**Chemical Reactions:
Background Information
for
Science 10
by
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S106.4

**Teaching Materials
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All resources used in these lessons are available through the Stewart Resources Centre:
http://www.stf.sk.ca/services/stewart_resources_centre/online_catalogue_unit_plans/index.html

Information regarding the protocol when inviting Elders into the classroom can be found in the document: *Elders in the Classroom* by Anna-Leah King (attached as Appendix A). Further information can be found in the Saskatchewan Learning document: *Aboriginal Elders and Community Workers in Schools*.

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Overview

This material provides background knowledge, from a First Nations and Métis perspective, for the unit entitled Physical Science: Chemical Reactions (CR) in the *Science 10 Curriculum Guide*. No lesson is included.

Learning Objective (LO)

Students will be able to:

CR1 LO4 Identify indicators that provide evidence that a chemical reaction has likely taken place.

Source: This and other objectives are found in the following document:
Saskatchewan Learning. (2005). *Science 10 curriculum guide*.
Regina: Saskatchewan Learning.

The knowledge supplied here was the spoken contribution of Anna-Leah King through an interview on March 16, 2007 in Saskatoon, and of Mathilda Frazer, Big River First Nation, 2007.

Introduction

Chemical reactions are a part of our daily lives, both within our bodies and within our natural environment. Some cultures recognize that chemical reactions are important for survival and the continuation of their culture. First Nations and Métis people rely on their ancestors' knowledge to make the products needed to sustain a good quality of life. Mixtures and combinations of natural and animal products were a vital part of their culture. One example of a chemical reaction, where the method has been passed down from one generation to another through oral history, is the reaction of corn with the burnt bark of a maple tree. Another example is how First Nations and Métis people made their own natural bleach, which they used in a variety of ways. Natural bleach was used to wash clothing, to whiten hides, and to make soap with a lye base.



Oral History

First Nations, including Métis people, were adept at making their own supplies. The Cree of Central Saskatchewan made their own natural bleach, which was not caustic like commercially processed bleach. The Cree also used unripe cranberries (the white ones) to thicken their berries into jelly as natural pectin or a thickening agent. They knew the properties of each plant and knew how to process certain parts from plants and animals to make the bases needed in formulas to create medicine and household products. This knowledge was acquired through the experiential learning process.

The Anishinabek people of Ontario and many Saulteaux people of Saskatchewan used a common chemical reaction to obtain food from a plant source. The Anishinabek people understood that the chemical reaction required the correct concentration of acid and a certain temperature for the reaction to work correctly. Certain types of trees contained the correct amount of acid for the reaction to proceed.



The Reaction

Natural bleach is made by taking $\frac{1}{4}$ cup of black poplar ash and $\frac{3}{4}$ cup of water and bringing it to a boil. (Large batches required large amounts of clean, flaky ash, and rarely did the people measure.) Use an old pot that is made from metal, not enamel. Let the ash settle to the bottom in a grey mixture and pour off the top clear liquid, now called lye or natural bleach.

The following story is from the Cecil King family on how they used traditional science principles to make corn soup:

White corn (mahndawmin) or big corn, as it is known to the Anishinabek people, can be used in a variety of recipes. The corn is picked; the husk is removed and set in the sun to dry.

White corn must be put through a lyeing process before it can be made into corn soup. The lye (binugzignug) may come from hardwood ashes of cedar but many used maple tree (nenawtik) burnt into ashes (bungue). The ashes are an extremely strong acid. Usually the ashes would be gathered from the campfire itself. The lyeing process involves the ash being placed into water in a cast iron pot (cotkik) with the corn to boil for about two hours. The corn is allowed to sit in the pot until the ashes have settled to the bottom. The ash will cause the outside layer of the corn to soften (nohkuzut), allowing it to pop like popcorn (bagushkazewut). The process allows the two black eyes, or hulls, on the kernel to be washed off. After the corn has popped, it is rinsed to free it of the lye and to make it ready for soup.

The individual preparing the soup must be a very knowledgeable person and take into consideration many factors:

1. The pH level in the boiling mixture must be correct for the reaction to occur. Too little ash will prevent the reaction from occurring.
2. A high amount of ash will destroy the corn and make it inedible.
3. The temperature of the reaction is maintained through the use of birch trees because they burn at a higher heat, whereas the poplar burns too quickly, and pine throws off thick gum smoke plus a lot of sparks.

Summary

First Nations people understood part of the world of chemistry through the art of preparing and cooking meals. They understood the process required to open white corn through a recipe using the proper amount of ash from the maple tree. They knew ash from other trees would not work due to different ash qualities. This knowledge or oral history was passed down from one generation to another generation.

- With respect to Cecil King through Anna-Leah King and to the ancestors of First Nations and Métis people of Saskatchewan.

Saskatchewan Birch Syrup

This material provides background knowledge, from a First Nations and Métis perspective, for the unit entitled Physical Science: Chemical Reactions (CR) in the *Science 10 Curriculum Guide*. No lesson is included.

Learning Objective (LO)

Students will be able to:

CR1 LO2 Observe and describe chemical reactions that are important in everyday life.

Source: This and other objectives are found in the following document:
Saskatchewan Learning. (2005). *Science 10 curriculum guide*.
Regina: Saskatchewan Learning.

Oral History

The Woodland Cree of Saskatchewan obtained sap from birch trees. They used a common reaction of boiling the sap to thicken it.

