Mânomin (Cree)

Ghínázë (Dëne)

Wild Rice

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A unit in the series:

Rekindling Traditions:
Cross-Cultural Science and Technology Units

Series Editor

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Mânomin

Mânomin

CURRICULUM CONNECTION

Grades 8-11:
habitat, ecosystems, plants, water quality, sustainable development, structure & design, and nutrition

OVERVIEW

The local wild rice industry is used to promote respect for Aboriginal knowledge and to teach ideas from ecology and biology, so students will become informed about an important northern industry. Students apply their knowledge first hand during site visits to a wild rice stand and to a processing plant. The nutritional value of wild rice is learned when eating dishes students prepare. Duration: 2 weeks of classes, plus 3 field trips (trial planting nearby, visit to wild rice stand and processing plant).

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Mânomin

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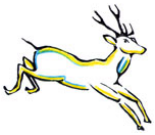
Shaun Nagy	La Loche Community School, La Loche Unit: *The Night Sky*	
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PURPOSE

This unit is designed to enrich students' understanding and appreciation of Aboriginal science and technology, and to encourage students to continue their studies in school science in the future. Knowledge (past and present) of growing, harvesting, and processing of wild rice forms a bridge between Aboriginal and Western views of nature. The unit makes a connection between everyday life in a northern Saskatchewan community and ecology and biology content in the school curriculum. At the same time, technological literacy is given special emphasis. The unit should demonstrate to students that they can achieve at Western science without setting aside their Aboriginal values and knowledge.

GOALS

1. To bring in a local wild rice harvester to focus students' attention on wild rice.
2. To systematically present the wild rice industry in a way that makes students feel it is part of their community, and in a way that makes them feel confident about knowing some of its science and technology.
3. To develop an interest in wild rice as a healthy food.
4. To involve Elders and the community people as a valid resource of knowledge.
5. To involve students in the planting of wild rice.
6. To introduce ecology or biology content expected for the class.
7. To get students to interact with their environment and their community.
8. To introduce students to career possibilities related to science and engineering.
9. To analyse water samples.
10. To acquaint students with the industry's need to be inventive with its harvesting technology.
11. To acquaint students with the technology and business end of wild rice production.
12. To develop language skills by making connections between a student's first and second language by using known events to which the two languages refer.
13. To have fun eating some of the recipes for cooking wild rice.

OBJECTIVES

1. Students will be able to properly sequence the 9 stages in the life cycle of wild rice.
2. Students will remember some of the details related to: a productive habitat, harvesting, processing, and food value.
3. Students will become aware of the fact that the Saskatchewan wild rice industry is “organic farming” and follows the principle of “sustainable development.”
4. Students will develop greater respect for Elders or other knowledgeable community members who have handed down information to them.
5. Students will accurately use both common-sense terms and appropriate scientific terms, depending on the context they are in.
6. Student will respect the environment by not causing any damage.
7. Students will estimate how many seeds are in a kilogram of seeds, and calculate how many bags of seed to buy for a particular stand of wild rice.
8. Students will be able to write accurate and fairly detailed stories about what happens to the harvested wild rice grains between leaving the stand, and being sent to the packagers for distribution around the world.
9. Students will be able to repeat the dietary advantages of wild rice.

BACKGROUND INFORMATION

processed wild rice grains
(photo by Dark Horse Studio)

Wild rice seeds were imported into Saskatchewan in the 1930's to provide food for ducks and muskrats. The purpose was to increase the population of ducks and muskrats to improve hunting, trapping, and tourism, which certainly helped some local economies in the north. Today Saskatchewan is Canada's major producer of *naturally grown* wild rice. Each year's yield brings in about one million kilograms. This is relatively small compared to the cultivated growing conditions of wild rice paddies in Minnesota and California where about seven million kilograms are produced by each state. However, Saskatchewan's naturally grown (organic) wild rice has a higher quality, and therefore it enjoys higher status and higher prices internationally.

Long before Europeans came onto First Nations lands, Aboriginal peoples harvested and processed wild rice in what is now the southern parts of Québec, Ontario, and Manitoba, and the eastern half of the United States. Wild rice was particularly plentiful in a region Europeans called "the wild rice bowl" (what is now Minnesota, Wisconsin, and Canadian land just north, in Ontario and Manitoba). At the time of contact, the First Nations peoples who inhabited the wild rice bowl belonged to the Algonquian and Siouan language groups. Pre-contact history involved inter-tribal clashes over who had jurisdiction over certain wild rice areas. Crop failures were known to have had devastating effects on the welfare of tribes (Schultz, 1979). Of the many First Nations who relied on wild rice, the Ojibwa nation was the largest producer at the time of contact. Ojibwa people called this grain cereal "mano'min," a word now borrowed by some Cree communities in northern Saskatchewan who call wild rice "mânomin." (The word has also been spelled manowin, mahnowen.)

In Pinehouse Lake, Saskatchewan, people consider a wild rice stand to be their garden. Consequently some Elders in Pinehouse use the Cree word "Kistigân" (garden) to refer to wild rice. Elsewhere in Saskatchewan, wild rice is usually known as "mânomin" in the Cree language. We use the term *mânomin* throughout this unit. You are encouraged to accumulate other indigenous words and expressions to incorporate into your lessons and assessments, learning them yourself as you go along. The validity of the community's Aboriginal knowledge and your students' cultural identities are enhanced by the non-trivial use of appropriate language.

History

Pinehouse Lake

It was in 1899 that the first European missionary visited Pinehouse Lake, then called Snake Lake. At that time the community's inhabitants were mostly Chipweyan. Unfortunately, a smallpox epidemic occurred during the late 1800's. This decimated most of the population and scattered many of the survivors to other adjacent communities such as La Ronge, Beauval, Île-à-la-Crosse, etc.

In 1935, the arrival of Tom Natomagan, a Métis, was followed by many other Métis, Cree, French, and German people. They settled in areas surrounding Pinehouse Lake, such as Bar Lake, Southend, Souris River and Sandfly Lake. Pinehouse Lake became predominantly a Cree community that speaks the Y dialect. Because of its location on the Churchill River system, Pinehouse Lake became a major trading post and service centre during the fur trade era. The people lived a traditional lifestyle, hunting, fishing, trapping, and gathering edible berries and plants, including the harvest of wild rice. Realizing that the name Snake Lake was keeping away many potential buyers, traders, and sports enthusiasts from the south, the people renamed the lake "Pinehouse Lake."

The traditional lifestyle at the time encouraged individuals to approach life and living from a holistic understanding of their environment. People envisioned themselves as a part of, not separate from, other life forms in their environment. Their needs for food, shelter, clothing, good health, and good social relationships, were based on cultural spiritual values and the belief that each value was part of their lifestyle. Trapping, hunting, and gathering were pursued to meet physical, emotional, mental, and spiritual needs, all of which resulted in access to food, shelter, and clothing.

The community as well was seen as a holistic entity. It was not traditionally divided up into little organizational compartments where each part competed for attention, but instead, it was obvious how each of the parts fit together to make a community. In the past, Aboriginal communities had not distinguished between community needs and the needs of its members. The two were not separate. They were part of the whole life style of the people. The purpose of the community was to show love, to care, to share, to support, and to provide healthy outlets for the social and creative needs of the people.

In 1939, the people of the region decided to get together to form a village. The construction of a church in 1944 and a school in 1948 brought the people from their outlying cabins into close proximity of the church and school. The children who were once taken by missionaries to Beauval or Île-à-la-Crosse at the age of six, were now able to stay with their families to pursue their education in their newly formed village. Until 1961, the main source of transportation was dog sled or horseback. It was also during the 1960's that housing development began with prefabricated units being constructed in the proximity of the church and school.

Today, the village of Pinehouse has a population of approximately 1000. A Coop store, constructed in 1954, provides food, clothing, hardware and some household goods and furniture for the local inhabitants. A radio station, wholly operated by local people, attends to social and creative needs of the people. There is a health clinic with local personnel to provide some medical support, as well as "fly-in" doctors to provide medical expertise. The school houses 400 students (K-12), 23 teachers, and approximately 12 support staff. Many of the local inhabitants still pursue vocations or leisure activities related to, for example, hunting, fishing, trapping, berry picking, and wild rice harvesting, in much the same way as people did earlier in the 20th century. Those who have chosen other careers are employed in the mining, forestry, and construction industries. With the expansion of the grade 12 program five years ago, more employment opportunities have opened doors to students choosing to pursue post-secondary education in fields such as dental therapy, computer programming, trades, forestry management, education, business management, and social work.

While the community has managed to maintain its Aboriginal language and traditional dance, very few members of the present generation have maintained the more traditional lifestyle. The traditional ideology of Pinehouse has been transformed by the road (to Key Lake Mine), by television, by government programs and services, by independent housing programs, and by the church.

Pinehouse takes great pride in speaking and maintaining its language, Cree (Y dialect). The people know that the language houses their stories, their humour, their value system, and their sense of identity as a community. Many families return to their cabins during the summer months to teach their children the knowledge and information that has been passed on from generation to generation, particularly how to live independently from others but in harmony with Mother Earth. Although all cultures change as the community evolves, one must keep those traditions and values that give identity to the group. When the school curriculum acknowledges and reflects the community's knowledge base, language, and value system, teachers can achieve relevance for students and instil self-esteem and a sense of pride in their culture and community.

