Snowshoe Through Time II

Pre-/Post-Site Materials

Forest Preserve District
OF WILL COUNTY

Bringing People and Nature Together

Table of Contents
In-School Program

Correlated State Standards.....2
Forest Preserve District of Will County, the Council of Chief State School Officers (Common Core), and the National Research Council (Next Generation Science Standards)

Recommended Readings.....2
Various Sources

History of the Snowshoe.....3-12
GV Snowshoes, Wendake, Quebec Canada

Snowshoe Basics.....13-17
The Alaska Native Knowledge Network

Sink or Stay?.....18
The Alaska Native Knowledge Network

Snowshoe Investigators.....18
Forest Preserve District of Will County

Design Your Own Snowshoe.....19
Forest Preserve District of Will County

Correlated State Standards

Identified ELA, Math and Science Standards are detailed below specific to this education program.
Source: Forest Preserve District of Will County, the Council of Chief State School Officers (Common Core), and the National Research Council (Next Generation Science Standards)

ELA Standards

Subject Codes	Grade 6	Grade 7	Grade 8	Grade 9-10
Reading for Information (RI)	RI 6.7			
Language (L)	L 6.3, L 6.6	L 7.3, L 7.5	L 8.3, L 8.6	L 9-10.3, L 9-10.6
Speaking and Listening (SL)	SL 6.1, SL 6.2 SL 6.3, SL 6.4	SL 7.1, SL 7.2 SL 7.3, SL 7.4	SL 8.1, SL 8.2 SL 8.3, SL 8.4	SL 9-10, SL 9-10.3
Reading for History (RH)	RH 6.7	RH 7.7	RH 8.7	
Science and Technical Subjects (RST)	RST 6.3	RST 7.3	RST 8.3	9-10.3

Math Standards

Subject Codes	Grade 6	Grade 7	Grade 8	HS
Ration and Proportional Relationships (RP)	6.RP.1. 6.RP.2 6.RP.3	7.RP.1, 7.RP.2		
Geometry (G)	6.G.1	7.G.4		
Expressions and Equations (EE)			8.EE.5	
Statistics and Probability (SP)	6.SP.4, 6.SP.5			
Number and Quantities (N-Q)				N-Q.1
Algebra – Creating Equations (A-CED)				A-CED.1

NGSS Standards

Disciplinary Idea	MS	HS
Engineering, Technology and Science 1, Engineering (ETS1)	ETS1-1, ETS1-2 ETS1-3, ETS1-4	
Life Science 2, Ecosystems (LS2)		LS2-8

COMMON CORE STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

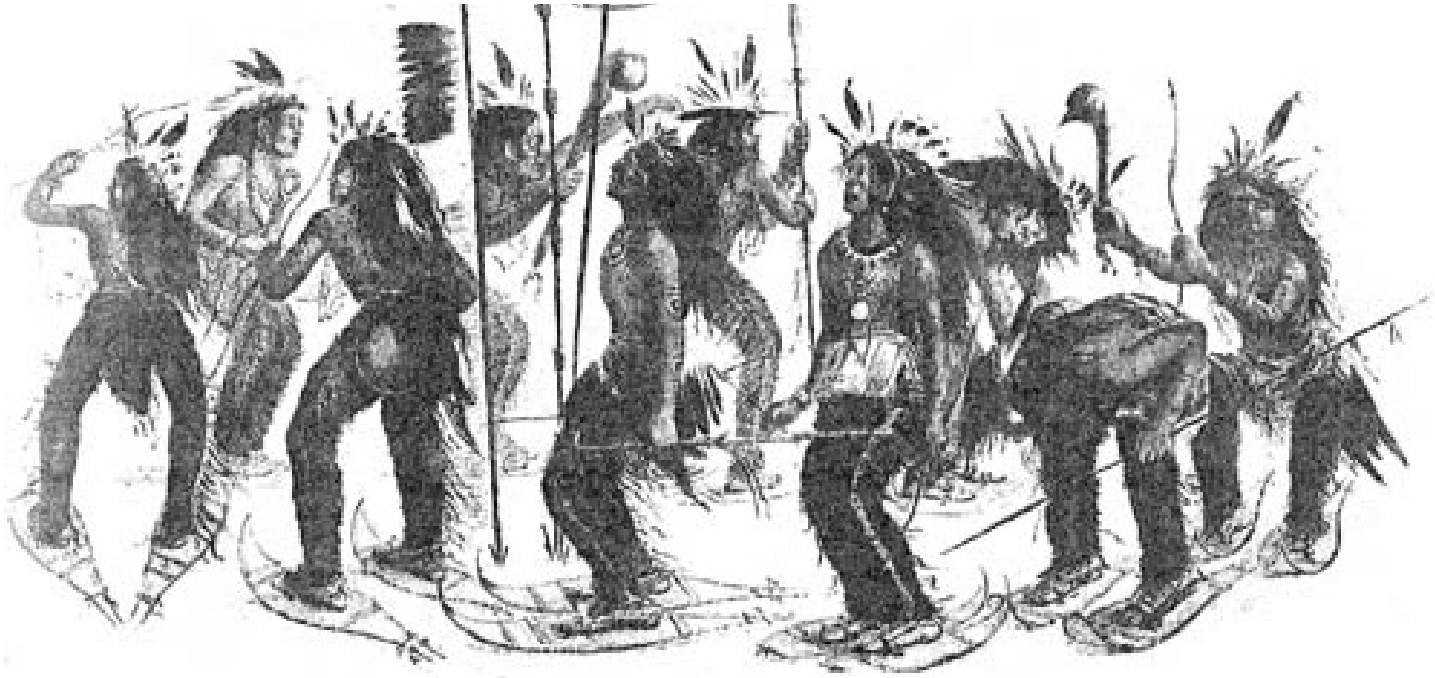
NEXT GENERATION SCIENCE STANDARDS

Recommended Readings

Osgood, William & Hurley, Leslie. "The Snowshoe Book. A Complete Guide to How, Why, When & Where." Stephen Greene Press; 2nd Edition. 1975.

