A Cure for the Cold

Let’s Go Ice Fishing Curriculum

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This curriculum is based on a publication by Curt Golder and Kelle MacKenzie and altered for Alaska audiences with permission from the New Hampshire Fish and Game Department.

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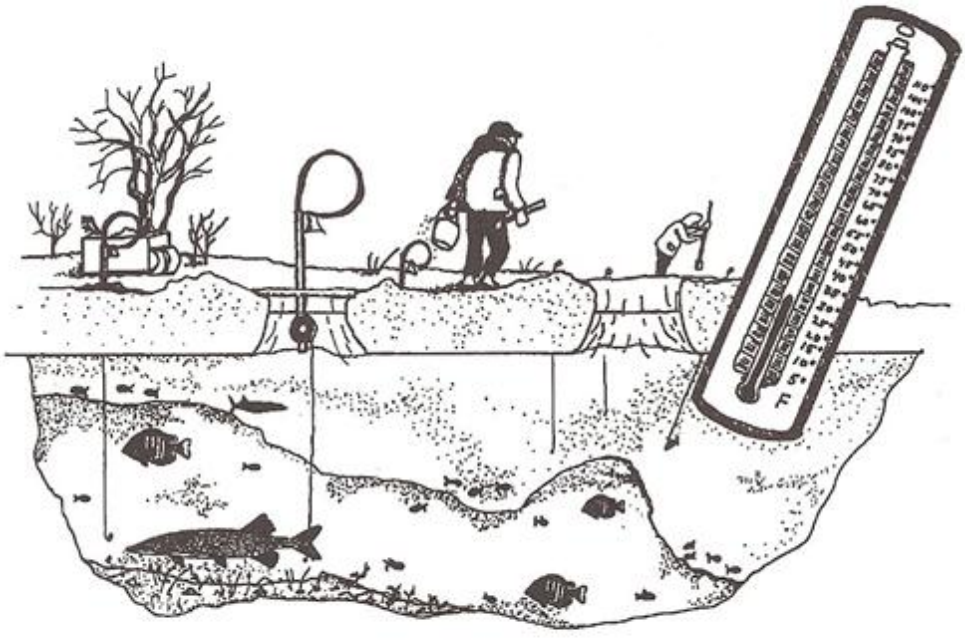
INTRODUCTION

For many people, the thought of standing on a frozen lake, staring down into a little hole, is less appealing than a trip to the dentist. For the knowledgeable, hardy soul it can be a great way to combat those winter blues. With some basic knowledge, techniques and a little equipment you can enjoy sport fishing through the winter months.

"A Cure for the Cold, Let's Go Ice Fishing" curriculum is designed to help the beginning angler understand the basic principles of ice fishing and the importance of responsible resource use in maintaining a healthy fishery.

At the conclusion of this course, you should have a general knowledge of fishing in the winter, ecology, ethics, responsible outdoor behavior, and safety.



Picture adapted from a Walter Dower illustration in the Sportsman's Notebook.

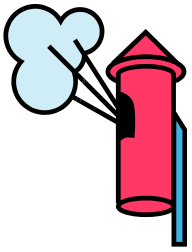
CHAPTER 1

TO FISH ANOTHER DAY (safety)

Every year we hear of an unfortunate person who falls through the ice on a pond or lake while ice fishing or snowmobiling. If lucky, the abrupt end to their ice fishing trip means only a cold, wet trip home to change and warm up. Without proper **precautions** that same unanticipated cold swim might have ended his or her life. When out in the weather, safety should always be your number-one concern.

When thinking about safety in ice fishing, the most obvious concern is the fishing platform, the ice. Not only must it be thick enough to support a person, it also has to have a uniform quality to support his or her weight. It is not uncommon for ice to vary in thickness. It may be thick enough in one area, but be unsafe a few yards away. Current, springs, upwelling, underwater structures and **aquatic growth** can all affect ice thickness. A snowfall after first ice can insulate ice from the cold and slow its thickening.

Let's take a look at how ice is formed. Water (two molecules of hydrogen and one of oxygen) exists in three forms: liquid, gas and solid.