Process

During the spring, the Cree people would use a birch tree to gather sap for a food source. The process began when the individual cut a tree with a knife or axe to start the flow of sap down the outside bark of the tree. A v-shaped mark was cut into the tree below the mark made with the axe. The v-shaped mark was pried up with a knife to aid the sap falling into the bucket below.

After the sap was gathered, it was boiled over an open fire until it thickened into syrup. Many people would place a moose hoof or duck into the sap to provide taste to the sap. The sap was used for a variety of dishes or as a treat for anyone.

Summary

First Nations people understood the world of chemistry and chemical reactions through the art of preparing and cooking meals. It is common knowledge that eastern people used sap to prepare syrup. Many Saskatchewan people used trees that were available to them including maple, birch, and poplar trees.

- Spoken contribution of Sally Milne, Elder, by interview in Saskatoon on March 16, 2007.



For Further Reading

Densmore, F. (1987). *Indian use of wild plants for crafts, food, medicine, and charms*. Ohsweken, ON: Iroqrafts Ltd.

Leighton, A. (2004). *A guide to 20 plants and their uses by the Cree*. La Ronge, SK: Lac La Ronge Indian Band Education Branch.

Murphey, E. (1990). *Indian uses of native plants*. Glenwood, IL: Meyerbooks.

Saskatchewan Learning. (2001). *Aboriginal elders and community workers in schools: A guide for school divisions and their partners*. Regina, SK: Saskatchewan Saskatchewan Learning.



APPENDIX A

Elders in the Classroom

by
Anna-Leah King

It is the Elders' responsibility to guard sacred knowledge and to maintain the ceremonial oral tradition of knowledge transmission. In Saskatchewan, the territory is home to four First Nations, namely Cree, Saulteaux, Dene, and Ojibwa - Dakota/Nakoda/Lakota.

Source: Office of the Treaty Commissioner. (2002). *Teaching treaties in the classroom: Participants manual*. Saskatoon, SK: Office of the Treaty Commissioner.

All of these First Nations have a home here and it is entirely appropriate to represent any or all of these First Nations when approaching curriculum content. The Elders bring with them traditional knowledge and perspective passed down from generation to generation through the oral tradition. The reference to Elders' wisdom has lately been termed "Indigenous knowledge" or "traditional knowledge." Their traditional knowledge and wisdom will give insight to teachers willing to reshape curriculum and validating First Nations content and perspective.

Inviting the Elders

Protocol

The Elders would expect to be approached in the traditional way, respecting traditional protocol. They are given a small offering of tobacco in exchange for their commitment to invest their time and energy into the work at hand. They can be asked to lead the gatherings with prayer and ceremony. First Nations gatherings always begin with prayer and ceremony. It is entirely appropriate to ask this of them. It may not be what you are familiar with, but you will soon realize the benefits of respecting First Nations protocol and ceremonial practice. The Elders may want to begin with a smudge on the first gathering and offer prayer for the task at hand and the team that has been brought together. The Elders are well aware that any given group put together is there to learn from one another and so blessings towards this endeavour are prayed for. Sometimes, depending on the size of the project, a pipe ceremony may be requested. Each Elder may have a slightly different approach to opening and closing ceremony. Some may speak for a while. Others will ask you to share so they can become more familiar with everyone. Simply inviting them with an offering of tobacco and asking that they open and close the gatherings is enough. The Elder will take it from there.

Elder Expectation

When you invite Elders, it is important that you are clear on what you expect from them. If you are asking them to contribute with their knowledge, wisdom, and guidance, then say so. They may not all be familiar with education and what teachers and curriculum writers are trying to do, so explaining what curricula is and what is needed of them is essential to a good working relationship. You want them to contribute First Nations and Métis content and perspective. The Elders need to feel confident that they will be of assistance. Let them know that you see their role as wisdom keepers and they need to draw upon their personal experience, cultural knowledge, and teachings to contribute to the process. The Elders will share what is acceptable and give caution for what they view as sacred knowledge that is only to be shared in the context of ceremony.

Elders need time to think before they answer. Do not be impatient and feel they are not answering soon enough, as they will answer your questions in time. Some Elders are reflective, philosophical thinkers. They will review holistically what you have asked of them. A concept that you think is simple and straightforward has many different dimensions to a First Nations speaker, and they must put the concept into the context of the whole and analyze the dimension of its interrelatedness. Sometimes they translate what you are saying to themselves in their language. They think things out in their mother tongue first and then find the words of closest approximation in English. Not all words and concepts are readily translatable. That is why letting the Elder know what is expected of them beforehand is important because it gives them time to think it over and to find some area of common ground.

Elder Care

Elders do not expect anything but it would be nice to assign one person to see to their needs. Offer them a comfortable seat and debrief them on the expectations for the gathering. Introduce them to everyone and generally make them feel welcome. See to it that they have water, juice, coffee, or tea. It is good to have a snack for them at coffee break. Invite them to pray over the food before you eat. Allow them to be first in line for lunch or let them know you will serve them. This is an example of First Nations protocol. These are small things, but kind gestures go a long way with Elders. They appreciate when younger people make efforts to lighten their load. These gestures make the Elder feel welcome and cared for in a respectful way.

Gifts

It is appropriate to have a small gift for the Elders. If they are paid for their time, this would be considered the gift. Some give a small gift in addition to the honorarium, such as a basket of teas or jams.

- Further information can be found in the document: *Aboriginal Elders and Community Workers in the Classroom*, available from the First Nations and Métis Branch of the Ministry of Education.