This lesson was funded by Minnesota Project Learning Tree and the Sustainable Forestry Initiative State Implementation Committee, and provided by the Minnesota Department of Natural Resources.

A Forest of Balance

Overview

Students will learn about renewable and nonrenewable resources, especially those used by Ojibwe and Dakota people in Minnesota. Students will take part in simulations that demonstrate how to take care of renewable resources so they will last for generations.

Grades

4-8

Objectives

Students will 1) identify and define renewable and nonrenewable resources and explain the differences between them, 2) participate in simulations that demonstrate society's use of renewable and non-renewable resources to understand the factors that make a renewable resource sustainable.

Subjects

Social studies, Science

Background

Natural resources are the raw materials we use for housing, clothing, transporting, heating, cooking, and so on. They include the air we breathe, the water we drink, the land we farm, and the space we use for living and recreation. In short, they are all the things we use in our physical environment to meet our needs and wants. We can put them into two categories: Nonrenewable and renewable resources.

Nonrenewable resources exist in finite or limited amounts. For example, fossil fuels are formed through natural processes that take millions of years. If we use all the available fossil fuels, no additional amounts of them will ever be available to us—at least for millions of years. Other nonrenewable resources such as copper and other metals were created billions of years ago during the explosions of giant stars. These nonrenewable resources are not created through natural processes here on Earth. The only way we could get more of them is to mine them on other planets.

Renewable resources can be replenished through natural and/or human processes. For example, even though trees die naturally or are harvested, new trees are naturally reseeded or can be replanted by humans. Likewise, people can consume animals while protecting habitat to produce future animals.

["Perpetual" resources such as solar energy and wind energy are a subgroup of renewable resources that are constantly or "perpetually" available.]

Renewable resources need to be carefully managed. This is important. People can use a renewable resources in a way that it cannot recover itself. For example, bison in Minnesota were once hunted so heavily and irresponsibly that they became extirpated from the state



(today's herds were carefully bred from remnant herds in Canada). Forests can be overharvested to the point where soil can be damaged through erosion or massive wildfires, preventing regrowth. Groundwater supplies may be pumped out of the ground faster than precipitation can trickle down to replenish them.

The maximum rate at which people can use a renewable resource without reducing the ability of the resource to renew itself is called **sustainable yield**. For example, a sustainable yield of timber would mean harvesting only the volume of trees that the forest could regrow. This term also applies to water and wildlife. The sustainable yield of any resource varies from region to region, and it can be altered through various management practices.

When people **recycle** or **reuse** natural resources, they decrease the demand on the resource, save energy, and reduce pollution. When people recycle aluminum cans, less bauxite needs to be mined to create "new" aluminum cans. Aluminum cans can be recycled and turned into new cans or other aluminum products many times over. The manufacture of recycled aluminum cans saves 95% of the energy used to manufacture aluminum cans from bauxite ore. The amount of energy saved in one year by recycling aluminum cans could light the entire city of Washington, D.C. for four years.

With paper products, the equation is more complicated. Paper fibers cannot be recycled indefinitely and new fiber from trees must be added to the papermaking cycle. However, producing recycled paper requires about 50% less energy than producing non-recycled paper. And making recycled paper produces 70% less water pollution and much less air pollutants, such as greenhouse gases, particulates, and other hazardous pollutants.

Many renewable resources (such as the indigenous forest products described in the student pages) and nonrenewable resources can be recycled and reused.

Getting Ready

Make a copy of the <u>Clues and Questions Student Page</u> for each team of four students. The <u>answers</u> are provided in this lesson. Prepare materials for demonstrations.

Doing the Activity

Part A: Demonstrations

Ask students to describe what a resource is. Guide them toward understanding that a resource is something we use, such as wood is a resource to make houses, or copper is a resource to make batteries for cell phones. Then, tell students that they will engage in two demonstrations (games) that simulate how we use resources.

Try these simple demonstrations to teach students about sustainable use and give them a better understanding of renewable and nonrenewable resources.

Popcorn Generation Demonstration

Fill a large jar or other container with popcorn. Mark 14 slips of paper as follows: Two "1st generation," four "2nd generation," and eight "3rd generation."