While the modern generation is less and less dependent upon hunting, gathering, and harvesting as a way of living, there is still the need to be part of the environment. There is still that tie to the community, to family, to one's traditional language, to customs, and to traditions that make Pinehouse Lake home for the offspring the founders of Snake Lake.

Mânomin in Saskatchewan

Because wild rice was first imported into Saskatchewan by people (rather than by nature), there are interesting stories around how and why this happened. Most of the people who were directly involved (e.g. John Stonhocker, and Conservation Officer Irving) have passed away. The following history was put together from the clear recollections of Kaz Parada of La Ronge, who was a commercial prospector in northern Saskatchewan in the mid 1900's. Kaz changed his vocation in 1967 when he took over La Ronge Industries. At the time, La Ronge Industries was a 3-year old business that specialized in wood working, with wild rice as a sideline (at Little Potato Lake initially). The wild rice part of the industry grew and expanded steadily through the years under Kaz's management. He retired in 1993.

At the end of Kaz's first year with La Ronge Industries, 4,000 lbs of wild rice was harvested in the Potato Lake region and sent to Manitoba for processing. In those days, no harvesting machinery was allowed on the lakes (a government regulation for commercial wild rice, a regulation that wouldn't change until 1979). Consequently Kaz learned the Aboriginal canoe method from his mentor John Stonhocker. The canoe method went like this: the person at the front of the canoe would pull the canoe through the wild rice, while the person at the back would use two wooden sticks to bend the plants into the canoe and shake the top part of the plant (its panicles). The ripe grain would drop onto the floor of the canoe. Kaz remembers harvesting 6 bags a day by working 8 hours before exhaustion set in. (Today with air boats, 6 bags are harvested in 15 minutes!) The canoe method continues to be used today by some First Nations in Minnesota who market their product as not only organically grown, but as hand picked.

In Kaz's early days (the 1960's), the wild rice industry was an employment creation program initiated by the provincial government. Thus there was pressure to expand to other lakes besides Potato Lake, in order to create more jobs. By 1969, Kaz's wild rice stands were found in Pinehouse Lake and as far as Île-à-la-Crosse.

Kaz recalls Stonhacker's story about job creation being the reason wild rice was first brought into Saskatchewan by conservation officer Irving in the early 1930's. The region needed to attract hunters for its tourism industry. Because the water level in the north was low at that time (making it amenable for wild rice), and because the population of wild ducks depended on the food available to them, people thought that wild rice would attract ducks, which in turn would augment tourism and thus create jobs.

As time went on, the industry expanded to more lakes. There was a growth rate of about 10% per year. For instance at Pinehouse Lake, Jerry Tinker leased a wild rice stand from La Ronge Industries in 1969.

By the end of the 1970's with the advent of airboats for harvesting, the wild rice yield was up to 300,000 lbs for Saskatchewan. Kaz was there when the regulations on mechanized harvesting were lifted, and he became involved in modifying airboats from Ontario and US to meet the conditions of northern Saskatchewan. This research and development was aided by Bill Reid's work at the College of Engineering, University of Saskatchewan. During the 1980's, people from all over the world came to La Ronge Industries to find out the latest achievements in airboat design. This immeasurably helped the Canadian industry in the manufacture of airboats. It also inspired people to grow wild rice crops in the western side of northern Saskatchewan, for instance, regions around Beauval and La Loche.

Not only did Kaz need to be creative with designing airboats, he also needed to be vigilant about international market conditions and the competition from the US industry. As a consequence, he helped to establish the International Wild Rice Association (in 1980) which led to co-operation in marketing, and thus an increase in markets all over the world for all players in the industry in North America.

Kas has observed that over the years as the wild rice industry expanded into the north country, traditional fishing, hunting, and trapping practices have decreased, along with the family outings that traditionally accompanied those activities. The technology of wild rice harvesting today does not encourage the traditional family outings that occurred seasonally in the past. These outings brought family members closer together. The modern wild rice industry poses an additional challenge to families: the wages earned during the short harvesting season (August and September) are not easily saved so that the money can be spent during the whole year.

Habitat of Mânomin

The conditions for growing mânomin in Saskatchewan are as complex as the balance of nature itself. Mânomin is particularly sensitive to a whole cluster of environmental conditions. Generally speaking, mânomin needs: (1) slow-moving rivers or shallow lakes that have water moving in and out; (2) climatic conditions (not too severe) that allow for a sufficient growing period of just over three months (100 days); (3) sufficient oxygen in the sediments where roots can take hold (stagnant ponds or

sloughs don't work); (4) clear water to allow sun light to pass through to the seedlings; (5) water that has low salt content, water that is neutral (or slightly basic) in pH (its acidity concentration), and water that has no pollutants; (6) protection from wind and waves; and (7) few competing plants (such as perennial weeds). Different conditions become more important than others during different parts of the growing cycle of mânomin (see the life cycle information below). For example, different depths of water will affect the growth of mânomin, as shown in Figure 1 (taken from page A17; i.e. page 17 in Appendix A). For more details on habitat, refer to pages A16-A32.

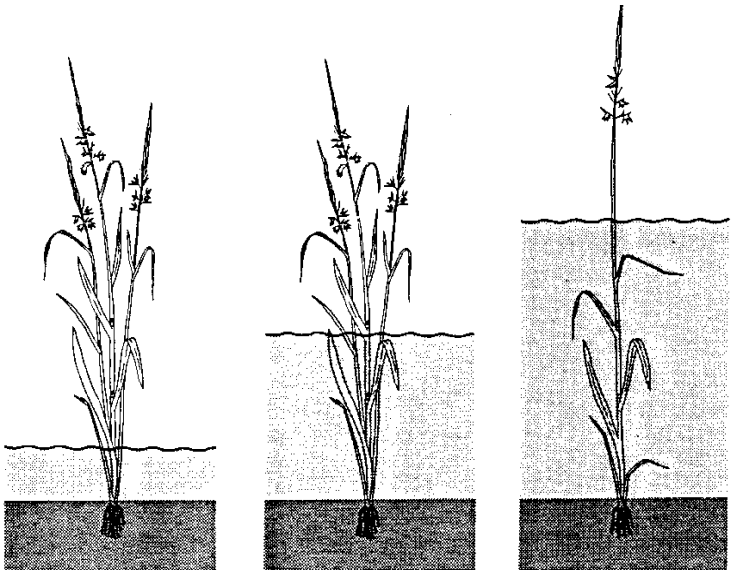


Figure 1. Mânomin growing in different water depths

Students in grades 11 and 12 may be interested in how some of these characteristics are assessed. For instance, the amount of salt content in the water can be estimated by measuring how well the water conducts electricity. The more salts dissolved, the more the water conducts electricity. There are gadgets to measure this conductivity. The concentration of acid in the water is measured by pH paper or by a gadget that indicates the water's pH level. The amount of oxygen available in the sediment can be estimated by measuring a chemical property of the substances that make up the sediment (an "Eh" reading, in millivolts). The chemical theory of oxidation/reduction explains all of this.

Due to mânomin's specific environmental needs, its preferred habitat will be populated by other plants whose presence signals good growing conditions. These plants include: yellow water lilies, water milfoil, and certain pond weeds. Thus, the habitat of mânomin demonstrates a balanced ecological system.

Characteristics of Mânomin

In General

Mânomin is an annual plant (cereal grain) that must develop from seed each year. Both the old and present-day technologies of harvesting mânomin cause seeds to drop back into the water for next year's crop. One of its peculiar characteristics is its germination process. Development of the seed (**germination**) is triggered by three to four months of freezing (or almost 0 °C temperatures). The seeds will not germinate if kept at warmer temperatures.

In the Culture of Western Science and Technology

Common white rice originally from Asia is called *Oryza sativa*. It is only distantly related to mânomin – both are members of the grass family, according to scientists.

The species of mânomin that grows in Saskatchewan is called ***Zizania palustris*** (one of four species/varieties found in North America; p. A6). Its hollow cylindrical stem and long narrow leaves resemble those of wheat, oats, and barley (all originally from Asia and all members of the grass family, by the way). A species of mânomin endemic to Asia, *Zizania latifolia*, is a perennial, and the roots are often eaten as a vegetable. Although *Zizania palustris* grows in Saskatchewan's boreal forest now, it is not native to this region. Therefore, you'll not find it listed in *Plants of the Western Boreal Forest and Aspen Parkland*.