Edmunds, David R. "The Potawatomi: Keepers of the Fire." Civilization of the American Indian Series. University of Oklahoma Press. 1987.

History of the Snowshoe



Public Archives of Canada. (William Osgood & Leslie Hurley)

Introduction

To snowshoe in the most beautiful winter surroundings gives the body and soul tremendous well-being. The simplicity of practicing this sport makes it the easiest of all winter sports, because if you can walk, you can snowshoe.

Of all inventions, because this is one, created by mankind to move in the snow, no other object can be as simple and efficient at the same time. That is probably why we had to wait 8,000 years for a significant technological revolution that is the arrival of aluminum and composite snowshoes, equipped with crampons in the 1980s.

The historical account of this phenomenal invention will be based on the North American history, mostly located in Eastern Canada, thus richly documented. It will be interesting to notice that we had to wait several thousands of years for this object to finally become a sport accessory.

"The white man always attempted to avoid the snow or skirt it, whereas the Indian always looked for the best way to walk on it and live in harmony with nature."

This is an Indian saying that was transmitted from generation to generation!

Prehistoric Origins

No research on the subject specifies with exactness who invented the snowshoe, not even what people or culture created it first. "The snowshoe seems to have appeared at an earlier period than the wheel. The earliest documents date the advent of the wheel around 3,500 B.C., whereas the ski already existed in quite a sophisticated state around 6,000 B.C..."

From the sophisticated aspect of the ski, it is logical to think that the "snowshoe" was invented first, in order to make the natural movement of walking on snow easier without sinking in, even before thinking of sliding on it. It is also plausible to think that man inspired himself with the active fauna in winter in order to observe how the animals were able to move around efficiently on the snow without sinking into it. Then, he must have tested various materials and various forms in order to optimize his floating.

During several thousands of years, the snowshoe was an object of prime necessity, strictly necessary for all peoples confronted in winter to hunt, trap, move around on short and long distances, communicate, discover and survive.

Primitive Snowshoes

From this statement, an evolutionistic approach was born, suggesting that several peoples confronted by the snow, at various periods of their evolution, invented simultaneously this object (snowshoe) under various forms.

The second explanation on the distribution of this object to several northern continents would be through an inter-ethnic transmission of cultural components. This transmission in North America would have taken place from 30,000 to 5,000 BC. by the Bering Straight, during the Ice Age that allowed it, by peoples from Central Asia.

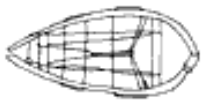
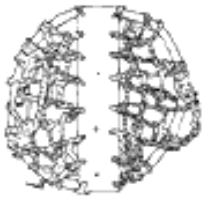
The most primitive snowshoes have allowed the migration of peoples towards the American Continent through the Bering Strait.

"Three elements of proof support the hypothesis of a passage from Asia to America for the snowshoe. The first is that America was populated by immigration. At the point where ethnological research is, we believe there might have been several waves of immigration between 30,000 and 5,000 B.C., which is at the very end of the last glaciation, or immediately after the latter. So, even if these people did not bring documents or objects reflecting their way of life, they carried with them their culture: their customs, their language and their thoughts. One of these migratory waves was at the origin of the North American civilization centered exclusively on hunting, fishing, gathering and which, as a whole, had not gone beyond the Stone Age.

This means that all the material culture of this civilization was developed according to its orientation: the prime importance of weapons, mobile habitat and transportation methods adapted to the geography of the surroundings. It is thus quite possible that one of these immigrant groups, knowing about the snowshoe in Asia, used it to tackle the Canadian winter.

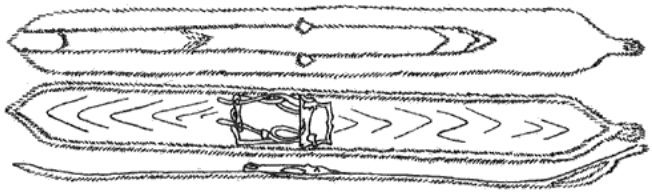
The second element of proof is the geographic distribution of the snowshoe of the disc-shaped type. This distribution forms a continuous series from the extreme west of Scandinavia to New Mexico, passing through the south of Asia and all along the west coast of America.

Finally, the third element of proof is another continuous series. The snowshoe of the lanceolate type (in the form of a spear tip) extends without interruption from the Kouriles Islands to Ontario, crossing the Chukchi Peninsula, Alaska, Yukon and the Prairies.

 Yugoslavia and Czechoslovakia (Davidson)	 Inuits, St. Lawrence Island, Alaska, U.S.A. (Nelson)	 Chukchis, Siberia (Mason)	 Yokohama, Japan (Mason)	 Banska Bystica Region, Czechoslovakia (Martin)
 Cadca Region, Czechoslovakia (Martin)	 Roznava Region, Czechoslovakia (Martin)	 Sweden (Davidson)	 Humenné Region, Czechoslovakia (Martin)	 Sweden (Davidson)

Modern Evolution of the Snowshoe

All those who wrote on the subject of the snowshoe agree in saying that it is the North American Indians who have perfected the traditional snowshoe as we know it nowadays, since the models from Europe and Asia kept a primitive stage during several thousands of years. The peoples from Europe and Scandinavia preferred to develop an object that has a similar function but that offers different characteristics: THE SKI.



