



Cross Country Skiing

Program Purpose:

The purpose of this program is to introduce students to cross country skiing and provide them with a basic orientation.

Program Length:

1 hour minimum

Age:

Grades 2nd - Adult

Maximum Number of Participants:

25 people

Wisconsin Standards:

A.8.3 Explore personal interests in a variety of new physical activities both in and out of the physical education class

A.8.8 Describe and analyze the ways in which people in different regions of the world interact with their physical environments through vocational and recreational activities

A.12.1 Participate regularly in health-enhancing fitness activities such as games, sports, dance, outdoor pursuits, and other physical activities that contribute to the maintenance of wellness, independent of class requirements

B.8.8 Identify major scientific discoveries and technological innovations and describe their social and economic effects on society

D.8.2 Recognize the social benefits of participation in physical activity such as the joy of participating with a team and sensing team fulfillment

Preparation:

Before the class arrives:

- An hour or two before class, heat up the wood stove on the boot side of the Craft Building. Do not heat the ski side of the building; warm skis stick to snow and eventually ice up.
- Check to see that the boots, skis and poles are in order.
- If you will have enough time to introduce the history of Nordic ski equipment, place the demonstration equipment on the table.

Basic Outline:

- I. Introduction (10-30 minutes)
- II. Skills (20-30 minutes)
- III. Skiing (30-45 minutes)

Introduction – History

If time allows give your students some history on cross-country skiing, also known as Nordic skiing. Nordic skis were invented approximately 5,000 years ago in the Scandinavian Region of northern Europe. This is a part of the world that is covered in a blanket of oftentimes deep snow for much of the winter. Why would people living 5,000 years ago in Scandinavia invent such a mode of transportation?

Early versions of Nordic skis, which will be discussed later, are similar to modern equipment in that they allow people to move more efficiently in deep snow. The long span of the skis displaces the weight of the user over a greater area on top of the snow. Skis allow the user to “float” on the snow’s surface, as opposed to sinking down deep with every step (also known as post-holing, or postholing). Skiing on top of the snow is much more efficient; post-holing is very slow and consumes much more energy. This can be demonstrated using a small, heavy rock and an old ski. Place the rock first in deep snow where it will readily sink down into the snow. Next place a ski on the same deep snow and then place the rock on top of the ski. Why doesn’t the rock sink into the snow? The ski displaces the weight of the rock on the snow over the entire surface area of the ski. Before the advent of snowmobiles, roads and cars, Nordic skis allowed people in Scandinavian countries to travel longer distances during the winter more efficiently. Prehistoric people in the northern portions of North America came up with a different solution to the same problem; do you know what they invented? Snowshoes!

The first Nordic skis were simply long pieces of wood with a strap in the middle to keep the skier’s foot in place on each ski. This works fine for going slowly on flat snow, but allows the skis to slip backwards on a slope. Thus, furs were added to the center of the skis for traction. The fur was placed with the hairs pointing backward so that the ski would slide forward easily, but grip into the snow when pushed backward.

Early bindings were simply pieces of leather which held the user’s foot in place. Later, in the early 1900’s, the three pin-style binding was invented. The three pin binding requires the use of special boots which have a flexible tongue that extends forward from the toe of the boot. The tongue has three holes formed or drilled into it that match the three pins of the binding. A clasp closes down on the tongue to hold it in place. There were several sizes of three pin binding/boot systems in use,

which were not interchangeable, until one standard was developed in 1927, the Nordic Norm (the norm refers to the distance of 75 mm from outside pin to outside pin). This allowed any Nordic Norm boot to be used with any Nordic Norm binding. The Nordic Norm was the standard binding/boot system for over 50 years and is still in use today. In fact, we use the three pin Nordic Norm binding at Upham Woods because this style of binding is generally preferable in backcountry-like skiing conditions.

In the 1980's a totally different boot/binding system was designed called the New Nordic Norm (abbreviated NNN or triple N). The New Nordic Norm employs boots with a metal rod in place just below the toe which clicks down into a receiver clamp in the binding (demonstrate this with the demonstration NNN boot and binding). Several different variations of this style now exist from different manufacturers, but the concept is very similar.