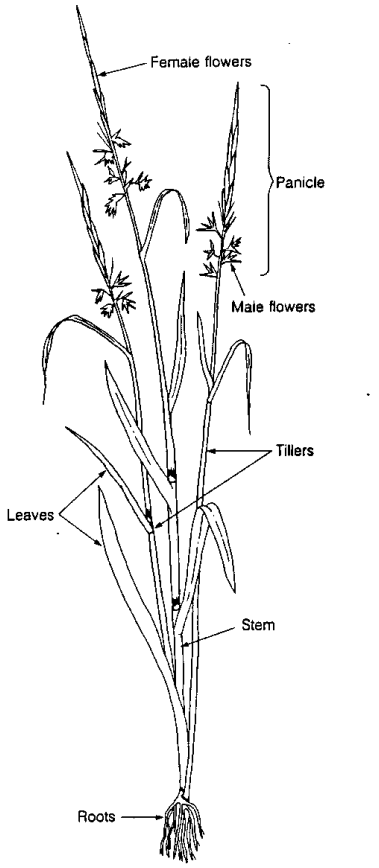


Figure 2. *Zizania palustris*

Figure 2 shows a drawing of *Zizania palustris*. It has 3 **panicles** (flower heads). Each panicle has both a **female floret** and **male floret** (see pages A5 and A13 for details). (Corn, another member of the grass family, has the male and female florets reversed.) The *Zizania palustris* florets grow out of the end of the main **stem** or out of the end of a branched stem called a **tiller**. The better the growing conditions, the more tillers are produced (see Figure 1, from p. A17). Reproduction (**pollination**) occurs between the female floret of one plant and the male floret of *another* plant. Here's the Western science explanation for how it happens (pp. A13-A15). In July the flowers mature on the plant from the top down. Thus the female floret matures before the male floret *on the same stem or tiller*. This usually prevents **self-pollination** from occurring. The wind blows some of the pollen from a mature male floret on one plant to a female floret on another plant. This process of **cross-pollination** results in a healthier gene pool.

Life Cycle and Habitat

The life cycle of mânomin can be described scientifically as going through 9 stages (described on p. A15): germination, floating leaf, aerial leaf, tillering, early flowering, pollination, grain formation, maturity, and seeding. These 9 stages are summarized here (see pages A17-A29 for more details). Environmental conditions can adversely affect the plant differently at each stage of its development. These habitat characteristics are also mentioned for each stage.

1. **Germination** stage. Germination occurs only after several months of cold temperatures (below 5 °C), most often in mid-May. When germination begins, it takes place very rapidly. Over the first 3 or 4 weeks, leaves sprout from the seed upward toward the water surface, as the roots anchor the plant into the sediment below.

The plant is completely under water during this time and is vulnerable to the availability of sunlight getting through to it. Thus, water clarity is important. As well there should be few plants (weeds) growing and little accumulated straw sitting around on the sediment, both of which will block out the sunlight. An absence of surface algae or scum is good. The sediment should have sufficient oxygen in it to promote root growth. The most important feature of the habitat at this stage, however, is the water depth – it cannot be too deep (not over 1.8 m). A depth of about 1 m is ideal, though the water level could be as low as 60 cm.

Whatever the depth is, it should remain fairly consistent, not varying more than 90 cm throughout the growing season. A gradual drop of water level during the whole summer is normal and does not affect the crop, as long as the drop is not more than about 90 cm.

Water circulation is an important habitat feature. Mânomin grows well in lakes and streams where there is some water movement. In northern lakes, natural water circulation occurs in the spring and fall. Oxygenated surface water and nutrients are carried below and enrich the sediment. Water circulation also carries away dead plants. This prevents the accumulation of straw from last year's crop. If the water moves *too quickly*, the sediment is washed away and the roots don't get a strong hold at the bottom of the lake or river.

2. **Floating leaf** stage. Finally, long, thin leaves reach the surface of the water, lie flat, and collect sunlight. The stem and other leaves continue to grow under the water. The plant is vulnerable to strong winds and waves at this point, so it should be grown in a sheltered area, such as bay. Also, a sudden rise or fall in water level of 15 cm (6 inches) can damage the young plants.

3. **Aerial leaf** stage. By the end of June, the stem and leaves begin to be seen sticking above the surface. They continue to develop during the aerial leaf stage.

4. **Tillering** stage. Additional branched stems (tillers) often form over the next 3 weeks. The more shallow the water, the more tillers produced (see Figure 1). The more weeds present, the less tillers produced.

5. **Early flowering** stage. Within a week (mid-July) the female and male florets emerge on the panicle. This is the time when the florets develop, the female slightly ahead of the male; the higher ones sooner than the lower one on the stem or on the tillers.

6. **Pollination** stage. By the end of July, pollination begins and continues for about 1 week. Successful pollination leads to the development of the plant's grain. (Described above in the section "In the Culture of Western Science and Technology."

7. **Grain formation** becomes evident in early August but takes about 4 to 6 weeks before the grain ripens.

8. At the stage of **maturity** harvesting can begin, usually at the end of August when the kernels at the *top* of the panicle are dark brown or black and fall off easily. These grain seeds are now mature. These are harvested quickly because they easily fall into the water for next season's crop, instead of into a harvester and off to market to be sold. A "wild rice harvester," as some mânomin agriculture workers call themselves, drives a harvester (usually an air boat; see pp. A47-A50) through a crop about once a week collecting the grain as it matures down the plant. Harvesting continues for about

2 to 4 weeks, up until a bad frost damages the remaining crop. Highly skilled, precision piloting must occur; for example, you have to maintain a straight line with little overlap between sequential passes over the crop (in spite of cross winds) and all this at a constant speed between 18-21 kph, no more no less (a difficult enough task driving a car with a speedometer!!). Pages A54-A57 provide more details.

If there are strong winds at the maturity stage, the ripe grain will shatter and will become seeds for next year's crop.

9. The last stage, **seeding**, happens naturally in the fall during harvesting (see pp. A36-A40). Also more seeding can occur just before freeze-up. This timing cuts down on the loss of seeds to migrating water birds. The seeds winter over in the mud. Spring seeding should start as soon as the lakes or rivers open and before the seeds begin to sprout. Spring seeding has the advantage of the seeds not being too implanted in the mud or being carried away by currents, but has the disadvantage of risking inclement weather and early development of the seed. Fall seeding is usually preferred by wild rice harvesters. Although seeding was traditionally done by hand, today a number of different mechanical devices have been invented.

Resources

Books:

Archibold, O.W. (Ed.). (1995). *Wild Rice in Saskatchewan: Agricultural Development in Harmony with Nature: A Reference Manual*. La Ronge, Saskatchewan: Saskatchewan Education, Northern Education Services Branch. ISBN 0-921291-13-2. This publication is **Appendix A** in this unit.

Johnson, D., Kershaw, L. MacKinnon A. and Pojar, J. (eds.). (1995) *Plants of the Western Boreal Forest and Aspen Parkland*. Edmonton, AB. (206, 10426-81 Ave.): Lone Pine Publishing. (ISBN 1-55105-068-7). This publication is a useful reference for the plants that compete with wild rice in its niche. Interestingly, for historical reasons, *Zizania palustris* is not an entry in the book.

Schultz, B. (1979). *The Wild Ricer's Guide*. (Out of print but in some libraries.) It has interesting information from a United States' perspective, particularly Aboriginal history and technology.

Internet sites (information):

http://www.agr.gov.sk.ca/crops/special/variety_options/Wrprod.asp
Wild Rice Production in Saskatchewan. Predates Archibold's "Wild Rice in Saskatchewan." Excellent site and photos. Last Update: April 1985.
http://www.agr.gov.sk.ca/crops/special/production_inf/Hvwrc.asp
Wild Rice Harvesting in Northern Saskatchewan**.** Connects with Archibold's "Wild Rice in Saskatchewan." Last Update: March 1989.
http://www.agric.gov.ab.ca/food/nutrit/grain03.html
Describes Alberta's wild rice industry that began in 1981. Topics include: how wild rice grows, harvesting, nutrition, and wild rice at the table.

http://www.barronspecialties.com/recipes.html
Has cooking recipes for wild rice dishes.
http://aquat1.ifas.ufl.edu/zizaqua.html
A scientific site about wild rice that grows in Florida.

Internet sites (commercial):

http://www.abc.gc.ca/expanding/english/grey_owl.html
Grey Owl Marketing Ltd., headquartered in Prince Albert, is owned by 72 Saskatchewan Indian Bands. It is a company built on co-operation. Incorporated in 1984, Grey Owl initially focussed on marketing Saskatchewan Lake wild rice. The Indian bands control the majority of the wild rice harvesting operations. They own 75% of the wild rice processing plant in La Ronge, and 100% of Grey Owl Marketing.
http://www.christmaspoint.com/
Christmas Point Wild Rice Company
Offering a variety of wild rice products growing wild in Northern Minnesota.
http://www.mnwildrice.com/
Minnesota Wild Rice from C & G Enterprises.

ACKNOWLEDGEMENT

Much of the historical information in the *Wild Rice* unit was the result of interviews with local people. The information was gathered for a class project by the 1997/98 grade 12 English class. "Thanks, students." Thanks also to Yvonne Maurice, our community Elder, and to Rose Smith for taking the time to read and make suggestions. As well, Gordon Healey, your knowledge of the history of Pinehouse was a welcome asset to the project. Thanks to Kaz Parada, La Ronge, for sharing his first-hand knowledge of wild rice in Saskatchewan.

The photograph of processed wild rice in a person's hands was loaned to the project courtesy of Northern Lights Wild Rice, La Ronge; photo by Dark Horse Studio, Saskatoon.

Last but not least, thank you Glen Aikenhead for initiating and believing in this project and for making it happen. It is a model for all disciplines for the inclusion of community-based knowledge in the school curriculum. It is a model that bridges languages, cultures, and knowledge, by taking the learner from the known to the unknown. I am deeply indebted to you for all you have taught me about teaching and about learning.