Wooden skis soled with sealskin, Gilliaks, Amur, Asia (Mason)

The snowshoe, in its developed form, was introduced in Europe by the return of the first settlers around 1600, who physically or by accounts (written or oral), brought back the snowshoe from traveling in New France (North America).

In volume III of his travels' accounts, page 164, year 1608, the founder of Québec, Samuel de Champlain (1567-1635) who formed an alliance with the Huron and Algonquin Nations, wrote "Winter, when there is much snow, they (the Indians) make a kind of snowshoe that are two to three times larger than those in France, that they tie to their feet, and thus go on the snow, without sinking into it, otherwise they would not be able to hunt or go from one location to the other".

Where Does the Word "SNOWSHOE" Come From?

It seems that the first French settlers, upon arriving in New France around 1604, immediately gave them the name of "Raquette" because they looked like an instrument used in Europe to play the game of real tennis, the "Rachète," which is the ancestor of the tennis we know now. In English, they simply call it "snowshoe" as the word describes well the object.

The Importance of the Snowshoe for the Colonization of New France

How useful has the latter been? Without it, missionaries and discoverers of the colony's first periods could not have followed the Indians in their peregrinations across the plains and forests.

Without it, trappers and traders would not have been able to hunt the fur animals into their faraway dens.

Without it, our ancestors would not have easily been able to communicate between themselves or take care of their work. In ancient times, the snowshoe was, in winter, what the canoe was in summer: an instrument of primary necessity.

The American Indians had thus developed and perfected transportation means adapted to the seasons. When the cold froze the natural routes, they had to travel by foot. As soon as an important layer of snow had fallen, they put on their snowshoes.

Upon the arrival of the white men in Eastern America, there was, as a road network, only rivers and a few foot paths where the small boats had to be carried. So, the white men settled down close to these natural ways and they adopted the transportation means already in existence: the canoe and the snowshoe, according to the seasons. The white settlers put on the snowshoe because that was the only means to move around on the snow until they were able to modify the surrounding environment. Québec was not yet one hundred years old that certain settlers could spend the winter without putting on snowshoes only once, since stretches of roads were already maintained, on which they could travel by horse.

If, on one hand, the normal development of the colony has been that, little by little, an increasing number of people were able to take advantage of methods of transportation more comfortable than the snowshoe, there existed, on the other hand, contingencies that explain why certain people had to go on "walking the country" during the cold season, at least until the nineteenth century. The first sections of roads started to radiate only in the large centres: Québec, Trois-Rivières and Montréal, limiting the use of vehicles in these locations. Other than the inhabitants of the remote regions, several others had to use snowshoes regularly to travel in winter.

Explorers and the Snowshoe

The explorers, interpreters and trappers formed a group that was apart because all of them obeyed the politico-economic requirements. The research of a "passage," the forming of alliances with the new peoples met, and the lure of furs brought these people to undertake lengthy expeditions.

As they found themselves almost constantly in unknown regions, these men rapidly adopted the way of life of the Natives with whom they were often in contact, since their survival depended on it. For some people, like Pierre Esprit Radisson who had made his this trade as an explorer and trapper, the snowshoe became the most important object for the winter season, for which, in certain circumstances, they would have sacrificed everything. Even if a man possessed a fortune in furs after an expedition, he would not have survived long enough to cash the value of his hard work if he had found himself alone in the forest and without snowshoes in winter.

Here is an excerpt of an adventure account by Radisson in the course of his fourth trip to western Canada:

(Paul Carpentier)

One evening, I found the hut and covered it with branches that were already all cut. As I was dozing off, a fire started, which only half woke me up, tired as I was, to save myself from this fire. My snowshoes, my shoes and my socks had saved my life; I absolutely had to save them. I took them and threw them as far away as I could, in the snow. The fire put out, I had to look for them in the dark in the snow, naked, exhausted and almost dying from hunger.

That shows how important and of prime necessity the snowshoe was for these adventurers.

The Army and the Snowshoe

(Paul Carpentier)

For the army, the snowshoe was not a vital element as it had been for the trappers or the missionaries, but it represented undoubtedly a strategic element that is quite original. The development of the northern part of America presented, mostly in winter, excellent conditions to carry out a guerrilla. The French settlers of the North, having adopted the American Indian way of life more widely than their southern enemies, could engage in this technique of military conflict which consists of benefiting from the knowledge of the territory to take the enemy by surprise and retreat before the counter-attack.

The use of the snowshoe for strategic ends and means would reveal all its efficiency thanks to a military genius and a master of the guerrilla: Pierre Lemoyne d'Iberville. Recruiting Canadians used to rowing and taking long walks on snowshoes, he took advantage of the territory and climate to make his attacks in locations and at moments unexpected by the enemy.

It is told that on January 9, 1666, the French Governor De Courcelles left from Québec with 500 men on snowshoes. Each soldier carried on his shoulders all he needs to survive: food, blankets, etc. The soldiers followed the St. Lawrence and the Richelieu, crossing the Champlain and Georges lakes for a march of 1,000 miles (1,600 km).

During the 1763-1775 period, the French royal army had even equipped itself, at the founding of New France, also during the battles with the "American freedom fighters" against the British (near the borders of Québec and northern New England). These Europeans considered that this was the only and best means of traveling on snow.