The approaching winter cools the surface water, packing water molecules more densely together and causing it to become heavier (Fig. 1). The surface water sinks into the less dense, warmer water below. This cooling and settling process continues until a uniform water temperature of 39.2 degrees Fahrenheit is reached. **Turnover**, the name given to this mixing phenomenon, occurs until the whole water column is **homogenized**, or of equal temperature and density (Fig. 2). An interesting and important event occurs as the water continues to cool. At 39.2 degrees water has reached its highest **density**, its molecules tightly packed. Then, as the surface water temperature drops below 39.2 degrees, the water molecules gradually expand, becoming less dense. You could say that they now take up more room. At 32 degrees the water molecules expand even further and begin to form organized ice crystals. Much lighter than the denser warmer water below, the ice crystals float.

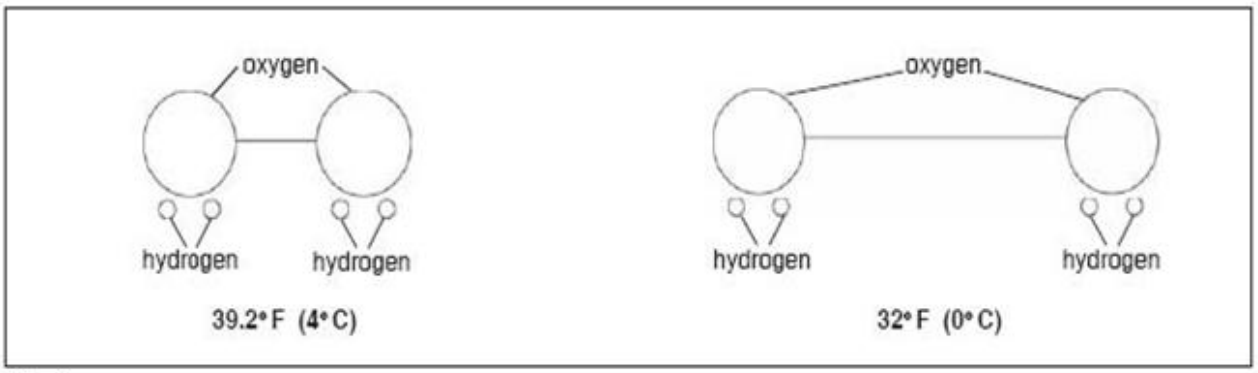


Fig. 1

The layers of ice that form on lakes and rivers act as insulators, preventing the water below from freezing. If it were not for this, a pond or lake would freeze from the bottom up, eliminating a year-round **environment** for aquatic plants and animals, and our ice fishing story would end here.

