Commonwealth of Pennsylvania
Fish & Boat Commission

Ice Safety:
Basic Survival & Rescue

Manual

Revised 12/23/2013

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PENNSYLVANIA WATER RESCUE PROGRAM

The Pennsylvania Fish and Boat Commission (Commission) developed the Pennsylvania Water Rescue Program to train personnel in the most current techniques of boating and water (ice) safety. The goals of the program are to:

- Familiarize the rescuer with the proper procedures used in basic water (ice) safety and safe boat handling.
- Have the rescuer demonstrate a proficiency in water rescue relative to individual capabilities.
- Provide the rescuer with competency in dealing with on-the-water emergencies.

The program was developed for training fire and rescue department personnel.

- It has been adopted by the Commonwealth of Pennsylvania and is in use in several other states.
- The course can also be used in the water rescue training of police departments, park service personnel, or for members of any boating and water safety organization.
- Depending on need or geographic location, only one or a combination of course may be necessary to fulfill your agency's training requirements.

SAFETY WARNING

Ice rescue is dangerous! This program only provides ice safety awareness information. Ice rescue is a water rescue technician level skill. The PFBC's Ice Rescue & Emergency Response (IRER) curriculum provides advanced training and practice under the direction of water rescue instructors.

COURSE OBJECTIVES

- Provide ice safety and awareness information.
- Cite who should have the ice rescue awareness level training.
- Discuss ice characteristics such as formation and factors that can strengthen or weaken ice.
- Identify the various types and stages of ice.
- Describe the proper way to dress and what materials maximize thermal protection.
- Identify medical conditions associated with water and cold weather.
- Discuss the information needed and how to activate the emergency response system.
- Learn how to survive a fall thorough ice.

ICE RESCUE OVERVIEW

- Ice can be a gathering place for many individuals who participate in winter sports such as: ice fishing, cross–country skiing, ice skating, snowmobiling, ice boating, winter hiking and many other recreational activities.
- Unfortunately, most individuals who venture out on the ice have a limited knowledge of how and why ice forms. A large number of people are unaware of the hazards and dangers associated with ice.

- Accidental breakthroughs occur no matter how careful one is regardless of checking and evaluating ice conditions. A fall through the ice mantle does not have to end in tragedy.
- Emergency service teams in cold climates will be faced with ice rescue emergencies. They must be able to take appropriate action to ensure personnel, team, and scene safety.
- Anyone who may become directly or indirectly involved with an ice emergency must be able to recognize risks.
- Rescue attempts by ill prepared bystanders or emergency service personnel can place them in the same hazardous environment as the victim, complicating the situation and possibly leading to tragic consequences.
- Proper training leads to efficient and safe rescues at an ice related emergency.

WHO SHOULD HAVE THIS TRAININIG?

- Emergency services personnel (fire/EMS/law enforcement)
- 911 Dispatchers
- Municipal employees (road crews/utility workers)
- Winter recreational enthusiast
- Any person/group with the potential to respond to an ice related emergency.

VIDEO: "Danger Thin Ice"

ICE CHARACTERISTICS

- Many are not aware of the dangers and hazards associated with ice. They ignore or are unaware of the warning signs and place themselves in danger.

ICE FORMATION

- Cold air cools water on the surface of a body of water.
    - Cold water sinks because it is heavier.
    - Warm water rises from the bottom to replace it.
    - This process is called vertical circulation.
- When the process stops, theoretically, water throughout the lake will be the same temperature.
    - This process is referred to as "isothermic."
- All water at different depths is exactly 39.2°F.
- Once this occurs, water at the surface begins to cool.
    - Temperatures near the surface will be close to 32°F and approximately 39.2^{o} F at the bottom.
    - This is called a "thermocline."
    - Ice begins to form.
- Water depth and weather will determine the depth of thermocline.

- Ice begins to form at the surface of the water when its temperature reaches 32°F.
    - Ice expands in volume approximately 9%.
    - Ice is lighter than water and will float.