Nowadays (2004), the Canadian Forces still use snowshoes as basic military equipment for all soldiers. On the other hand, these are no longer made of ash and leather straps, but of a magnesium frame, aluminum studs, a rigid pivot, a sieve in steel wires and a nylon harness. GV Snowshoes is the proud supplier to the Canadian Forces.

Political/Social Changes that Influenced the Importance of the Snowshoe

At the turn of the eighteenth century, numerous transformations deeply modified the French Canadian society. Events such as the "Treaty of Paris (1763)," the massive arrival of five thousand loyalists during the American revolution, the Act of 1791 and the Union Act of 1840 stand out as significant dates in the political history, but also reflected directly on the country's evolution.

(Paul Carpentier)

Results:

- New geographical demarcation of the Canadian territory;
- A rapid increase in the population within which a trading middle-class of an imperialist vocation takes over from a mercantile aristocracy;
- Adaptation of the explorer settlers to a sedentary system promoting the growth of villages and towns;
- Prohibition striking trappers in 1672 and 1709, forcing them to change their way of life and reduce the use of the snowshoe;
- The appearance of the forestry companies around 1830, which brought the trappers to become lumberjacks;
- The Canadian population during one and a half century under the French Regime was at 175,000 inhabitants. One century later, it saw its demography explode at 2,750,000 inhabitants and the establishment of several villages, also an elaborate road network allowing the use of the horse year-round. For the first time, the snowshoe then lost its role of a first necessity object for most of the settlers. Only the Indians and a group of rural settlers kept the snowshoe as a means of journeying that is essential in winter.

Birth of a New Sport: Snowshoeing

We had to wait almost another 250 years, from Samuel de Champlain's discovery of the rustic Indian Snowshoe until 1840 for this object to retain the attention of a group of Canadians. This was the birth of Snowshoe Clubs. Seeing that the practice of snowshoeing was declining, groups of people gathered together, organized, made rules and formed Snowshoe Clubs. The first one to be established is the Montreal Snowshoe Club, established in 1840 in the Canadian metropolis by Anglophones.

Three years later, this club introduced annual races at the old racing field of the St. Pierre River, now part of the City of Verdun. Indians and white people struggled for speed and these tournaments became events. From this institution, other clubs originated. The two most famous French Canadian clubs that existed in Montréal were the "Canadien de Montréal," created on November 20, 1878 and the "Trappeur de Montréal."

For more than 60 years, several snowshoe clubs were established, including the:

- **Ottawa Snow Shoe Club**, created in 1881
- **Club de Raquette Frontenac de Québec**, created in 1883
- **Club de Raquette Le Huron de Québec**, created in 1884
- **Club de Raquette de Lévis**, created in 1886

These clubs organized weekly events and were, during several decades, reserved only for men. Clubs were managed seriously and only members in good standing were accepted within the latter.

Following a constant growth of the clubs, the "Union canadienne des Raquetteurs" (the Canadian Snowshoers' Union) was founded on March 8, 1907 and was set up on November 9 of the same year. The first convention of the Union was held in Québec City on January 25 and 26, 1908.

During its first annual assembly, the Canadian Snowshoers' Union included 25 clubs (English Canadian, French Canadian and Irish Canadian) representing a total of 800 members, who greatly loved the practice of this beautiful sport of snowshoe and all united in the same spirit of enthusiasm and loyalty.

Birth of a New Sport: Snowshoeing (Continued)

During the first seven years of its existence, the Canadian Snowshoers' Union achieved great success. It contributed to the formation of many snowshoe clubs. In 1911, it included 52 snowshoe clubs affiliated with its organization, including three clubs from Winnipeg. In 1924, a branch of this Union was organized in western Canada including the 10 clubs from this part of Canada.

The year 1924 was memorable in the history of the Canadian Snowshoe Union, since the snowshoe sport was organized in the State of Maine, United States, and the following year, in 1925, the first international snowshoe congress was held in Lexington, Maine. It was following this congress that the American Snowshoe Union was established, which included, in 1930, 18 men's clubs and 14 women's clubs.

In November 1932, the Snowshoe Sport International Committee was organized. This Committee was formed of the Canadian Snowshoers' Union, western and eastern branches, and of the American Snowshoe Union. The aim of this Committee was to promote the snowshoe sport, to improve the Unions and the races, and to see to a good understanding between all of the clubs.

Thus, starting in the 19th century, snowshoe officially started filling a double role – that of being still an object of prime necessity for explorers, surveyors, trappers, forestry workers and a sport article.

The snowshoe is and will remain forever a symbol of courage, adventure and recklessness for Canadians, a symbol which reminds us that thousands of French and English Canadian settlers have walked through our beautiful country on thousands of kilometers in winter to give us, today, the leisure of taking advantage of these superb sites in winter on snowshoes.

Example of a race organized by the International Committee of Snowshoe Sport at the end of the 19th Century.

The Origin of the Traditional Snowshoe

The snowshoe was, since the beginning, manufactured by the various Indian Nations in North America and each Nation developed a form adapted to the needs of the environment in which they had established themselves. The frame was either built of white birch or of ash, the last being the most popular thanks to its more adequate properties. In the course of the centuries, they perfected the weaving to optimize the floating or adherence.

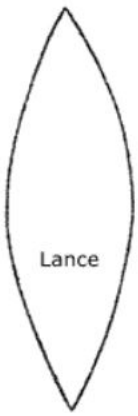
Most of the time, these snowshoes were weaved with skins from the red deer, the caribou and the moose. The last was more appreciated because its skin kept better its tension than the other cervids. With the introduction of the cow by the Europeans, the latter was greatly used because of its availability in great numbers and it offered the same properties as the cervids. It is still used today.