Lesson 1: *A Wild Rice Harvester*

Timing
1 class. Just before or during harvesting (late August to early October), or just before spring seeding.

The old canoe method of harvesting

Goals
1. To introduce the unit by bringing in a local harvester to focus students' attention on mânomin.
2. To give validity to local knowledge.
3. To provide information and a point of view to draw upon for Lesson 2.

Objectives
1. Students will pick up various bits of information about mânomin.
2. Most students will be motivated to learn about the industry.
3. (Optional) Students will use the old method to process the harvested mânomin into edible mânomin grains.

Value to be Conveyed
the community's knowledge can be very useful and important

Instructional Strategies
direct

Lesson Outline
1. Introduce the speaker. (A student may be the best one to do it.)
2. Clarify your expectations (e.g. students will use the speaker's information in future classes).
3. A student will thank the speaker, presenting an appropriate gift.
4. (Optional) As a demonstration or a group activity, process some freshly harvested mânomin into ready-to-cook grains, using a simulation of the old ways. This is what to do. Over a gas camp stove out of doors, heat a wok. Throw in a few hand fulls of freshly harvested mânomin. Toss them around using the wok to ensure the hulls (the husks surrounding the mânomin kernels) are heated evenly. Heat until the hulls are lightly burnt and crisp. A second person wearing thick leather working gloves grabs a hand full of the heated mânomin, lifts it up above the wok to catch any wind there might be, and rubs their hands together. The crisp hulls of the processed mânomin tend to blow away in the wind and the grains of mânomin drop back into the wok and tend to parch (become toasted). If the hulls are not crisp enough and stick to the grain, they will drop back into

the wok, too. Repeat several times to get rid of most of the hulls.

CELs / Subject Integration: technological literacy, Native Studies

Dale Smith talks with a class about harvesting mânomin and its connection to life.

Resources
local person in the industry

(optional part: gas stove, matches, leather work gloves, harvested mânomin)

Teacher Notes

- Choose someone who you think will relate well to your students. A student's parent or relative may be best.
- Contact the person well ahead of time. If it's during harvesting season, a rainy day might work best for the person.
- For the optional activity, it would be best if you could enlist the help of someone who was familiar with this process, perhaps the local industry person who comes in to talk to your students. Be sure to practise the process before doing it with your students.

Modern method of harvesting with an airboat

Lesson 2: *An Overview of Mânomin*

Timing
1 or 2 classes, following Lesson 1.

Goals
1. To systematically present an overview of the mânomin industry, in a way that makes students feel it is part of their community, and in a way that makes them feel confident about knowing some of its science and technology.
2. To develop an interest in mânomin as a healthy food.

Objectives
1. Students will remember where mânomin originated from and where the industry flourishes today. See Background Information, or Appendix A chapter 1. Use the local language as much as possible in this lesson. The Western scientific point of view will be introduced in Lesson 4.
2. Students will be able to properly sequence the 9 stages in the life cycle of mânomin (germination, floating leaf, aerial leaf, tillering, early flowering, pollination, grain formation, maturity, seeding). See Background Information, or Appendix A chapter 2. Change the above vocabulary to conform with local terminology.
3. Students will become aware of the fact that the Saskatchewan mânomin industry is "organic farming" and follows the principle of "sustainable development."
4. Students will remember some of the details related to:
   - a productive habitat. See Background Information, or Appendix A chapter 3.
   - harvesting. See Background Information, or Appendix A chapter 5.
   - processing. See Background Information, Appendix A chapter 7; or the tour of La Ronge Wild Rice Corporation, Appendix B.
   - food value. See Background Information, or Appendix A chapter 9.

   These will be addressed in greater detail later in the unit. This lesson, therefore, is an overview introduction to this information.
5. Students will be aware of future hands-on activities in the unit.

Value to be Conveyed
sustainable development

Instructional Strategies
direct

Lesson Outline
1. Present the information using as many photos, concrete props, and materials as possible. Involve students physically by getting them to display materials or demonstrating sequences of events. Constantly make the connection between the information you present and the visitor in Lesson 1.
2. To help students' personally access lecture information in the future, you might wish to do one of the following: (a) coach students on taking notes during your presentation; (b) hand out an outline of your presentation, leaving room for students to add information as you present it; or (c) hand out the information as a booklet to students.
3. When talking about the food value of mânomin, have students eat a small sample of a dish (dixie

cups and plastic forks).

4. Closure: invite each student to state one new thing they learned about mânomin that interests them. Arranging students in a talking circle might be a natural way to conduct this.

CELs / Subject Integration: communication, Social Studies

Resources

materials: cooked and uncooked mânomin
photos, brochures, posters, etc.
samples of mânomin at various stages in its development, harvesting, and processing, laminated onto bristle board
Appendix A

Teacher Notes

- Draw on your local industry for as many resources as possible. Web sites might be of interest to students (see Resources in the "Background Information" section).
- Cook some mânomin ahead of time, maybe as part of a dish, to serve near the end of the presentation. Recipes are found in Lesson 9.

Lesson 3: *Choosing Where to Plant: Stories from the Past*

Timing
1 class, plus 1 outing to plant seeds (optional)

Goals
1. To identify (in an everyday way) the plants in the place where it's best to plant mânomin.
2. To involve older people in the community.
3. To involve students in a trial planting of mânomin.

Objectives
1. Students will be able to identify the plants that usually grow where mânomin best grows (e.g. yellow water lilies, water milfoil, Richardson's pond weed).
2. Students will develop greater respect for the stories of older people who have knowledge handed down to them.
3. Students will identify this knowledge as the community's valid way of knowing about planting mânomin. This is valuable local knowledge.
4. (Optional) Plant mânomin seeds in a local lake or stream.

Value to be Conveyed
respect for traditional knowledge

Instructional Strategies
direct, experiential

Lesson Outline
1. Relate the local stories to students. The Western science point of view will arise in the next lesson.
2. Depending on the season, plant some mânomin seeds (from their frozen state in a freezer) in a local area that may sustain growth. Seeds often do very well, but only for one year. (The trick is to find a place that will regenerate seeds for ensuing years.)

CELs / Subject Integration: personal and social values and skills, Social Studies, Native Studies

Resources

Teacher Notes
- Gather information and stories from older community members who participated in mânomin cultivation in the early days. Be sure to get permission to retell their stories. Alternatively, you might want to arrange for students to interview people (after coaching them on the proper protocols to follow). For directions on how to prepare students to interview people, see the unit *Asâmak* (Snowshoes) Lesson 3 and the unit *Tth´ën* (The Night Sky) Lesson 1. You might also want to bring someone into your class.

Lesson 4: *The Habitat: Western Science Stories about* Zizania palustris

Timing
1 or 2 classes, but it could expand to much more depending if you wish to explore other ecology-biology content that is on your agenda for the year (optional).

Goals
1. To identify Western science as one of many cultural ways of knowing plants, a way that tries to be universally valid rather than locally valid.
2. To study the important plants related to mânomin and its habitat.
3. To introduce ecology or biology content expected of your class (optional).

Objectives
1. Students will describe 5 plants often found in the habitat of mânomin in the community; (e.g. yellow water lilies, water milfoil, Richardson's pond weed, cattails, spike rush, bladderwort, coontail, bur-reed, duckweed – the community's commonsense words). See pages A24-A28, as well as *Plants of the Western Boreal Forest and Aspen Parkland* pp. 226, 224, 221, 217, 246, 211, 224, 216, & 226, respectively.
2. a. Students will memorize the scientific name for mânomin grown in the community (*Zizania palustris*)
   b. Students will recognize the names of 2 other North American species (*Zizania aquatica and Zizania texana*) and the name of the main Asian species (*Zizania latifolia*).
   c. Students will recognize our common white rice (originally from Asia) as *Oryza sativa*.
3. At any given moment in the lesson when a student or teacher is talking, students will be able to identify the subculture in which the person's words belong; for example: "mânomin" – the community's common-sense culture; "*Zizania palustris"* – Western science; or "black rice" or "wild rice" – one's personal culture). [Emphasis in this lesson is on the subculture of Western science. But conversations will occur that belong to other subcultures, and students are expected to identify these subcultures, so that students will know what language and concepts belongs with what subculture.]
4. (Optional) Students will construct ecology/biology concepts you wish them to learn (e.g. niche, competition).

Western Scientific Value to be Conveyed
a naming system should be universal (it should work any where on the planet)

Instructional Strategies
direct

Lesson Outline
1. Just like a good tour guide taking students into a foreign country, make a game out of crossing a cultural border into the culture of science in which use scientific words such as *Zizania palustris, Zizania aquatica, Zizania texana*, *Zizania latifolia*, *Oryza sativa*, etc. Use this event to identify the 3 or more subcultures within which people will naturally be talking in the classroom, sometimes simultaneously (e.g. Aboriginal science, the community's common sense, personal family knowledge, and Western science). This should be fun for students. By identifying the various

subcultures that we switch between in the classroom, we nurture students' self-identity and encourage them to learn the Western science content. To learn Western science does not mean they have to reject their knowledge from the other subcultures they live in daily.