- 2. Have 14 students each draw a slip of paper from the sack. They should not tell anyone what the paper says. Give those students a lunch bag and explain they will be part of a demonstration.
- 3. Ask the two 1st Generation students to come up to the big jar of popcorn. Explain that the food in the jar represents the world's supply of a nonrenewable resource. Tell them they can take as much of it as they want. Let them fill their bags while the rest of the group watches.
- 4. When the 1st Generation students have gotten their fill, invite the four 2nd Generation students to go up and take as much of the remaining popcorn as they want. After they've finished, have the 3rd Generation student come up and take what they want.
- 5. Discuss with the students what is happening to the world's popcorn supply. What happened to the total amount of the resource? How much was left for each successive generation? Was anything left for a 4th generation? Did any of the students who were part of the demonstration think about those who might be eating after them, or were they only trying to get as much popcorn as they could?
- 6. What parallels do the students see between what happened in the demonstration and what happens in the real world?
- 7. You may choose to have students repeat the demonstration and try different variations. For example, vary the number of students in each generation while the distribution of the resources remains the same. Or students can come up with their own variations to try.

Note—Students may eat as much of the popcorn as they can without any thought as to who will come after them. By the time the 3rd Generation students are finished, there should be little or no popcorn left for the 4th. Even if the students don't eat as much as they can, they will eat some and the 4th generation will have very little. The students should realize that as new generations come along, there will be less and less of the resource available to them, and eventually there will be nothing.

Greed vs. Need Demonstration

- Divide the group into teams of four. Give each team 16 pieces of candy, such as M&Ms, or wrapped candy. Explain that students will play a game in which the candy represents the team's supply of a renewable resource that is replenished after each round of play. Each student can take freely from the team supply; however, the team should keep in mind the following: Rules:
 - At the end of the game, each team member will get to eat all the candy he or she amassed.
 - Each team member needs to take at least one piece per round to be sustained.
- Round One: Allow students on each team to take freely from their team's candy supply. Students should record how many pieces they have taken and how many are left in the team pile.
- 3. Find out how many pieces each group has in its team pile, and give the group half that amount in new pieces.
- 4. Play three or four more rounds, stopping after each to find out if any of the students didn't survive. Then provide each group with the prescribe amount of new candy.
- 5. After four or five rounds, have the students share what happened in their teams. In which teams did all the students survive? Which students had the most candy in their personal supplies? Which team had the most candy in its collective pile? Which teams think they would be able to



keep a resource forever as long as the resource kept renewing itself? On these teams, how many pieces were these students taking each round?

- 6. Discuss these questions with the entire group:
 - What are the advantages and disadvantages of using a resource in a sustainable way? (Advantage: it can last forever. Disadvantages: You need to control your use of it.)
 - What advantages and disadvantages are there to using a resource in a nonsustainable way? (Advantages: People can use as much as they want of an available resource; they can make a lot of money in the short term. Disadvantage: They can destroy the resource base for themselves and future generations.
 - In this demonstration, the population of each group stayed the same. In reality, however, the human population is increasing rapidly. What would have happened if one or two or three additional people would have been added to your group?
 - How would the following potentially impact the quantity and quality of resources? Natural disasters? Improved education systems for all? Disease? Advanced technology systems?

Note—Some of the groups may run out of resources right away or after only two rounds. But one or more of the groups should figure out a way to collect at least one piece of candy in each round and still have leftovers in the collective pile to be "renewed" each round. During the discussion, be sure to introduce the concept of "sustainable yield."

Part B: "Sorting What's What"

Now that you've completed both demonstrations with the student, it's time to guide students toward defining which demonstration simulated using a renewable resource, and which one simulated using a nonrenewable resource.

- 1. Write the terms "renewable resource" and "nonrenewable resource" on the board. Have students describe what they think each term means or give a few examples for each.
- 2. Divide the group into teams of four. Explain that teams will be working together to come up with a one- or two-sentence definition for each of the terms.
- 3. Give each team a copy of the <u>Clues and Questions Student Page</u>. Have them cut out the clues and give one to each team member.
- 4. Students should read their clue and share the information with the rest of their team. Then, each team should use these bits of information to synthesize a definition for "renewable" and "nonrenewable" resources. Everyone on the team should understand each of the clues and agree with their team's definitions.
- 5. Teams should then discuss the questions on the student page, with one member designated to record their responses and one designated to report them
- 6. Review each of the questions with the entire group, with each team reporting its answers. Have students compare their earlier responses with the group's definitions.
- 7. Ask the group which of the demonstrations they did earlier reflected the use of a renewable or nonrenewable resource.