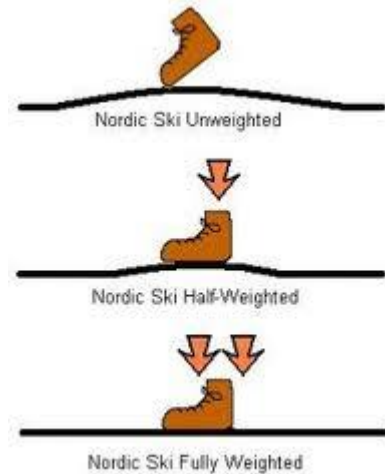
Nordic skiing started to gain popularity as a sport in the late 1700's, first in northern Europe, but by the 1800 and 1900's, Nordic skiing's popularity spread throughout Europe and North America. Over the past couple hundred years, ski design and materials have evolved dramatically. The sport has grown partially because of the evolution of the equipment and the equipment has evolved because of the sport's popularity. Nordic skis are now used by millions of people across the planet for fun, recreation, and winter exercise, not just travel.

Introduction—Equipment

If time allows use the demonstration pieces of ski equipment and/or a dry erase board to demonstrate the features of modern skis. Most modern Nordic skis have a wood core that has had numerous holes drilled or cut into it to make the ski lighter and more flexible. The outer surfaces of the ski are covered in fiberglass and/or plastic to make them strong, waterproof and to keep snow from sticking. The bottom surface of the ski is covered with an additional layer of plastic called the base.

One of the biggest advances in Nordic ski design was the invention of the camber, or upward curve in the middle, of the ski which allows for both a kick and glide section on the same ski. (Place a ski on a flat surface in front of your group to clearly illustrate the camber. Use the demonstration ski to also show the kick and glide sections of the ski.) The camber lifts the kick section, or traction part of the ski, off the snow during gliding. When you have equal weight on both skis—as when gliding—the traction part of the ski (the middle third that has either a textured pattern or wax for traction) remains arched up off the snow to ensure an easy glide. When you place all your weight on one ski, as would happen when pushing down to push forward, you completely flatten that ski against the snow, so that the kick zone grips the snow and gives you backward traction to kick

forward (Push down on the ski several times for your group to demonstrate). This is why your body weight is so important in determining your correct length of ski.



The grip or kick section of the ski gets traction in one of two ways: either the bottom of the ski has a manufactured texture pattern, a ski type called waxless, or the ski base is designed so waxes are applied which do all the work: slippery glide wax is applied to the glide section of the ski and sticky wax to the kick part of the ski, the latter ski called waxable.

Waxless skis are the most popular choice because they are convenient and provide grip in a variety of snow conditions. Their textured pattern digs into and grips the snow, though it reduces glide somewhat. Despite their name, waxless skis perform better with some glide wax applied to the tips and tails which we do here at Upham woods.

Waxable skis are more work, but they can outperform waxless models if their wax is precisely matched to snow conditions. The wax must be soft enough for snow crystals to dig in and grip, but not so soft that snow sticks to skis. In consistent temperatures above or below freezing, well-waxed skis perform superbly. When temperatures are erratic or right at the freezing point, waxing is difficult and waxless skis are the better choice.

Nordic skis come in different widths (hold up several examples of different width skis and compare them for your group). The width of the ski causes the ski to perform better on different snow types. The tracking mechanism on Nordic ski center groomers forms a packed track that is approximately 60-70 mm wide so most common Nordic skis are less than 70 mm wide so they can fit within the formed track. Because of this, classification of Nordic ski is sometimes referred to as a track ski. Track skis perform very well on the firm, packed snow of a groomed trail; however, they perform poorly on unpacked powdery snow because they are relatively narrow. Track skis will tend to roll from side to side in deep, powdery snow. Trail skis or backcountry Nordic skis are wider than track skis and thus provide better floatation and stability on deep and/or powdery snow. Because they are wider than 60-70 mm they won't fit in the groomed tracks at Nordic ski center and thus are usually not allowed. Backcountry skis put more ski

surface in contact with the snow, thus are slower and take more effort than a narrower ski such as a track ski.

The binding keeps the ski boot attached to the ski. On Nordic skis the binding holds the front of the boot in place yet pivots to allow the heel to lift. We use three pin or Nordic Norm boots and binding at Upham Woods. Refer to the history section of this lesson plan for an explanation of the three pin binding.

Ski poles are usually made out of aluminum or fiberglass. Older poles were constructed of wood. The pole grip and strap keeps the pole in your hand and transfers some of the user's arm motion to the ground to help propel the skier forward, though the kick portion of the ski should do most of the work. The basket of the pole keeps the pole from sinking too far down in the snow.

Getting Suited Up!

Have students sit down on picnic tables in Craft Building to explain how they are going to fit their skis, boots, and poles.

Boots

Explain that the ski boots are in European (metric) sizes. Point out the conversion charts in the room. The ski boots should not fit tightly, but leave enough room for one finger between the end of your toe and the tip of the boot. Boots should always be taken and returned as a pair.