2. Using as many real materials as possible (or good photographs or diagrams), tell an engaging Western science story about the habitat of *Zizania palustris*. Make your objectives clear to students so they know what notes to take (or help them take these notes). Be particularly careful not to expect too much memorizing of Western scientific terms – just a few key terms from the whole lesson would be fine.
3. Point out the regions in North America where other species of *Zizania* exist. On a world wide scale, introduce students to the 2 Asian rice, *Zizania latifolia* and *Oryza sativa*. (A box of Uncle Ben's Rice would make a good prop for *Oryza sativa*.) You may wish to introduce students to wild rice paddies found in the US, contrasting them with the organic sustainable agriculture of mânomin. The concept of sustainable development applies here.
4. Closure: play a matching game by having students choose and place the correct card (with a scientific name printed on it) next to the material or photo you have on display. (In future lessons and units, get students to print their own cards and let them pose the matching game for other students in the class.)

CELs / Subject Integration: critical and creative thinking

Resources
sample of mânomin
samples (photos or diagrams) of plants in the habitat of mânomin
3 by 5 cards
Appendix A.

Teacher Notes
- Enlist local harvesters (or anyone with a boat) to get samples of the habitat plants you want to introduce your students to. If students have safe access to a rice garden, they could collect such plants. Your speaker (Lesson 1) may have identified some.
- Print Western scientific names of things on cards (3 by 5 inches) for the closure game.

Lesson 5: *Where the Mânomin Grows: A Field Trip*

Timing
field trip to a stand

Goals
1. To use the ideas from previous lessons in the natural context of a mânomin garden.
2. To collect materials and samples for analysis in subsequent lessons.
3. To get students to interact with their environment and their community.
4. To introduce students to career possibilities related to science and engineering.

An aerial view of a mânomin stand. The rows are evident.

Objectives
1. Students will accurately apply both common-sense terms and scientific terms as they interact with, and talk about, the mânomin stand.
2. Student will respect the environment by not causing any damage.
3. Students will systematically acquire and label several 1 litre (or half-litre) water samples in the area.
4. Students will collect (with the owner's permission) mânomin stocks (roots and all).
5. Students will observe the wild life or evidence of wild life (e.g. mallards and muskrats) that feed from mânomin. In short, students will be able to answer: Mânomin is a home to what?

Aboriginal Value to be Conveyed
respect for Mother Earth

Instructional Strategies
experiential

Lesson Outline

1. Before leaving:
   a. make sure students know exactly what they are to accomplish (observation sheets should be ready if needed), and exactly how they are to behave. Role playing a scientist might be helpful (to continue Lesson 4's cross-cultural game of identifying what subculture a person is speaking in) in focussing students' attention and behaviour.
   b. go over the class checklist of materials students are to bring.
2. At the site:
   a. conduct a short fun activity to bring students together.
   b. students will carry out the activities you arranged for them; for example:
      - identify plants whose names are on the 3 x 5 cards.
      - examine the mânomin carefully to identify its parts, its stage of development, etc.
      - for ripe mânomin, collect as much grain as possible.
      - identify wild life in the habitat. A dip net could be used to collect tiny critters that live in the habitat or in the vicinity of the mânomin plant.
      - measure water depth
      - measure flow of water at the stand: Mark 2 points, point A ("up stream") and point B, exactly 10 metres apart. At point A and in conjunction with a timer, a student lightly throws an apple into the water at right angles to the shore and the timer (standing at point B) determines how long it takes the apple to reach directly in front of point B. (If the flow is very slow, food dye may work better.) A recorder takes down the times. Repeat at least twice for a reliable measurement. Students calculate the speed of the water in the mânomin stand, metres per second, and in addition perhaps, kilometres per hour. If the flow is too slow to measure, abandon this activity.
      - good artists sketch some aspect of any harvesting equipment or feature of the habitat (pencil sketches on white hardboard – used for making walls – works best); other students can take photographs with a recyclable camera.

CELs / Subject Integration: critical and creative thinking, numeracy, Art

Resources

small containers for water samples (cleaned out plastic pop bottles);
plastic bags to hold wet plant specimens; materials to label containers and bags
old apples (or food colouring), metre stick, watch with second hand, observation sheets (for measuring the flow of water), white hardboard for pencil sketches
recyclable cameras (about 3)
reference materials; 3 x 5 cards with scientific names printed on them
drinking water (students' responsibility)

Teacher Notes

- Make all the proper arrangements for a field trip. It would be best to have extra adults to help at the water's edge. Students should bring rubber boots to class, several days ahead of time, to wear on the field trip.
- "Ducks taste noticeably better if they have fed on mânomin." Testing this claim could make an interesting science fair project!

Lesson 6: *Follow Up to the Field Trip*

Timing
2 classes following the field trip, (or more depending on how much class time you give to a poster construction activity); plus a little time over the next few weeks to follow up the germination activity.

Goals
1. To organize materials collected at the mânomin stand.
2. To analyse the water samples. pH is used in this lesson, though other tests will depend on the availability of the school's technology. Some ecology kits have very convenient measuring devices for oxygen content, etc.
3. To involve students in germinating their own mânomin.

Objectives
1. Students will make posters etc. out of the plant materials collected. These posters should illustrate some **idea** about the mânomin industry or about the ecology of the stand. Assessment should be influenced by how clearly other students or teachers get the message of a poster.
2. Students will construct the concept of pH (a scale from 0 to 14, indicating one type of chemical activity – "acid-base" activity – that has 7 as its "neutral" point. Samples of household materials will be studied.
3. Students will test the pH of the various water samples, using either pH paper or pH meters.
4. Students will germinate mânomin seeds and determine their quality (% of seeds that germinate).

Scientific Value to be Conveyed
math can make observing more precise, more observations increases our confidence in a result

Instructional Strategies
hands-on, experiential, direct

Lesson Outline
1. Explain how the posters will be assessed (the criteria and who decides) and how long students have to work on them (in class and out of class). Organize students to make their posters.
2. Introduce students to pH from the point of view of the need to measure the pH of mânomin stands, which give wild rice harvesters an indication of the appropriate balance of nutrients. Water with a pH measurement of between 7 and 8 is ideal for mânomin (i.e. neutral or very mildly alkaline), but good crops can develop in water that has a pH between 6 and 8.5 (very mildly acidic to very mildly alkaline. Some water areas in northern Saskatchewan are less than pH 5 and won't support a mânomin crop. Alkaline lakes in southern Saskatchewan would not work either, with a pH over 10.
3. Apply the concept of pH scale to common water-based substances, for example: vinegar, tap water, cleaning substances. Students may likely have studied pH before, and so draw upon their past knowledge here.
4. A fun instance of an acid-base reaction is vinegar with baking soda (or baking powder). The bubbles of carbon dioxide make it look almost like an explosion. Place a few tablespoons of baking soda in a glass. Pour vinegar on top and stand back. Get students to determine if the resulting solution is acidic or basic. It will be one or the other depending on whether you had more vinegar or baking soda to begin with.

5. **Germination** activity. Note: Mânomin seeds must be frozen for several weeks before they will germinate. See pages A37-A38 for some background information.
   - Give each group of students about 10 seeds (mânomin grains) that have been taken out of the freezer within the last 24 hours.
   - Test the pH of a large container of fresh lake or stream water.
   - If the pH is acceptable, students put about 500 mL of this water into a glass jar, one jar per group.
   - Students count their seeds and place them in a jar of this water. Cover the jar to prevent evaporation. Place the jars in the window, so they are all in the same conditions of temperature, light, etc..
   - Students observe their seeds each day and make observations.
   - Change the water every 2 or 3 days (whenever it becomes cloudy).
   - Within a week to 3 weeks, all the seeds that will germinate will have done so. (Seed quality varies depending where and when it was harvested. A 70% rate is considered very good. A range between 23% to 81% is typical for Saskatchewan.) Get each group of students to calculate their percent germination.
   - Pool the groups' data to calculate a class average, and discuss the value of relying on a conclusion based on more readings. Often, other teachable moments will arise when pooling data (e.g. a discussion whether or not to use a group's result if it is terribly different from the others).
   - A variation: If you can get seeds from different areas, investigate which area is best. This investigation will need to be conducted with more exact controls.

CELs / Subject Integration: Math

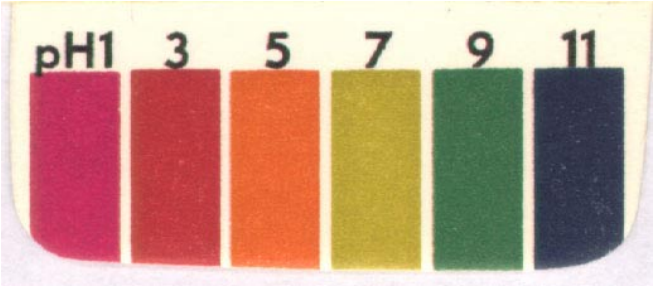
Resources
materials for the type of posters you wish students to construct
pH paper or meters
glass jars (sealers less that 1 litre, or beakers)
previously frozen mânomin seeds
fresh natural water (enough for the number of groups you have)

Teacher Notes
- Group work will likely be best.
- The **pH scale** divides water solutions into two categories – acids and bases. The line dividing the two categories is "neutral" and has a pH of 7. Pure water has a neutral pH, for instance. Also, a salt solution such as table salt dissolved in pure water will have a neutral pH of 7. (By the way, the saltiness of water can be a problem for growing mânomin, but saltiness is measured in a completely different way. A salty solution is often called "saline.") Some salts, however, chemically react with water to produce an acid or basic solution.