Part C: A Forest of Balance

- 1. Give each student a copy of <u>A Forest of Balance</u> student pages to read.
- 2. After they read it, ask the class if the resources (wild rice, birch bark, maple sap, water, animals) used by indigenous people in Minnesota (Dakota and Ojibwe) are renewable or nonrenewable resources. (All are renewable.)
- 3. Have the students work in groups of four. Ask each group to discuss the following questions, one by one. Each group should assign a note-taker and a speaker to report back to the rest of the class.
 - How did indigenous people protect their resources to ensure sustainable yield?
 - What other factors helped these people take care of their resources?
 - What natural events may alter the availability of their resources?
 - How do you think people today are managing the same resources?

Part D: The Things in Your Life

- 1. Have each student bring in a favorite object such as a toy, tool, or other object. (You may want to forbid bringing in electronic items to reduce risk of damage.) Give students five minutes to write down as many of the materials that went into making it as they can. They should be able to generate a list of common materials just by looking at the object (plastic, wood, aluminum, steel, leather, rubber, glass, etc.)
- 2. Ask several students to describe their possessions and the materials that went into making them. As they list the materials, write them on the board, without duplicating responses.
- 3. Explain to the students that all the products we use and the materials in them are derived from natural resources—resources that occur naturally on Earth. Go down the list of materials on the board and help the students to identify the natural resource from which each material is derived. Afterward, ask the students to identify the major groups of natural resources from which all the materials are made (plant, animal, metal or mineral, fossil fuel).

Major group	Natural Resource	Material
Plant	Trees	Wood, paper, cardboard
	Rubber trees (sap)	Rubber (natural)
	Cotton plants	Cotton cloth
Animal	Cow hide	Leather
	Sheep wool	Wool
Metal or mineral	Sand, limestone, soda ash	Glass
	Bauxite ore	Aluminum
	Iron ore	Steel
Fossil Fuel	Petroleum and natural gas	Plastic, rubber (synthetic),
		or cloth (synthetic)

Example

- 4. Explain to the students that some natural resources can be renewed or replenished while others cannot. Ask students which of the resources that they've identified are renewable and which are not. Which materials came from nonrenewable resources? Could the materials that are not from renewable resources be substituted with materials that are?
- 5. Explain the some materials can be recycled and some cannot. Have the students look at the list of materials on the board and decide which ones they think can be recycled and which ones cannot. (Glass, paper, steel, aluminum, and some plastics can be recycled.) Does this mean that



products made from these materials can always be recycled? (No. It is difficult to recycle products that contain different resource materials mixed together.) Can any of the items the students brought in be reused? How long will they last? Will it eventually get thrown into the trash?

Assessment Opportunity

Have each student write in his or her own words what renewable and nonrenewable resources are. Then have the students answer these questions:

- If a resource is renewable, does that mean it will continue to exist no matter what people do? Give an example of a renewable resource and explain how people can make sure we don't run out of it.
- 2. What two factors would you say are most important in determining how fast natural resources are used?
- 3. Give one change you would make to the simulation to make it more realistic. Explain why.
- 4. Describe how Minnesota Ojibwe and Dakota people could make sure they always a renewable supply of: wild rice, maple sap, and game animals such as bison, moose, and deer.

Answers to "Clues and Questions Student Page"

- 1. Renewable: wild rice, sunshine, tides, trees, walleye, geothermal or hot springs, wind, water. Nonrenewable: oil, coal, gold, sand
- 2. Answers will vary.
- 3. Answers will vary. For example, students may suggest that wood may be used as a substitute for plastic or metal in chairs.
- 4. Answers will vary. Students may suggest that some materials are cheaper than others, that products made from renewable resources are better because the materials to make them can always be available or that some materials from nonrenewable resources are superior to others because their lighter in weight or have other properties.
- 5. If the student don't come up with answers to this questions, don't worry. And don't give them an answer! The demonstrations in Part B should teach the students conditions under which this could occur.
- 6. Solar energy, winds, tides, etc.

Enrichment

Have students read <u>After the Harvest</u> or <u>Launching Into Wild Rice</u>, from the *Minnesota Conservation Volunteer magazine*. Both articles describe how indigenous people harvest wild rice today. After reading the student page, have them compare and contrast how people harvest wild rice in the past and in the present.