It was possible then to determine the Nation of an Indian or to know from what region the white settler came from solely by the form of his snowshoes.

We are able to identify five historical forms of snowshoes inspired by exact forms, that is:

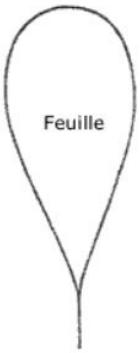
- Spear
- Leaf
- Disc/Pear
- Ellipse
- Ovate

Inspiration in the Form of a Spear



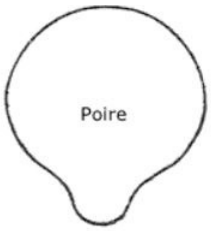
The category of spears is today characterized by the Ojibwe model which originates from the Nation of the same name. This Nation settled along the Canadian Great Lakes, and extend into the United States, that is Michigan, Érié, Huron, Ontario and Superior. We also find these models in Saskatchewan and Manitoba since the topography of the land furthers this snowshoe type. In this category, we also find the Alaskan model (also called Yukon or Pickerel) which originates from the Nations settled in the Yukon and in Alaska.

Inspiration in the Form of a Leaf



This category is characterized by the Huron model, also called Algonquin or Maine, which originates from the Nation Huronne. This model was widespread along the St. Lawrence and towards the eastern United States. This model was also the one used by the first French settlers since Samuel de Champlain, the founder of Québec, had an excellent relationship with the Nation Huronne. This Nation covered a hunting territory from Lake Huron to Tadoussac.

Inspiration in the Form of a Disc/Pear

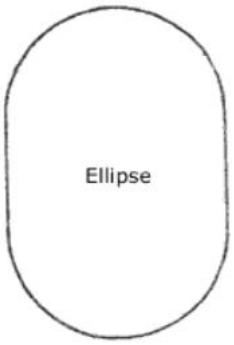


This category is characterized by a very particular model commonly called Montagnaise, originating from the Nation of the same name. Its particular form does not offer much efficiency to walk medium or long distances since the extreme width of this model limits movements and makes walking uncomfortable. On the other hand, its properties for floating are indisputable. This model was never really popular on the commercial level, but it is still quite important in the history of traditional snowshoes.

Inspiration in the Ovate Form

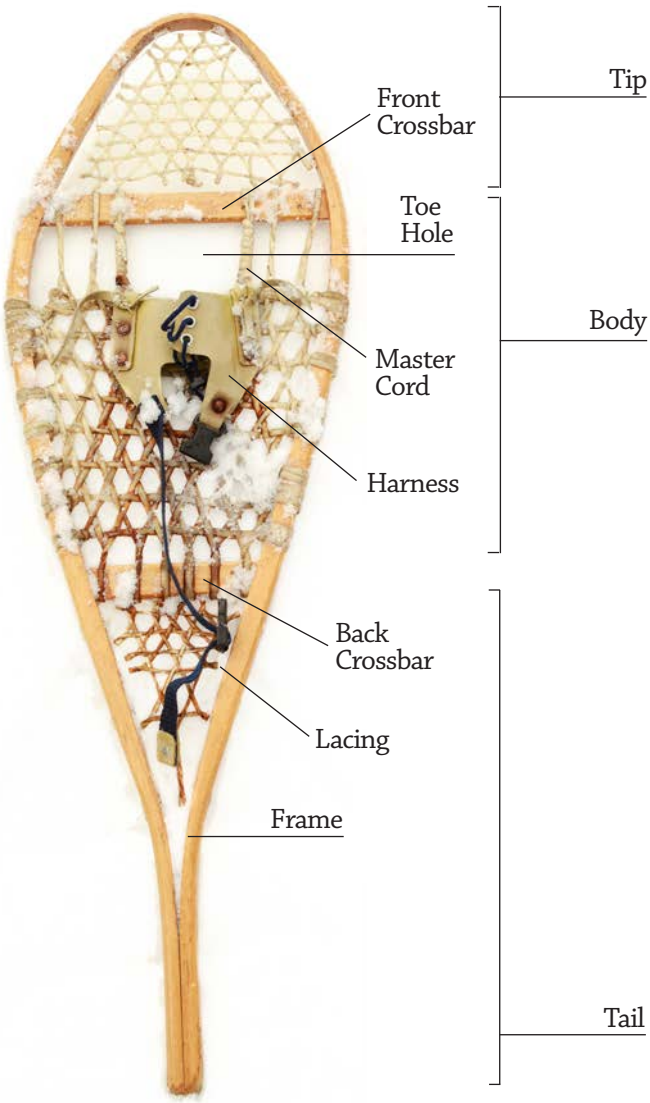
This category is characterized by the Bear Paw which is the second most popular traditional model after the Huron model. It originates from Nations of eastern Canada and the United States. It is short, light, efficient and easy to maneuver in the dense forest and lands less mountainous.

Inspiration in the Form of an Ellipse



This category is characterized by the modified Bear Paw. It is the ancestor of the modern aluminum snowshoe. Its ideal form offers the same ergonomics, allowing a frame less wide (8, 9 or 10 inches) and longer (between 21 and 36 inches). Offering maneuverability and floating, this model was developed by the Indians of eastern Canada and the United States in the middle of the 20th century.