ICE STRENGTH

- There are many factors that influence ice thickness and strength.
    - In an emergency, identifying these factors may be difficult.
- Follow these general guidelines on ice formation can improve your safety:
    - Ice strength and thickness varies.
    - Ice seldom freezes and thaws at a uniform rate.
    - Thickness is only one factor that determines ice strength.
- Although the thickness of the ice may meet the recommended thickness guideline, it still may not support a person.
- Rotten ice 4-6 inches thick can break and plunge unsuspecting ice travelers into frigid waters.
- New ice is usually stronger than old ice.
    - Ice normally grows stronger and thicker during formation.
- Decaying ice can maintain its thickness but be unsafe.
    - Does not melt at a uniform rate.
    - Bond between the ice crystals decays or “candles” the ice into a dangerous porous condition.
    - Ice may take on a black colored appearance.
- Factors that cause ice formation and strength also cause deterioration.
- Weather (temperature, wind, snow, and sunlight)
    - Daily temperatures affect ice strength and thickness.
    - Consistent cold temperature maintains ice strength.
    - Warm temperatures weaken and deteriorate ice.
    - Sunlight can deteriorate ice from below when it reflects off rocks or a sandy bottom.
- Changing air temperatures cause thermal expansion, which create cracks in the ice.
    - Booming sounds are caused by the ice sheet expanding and changing shape due to temperature changes. This often creates:
        - Dry cracks which refreeze to a strength similar to the original ice.
        - Wet cracks that reach through to the water level.
    - Cracks that meet at 90° angles or are open to water create very hazardous conditions-especially at night.
- Thermal expansion can create pressure ridges (also referred to as pushups).
    - Weaker, soft ice or open water areas often occur near these ridges.
- Wind
    - Light wind speeds up ice formation.
    - Heavy wind creates a chop on the water and slows ice formation keeping areas open on frozen lakes.
        - Wave action erodes the underside of the ice mantle, creating a thinner sheet near open water. Wind forces water beneath the edge of the open ice, weakening and rotting it from below.
- Snow
    - Insulates strong ice and reduces melting.
    - Can cause ice to form slowly or to deteriorate.
    - Weight depresses ice and reduces carrying capacity.

    - Covers up danger signs of ice.
- Water
    - Water on the ice surface causes ice to erode and deteriorate.
    - Creates dangerous vertical fractures.
    - Can percolate through fractures.
    - **Warning sign of a weak ice condition.**
- Slush
    - Caused by rain, warm temperatures or by water rising through cracks in the ice.
    - Sign that the ice is no longer freezing from below.
    - Slush normally freezes from the top down.
    - **Warning sign of a weak ice condition.**
- Bottom/Shore
    - Ice closer to shore is weaker because of shifting, expansion and sunlight reflecting off the bottom in the shallower water.
    - During ice formation, ice will form first near the shore where the vertical circulation conditions change rapidly.
- Underwater springs
    - Ground water is typically near 50 degrees.
    - Underwater springs weaken ice formation from the up swelling of warm water, which prevents or slows ice formation.
    - Ice weakened by springs can be camouflaged by snow
- Water depth
    - Very large lakes may remain open in winter because of wind, waves, and current.
    - Large deep lakes take longer to form ice and the ice is slower to decay.
- Lake draw-downs
    - Water draw-downs on a lake after the ice sheet has formed can create a space (sometimes many feet), between the ice and the water.
    - Ice sheet may become concave or collapse due to no support from below.
    - Although the ice may meet minimum thickness guidelines for safety, it will be significantly weaker because of no support from below.
    - A second layer of ice may form below the top ice sheet.
- Current and water velocity
    - River ice is weaker than lake ice.
    - Straight stretches of a river have stronger ice than on a river bend.
    - Ice on the outside bend of a river will be weaker because the current is faster and stronger.
    - Mouths of rivers create dangerous ice formations because of cross currents.
    - Underlying current causes air pockets in ice.
- Water chemistry
    - Pure water freezes faster and is thicker than water containing chemicals or pollutants.
    - Pollutants concentrate along ice crystal boundaries causing melting along the boundaries, which create porous, vertical streaks called “candling.”
    - Road salt used on a bridge surface drains onto the ice mantle from above and creates weak ice conditions under the drainage.
- Obstructions (rocks, logs, vegetation, and pilings)
    - Shifting and expansion create pressure cracks and ridges around obstructions.
    - Obstructions absorb heat and melts surrounding ice.
    - Decomposing vegetation generates heat and hinders ice formation.
- Fish and waterfowl
    - Waterfowl and schools of fish can prevent ice formation.
    - Can cause a vertical circulation of water.

- Can cause thin ice spots or open water.
- Waterfowl try to keep an area of water open.
- If they leave, the open area freezes and is often thinner and weaker than surrounding ice.