Poles

To fit the poles, students should stand and place the tip on the floor – the top of the pole should just about reach their armpit. (It's better to have poles on the short side rather than long.) Also, demonstrate how to bring your hand up the bottom of the loop and how to grasp the pole over the straps. The poles are arranged by color depending on their length.

Skis

Nordic skis are fitted by weight. The ski racks should have signs on them indicated which ski is appropriate for corresponding weight ranges. The skis are color-coded for the appropriate weight range. Make sure they have a pair with a left and a right ski as indicated on the binding. Skis should be removed from and returned to the rack as a pair. Demonstrate with a boot and ski how to insert and remove the boot from the binding.

Ski Skills:

Have them walk their equipment out to the sandlot to show them some basic skills. Never ski on bare ground!

Clipping in – Have everyone put on their skis and assist where needed.

Falling - Explain that most of us will fall today. We need to know how to do it properly and how to get back up. If you have a choice, it's best to fall onto your butt, in a sitting position rather than falling forward, allowing for more cushioning and won't break wrists. Demonstrate how to properly get up by leaning forward, crawling into a kneeling position and standing up by pushing off the ground or thigh (not the poles, so they don't break). Have everyone practice this a couple times.

Position and Forward Motion – Once you get going you'll be shifting your weight back and forth over each foot. Practice some simple balance by picking up one foot so the ski comes off the ground and then switching. Don't rely on your poles to keep you up. Since your legs do most of the work, your arms should be relaxed. This enables your poles to land in the correct spot to help keep you moving forward. The poles are there to help you with balance and assist in getting up hills. Have everyone practice the "gorilla" stance, stick your poles behind you, relax the shoulders and hang your hands down. As you move forward and bring your arm up, the poles should naturally land beside your foot (not in front) to provide push. If you put them in front, it will slow you down!

Turning – Show how to turn by lifting up and moving one foot at a time, turning each a little until you're going the way you want to (called a daisy turn for the pattern in the snow made). To turn left, move left foot first and vice versa. If they have the flexibility and balance they can try the 180° turn. This is done by balancing on one foot while lifting the other, up and out, flipping it so it's completely turned around, then shifting weight and bringing the remaining foot around.

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To practice balance and gliding, have them get into their individual tracks. (If you have more skiers than tracks, double up but have the faster one go first.) First have them put all their weight gliding their left foot in the "left lane". Then shift to the right foot gliding in the "right lane". Tell them to focus their eyes on the lane they are working on, thus shifting their eyes back and forth along with their feet. This should be a pretty slow gliding motion. Have them go up and down their own lanes a couple of times and practicing turning-around at the end. Another way to reinforce gliding is to play Green Light, Red Light. On Green Light they begin moving but on Red Light they can only glide. They will probably end up trying to go fast during Green Light so as to have more glide during Red Light.

Stopping - Explain how to snowplow by making a "V" with their skis and leaning on the inside of their skis. Explain that it should look like a pizza slice with their toes in. Another way is to just sit down!

Uphill – If a hill is too steep to walk up, point your toes out sideways and "duck-walk/herringbone" up the hill.

Dig your edges in and put your poles behind your skis to help push you up. If the hill is too steep, walk sideways up the hill, with your skis perpendicular to the incline. Place weight on the uphill side of your skis, taking small steps.

Downhill - Get into the “snowplow” position and turn ankles in. Hold your hands out in front of you as if you were holding a tray. Have your back straight and knees bent. The more pressure you put on the inside of your skis the slower you will go.

Go out on their own!

After teaching them the basic skills hit the blue trail! The trail starts at the southwest corner of the sandlot. Follow the blue triangles on the trees on a loop behind the nature center for the beginner course. It loops back around to the northwest corner of the sand lot.

If they would like to try the advanced course, you can take your group across the road to the Westridge Trail. Cross as a group using orange safety flags. The skis must be carried across to keep from scratching the ski bases on the pavement.

Conclusion

Walk back to the Crafts Building to put away the ski equipment and to conclude class. Remind your group to put away all equipment as a pair from where they got it. Notify an Upham staff member if any equipment is in need of repair.

After all the equipment is put back in its correct place, the room is orderly and your group members have their own boots/shoes back, on ask some processing or reflection questions. Some examples are:

- Why do we teach Nordic skiing at Upham Woods?
- Why is it important to learn an outdoor activity like Nordic skiing when living in a cold weather climate like Wisconsin?
- How did the invention of Nordic skis affect the people of northern Europe?
- What did they enjoy about learning to cross country ski and why?
- How can they use what they learned from this class in their everyday lives?

References:

<http://www.adventuresofscatman.com/2010/11/snows-here-are-you-in-part-2/>

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