Snowshoe Diagram



A Sampling of Traditional Snowshoes

Bear Paw

Huron

Michigan or Maine

Ojibwe

Technological Revolution that Brought Back the Snowshoe Sport

The traditional wooden snowshoe was the only category of sporting snowshoe available during several millenniums. It was its strength and it also was the cause of its decline. The arrival of European immigrants to North America during the first and second world wars permitted the expansion of a new winter sport unknown to Canadians until then: SKIING. This same sport, that Europeans had perfected so well thousands of years ago to the detriment of the snowshoe, was to become the fashionable winter sport.

Alpine skiing and Nordic skiing are part of the European culture and once in Canada, the European immigrants were able to appreciate the Canadian mountains and the long winters covered with thick layers of snow. This then became an unexploited gold mine. Alpine ski resorts and marked out, maintained circuits for long-distance skiing appeared at the beginning of the 20th century, and that changed the sporting customs of Canadians.

The snowshoe practice then lost in popularity and the snowshoe clubs drastically disappeared. Only a few survived these new winter sports. All the same, the snowshoe remained a work object essential even if the arrival of the snowmobile also encouraged the erosion of the snowshoe. One had to wait until the 1980s so that the first technological revolution could see the snowshoe sport revived from its ashes, with the introduction of plastic matters and aluminium in the manufacture process. The composite materials revolutionized the forms, dimensions, weight and features of the modern snowshoes.

The greatest innovation was the addition of spikes under the snowshoe to allow an adherence that did not exist before. The beginning of these new materials was the reason why several other manufacturers who wished to start the commercial manufacture appeared, and each one of them competed in ingenuity. On the other hand, only the more prepared were successful commercially.

Here are the features that revolutionized the snowshoe:

New materials: Aluminum and polymers allowed for the creation of new forms that are very efficient and that are adapted to different grounds and various uses.

New forms: The new materials enabled the reduction by 50 percent of the size of the snowshoe for a floating efficiency similar to that of the old models.

Lightness: The new materials enabled the reduction of the weight of snowshoes by 40 percent for increased floating.

Adherence: Adding aluminum or stainless steel spikes enabled the snowshoe to come back to its popularity by offering a playground that had been until then unattainable with the traditional snowshoe: The Mountain.

Ergonomic harness: The greatest weakness of traditional snowshoes was the harness, since it did not allow an appropriate support for the foot and the walking step was, on long hikes, quite inefficient and could make the hike difficult. New harnesses made of Hyrtel® or olefin, among others, allowed an ergonomic adjustment to all temperatures and they do not react to humidity.

Pivot system: The creation of a pivot allowed, for the first time, an efficient and precise marching step. It enabled the snowshoe to stay in continuous contact with the snow, cancelled all lateral movements and allowed an efficient grip of the spikes on the hardened snow or on ice, for an optimal adherence.

System of catch fastener: This system, inspired by that used on snowboard bindings, allows an adjustment that is precise, fast and easy to use in all circumstances. The advantage of catch buckles is significant because since the clamping strength is unequalled by other systems, it maintains the tension required and, above all, the buckles never freeze.

Easy maintenance: The new materials no longer require special maintenance. They can be put away anywhere during the summer season and require no special adjustment or treatment. Only a visual inspection of the components is needed to know if the snowshoes are functional.

Technological Revolution that Brought Back the Snowshoe Sport (Continued)

It is, in great part, thanks to the improvements mentioned on page 11 that the snowshoe has become once more a sport valued by lovers of winter outdoor sports. It is also thanks to the low cost to purchase snowshoes that this sport is gaining in popularity with families since it allows enjoyment with family and friends and its transportation is easy since it uses very little space. As any sport worthy of respect, accessories now come with its practice, such as transportation bags to put away the equipment; telescopic walking sticks to balance the body in slopes and climbs, thus distributing the body's pressure points; insulated, light and waterproof winter sport boots; and gaiters to stop snow infiltration in the boots.

GV Snowshoes is a pioneer in the area of new snowshoe manufacturing which thrills the winter outdoor lovers. Its efforts in research and development have allowed it to create new products that are more technical and sophisticated in order to offer to the followers products that will revolutionize in ingenuity and efficiency, and mostly to continue to write the history of the snowshoe.

Conclusion

For time immemorial, snowshoes have been manufactured by craftsmen from Indian Nations and, of all these Nations, only the Nation Huronne was able to develop, perfect and innovate the snowshoe to be marketed today on an international scale.

Here are two excerpts of an historical text authenticating the Nation Huronne as the manufacturer of snowshoes:

"Facing bad weather, these snowshoers, as their trapper ancestors, feel running within them, if not blood, at least the Amerindian spirit. Moreover, the soft shoes and snowshoes used in Québec at that time (1894) come from the Village Huron de la Jeune Lorette." – Excerpt from an historical account by Jean-Marie Lebel, historian.

And:

"afterwards, the Indians dominated, for a long time until very recently, the industry of the snowshoe. Even still today, the best snowshoes, and the less expensive, are manufactured in Indian reserves. In the small village at Lorette, for example, near Québec, the descendants of the Huron tribe manufacture an excellent product sold throughout Canada and the United States." – Excerpt from the book "The Snowshoe," by William Osgood and Leslie Hurley.

Nowadays, in 2008, GV Snowshoes company, founded in 1959, manufactures more than 16 models of snowshoes (a total of 53) in various materials, including wood, aluminium, composite and magnesium. Proud of its history and confident in the future of this sport, GV Snowshoes manufactures products of a high quality within a millenary traditional heritage.

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Snowshoe Basics

Snowshoes have been a part of the traditional culture in interior Alaska for more years than we can trace.

The design of snowshoes has varied from location to location, controlled mostly by the needs, conditions, and materials at hand.