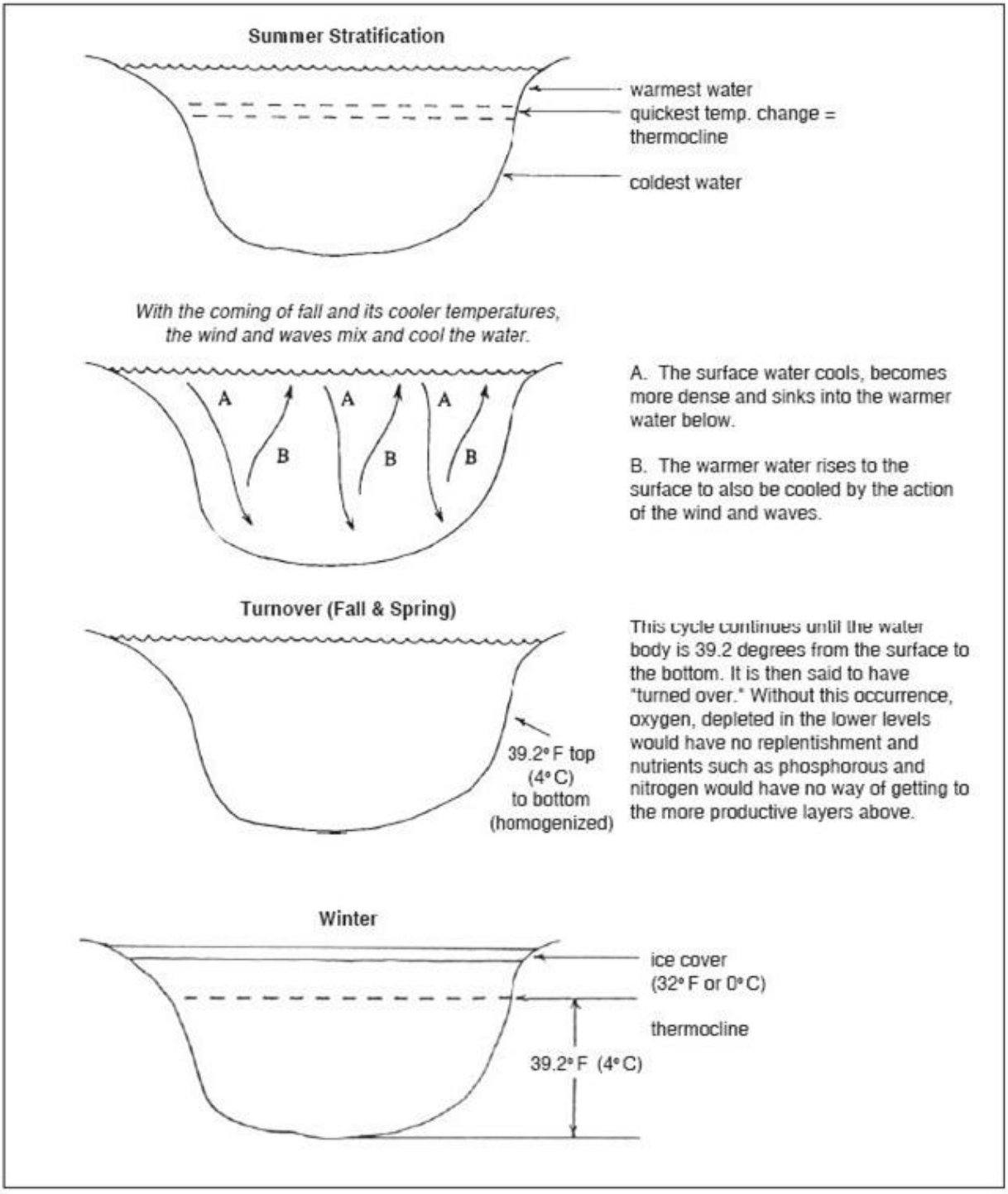

Summer Stratification
warmest water
quickest temp. change = thermocline
coldest water
With the coming of fall and its cooler temperatures, the wind and waves mix and cool the water.
A
B
A. The surface water cools, becomes more dense and sinks into the warmer water below.
B. The warmer water rises to the surface to also be cooled by the action of the wind and waves.
Turnover (Fall & Spring)
39.2° F top (4° C) to bottom (homogenized)
This cycle continues until the water body is 39.2 degrees from the surface to the bottom. It is then said to have "turned over." Without this occurrence, oxygen, depleted in the lower levels would have no replentishment and nutrients such as phosphorous and nitrogen would have no way of getting to the more productive layers above.
Winter
ice cover (32° F or 0° C)
thermocline
39.2° F (4° C)

Fig. 2

The best method of checking the ice is with an old standby tool, the ice spud. Best described as a chisel with a long, heavy handle, the spud is used to "thunk" the ice as you slowly proceed. If the spud breaks through, get off the ice immediately! If it does not, use it or an auger to drill a series of test holes.

This leads us to the question, what *is* safe ice thickness? Remember: all conditions call for sub-freezing temperatures. As a rule of thumb (for new, clear ice), there should be a minimum thickness of:

4 to 6 inches for a few, well-dispersed anglers

6 to 7 inches for small group activities

8 to 10 inches for snowmobile activities

12 or more inches for passenger vehicles

Remember: SOMETIMES NO ICE THICKNESS IS SAFE. Shoreline ice and frozen bays may be affected by wind and waves. Moving water erodes ice from underneath. Bridge supports and reefs can harbor unsafe ice. Docks, logs, weeds or any protruding objects can absorb heat and weaken ice. If the ice looks too clear, honeycombed, or just not safe, don't risk it.

Don't forget the weather. An extended period of sub-freezing temperatures helps ensure safe ice. **A few days of warm, windy weather can drastically weaken ice.** Being aware of what weather has occurred and what is forecast will help make your ice fishing trip more enjoyable and safe.