ICE TYPES

- Frazil ice
  - First ice to form.
  - Composed of disk shaped crystals suspended in water.
  - Thin oily or opaque film that floats on the surface.
- Frazil slush
  - Soft and forms in moving water.
  - Current prevents solid freeze.
- Clear ice
  - New ice formed by long hard freeze.
  - Can be blue, green or black due to the color of water underneath the ice.
  - Usually strongest ice.
- Snow ice
  - Opaque, milky looking weak ice.
  - Formed from freezing of water soaked snow.
  - Low density, porous and weak.
- Layered ice
  - Striped appearance.
  - Formed from many layers of frozen and refrozen ice.
- Anchor ice
  - Formed when objects in water cool to 32^{o}F.
  - Ice forms on objects.
  - Sun warms objects then releases.
- Drift or floating ice
  - All free floating ice on a body of water.
- Pack ice
  - Ice driven against ice by wind, current or waves.
  - Pile up and freeze together leaving weak holes.
  - **Very dangerous ice condition.**
- Fast or shore ice
  - Unbroken sheet attached to the shore of a lake or river.
  - Shore ice freezes first because of shallow water depth where water temperature conditions change rapidly compared to deeper sections of a body of water.
  - Shore ice is also one of the first areas to deteriorate.
- Candle ice
  - Fingers in ice that is rotting or disintegrating.
  - Resembles candles bundled together or varicose veins.
  - Commonly found in late winter or early spring.
  - **Warning sign of a weak ice condition.**
- Ridged ice
  - Ice piled up by pressure and thermal expansion.
  - Form ridges or walls.
  - Area will be weak and may be open to water.

- Ice crack
    - Any fracture in the ice.
        - Dry crack (one that does not extend to the water), wet crack (open to water)
- Puddle ice
    - Accumulation of melted water on the ice surface.
    - Initial stage is patches of melted snow.
    - Water on ice surface weakens its strength.
    - **Warning sign of a weak ice condition.**
- Thaw hole
    - Vertical hole.
    - Found in same location every year.
    - Created by a spring or other underwater condition.
    - Ice will always be thin in this area.
    - Snow can camouflage the hole creating a tiger trap condition.
    - **Very dangerous ice condition.**
- Rotten ice
    - Honeycombed appearance.
    - Advanced stage of disintegration.
    - May appear black of gray because of water saturation in the ice.
    - If standing in one spot on rotten ice, water will percolate through the ice and puddle around feet.
    - Most ice rescues will occur on this type of ice.
    - **Very dangerous ice condition.**

COLD WEATHER CLOTHING

- By wearing proper cold weather clothing the individual can stay warm, dry, and reduce the risk of hypothermia.
- Dressing in multiple clothing layers allows the wearer to regulate body temperature by either removing or adding clothing as needed.
- A variety of clothing materials are available for outdoor use.
    - These materials provide thermal insulation and protection from the elements.
    - Each clothing layer performs a specific task.
- Select durable personal protective equipment that provides flexibility and thermal protection for the user.

LAYERS

- Inner vapor transmission
    - Material - silk, polypropylene or other combinations
        - Polypropylene and other garments are available in light, medium or heavy weights.
    - Use - provides some insulation but the primary function is to transport (wick) moisture away from the body.
- Middle insulation
    - Material - Pile (polyester), neoprene

    - Use - traps air to provide insulation, also designed to absorb and transport moisture outward.
- Outer protection
    - Water and wind-proofed fabric (breathable preferred)
    - Use - protection from the elements (wind, rain, etc.)
        - Coated nylon is wind and waterproof but does not transport moisture away from the body.
        - Breathable fabrics are designed to transport water vapors through the material while providing a water and windproof exterior barrier.

PERSONAL FLOATATION DEVICES (PFDs)

- Anyone near water must always wear a United States Coast Guard (USCG) approved personal flotation device (PFD).
- A Type III or V PFD is used in rescue situations.
    - Inflatable PFDs are **not** appropriate for ice rescue.
- PFDs
    - Must be properly sized to wearer.
    - Must be completely zippered or all buckles fastened.
    - May offer thermal protection.