Basic Idea

The idea behind snowshoes is fairly simple: Increase the surface area of a person's foot so they can walk on top of the snow rather than penetrating to the bottom. The number of snowflakes holding up the person is increased when the surface area is increased. Without snowshoes, the number of snowflakes is rather small. With snowshoes, the number of snowflakes is greatly increased.

This sounds easy, but it's really an engineering feat to design a shoe that:

- is light and strong,
- will be comfortable to use in deep or packed snow,
- is easy to put on and take off,
- will keep the traveler on top of the snow, but
- won't accumulate snow on its surface.

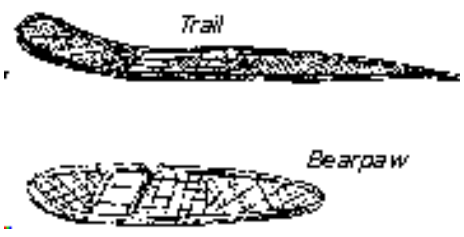
Size and Shape

How big should snowshoes be? If they are too wide, the person will walk bowlegged. If they are too narrow or too short, they won't have enough surface area to support the traveler. If they are too long, they will be too heavy, and difficult to use in the brush.

If they don't have enough turn-up in the front, they dive into the snow, and cause the traveler to constantly fall. If they have too much turn-up, they won't provide enough area on a harder surface to support the person.

Two Types

There are basically two types of snowshoes: trail and bearpaw.



Trail snowshoes are usually ten inches wide and fifty-six inches long including the tail. Bearpaws are shorter and rounded on both ends.

The front of trail snowshoes are turned upward for deep powder snow. The rounded shape of the bearpaws give a little bounce to the traveler's step on hard-packed snow, acting like a mini-trampoline.

PSI

The pressure that snowshoes exert on the snow can be described in pounds per square inch (psi). A heavier person will sink deeper on the same pair of snowshoes than a lighter person because the pounds per square inch of snowshoe surface is greater.

Both a lighter and a heavier person sink deeper in powder snow because the strength of the powder snow is less than the strength of packed snow.

The optimum size of snowshoes depends on the traveler, snow conditions and use. If the traveler is fairly light or usually travels on hard-packed or drifted snow, small shoes will be enough.

Once the traveler sinks deeper than his knees, traveling becomes very difficult. In powder snow, seldom is a pair of snowshoes too big except in some instances fighting through brush.

Old timers purposely used smaller snowshoes to break a good trail for dogs or other people following behind.

When they ran down a moose, they often used very large snowshoes (six feet) to stay on top of the snow and conserve their energy.

Balance

The front of some snowshoes dive into the snow, tripping the traveler.

To prevent this:

- The front of the snowshoe should have more surface area than the rear.
- The front of the snowshoe should be turned up.
- The rear of the snowshoe should have more weight.
- These three features work together to keep the front of the snowshoes from diving.

The Trail

Some trail model snowshoes have a long tail. It serves an important purpose. The tail keeps the snowshoe pointing forward, like the keel on a canoe or a tail on a kite. Without the tail, the snowshoe would swing from side to side, particularly in the brush, getting hung up, slowing and frustrating the traveler.

Mesh

The mesh underfoot obviously needs to be bigger and stronger than that in the front and back.

Powder snow demands mesh in the front and back that is smaller and more tightly woven to provide adequate surface area. Wetter or coarser snow demands mesh that is thicker and more durable against abrasion.

Materials

Frames

A well-chosen birch tree is tougher than all commercial woods sawn from a tree.

Not every birch tree is adequate. Old timers spent days and months looking for the right tree with the proper grain that was flexible, durable and with no knots.

Once they found the tree they were looking for, they split the snowshoe frame from the tree. This left the strength of the natural grain intact. Sometimes hot water or steam was used to bend the frame. Great care was taken to avoid overheating. Heating and steaming weaken the wood.

Commercial snowshoe frames are made from hickory or ash trees. The wood is sawn from planks rather than split, so the grain of the frames is greatly weakened. All first growth ash and hickory are gone from the United States as well as most of the second growth. The hickory and ash harvested now are from small, third-growth trees.

Manufacturers have experimented with aluminum alloys. They are very light and strong. It doesn't take much imagination to know what happens in overflow.

Webbing

For webbing, old timers used the skin from the belly of a spring moose. This is the strongest and toughest skin available. Caribou is a close second.

There is a real art to making the rawhide as it takes two people working well together … a true test of a marriage or friendship!

Nowadays, it is hard to find a good skin to work with. Untreated rawhide stretches when it is wet.

Unfortunately, dogs like to eat rawhide and more than a few travelers have cursed their dogs for eating their snowshoes.

Weaving the webbing to snowshoes in a way that is appropriate for local snow conditions is an art.

Bindings

Commercial bindings available today are functional, but the bindings on the old-time snowshoes were light and could be put on or removed in seconds without using your hands. Manila rope treated with linseed or vegetable oil works best for Native-style bindings because it is quiet and doesn't stretch like synthetics. Rawhide stretches too much when wet.

Few things are more miserable than snowshoe bindings that don't work properly.

There are some good quality modern bindings, but they are very expensive. Complex buckles and straps make travel on thin ice very dangerous. Traditional Native bindings come off with a twist of the foot.

Noise

Oiling snowshoes reduces noise when hunting. The friction of wood to wood or rawhide to wood produces enough noise to alert animals, particularly in very cold weather. The sound of snow being compressed is loud enough in cold weather. Creaking snowshoes make matters much worse.