When going ice fishing, plan ahead and bring some safety devices. Before you leave home let somebody know where you are going and when you are planning on being back. When you are not quite sure of ice thickness or conditions, the most important thing you can do is bring is a friend. *Do not go alone.* If one person or the other falls through the ice, the other can get help. The following is a list of things you should take along:

1. A friend 

2. Spike nails tied together by a cord (in case you have to pull yourself back onto the ice)

3. Proper clothing

4. Emergency preparation plan

5. Ice spud

6. Compass, GPS, or both (sudden storms can arise, seriously affecting visibility)

WHAT DO I DO IF I FALL IN?

As in any emergency, **don't panic.** Call for help. It doesn't take long for the cold water to start slowing your physical and mental

functions, so you must act quickly. Air will remain trapped in your clothes for a short time aiding your buoyancy. Kick your legs while grasping for firm ice. Try to pull your body up. After your torso is on firm ice, roll towards thicker ice. This will better distribute your weight. Remember: ice you have previously walked on should be the safest. After you reach safe ice, contact emergency services as soon as possible and make them aware of the incident. Hypothermia is extremely dangerous and you need to be taken care of as soon as possible. You need to warm up to prevent hypothermia. Go to the nearest ice fishing shanty, warm car or home.

WHAT DO I DO IF SOMEONE ELSE FALLS IN?

Call for help. It does no good to have two people in the water. Don't put yourself in danger. Let the person in the water know that they are going to be okay. Have them try to get on to thicker ice. After getting help, and if it is safe, toss the person a rope or another long object. A ladder, a long branch, a piece of clothing, anything to extend your reach can be used. It is important that your weight be distributed. But remember, the most important thing you can do to help the person is to stay calm and contact emergency services.

One of the nice things about ice fishing is its simplicity. With just a few pieces of equipment, proper preparation and prudent safety practices you can be sure to fish another day.

Possible extension activities:

1) (Critical Thinking Exercise) Discuss the safety items in the room that you would take with you ice fishing. Once the items are listed, pretend to have somebody fall through the ice and show what you would do.

CHAPTER 2

FIGHTING OLD MAN WINTER (combating the cold)

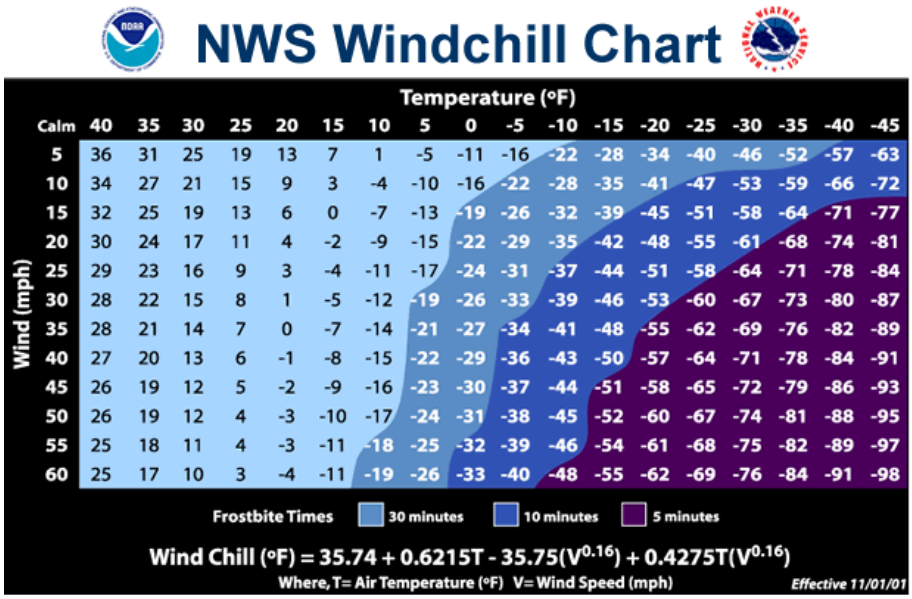
Old man winter is a tricky fellow. He'll cheat you of your comfort, steal your warmth and sneak into any area left unprotected. With some knowledge of his tactics and our weaknesses, we can develop a battle plan to neutralize his most chilling assaults. With the proper preparation we can enjoy, rather than endure, most winter outdoor conditions.