MEDICAL CONSIDERATIONS

- One needs to have knowledge of medical conditions associated with ice related emergencies.
    - Cold water shock
    - Hypothermia
    - Drowning

COLD WATER SHOCK

- Cold shock
    - Rapid development of a number of shock responses that can result in sudden drowning.
        - One of the first responses by the body upon sudden immersion in cold water is an involuntary gasp (torso reflex). Covering mouth and nose with your hands when falling into cold water reduces the chance of inhaling water.
    - Hyperventilation (rapid breathing) and breathlessness follow. Victim may feel claustrophobic and panicked.
    - Hyperventilation can cause “alkalosis” reducing blood levels of CO2, which reduces blood flow to the brain.
    - Cold water vastly reduces the victim’s ability to hold his breath. Loss of breathing control and reduced breath-holding ability will impair the victim’s ability to swim.

HYPOTHERMIA

- Condition in which the body's core temperature has been lowered
    - Usually below 95 Fahrenheit
- Two types of hypothermia are:
    - Chronic - occurs from prolonged exposure to the environment.
    - Acute - occurs from sudden immersion into cold water.
- Water conducts heat from the body approximately 25 times faster than air at the same temperature.
- The body loses heat by five methods:
    - Conduction - transfer of heat by direct contact with water, air, or ground
    - Convection - transfer of heat by air or water moving away from the body
    - Radiation - loss of heat from unprotected body parts through energy transfer
        - High heat loss areas are the head, armpits, and groin area.
    - Evaporation - conversion of perspiration into water vapor, releasing heat from the body
    - Respiration - exhalation of water vapor carrying with it heat from the body.
- States of hypothermia
    - Mild – shivering, impairment of movement, cold skin
    - Moderate – poor coordination, confusion, apathy, slurred speech
    - Severe – slow respiration and pulse, muscular rigidity, diluted pupils, coma and death
- Each person will be affected by cold water in different ways. The primary factors that determine survival time are:
    - Water temperature
    - What the person is wearing (dry suit, wet suit, amount of type of clothing, etc.)
- Other factors influencing heat loss include:
    - Age - children and elderly lose heat faster.
    - Body type - thin people lose heat faster than heavier people.
    - Movement in water - A person swimming or thrashing will lose heat faster than someone floating in water.
    - Posture in the water – Heat Escape Lessening Posture (H.E.L.P.) or huddle conserves body heat.
    - Alcohol use - dilates blood vessels, causing a victim to lose heat faster.
    - Medical conditions - injury, illness, shock, chronic illness, etc.
    - Gender – the average female will have 10% more body fat than a male and should cool more slowly. However, because of other factors it is difficult to make a fair general statement comparing cooling for gender.
    - Overall fitness/acclimation.
    - Nutritional state and blood sugar concentration. Food is fuel.
    - Previous exposure to cold water.
    - Attitude and will to survive.
- Care for hypothermic victims:
    - Handle gently.
    - Remove from cold environment.
    - Ensure ABCD's (airway, breathing, circulation, degrees – prevent further heat loss).
    - Check pulse in hypothermic patients for one full minute prior to starting CPR.
    - Follow Automated External Defibrillator (AED) protocol for hypothermic patients.
    - If no pulse or respirations begin CPR (don't consider dead until warm and dead).
    - Take off wet clothes and replace with dry.
    - Cover head with hat.
    - Wrap in blankets and warm slowly.

    - Transport to medical facility as soon as possible.
- Hypothermia prevention
    - Eat high-energy foods.
    - Maintain adequate fluid intake (avoid caffeine).
    - Dress in layers for weather conditions.
    - Protect areas of high heat loss - cover head.
    - Recognize signs and symptoms of hypothermia and take immediate action.

DROWNING

- Drowning is a leading cause of accidental death.
- Drowning is defined as suffocation in a liquid.
- Any near drowning victim must seek medical attention to avoid the possibility of secondary drowning.
- Individuals have been successfully revived after being under water for over one hour.
- Care for drowning:
    - Remove from water.
    - Ensure ABCs and initiate CPR as required.
    - Follow Automated External Defibrillator (AED) protocol.
    - Prevent further heat loss.
    - Handle gently.
    - Administer 100% oxygen.
    - Transport to nearest medical facility, which can handle these types of emergencies.