Care

Linseed oil discourages animals from eating the snowshoe webbing. Snowshoes are usually kept outside in a cool dry place, above the reach of animals. While birch has great strength, it tends to rot easily, and oil helps prevent this. As the best snowshoes are very light, the traveler must walk carefully to avoid breaking the frames.

Activities

1. Time someone walking a given distance in deep snow without snowshoes. Then time the same person with snowshoes.

2. Try different kinds of available snowshoes (trail, bearpaw) on different snow conditions. Which is easier and why? Which is easier in the brush? On a snow machine trail? On windswept snow? In powder-like snow?

3. Try different kinds of bindings. Which seem better to you? This test is invalid unless you walk under many different conditions: packed trail, in the brush, up hills, in deep powder, etc. Which bindings and snowshoes are the quietest?

4. Compute the psi of individuals wearing winter boots and again with a pair of snowshoes (their weight divided by the area of the boots or snowshoes).

5. If a pair of homemade snowshoes is available, try to discover the pattern followed to lash the webbing. What did old timers do to protect it from wearing?

6. Study the different kinds of snowshoes described in catalogs and resource materials. What kinds of traditional snowshoes were used in other regions of the North? Can you guess their winter weather by the design? Look at the following picture.

What kind of snow conditions do you think this snowshoe was designed for?

7. What kind of snowshoes do you think are best for walking home on a snow machine trail? Time someone walking with these snowshoes for a mile. Time someone without snowshoes. Who walks faster?

Student Response

1. What is the idea behind snowshoes? Use the term "psi."

2. With the same snowshoes, who will sink more deeply into the snow: a person eighty pounds or someone one hundred and ten pounds?

3. Which is better for hard packed snow: bear paw or trail snowshoes?

4. Which is better for powder snow: bearpaw or trail snowshoes?

5. Why would someone want smaller snowshoes even if the snow is soft, deep powder?

6. What purpose does the tail of the snowshoe have?

7. Why aren't commercially-made snowshoe frames strong?

8. What kind of skin was the toughest to use for traditional lashing? What is the disadvantage of this kind of lashing?

9. Why did old timers oil their snowshoes?

Math and Snowshoes

1. What is the psi of a person weighing 175 pounds on snowshoes that have 400 square inches?

2. What is the psi of the same person wearing boots with 48 square inches? Snowshoes increase the surface area the person is exerting force upon by how many times?

3. On a trail snowshoe, measure the surface area in front of the individual's toe. Measure the surface area behind the individual's heel. Which is greater?

4. Compute the psi of the smallest person in the class if they have a standard pair of 10" x 56" snowshoes. How big would the snowshoes have to be for the largest person in the class to have the same psi, therefore sinking the same distance into the snow? You will have to figure the area of the snowshoes out in several different parts, circles, squares and triangles.

5. A homemade snowshoe weighs 2.2 pounds. Another one made by the Army is 3.0 pounds. If someone's step is 2' and there are 5,280 feet in a mile, how many extra pounds are lifted in a mile? How many extra pounds are lifted on a hunting trip where the person walks 7.4 miles?

Sink or Stay?

Learning Goal:
Students will compare psi of different footprints to help understand the concept.

Procedure:

1. Have students trace their boot on centimeter graph paper.

2. Ask the students to count the number of square centimeters covered by the boot's surface. Since a boot does not have straight edges, some estimating will be necessary. Also have the students count the squares that are more than one-half included inside the outline of the boot, but caution students NOT to count squares that are less than one-half included.

3. Ask the students what they think makes a person sink into the snow. (Elicit weight, pressure, quality of the snow – packed or loose). What relationship can students think of between weight and sinking in snow?

4. Measure the weight in kilograms of all students individually. Use the same scale for everyone.

5. Can students think of a numerical relationship (ratio) between the area of their boot and their weight? Call it pounds per square centimeter (psi) or "sink-in-the-snow factor." Ask all students to find their own sinking factor (division required!).

6. Then ask students to find the square centimeters covered by a moose print (provide track outline). And the sinking factor of a cow moose that weighs 800 pounds.

7. Provide students a large piece of cardboard. Shoebox lids work excellent for this exercise. Do same calculations from #1-5, finding the area in square centimeters of the cardboard area.

To figure the psi, you estimate the area of the footprint or snowshoe:

a) area of a rectangle = length x width = sq. in.
b) area of a triangle = 1/2 (base x height) = sq. in.
c) area of second triangle = 1/2 (base x height) = sq. in.
d) area of the snowshoe = a + b + c = sq. in.

Optional Extensions

Have students:

- Find the sinking factor of a hare, lynx or deer (provide track outline).
- Compare their boot to other prints. Ask which kind of animal can move efficiently through snow, and what characteristic about snowshoes and large feet might cause users to stay on top of the snow better?
- Try to think of any other modes of transportation that use this same idea of psi.
- Calculate the psi of a stiletto-style high heel and compare it to the psi of their boot.
- Try to draw conclusions about the relationship between surface area and psi.

Snowshoe Investigators

- Study the different kinds of snowshoes described in catalogs and resource materials. What kinds of traditional snowshoes were used in regions of the North? In Will County Illinois?
- Look at the following picture.

What kind of snow conditions do you think this snowshoe was designed for?
- What kind of snowshoes do you think are best for walking on a snow-packed trail?
- What kind of snowshoes do you think are best for walking on a fresh/untraveled trail?

Design Your Own Snowshoe

Brainstorming Questions:

1. What raw materials are the snowshoes made from?

2. What time period is the snowshoe from?

3. How does the snowshoe work?

4. What type of snow/terrain is the design intended for?

5. What is the name of your snowshoe?

Draw your snowshoe design here:

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