  Acidic substances chemically react with basic substances to produce water and salt-like substances (the type of salt depends on what acids and bases reacted). Base solutions (greater than pH 7) are sometimes called "alkaline," but acid solutions (less than pH 7) are always called "acidic."

The pH scale is not a linear scale, but an exponential scale (base 10). For each unit change on the pH scale, the acidity changes by *a factor of 10*. This means that a water sample with a pH of 6 is 10 times as acidic as a water sample with a neutral 7 pH. Similarly, a water sample with a pH of 3 is 1,000 times as acidic as a water sample with a pH of 6 (*not twice as acidic*). This is true anywhere along the pH scale between 1 and 14. However, when the pH is lower than 1.0, the acid concentration changes by a factor of 10 for every 0.1 change on the pH scale, and so on until reaching an imaginary acid concentration of infinity at a pH of 0. Similar things happen when the pH is greater than 14, and the imaginary infinity is reached at a pH of 15. These extreme points (0 and 15) can't actually be reached.

Students are not expected to deal with pH numerically like this (unless in grade 11 or 12). They are only to identify the scale with common substances, so they get a feel for the scale; e.g. materials with less than about 1 pH are dangerously acidic while materials with greater than 11 are seriously basic. (Normal stomach fluid, by the way, has a pH of about 1.) The table on the next page shows the different pH values for substances that students will recognize. If any student becomes curious about how our human bodies can have such variation in pH (from 1 to 9) but the blood maintains a constant pH of 7.40, then get them to investigate the curiosity as a science fair project. (The Western science explanation deals with acid-base reactions and buffer solutions.)



- Germination Activity:

  Obtain mânomin seeds much ahead of time and place them in a freezer for at least several weeks in a sealed bag. They can also be stored in a frozen block of ice.

  The day or so before the activity, get a bucket of fresh clear lake or stream water, with a pH close to 7.

COMMON THINGS AND THEIR pH

pH	natural things	store bought things	comments
			*
		battery acid	*
1 —			**Anything lower is dangerous to humans*
		lime juice	
2 —	stomach fluid (pH = 1 - 3)		
		vinegar	
		lemon juice	
3 —		soft drinks (pH = 2-4)	
		grapefruit & apple juice	
		orange juice	
4 —	acid rain	tomatoes	yellow perch & lake trout die
			brook trout & salamanders die
5 —		coffee (black)	perch, pike, & small mouth bass die
	normal rain water		
		potatoes	salmon, rainbow trout & whitefish die
6 —			snails, crabs etc die
	mouth saliva (pH = 5.5 - 7.5, depending on whether you're eating or not)		
	human urine (pH = 5 - 8, depending on what you ate or drank)		
		milk	
7 —	pure water		
	blood (pH = 7.40)	swimming pools	
		eggs	
	water good for mânomin (pH = 7 - 8)		
8 —			
		baking soda	
9 —	pancreatic fluid (reacts with the stomach fluid going into the large intestine)		
	sea water (pH = 8.5 - 10)		
10 —		normal hand soap	
	stomach antacid solutions from the drug store		
11 —			**Anything higher is dangerous to humans*
			*
			*
			*
12 —		bleach	*
		household ammonia	*
			*
		liquid drain cleaner	*
13 —			*
			*
			*
		solid drain cleaner	*
14 —		lye, caustic soda	*
			*

Lesson 7: *The Technology of Harvesting*

Timing
1 class

Goals
1. To acquaint students with the industry's need to be inventive with its harvesting technology.
2. To involve students in an authentic math activity.

Objectives
1. Students will be able to identify the harvesting equipment, and will tell accurate stories about the know-how needed by someone who uses the equipment (e.g. how fast an airboat should travel and how difficult this is to attain).
2. Compare the harvesting methods of two people in a canoe (highly sustainable development) with modern machinery. Articulate the technological value of efficiency (cost effectiveness) that goes along with the technology that people choose to use and develop.
3. Students will solve the problem of:
   a. estimating how many seeds are in a kilogram of seeds.
   b. calculating how many bags of seed to buy for a particular stand of mânomin.

Technological Value to be Conveyed
efficiency, using math can help efficiency

Instructional Strategies
direct, group (or individual) puzzle solving

Lesson Outline

1. Either you or a harvester will tell the stories about how to harvest the mânomin, drawing upon the field trip experiences and observations as much as possible. These stories will include how people have made the airboats more efficient and how they have changed their techniques using the airboats. See Appendix A chapter 5.
2. Pose the puzzle: If these mânomin grains were going to be your seeds, how many would be in a 1 kg bag. (Students will need to count out a certain number, such as 30, weigh them, and then calculate how many would be in 1 kg. Combing results into a class average would be a logical thing to do in the culture of science.) Deciding how many to count out raises an interesting discussion about efficiency – the more you count out, the more accurate your result; but the more you count out, the more human resources it takes (time = $). A trade-off must be made.
3. Using the results from the first puzzle, pose a second puzzle: If you own a 8 hectare stand (a small family operation size), and if you wanted to plant 35 plants per square metre, and if the germination rate of seeds is 70%, how many bags of seeds (at 1 kg/bag) do you need to buy? A hectare is a square plot 100 m by 100 m. Have students submit a business proposal for buying their seeds. Group work may work best.

CELs / Subject Integration:
technological literacy, Math

Resources

photos and sketches of harvesting equipment,
local harvester,
a packet of mânomin (to distribute among students for them to count and weigh the grains),
weigh scale (sensitive to a tenth of a gram, if possible),
calculators

Teacher Notes

- Arrange this presentation ahead of time so support material can be in place.
- Some First Nations peoples in Minnesota continue to use traditional methods to harvest mânomin. This is a selling feature of their product. In Saskatchewan, commercial growers were not allowed to use any machinery up until about 1979. Mechanized harvesting is a fairly new phenomenon.

Lesson 8: *Processing Mânomin*

Timing
field trip to La Ronge Wild Rice Corporation, or a photo/script tour of the plant (Appendix B) – about 40 minutes


Ready to send the crop to La Ronge

Goals
1. To acquaint students with the technology and business end of mânomin production.
2. To develop language skills by making connections between a second language of a student and the concrete events to which that language refers.

Objective
1. Students (in groups) will be able to write accurate and fairly detailed stories about what happens to the harvested mânomin grains between leaving the stand and being sent to the packagers for distribution around the world. See Appendix A chapter 7.
2. Students will be able to explain some of the mechanized processes used at the plant; e.g. how a mixture of solid things (hulled mânomin grains, pure mânomin grains, and rocks) can be made to act like a fluid, due to a machine's vibration, due to the air blowing upward through the floor of the machine, and due to gravity pulling down on the solid particles, all at the same time.

Value to be Conveyed
quality control

Instructional Strategies
experiential, direct

Lesson Outline
1. Prepare students ahead of time for what they should expect to do and see, and what you expect of them. Observation sheets or booklets might be a good idea for organizing students' observations when they are at the plant.
2. a. Conduct the field trip.
   b. Alternatively, arrange for your students to see a multimedia tour of the plant by interacting with Appendix B, either with you as the tour guide or students working in groups. For students who need more teacher direction, or as an introduction, you can effectively use Appendix B to conduct your own tour of the plant. The language and detail you use will be tailored to the needs of your students. As a follow-up to this introduction, put students in pairs or triads, selected in a way so they can help each other read the material, explain the material, and keep on task. Compose an assignment or activity to guide their work.
3. Follow up. Have students compose thank-you letters to manager Mr. Bill Plunz.

CELs / Subject Integration: critical and creative thinking, technological literacy, Language Arts

Resources

Appendices A (a PDF file) and B (a Netscape file).

Mr. Bill Plunz, manager
La Ronge Wild Rice Corporation
Box 510, La Ronge, SK, S0J 1L0
phone (306)-425-2283, fax (306)-425-5575

Teacher Notes

- Make all the proper arrangements for a field trip.
- If you are going to use Appendix B, try to tour the plant yourself ahead of time. The photographs in Appendix B will mean much more to you if you have seen the real thing. Here are four of them:

Unloading bags of mânomin into piles called "windrows"

Turning the windrows to prevent rotting, while the mânomin cures

A conveyer belt drops a mixture of pure mânomin (black) and hulled mânomin (brown) into a "cup elevator."

The green machine vibrates to separate pure mânomin from other stuff, then it is bagged (bottom left). The man is doing quality control.

Lesson 9: *Nutritional Value of Mânomin*

Timing
about 1 class, and extending into a lunch hour would be good

Goals
1. To develop interest in good dietary decisions.
2. To have fun eating some of the recipes for cooking mânomin.

Objectives
1. Students will be able to repeat the dietary advantages of mânomin (e.g. compared to other cereals, mânomin is high in protein, carbohydrates, and minerals, but low in fats and oils). See Appendix A chapter 9.
2. Students will be able to follow a recipe.
3. Students will describe their taste sensations when they eat the mânomin dishes.