Hyperlink Source: PFBC, Ice Safety Thickness, http://fishandboat.com/water/ice_thickness.pdf

TRAVELING ON ICE

- The following guidelines can help you make wise choices:
    - Check for known thin ice areas with a local resort or bait shop.
        - Test the thickness yourself using an ice chisel, ice auger or even a cordless 1/4 inch drill with a long bit. (Refer to appendix A)
    - Refrain from driving on ice whenever possible.
        - If you must drive a vehicle, be prepared to leave it in a hurry--keep windows down and have a simple emergency plan of action you have discussed with your passengers.
    - Avoid alcoholic beverages.
        - Even "just a couple of beers" are enough to cause a careless error in judgment that could cost you your life. And contrary to common belief, alcohol actually makes you colder rather than warming you up.
    - Don't "overdrive" your snowmobile's or ATV's headlight.
        - At even 30 miles per hour, it can take a much longer distance to stop on ice than your headlight shines. Many fatal through-the-ice accidents occur because the

machine was traveling too fast for the operator to stop when the headlamp illuminated the hole in the ice.

- Wear a PFD under your winter gear or a new flotation suit.
  - Carry a pair of manufactured or homemade ice awls. The ice awls help pull yourself back onto solid ice.

CAUTION: *Do not wear a flotation device when traveling across the ice in an enclosed vehicle!*

Hyperlink Source: PFBC, Ice Awls, http://fishandboat.com/iceawls.pdf

IN THE EVENT OF AN EMERGENCY

- Ensure your own safety and activate the Emergency Response System by dialing 9-1-1 and provide the following information:
  - Nature of the emergency
    - Brief description of the incident and the scene
    - Number of individuals (victims)
    - Point (the victim) Last Seen (PLS) or Last Known Point (LKP)
  - Exact location
    - Address/road
    - Name of river/lake/access
    - Shore (river right or left) - right or left always refers to looking downstream
    - Distance from a known point
    - GPS location
- ***Resist the urge to run up to the edge of the hole!*** This may result in two victims in the water. Also, do not risk your life to save a pet or other animal.
- Try to communicate with the victim and encourage them to fight to survive. Reassure them that help is on the way.
  - Try to keep the victim(s) calm and above water.

WHAT IF YOU FALL IN?

- First, try not to panic. This may be easier said than done, unless you have worked out a survival plan in advance. Read through these steps so that you can be prepared.
  1) Don't remove your winter clothing. Heavy clothes won't drag you down, but instead can trap air to provide warmth and flotation. This is especially true with a snowmobile suit.
  2) Turn toward the direction you came. That's probably the strongest ice.
  3) Place your hands and arms on the unbroken surface. This is where a pair of nails, sharpened screwdrivers or ice awls comes in handy in providing the extra traction you need to pull yourself up onto the ice.

4) Float your legs to horizontal and kick your feet and dig ice awls to work your way back onto the solid ice. If your clothes have trapped a lot of water, you may have to lift yourself partially out of the water on your elbows to let the water drain before starting forward.
5) Lie flat on the ice once you are out and roll away from the hole to distribute weight. This may help prevent you from breaking through again.
6) Get to a warm, dry, sheltered area and re-warm yourself immediately. In moderate to severe cases of cold water hypothermia, you must seek medical attention. Cold blood trapped in your extremities can come rushing back to your heart after you begin to re-warm. The shock of the chilled blood may cause ventricular fibrillation leading to a heart attack and death!

WHAT IF YOUR VEHICLE BREAKS THROUGH?

- If your vehicle plunges through the ice, the best time to escape is before it sinks, not after. It will stay afloat a few seconds to several minutes depending on the air tightness of the vehicle.
    - While the car is still afloat, the best escape hatches are the side windows since the doors may be held shut by the water pressure. If the windows are blocked, try to push the windshield or rear window out with your feet or shoulder.
    - A vehicle with its engine in the front will sink at a steep angle and may land on its roof if the water is 15 feet or deeper. As the car starts its final plunge to the bottom, water rapidly displaces the remaining air. An air bubble can stay in a submerged vehicle, but it is unlikely that it would remain by the time the car hits the bottom.
    - When the car is completely filled, the doors may be a little easier to open unless they are blocked by mud and silt. Remember, chances are that the car will be upside-down at this point! Add darkness and near freezing water, and your chances of escape have greatly diminished. This underscores the necessity of getting out of the car before it starts to sink!

SAFETY EQUIPMENT

- Ice awls
    - Have ice awls readily available.
    - Toss set of ice awls to victim.
        - Instruct the victim to come out of the hole in the direction from which he came.
        - Instruct the victim to kick to the horizontal and pull self up onto the mantle.
        - Instruct the victim not to stand once out of the hole, but to continue to crawl towards shore.
        - Limitations
            - Must be 100% accurate – awls must be within grasp of victim.
            - Risk of injury if awls separate exposing the pointed nail.
            - May not be able to grasp because of loss of dexterity.
- Throw (rescue) bag with a one foot loop of webbing attached to bottom of bag
    - Contains 50 – 75’ of polypropylene rope.
    - Technique
        - Determine location for closest throw.
        - Communicate that you are going to throw the bag and if the victim can reach it, to grab the rope, not the bag.