Connections to Minn. Social Studies Standards (Parts C and D)

2P.4.2.2.1: Obtain information and communicate how Minnesota American Indian tribes and communities and other cultures apply knowledge of the natural world in determining which materials have the properties that are best suited for an intended purpose.



4E.4.2.2.1: Obtain and combine multiple sources of information about ways individual communities, including Minnesota American Indian tribes and communities and other cultures use evidence and scientific principles to make decisions about the uses of Earth's resources.

7L.4.2.2.1: Gather multiple sources of information and communicate how Minnesota American Indian tribes and communities and other cultures use knowledge to predict or interpret patterns of interactions among organisms across multiple ecosystems.

6.1.5.10.1: Explain the concept of sovereignty and how treaty rights are exercised today by the Anishinaabe and Dakota today.

2.1.5.10.1; 2.2.5.10.1; 2.3.5.10.1; 2.4.5.10.1; 2.5.5.10.1; 2.6.5.10.1; 2.7.5.10.1; 2.8.5.10.1: Understand that artistic works influence and are influenced by personal, societal, cultural, and historical contexts, including the contributions of Minnesota American Indian tribes and communities.

Correlations to Minnesota Science Standards, 2020

2P.4.2.2.1 Obtain information and communicate how Minnesota American Indian Tribes and communities and other cultures apply knowledge of the natural world in determining which materials have the properties that are best suited for an intended purpose.* (P: 8, CC: 2, CI: PS1, ETS1). *Examples of cultures may include those within the local context of the learning community and within the context of Minnesota. Emphasis of the practice is on obtaining, interpreting, and communicating information related to how various cultures have built materials suited for intended purposes according to their properties. Examples of materials may include instruments (Cedar for knockers and Black Spruce for poles) for ricing, birch bark for baskets or other containers for carrying water, and sinew for connecting parts of tools.*

1P.4.2.2.1 Communicate solutions that use materials to provide shelter, food, or warmth needs for communities including Minnesota American Indian tribes and communities.* (P: 8, CC: 2, CI: PS1, ETS2) *Examples of cultures may include those within the local context of the learning community and within the context of Minnesota*. *Examples of solutions may include past and current building practices that incorporate natural building materials and other green practices as used in sweat lodges, green roofs, moss used for insulation, or sustainable food production and tools used for ricing (harvesting and finishing).*

4E.4.2.1.1 Read and comprehend grade appropriate complex texts and/or other reliable media to describe that energy and fuels are derived from natural resources and their uses affect the environment. (P: 8, CC: 2, CI: ESS3, ETS2) *Examples of information about natural resources should include details about those found in Minnesota. Examples of renewable energy resources may include wind, water behind dams, and sunlight; non-renewable energy resources include fossil fuels and fissile materials. Examples of environmental effects may include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution and global warming from burning fossil fuels.*

4E.4.2.2.1 Obtain and combine multiple sources of information about ways individual communities, including Minnesota American Indian Tribes and communities and other cultures use evidence and scientific principles to make decisions about the uses of Earth's resources.* (P: 8, CC: 4, CI: ESS3, ETS1). *Examples of cultures may include those within the local context of the learning community and within the context of Minnesota. Examples may include balancing the water, soil, wildlife, plant, and human needs to support sustainable use of resources.*



Clues and Questions Student Page

Clue 1	Clue 2
On Earth, there are only limited amounts of fossil fuels such as oil, coal, and natural gas. There are also only limited amounts of minerals such as iron, copper, and phosphates. These resources either cannot be replaced by natural processes or require millions of years to replenish.	Some nonrenewable and renewable natural resources can be recycled or reused. This process decreases the rate at which the supplies of these resources are depleted. For example, aluminum cans can be recycled and turned into new cans or other aluminum products many times over. Recycling reduces the need to mine bauxite, the mineral used to make aluminum. Another example is recycle oil. The motor oil from your vehicle can be reprocessed into fuels or refined into lubricating oils.
Clue 3 Renewable natural resources include plants, animals, and water, when they are properly cared for. Minerals and fossil fuels such as coal and oil, are examples of nonrenewable resources.	Clue 4 Trees, wildlife, water, and many other natural resources are replaced by natural processes. Plants and animals can also be replenished by human activities. Water is continuously cycled and reused. Sunlight, wind, geothermal heat, tides, and flowing water are resources that are constantly or "perpetually" being renewed or restored.