Value to be Conveyed
good health is important

Instructional Strategies
experiential

Lesson Outline
1. Relate stories about mânomin determining the inter-tribal politics of some First Nations tribes because of its high nutritional value. Mânomin sustained many tribes and was dearly sought after. Schultz's *The Wild Ricer's Guide* is one source that has pertinent information.
2. Hand out your selection of recipes, indicating which ones students would prepare today, which ones have already been made. (See "Recipe Ideas" at the end of this lesson.)
3. Have students prepare some dishes by following the recipes. Heat the previously prepared dishes.
4. Compare the relative nutritional content of mânomin with regular white rice. See Table 1 for data.
5. Eat the fruits of the students' labour. You may want to invite guests, such as the principal, and people in the community, especially those who helped with the unit.

CELs / Subject Integration: technological literacy, Native Studies

Resources
access to the cooking room
recipes for mânomin dishes (see specific suggestions at the end of this lesson, plus a section towards the end of *Wild Rice in Saskatchewan* – Appendix A to this unit).

Here are some recipe books:
How to Cook Wild Rice. Northern Lights School Division, La Ronge.
Northern Saskatchewan Wild Rice. Sask. Agriculture, Extension Service, Box 5000, La Ronge.
Wild Rice Cook Book, La Ronge Industries Ltd, Box 193, La Ronge.

Teacher Notes

- Mânomin expands 4 times in volume when cooked.
- Choose the recipes you think will have the best effect on students.
- NOTE: check on student allergies, and eliminate cooking ingredients accordingly.
- Cook some dishes ahead of time to be heated at school (in a microwave oven).
- Acquire and prepare the ingredients for the dishes you wish students to prepare in class.
- Because the expense may be a critical factor in students' homes, one must be sensitive about expecting families to purchase mânomin for preparing dishes at home.

Table 1. Nutritional Content of Common Rice Varieties

Nutrient	Mânomin	White Rice	Brown Rice
Protein	12.6 grams	6.7 grams	7.5 grams
Fat	0.9 grams	0.4 grams	1.9 grams
Carbohydrate	73.4 grams	80.4 grams	77.4 grams
Calcium	30 milligrams	24 milligrams	32 milligrams
Phosphorus	320 milligrams	94 milligrams	221 milligrams
Iron	1.5 milligrams	2.9 milligrams	1.6 milligrams
Sodium	-	5 milligrams	9 milligrams
Potassium	181 milligrams	92 milligrams	214 milligrams
Thiamine	0.45 milligrams	0.44 milligrams	0.34 milligrams
Riboflavin	0.63 milligrams	0.04 milligrams	0.05 milligrams
Niacin	6.2 milligrams	3.5 milligrams	4.7 milligrams
Calories	352 kcal	353 kcal	360 kcal

From *How to Cook Wild Rice*

Recipe Ideas

Basic Recipe for Cooking Mânomin

250 mL	(1 cup)	mânomin
1 litre	(4 cups)	water
5 mL	(1 tsp)	salt

1. Wash mânomin by placing in a wire strainer and running cold water through it.
2. Place rice, water, and salt in a heavy saucepan. Bring to a boil.
3. Cover and simmer over low heat for about *50-60 minutes* (until kernels puff open to reveal their white interior).
4. Remove cover. Fluff mânomin with a fork. Cook 5 minutes longer.
5. Remove saucepan from heat and drain.

Makes 8-10 servings. (Provided by Matilda Lariviere, Pinehouse Lake.)

Cream of Mânomin Soup

125 mL	(½ cup)	uncooked mânomin (or 2 cups cooked mânomin)
1 large onion		diced
½ green pepper		diced
2 ribs celery		diced
10 large fresh mushrooms		diced
125 mL	(½ cup)	butter
125 mL	(½ cup)	flour
2 litres	(8 cups)	hot chicken broth
salt & pepper to taste		
250 mL	(1 cup)	light cream (or half and half)

1. Prepare mânomin following basic recipe. Wash mânomin with cold water. Place rice and water in a heavy saucepan. Bring to a boil. Cover and simmer over low heat for about *50-60 minutes* (until kernels puff open to reveal their white interior). Drain well.
2. Saute the onion in butter. Add mushrooms, green pepper and celery, and then cook until tender.
3. Sprinkle in the flour, stirring and cooking until the flour is mixed in, but do not let it begin to brown.
4. Slowly add the chicken stock, stirring until all the flour/butter/vegetable mixture is blended well.
5. Add the rice and season to taste with salt and pepper.
6. Heat thoroughly but gently, stir in the cream, but do not boil.

Makes about 12 servings. (from *How to Cook Wild Rice*)

Mânomin Fruit Salad

3 cups	cooked mânomin
1	11 oz can mandarin oranges, drained
1	16 oz can pineapple chunks, drained
1	3 oz jar maraschino cherries, drained and halved
1 cup	chopped walnuts
1	3 oz package orange-pineapple flavour gelatine. Do not dissolve.
1	13½ oz carton frozen whipped topping
1 cup	miniature marshmallows
shredded coconut	

1. Combine all ingredients, except coconut, in a bowl. Sprinkle with coconut if desired.
2. Salad will keep up to a week if properly refrigerated.

Serves 8-10. (from *How to Cook Wild Rice)*

Mânomin Spinach/Lettuce Salad

250 mL	(1 cup)	mânomin
1 litre	(4 cups)	water
5 mL	(1 tsp)	salt
250 mL	(1 cup)	golden Italian dressing
125 mL	(½ cup)	red peppers, sliced or chopped
250 mL	(1 cup)	fresh mushrooms, sliced
125 grams	(¼ lb.)	bacon, fried to make bacon bits
		Romaine lettuce or spinach (or combination)

1. Prepare mânomin following basic recipe. Wash mânomin with cold water. Place rice and water in a heavy saucepan. Bring to a boil. Cover and simmer over low heat for about *50-60 minutes* (until kernels puff open to reveal their white interior). Drain well. Cool.
2. Marinate the rice in golden Italian dressing for 1 day.
3. Toss the marinated rice with the vegetables, bacon bits, and lettuce or spinach. Season with salt and pepper to taste.

(from *How to Cook Wild Rice*)

Mânomin and Chicken

6	chicken breasts
1 cup	while wine
1 can	cream of celery soup
1 can	cream of chicken soup
1 soup can	water
1 pkg.	onion soup
1 pkg.	Uncle Ben's wild and long grain rice

1. Preheat oven to 350 °F.
2. Mix all ingredients except chicken.
3. Place breasts (cut in two) into mixture in 9x12 inches pan.
4. Bake, covered, ¼ hour; then uncover and continue baking 1 hour or until tender.

(Provided by Rose Smith, Pinehouse Lake.)

Bonnie's Mânomin Casserole

1 cup	celery, chopped
½ cup	green pepper, chopped
4 tbsp	butter, divided
1	10-oz can cream of mushroom soup
1	can cream of chicken soup
1 cup	chicken broth or bouillon
1	4-oz can mushrooms stems and pieces, drained
1	2-oz jar pimento, chopped, drained
dash	garlic powder, salt and pepper to taste
3 cups	cooked mânomin
2 cups	cooked chicken or turkey, diced
1	2-oz package thinly-sliced almonds
1 cup	croutons

1. Preheat oven to 350 °F. Grease a 3 quart baking dish, set aside.
2. Saute onion and green pepper in 2 tbsp butter until onion is golden and transparent, but not brown.
3. Blend soups and chicken broth (or bouillon) together until smooth.
4. Mix all ingredients, except croutons, together gently and put into prepared baking dish.
5. Saute croutons in remaining 2 tbsp butter. Sprinkle over casserole.
6. Bake for 1 hour.

Makes 8-10 servings. (from *How to Cook Wild Rice*)

Mânomin and Ground Beef Casserole

1 cup	uncooked mânomin
1 lb.	lean ground beef, do not brown
1	4 oz. can mushrooms, undrained
1	4 oz. can cream of mushroom soup
1	4 oz. can cream of celery soup
1	soup can of water
½ cup	*each* of diced celery and onion
salt and pepper to taste	
¼ cup	Parmesan cheese (for topping)

1. Blend all ingredients, except the cheese, together in a 2-quart casserole. Top with Parmesan cheese.
2. Cover and bake at 325 °F (160 °C) for 2 hours.

Makes 10 servings. (Provided by Rose Smith, Pinehouse Lake.)

Mânomin Casserole

1 cup	mânomin
2 cups	water
1 can	consommé (beef broth)
1 cup	minute rice
1 cup	celery
½ cup	green peppers
1 medium	onion
1 can	mushrooms, drained

1. Soak water and rice overnight.
2. Sauté celery, green pepper, onion and mushrooms.
3. Mix all ingredients into a casserole dish.
4. Cover and cook in oven at 350°F for 30 minutes (or until rice is cooked).

Serves 4 to 6. (Provided by Rose Smith, Pinehouse Lake.)