        - Throw the bag.
        - If accurate, instruct the victim to wrap one hand around the rope (this is contrary to moving water where rescue personnel are taught never wrap into the rope).
        - In ice rescue, rope is difficult for a person to hang onto because it may be covered with ice, or the person has lost dexterity.
        - Have the victim wrap hand and arm around the rope to reduce the chance of losing grip when pulled up and out of the hole.
        - A one-foot loop of webbing attached to the end of the bag can also aid the victim.
        - Victim can place arm through the loop and wrap arm around the rope.
        - When the victim is wrapping hand and arm around the rope, the rescuer provides enough tension to support the person so they do not slip off the mantle, but not too much tension to pull the rope from the victim's grasp.
        - Instruct the victim to hold tight and kick hard to come up and out of the hole.
        - Make sure the victim does not stand up once out of the hole, but continues to hold onto the rope and crawls towards shore.
    - Limitations of a throw bag
        - The throw must be 100% accurate – within grasp of victim.
        - The victim may not be able to grasp because of loss of dexterity.
        - Environmental factors (wind – shoreline vegetation) can reduce accuracy.
        - Victim may be beyond reach of a shoreline throw.
        - Properly dressed and equipped rescuer can move onto the ice and make a throw closer to the victim.
- Extension Devices (Ladder, Ice Staff, Poles, Ice Cross)
    - If victim is close to shore, an extension device may be extended to a point where it can be grasped so the victim can be pulled out of the hole.
    - Devices can be used from shore or if a rescuer is properly dressed and equipped, can be used as an ice based rescue tool.
    - Many devices exist – both commercial and improvised
    - Limitations
        - Limited reaching distance.

COURSE SUMMARY

- After completion of this entire course, students should have a general understanding of the following:
    - Ice safety and awareness information.
    - Who should have the ice rescue awareness level training.
    - Ice characteristics such as formation and factors that can strengthen or weaken ice.
    - Various types and stages of ice.
    - Proper way to dress and what materials maximize thermal protection.
    - Medical conditions associated with water and cold weather.
    - The information needed and how to activate the emergency response system.
    - How to survive a fall thorough ice.

Utilize this information to ensure safety when around ice. Periodically refresh your training and take additional ice safety training that meets your needs.

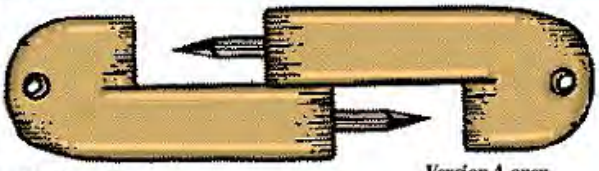
SMART Angler's Notebook

by Carl Richardson

Illustrated by Ted Walke

Ice Awls

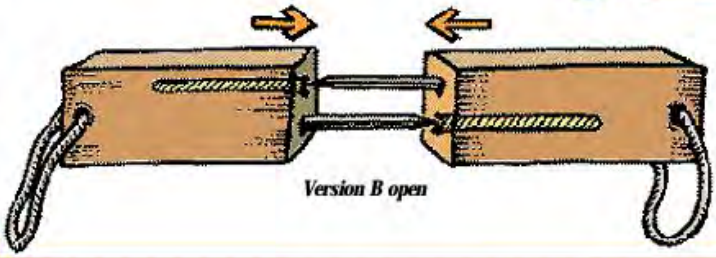
Version A closed



Version A open

DIRECTIONS

Trace the pattern on the wood and using the saw, cut out the two pieces. Note: If a coping or jig saw is unavailable, the awls can be made just by cutting the piece in half. Using the 3/16-inch bit, drill one hole at the end of each piece. On the end of each piece drill the following holes: One the same diameter as the nail, the other slightly smaller. The hole that is the same diameter serves as a "sheath" for the nail. The other is a pilot hole to prevent the wood from splitting. Make sure that the pilot hole on one side lines up with the sheath hole on the other piece. Drive the nail into the pilot hole on each piece leaving at least 1 1/2 inches of the nail exposed. Using the cutters or hacksaw, cut off the head of the nail. File or grind the head of the nail to a point. Put nylon line through the hole at the end of each piece. Knot the line so that it won't pass back through. Repeat on the other end. Assemble the two pieces and wear the awl around the neck when on the ice.