Questions

- 1. Categorize the following as renewable and nonrenewable resources:
 - Wild rice
 - o Oil
 - o Coal
 - o Sunshine
 - o Tides
 - o Trees
 - o Walleye
 - o Gold
 - o Geothermal/hot springs
 - o Sand
 - o Wind
 - o Water
- Look around the room or place you're in and list as many items you can that are made from renewable natural resources.

Make a separate list of all the items made for nonrenewable natural resources.

- 3. What renewable natural resources could be used to replace the nonrenewable ones used in the items us listed in Question 2? What nonrenewable resources could be used in place of the renewable ones?
- 4. What advantages and disadvantages might there be for using renewable natural resources in place of the nonrenewable ones?
- 5. Under what circumstances, if any, would a renewable natural resource not be renewable?
- 6. Which resources, if any, would continue to be available no matter how much people used them?



A Forest of Balance: Student Page (3 pages)

In Minnesota, indigenous people have used many renewable natural resources—wild rice, maple sugar, trees, abundant clean water, bison, moose, and whitetailed deer—for as long as they have lived here. These resources provide places to live, ways to travel, tools for survival and art, and food and medicines. Some of these resources have been used by both the Ojibwe and the Dakota, while some are uniquely used by one or the other.

Water. Minnesota's thousands of lakes, streams, and rivers provide water necessary for the survival of nearly every living being. It is important to maintain this resource and not overuse it. Among Native communities in Minnesota, water takes on another level of significance by having spiritual importance. For example, when the Dakota lived along the shores of modern-day Mille Lacs Lake, they revered the lake for being sacred, calling it Mde Wakan, which means Spirit Lake.

Today the contemporary Dakota community, the Shakopee Mdewakanton Sioux Communityⁱ, are the descendants of this band of Dakota. The Ojibwe called Lake Superior *gichigami*ⁱⁱ, its massive size referred to being like an ocean rather than a lake.

Fishing continues to sustain Native communities. Historical treaties retain certain rights for Native people in Minnesota to hunt, gather, and fish, including using nets for fishing in specific waterways within ceded treaty territoriesⁱⁱⁱ. Like many other Minnesotans, Native people also enjoy swimming, boating, canoeing, kayaking, and relaxing around water.

Today, environmental change and human impact are the biggest threats to the water resources in Minnesota. In recent years, algal blooms dangerous to humans and animals alike have become more common because of climate change and human impact^{iv}.

Mining and pipeline projects also threaten waterways within Native communities. Native community members (as well as other Minnesotans) have opposed such projects for years, citing concerns about spills degrading drinking water quality and affecting other resources such as fish and wild rice.

Maple syrup and sugar. Historically, the Ojibwe and Dakota both relied on maple trees to harvest sap and produce maple syrup and sugar. The city of Chanhassen derives its name from the Dakota word *Çaåhasaå Paha*^v, which refers to the area's trees of "white bark," meaning either sugar maple or birch.

When the Dakota began transitioning to the prairie regions of the state, they lessened their reliance on this resource. The Ojibwe, however, continue to rely on maple products. Sugar maple trees, or *ininaatig*^{vi} in Ojibwe, are relatively widespread in the eastern part of Minnesota^{vii}.

When conditions in the spring are right (warm, sunny days and nights below freezing), the sap begins to run in the tree. People tap maple trees to release and collect the sap. Then, sap is boiled in baskets or iron kettles to remove moisture and concentrate the sugar into syrup. Boiling syrup further creates maple sugar.

Historically, both of these products were important for both trade and as a staple food source. Maple syrup (*zhiiwaagamizigan*^{viii}) requires an average of 40 gallons of sap to produce 1 gallon of syrup. For Ojibwe who followed a seasonal-round lifestyle, maple sugar (*ziinzibaakwad*^{ix}) was highly prized because it was easy to carry. Maple sugar was used to season food, sweeten beverages, and preserve meats.

Today, maple syrup is a big business. In 2018, Minnesota ranked twelfth in the nation for syrup production^x. Maple products are produced using a combination of traditional and modern harvesting and processing techniques. Maple products are a good source of income for Native communities through businesses such as Native Harvest Ojibwe Products, Spirit Lake Native Farms and Red Lake Nation Foods.