Mânomin Broccoli Casserole

1 cup	mânomin
1 bunch	broccoli
1 cup	fresh mushrooms, sliced
½ cup	chopped celery
2 tbsp	Cheez Whiz
1 can	cream of mushroom or cream of broccoli soup
¼ cup	milk

1. Wash and soak mânomin overnight. Drain.
2. Put mânomin into cooking pot. Cover with water. Add pinch of salt.
3. Bring to a boil and simmer until mânomin is tender (30-40 minutes), adding more water if necessary.
4. Drain. Stir in 2 tbsp Cheez Whiz until melted.
5. Mix in can of soup and ¼ cup milk.
6. Peel broccoli stems and cut into bight-sized pieces. Steam broccoli, mushrooms and celery until tender-crisp.
7. Place steamed broccoli, mushrooms, and celery into a large casserole dish. Add mânomin mixture.
8. Bake uncovered for ½ hour at 325°F.

(Provided by Rose Smith, Pinehouse Lake.)

Mânomin

2 cups	mânomin
1 medium	onion, chopped
	salt
6 cups	water
2 cans (284 ml)	mushrooms
¼ cup	butter or margarine

1. In a large pot, add mânomin to salted water and bring to a boil.
2. Reduce heat and let boil slowly for 45 minutes to 1 hour, or until rice has popped and is tender.
3. In a frying pan, melt butter and sauté the onions and mushrooms.
4. Drain wild rice; add the onions and mushrooms. Stir well and serve.

Serves 4. (Provided by Rose Smith, Pinehouse Lake.)

Mânomin Dressing for Game Birds

1 (6 oz.) pkg	mânomin
4 cups	water
½ cup	onion, shredded
¼ cup	butter
¼ cup	mushrooms, sliced
¼ cup	celery, diced
1 can	chicken broth

1. Wash and soak mânomin 3 to 4 hours.
2. Boil in salted water until tender (40 minutes), making sure the mânomin is not sticking (add more water if necessary)
3. Melt butter in frying pan. Add onion and sauté.
4. Add mânomin and season to taste. Mix lightly.
5. Stuff game or fowl.

(Provided by Rose Smith, Pinehouse Lake.)

Mânomin Dressing

1½ cup	mânomin
¼ cup	butter
3 stalks	celery, chopped
1	onion, chopped
1	sweet red pepper, chopped
½ lb	framer's sausage, casing removed
½ cup	chicken stock
1½ tsp	dried marjoram
¾ tsp	salt
¼ tsp	black pepper

1. Cook mânomin in boiling water for 45 minutes, or until tender. Drain.
2. In a skillet, melt butter over medium heat; then cook celery, onion and red pepper for 3 to 5 minutes.
3. In a bowl, mix together sausage (break into bight-sized pieces), chicken stock, mânomin, onion mixture, marjoram, salt, and black pepper.
4. Transfer to a greased 12-cup casserole. Cover and bake in a 325°F oven for 45 minutes.

Makes about 8 cups. (Provided by Rose Smith, Pinehouse Lake.)

Mânomin Stuffing

½ cup	mânomin	salt & pepper	½ tsp sage
1 qt.	boiling water	½ lbs. sliced mushrooms sauté	2 tbsp fat
			2 beaten egg yolks

Cook mânomin (40 minutes), drain and rinse. Add remaining ingredients and blend well. Stuffs a 2 lb bird.
(Provided by Lena McCallum, Pinehouse Lake)

Mânomin Pancakes

¼ cup	uncooked mânomin
2 cups	water
½ tsp	salt
1	egg, beaten
1 cup	milk
1 cup	all purpose flour
3 tbsp	butter or margarine, melted
2 tbsp	sugar
2 tsp	baking powder
½ tsp	salt

1. Prepare mânomin following basic recipe. Wash mânomin with cold water. Place rice and water in a heavy saucepan. Bring to a boil. Cover and simmer over low heat for about *50-60 minutes* (until kernels puff open to reveal their white interior). Drain well. Rinse with cold water and drain again.
2. Beat remaining ingredients in a medium bowl until blended. (Batter will be lumpy.)
3. Stir in mânomin.
4. Lightly grease heated griddle. Pour batter by ¼ cupfuls onto hot griddle.
5. Turn pancakes when bubbles form, but before bubbles break. Cook until golden brown.

Makes about 10.
Alternative: use your own favourite pancake batter. Just stir in cooked mânomin before frying.
(from *How to Cook Wild Rice*)

Mânomin Muffins

1/3 cup	uncooked mânomin
2 cups	cold water
½ tsp	salt
2	eggs, beaten
1½ cups	all purpose flour
3 tsp	baking powder
2 tsp	sugar
½ tsp	salt

1. Prepare mânomin following basic recipe. Wash mânomin with cold water. Place rice and water in a heavy saucepan. Bring to a boil. Cover and simmer over low heat for about *50-60 minutes* (until kernels puff open to reveal their white interior). Drain well. Rinse with cold water and drain again.
2. Heat oven to 400 °F.
3. Mix mânomin, milk, butter, and eggs in medium bowl. Stir in reaming ingredients just until flour is moistened. (Batter will be lumpy.)
4. Four by ¼ cupfuls into greased muffin cups.
5. Bake in 400 °F oven until muffins are golden brown, 20-25 minutes. Remove muffins from pan immediately.

Makes 12 muffins. (from *How to Cook Wild Rice*)
Alternative: use your own favourite muffin batter. Just stir in cooked mânomin before baking.

Lesson 10: *Debriefing and Review*

Timing
1 class

Goal
To review some of the unit's details.

Objectives
1. Students will have information about the mânomin industry on the tips of their tongues.
2. Students will compare the old methods with the new methods for harvesting and processing mânomin.

Value to be Conveyed
co-operation

Instructional Strategies
indirect

Lesson Outline
1. Assign different groups of students different aspects of the industry (selecting a site, seeding, harvesting, processing, eating, etc.). Get each group to compose a game, such as Pictionary, Charades, Jeopardy, or Trivial Pursuit. You might want to assign each group to one part of the mânomin industry or to the unit, in order to cover all the aspects of your teaching. Decide if all groups will use the same game, or whether they'll be able to choose themselves among the formats you propose. It could be fun to have the groups give themselves a name. See Teacher notes below for ideas on four games.

CELs / Subject Integration: personal and social values and skills

Resources
Compose about 10 "trivial pursuit" cards related to various aspects of the mânomin industry. Choose topics you want students to review.

Teacher Notes
- Here are some ideas to get you started using a game format for reviewing the unit's content.
  a. Pictionary: Involve students in composing words to be drawn, and in deciding how to organize the class for maximum participation.
  b. Charades: Have each group write 2 or 3 facts or terms about the mânomin industry. A student in another group has to act out the fact or term in front of his/her own group to figure out. Keep time limits short. Take turns among the groups.
  c. Jeopardy: Compose categories in which students will compose statements. Decide how many statements per category you'll have ($100, $200, $300, etc.). A 5 by 3 Jeopardy set up will need 15 statements, for instance. Compose a class Jeopardy chart on the overhead or flip-chart paper. Each group designates its recorder. That person writes down (decide how you want to organize this) both the square's statement and the expected question that should be posed by another

group. During the game, when category C is chosen, for example, then group C's recorder will administer the game while the rest of the group members will hum the Jeopardy theme – to time the group composing the question. The teacher is arbitrator and keeps a record of each group's winnings ($). Organize for maximum participation.

d. Trivial Pursuit: A group composes 5 "trivial pursuit" cards about their assigned part of the industry. Play the game as a whole class, organized into groups, using students' cards and the ones you made up yourself.

- For a group of interested students, an imaginative *science fair project* could be to design a board game that teaches players the content of this unit. For instance, each player moves 1 space per turn, which represents 1 week in the growing season for growing mânomin (100 days is about 15 squares). Different regions of the board represent different stages of growing. A player lands on squares that require picking a card from the top of various piles of cards stacked face down (each card states some positive or negative event that has a consequence for the yield and profit for that year). Each player would keep a public record of gaining or losing money profit or yield. Everyone keeps moving forward on the board, but depending on which cards are picked (the cards are randomly shuffled and stacked upside down as in many board games), some players will have higher profits. Remember to include squares at the end for processing and marketing, including the trip into market and the market conditions.

Churchill River flowing into Pinehouse Lake

Mânomin

Appendix A

Wild Rice in Saskatchewan

Agricultural Development in Harmony with Nature
A Reference Manual

Saskatchewan Education, Training and Employment
Saskatchewan Agriculture and Food

This document is electronically stored as a PDF file on the *Rekindling Traditions* CD and on the internet at http://capes.usask.ca/ccstu.

Appendix B

A Tour of the
La Ronge Wild Rice Corporation
Processing Plant

Script:	Glen Aikenhead
Consulting:	Bill Plunz, La Ronge Wild Rice Corporation Gloria Belcourt
Photos:	Glen Aikenhead
Production:	Debbie Mielke, Saskatchewan Education, Northern Division
Voices:	Jason Bekkatla & Dallas Hicks, MBC, La Ronge

This multimedia tour is electronically stored as a Netscape file on the *Rekindling Traditions* CD and on the internet at http://capes.usask.ca/ccstu.

CD DIRECTIONS: For Windows, open Netscape and choose File > Open Page. Select the “Choose File” (Browse) button. Locate *Wild Rice Appendix B* on the CD, and open it. Select the “index” file. This is the file that Netscape should open to begin the tour. Open it.