Version B open

TOOLS NE

- ❑ Drill
- ❑ Hand coping saw, jig saw or scroll saw
- ❑ Drill bits:
  - ❑ 3/16-inch
  - ❑ same diameter as the nails
  - ❑ slightly smaller than nail diameter
- ❑ Hammer
- ❑ Hacksaw or bolt cutters for cutting nails
- ❑ File or grinder

MATERIA

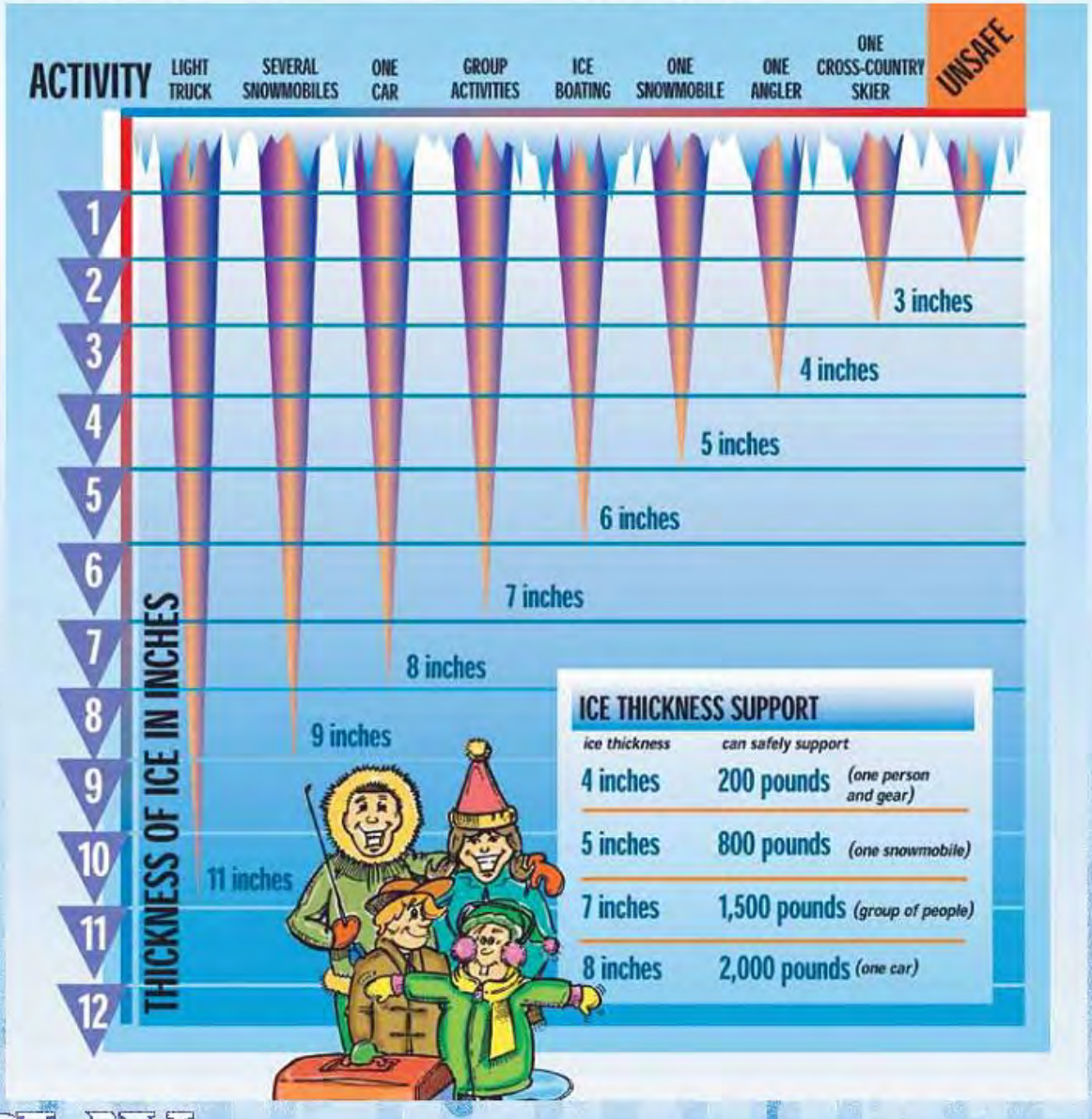
- ❑ Any hardwood, dimensions: 2" x 2" x 8"
- ❑ Galvanized or masonry nails, 16 penny or larger
- ❑ 3/16-inch nylon rope, at least 24 inches long

TO U THE

After falling in, the awls are used to pull yourself to safety. To do this, A firmly drive each spike into the ice and B pull yourself onto the ice. C Don't stand up once on the ice! Slowly roll to safer ice.