Some Minnesota students participate in the activities at a sugar bush (*iskigamizigan*^{xi}). The South



Minneapolis High School has formed partnerships to make many cultural traditions accessible to Native students who live in urban areas, including participating in a sugar bush in the neighborhood around their school^{Xii}. Among the Ojibwe, maple syrup and sugar are so important culturally that they feature in a traditional story.

Trees and forests create habitats for different animals and provide resources for people. While contemporary Native peoples in Minnesota no longer build traditional dwellings like wigwaams or bark lodges for permanent homes, timber still features prominently in the construction of modern homes. In the state, the forest products industry is the fifth largest employer with over 60,000 jobs^{xiii}. Some Native people use wood products today to continue traditional forms of arts and crafts. Pat Kruse of the Mille Lacs area uses birch bark to produce beautiful pieces of art that are a mix of modern and traditional. John Hunter (founder and coach for Twin Cities lacrosse) relies on ash trees to create traditional Ojibwe and Dakota lacrosse sticks for program participants.



Ojibwe lacrosse stick made from ash wood

Minnesota Historical Society Collections Online 64.139.18.2

Bison, moose, and white-tailed deer. Before the Ojibwe moved into the area, the Dakota relied on wild herds of buffalo (bison) for their prime source of meat and for their hides, bones, and other tools. While wild herds are gone, Native communities and the

Minnesota Department of Natural Resources maintain numerous domestic herds.

Buffalo, or *tataŋka*, continues to be an important resource to the Dakota communities in the state. The Prairie Island Indian Community began their Buffalo Project in 1992. Currently, their herd is an aspect of educational outreach, spiritual connection, and a traditional, high quality source of meat for Prairie Island and Shakopee^{xiv}.

The Ojibwe never hunted buffalo in Minnesota. Instead, they hunted moose (*mooz*^{XV}) when they were more prevalent, and later white-tailed deer (*waawaashkeshi*^{XVi}). Moose and deer provide meat, hides for leather and drums, and bones for tools.

Historically, moose hunting has been available to anyone with the proper license. Today, moose populations have dwindled, and moose hunts in the state have been limited to Native peoples exercising treaty rights under the guidance of state and tribal biologists. The warming climate, prevalence of ticks, and the growing white-tailed deer population are the biggest causes for declining moose population.

White-tailed deer hunting in Minnesota is extremely popular, and a huge source of revenue for the state, with over \$500,000 in license sales in 2018^{xvii}. Additionally, hunting provides a lot of money to communities as hunters travel and spend money on lodging, food, and supplies. Many Native people in Minnesota rely on deer hunting as a way to provide for their families cheaply and ethically.

Wild rice is perhaps one of the most well-known resources used by both groups. The Ojibwe called it *manoomin*^{xviii} and the Dakota called it *psin*^{xix}. Historically, wild rice could be found in every corner of the state and in over half of its counties^{xx}, which might explain why it is Minnesota's state grain. Ripening in late August to early September, we harvest and process this resource over stages to produce a staple food that can last throughout the winter, spring, and summer months. Wild rice requires very specific conditions to be successful: consistent shallow to moderate water depth, natural water movement, soft



marine bottoms, and the absence of competing vegetation (both native and invasive).^{xxi} Wild rice is therefore extremely sensitive to changes in the environment that can affect its growth, including extreme weather (high winds, severe thunderstorms, heavy rains), pollution (chemical runoff, chemical spills, agricultural runoff), and human impact (introduction of invasive plants and animals, disturbance from recreation, and intentional removal of vegetation along shorelines).

The stages of wild rice harvesting haven't changed too much over the years. Collecting wild rice involves pushing a canoe (*jiimaan*^{xxii} in Ojibwe and *wata*^{xxiii} in Dakota) through the rice. Gentle pushing prevents damaging the plants from paddles or oars. People remove rice from the plant by gently bending it over the canoe and using ricing flails, or knockers (*bawa'iganaakoog*^{xxiv} in Ojibwe). Flails are still made of a lightweight wood like cedar, that, when used correctly, won't damage the plant. Next, people remove the rice from the canoe and spread it out on a tarp to remove debris and any number of insects^{xxv}, including rice worms.