Ice Safety Thickness

- Ice may not be the same thickness all over.
- Stay away from "stickups" like brush, logs, plants or docks.
- Stay away from multiple pressure cracks on the ice.
- When ice fishing, spread out because crowds can add too much weight in the same area.
- When fishing from shore, be extra careful near rivers and streams. Moving water wears ice from underneath, so the ice may look thicker than it really is.
- Make sure you study this chart, so you know when it's safe to go on the ice.



Tips and Tricks:
A Safety Checklist for Ice Anglers

Here are some tips and tricks to make your ice fishing days safer and more enjoyable.

BEFORE YOU GO

Always take a partner along.

✔ Let others know exactly where you are going and when you will return.

Layer It

✔ Know how to dress for cold weather by using the layering system. Layering makes it easier to remove or put clothes back on if you get too warm or too cold. The first layer should be thermal underwear that wicks away perspiration. Your second layer should be insulating like fleece, wool or flannel pants and shirts. The outside layer should be a windproof and waterproof jacket or down-filled coat with a hood.

✔ Don't forget to wear a warm wool, fleece or knit hat. Avoid cotton because it's not a good insulator, especially when wet.

Happy Feet and Hands

✔ Wear insulated waterproof or rubber boots.

✔ Wear liner socks and a pair of thick wool or non-cotton socks.

✔ Keep your boots loose to avoid cutting off warm circulation to your feet.

✔ Wear neoprene or waterproof nylon mittens to protect your hands from the icy water. Or wear thin rubber gloves (hospital type) to allow flexibility, and then slip them under mittens.

Things to Bring

✔ Small bag of sand to sprinkle around your ice hole for better traction.

✔ Extra dry clothes and socks in case you get wet.

✔ Energy-rich snacks and warm drinks to fuel you through the cold day.

✔ A coil of rope to use in case someone falls through the ice.

✔ Small first aid kit in case you need to treat an injury.

✔ Matches stored in a waterproof container or 35mm film canister in case you need to start a fire.

✔ Home-made ice awls carried in an easily accessible outer pocket.

✔ **PFD seat cushion to use as a seat or flotation in case of an emergency.**

✔ Hand warmers.

Watch Your Step

✔ Never fish on ice that's less than 4 inches thick.

✔ Avoid areas where there are feeder streams and springs.

✔ Avoid dark, honeycombed or porous ice.

Oops!

✔ Don't panic if you fall through the ice. Remain calm.

✔ Use ice awls to pull yourself up onto the ice.

✔ No ice awls? Try "swimming out," which lets your body rise up and allows you to get onto firm ice.

✔ Use your legs to kick behind you to keep from being pulled under.

✔ If you can't get to safety, call for help.

✔ Slip your "loose boots" off to make treading water easier.

✔ Keep your clothes on because they will insulate you from the cold water.

✔ Once on the ice, stay low and distribute your weight over as much surface area as possible.

✔ If someone else falls in, always remember to use Reach (stick fishing, pole), Throw (rope, PFD, anything that floats), Row (row or push a boat), Go (call for help).

Know when to quit

If you become wet, immediately change into dry clothes and seek warm shelter.

If you feel cold, it's because you are cold. Head home for some warm soup!!!

Watch out for frostbite (pale skin on exposed flesh). Treat it with warm water.

Watch out for hypothermia (shivering, loss of judgment). Treat it with warm fluids, dry clothes, a blanket and warm shelter.

Stop fishing if you become tired or cold. Remember that there will always be plenty of other days to go ice fishing.

PLAY

Commonwealth of Pennsylvania
Fish & Boat Commission

Certificate of Attendance

Ice Safety – Basic Survival & Rescue

_____

Student Name

_____	_____	_____
Instructor Name	**Instructor Signature**	**Course Date**