The next step is roasting or *parching*. People may leave the rice on the tarp to dry in the sun, although for many communities and families, parching (*gaapizan*^{XXVi} in Ojibwe) is still done the old way: rice is placed in a large cast iron pot over a hot fire and stirred with a special paddle. However, there are also commercial ways to process rice now that involve the use of large dryers. Parching makes it easier to remove wild rice's protective outer sheath. Parching also helps to dry and harden the rice itself so it can be stored long term.

After parching, the sheath of each grain must be cracked so it can be removed. This is often done through jigging (*mimigoshkam*^{xxvii} in Ojibwe), in which smaller (often children) community members gently "dance" on the rice while wearing soft leather moccasins.

The final step in processing is winnowing (*nooshkaatoon*^{xxviii} in Ojibwe) the rice to remove the cracked outer sheath. Winnowing is done in small batches using a special wild rice tray called

PROJECT LEARNING TREE © SUSTAINABLE FORESTRY INITIATIVE

nooshkaachinaagan^{xxix} by gently tossing rice in the air and allowing a breeze to sweep away the lighter sheath. Larger batches are often gently dropped in front of large commercial fans that blow away the sheaths. When processed correctly, wild rice can last for years if stored properly.

In Minnesota, several Native communities process wild rice to sell commercially: Red Lake Nation Foods^{XXX}, Leech Lake Band of Ojibwe Natural Wild Rice^{XXXi}, White Earth Wild Rice^{XXXii}, Native Harvest Ojibwe Products^{XXXiii}, Spirit Lake Native Farms^{XXXiv}, Nett Lake Wild Rice^{XXXV}, and Lake Region Wild Rice Company^{XXXVi}. Among the Ojibwe, wild rice is an extremely important part of their culture that features in their historic migration story.



Processing Wild Rice student page



Minnesota Historical Society Collections Online; Original photo: Frances Densmore E97.32W p32

Beds of wild rice grows on Minnesota lakes. Canoes are poled, not paddled, through the water to avoid harming the rice beds.



Harvesting wild rice today. Photo by Annette Drewes



Gathering wild rice. Minnesota Historical Society Collections Online E97.32W r12

Gatherers bend the stalks of wild rice into the canoe, and knock off the grains with ricing flails into the bottom of the boat.



Gathering wild rice today. Photo by Annette Drewes



Collecting wild rice. Minnesota Historical Society Collections Online E97.32W r22

Wild rice grains are collected into bags.



Collecting wild rice today. Photo by Annette Drewes



Processing Wild Rice student page



Parching wild rice. Minnesota Historical Society Collections Online; Original photo possibly by M.C. Colburn E97.32W r32

Wild rice is parched in cast iron pots over a fire.

Today, people also use large parchers.



Parching wild rice. Photo by Annette Drewes



Treading wild rice. Minnesota Historical Society Collections Online E97.32W p5

A boy wears special moccasins to tread (or dance) on parched rice. This cracks the inedible husks and separates them from the grains.



Unprocessed wild rice husks. Photo by Annette Drewes



Winnowing threshed wild rice. Minnesota Historical Society Collections Online; Original photo by Monroe P. Killy E97.32W p40

Winnowing allows the wind to blow away the inedible husks and retain the heavier grain in the basket.

Wild rice is still winnowed in baskets today.

However, large quantities of rice harvested for sale can be winnowed through a machine that separates the husks from the grain.



ⁱⁱ Ojibwe People's Dictionary: <u>Gichigami</u> https://ojibwe.lib.umn.edu/main-entry/gichigami-ni

^{iv} University of Minnesota Extension: <u>Blue-green algae in Minnesota lakes</u>

- vi Ojibwe People's Dictionary: Ininaatig https://ojibwe.lib.umn.edu/main-entry/ininaatig-na
- ^{vii} MN DNR: <u>Sugar maple</u> https://www.dnr.state.mn.us/trees/sugar-maple.html
- viii Ojibwe People's Dictionary: Zhiiwaagamizigan https://ojibwe.lib.umn.edu/main-entry/zhiiwaagamizigan-ni
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^{xvi} Ojibwe People's Dictionary: <u>Waawaashkeshi</u> https://ojibwe.lib.umn.edu/main-entry/waawaashkeshi-na ^{xvii} MN DNR: <u>2018 Minnesota Deer Harvest Report</u>

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