Human beings, like all mammals, are **warm blooded** (homeothermic), which means we have a fairly high and constant body temperature that is relatively independent of our surroundings. If not around an outside heat source, heat must be produced internally; our "fuel" is food. When unable to maintain a constant body temperature of 98.6 degrees Fahrenheit, we risk **hypothermia**. As our body temperatures drop below 97 degrees, shivering and a loss of coordination begins. If cooling continues, at around 88 degrees the shivering slows or

HYPOTHERMIA CHART			
	MILD	**MODERATE**	**SEVERE**
SYMPTOMS	• Shivering • Complaints of cold • Loss of coordination • Psychological withdrawal and apathy	• Listlessness, mental confusion, refusal to recognize problem • Uncontrollable shivering • Slurred speech • Stumbling	• Unresponsiveness • Decreased pulse and respiration • Cessation of shivering • Physical collapse
FIRSTAID	• End exposure – get victim out of cold and wet • Replace wet clothing with dry, or add insulation • Place victim in warm environment • Offer warm liquids or food only if victim is fully conscious	• End exposure – cover victim rather than walking him to shelter • Treat victim gently – avoid jostling or movement • Do not allow victim to exercise or move • Check victim for other injury, including frostbite	• Treatment should be attempted only if victim cannot be evacuated to a hospital promptly for professional care • In such a case: Deliver warmth to head, neck, armpit and groin areas by application of warm water bottles, warmed blankets, or another warm body

stops, we become disoriented and rational thinking is all but impossible. Without immediate expert care, chances of surviving are low. If nothing is done to halt the decline in our body temperature, death usually occurs at around 77 degrees. It doesn't need to be below freezing for hypothermia to occur. Temperatures below 60 degrees with a slight breeze can place a wet person in danger of hypothermia.

Frostbite, the freezing or the effects of partial freezing of parts of the body, is a sneaky attacker. Because cold numbs the nerves, you might not know that your toes, finger tips, ears, or nose have frozen. If circulation is cut off for too long you could lose these extremities. Wet fingers, freezing temperatures and a brisk breeze could easily cause frostbite!



Windchill is Old Man Winter's favorite and most effective method of attack. Combined with cold temperatures, wind can quickly rob you of precious body heat.

HOW DO WE FIGHT THIS ATTACK?

The key is to keep body warmth in, and cold air out. The best way to accomplish this is to dress in layers. Pockets of air between the body and the cold insulate the best. Loose fitting clothes make the formation of these air pockets possible. Certain materials retain warmth better under certain conditions than others. Cotton breathes well, but lets cold air through and has almost no insulating effect when wet. Wool retains heat whether dry or wet, but may irritate your skin and is relatively heavy. Down insulates well when dry but is useless when wet. Rain jackets and parkas made out of some materials keep the rain or snow out, but do not allow for perspiration moisture to escape. This wets the clothing next to your body and robs you of insulating warm air.

Luckily, these problems can be solved by adjusting these layers and using synthetic materials. Gore-tex-type materials for outer shells allow perspiration molecules to escape while keeping rain, snow and wind out. Polypropylene materials transfer moisture away from the body. Many new synthetics have the insulating qualities of down and retain them when wet.

Some people find a combination of old and new to work best. For the coldest temperatures the list of clothing might be: undershorts and t-shirt, synthetic long underwear (tops and bottoms), two pairs of socks,

shirt, warm-up pants, wool shirt or wool sweater, wool pants, pac boots, gloves or mittens, hat (that covers ears) and a hooded jacket

(Photo ©Ken Marsh, ADFG)

of synthetic material. Depending on wind or snow, a hooded sweatshirt or another pair of wool socks might be added. Remember: all this should be loose fitting to allow for circulation, air entrapment and freedom of movement.

This same clothing, good for standing still, would be inappropriate for someone active. If you have to walk a long distance and then stand still for a long time, you should subtract a layer or two while moving. Sometimes venting, or letting some cold air in, will suffice. Removing a hat or gloves or exposing your neck are effective ways to vent. If you were active the whole time (hiking, skiing or snowshoeing) you wouldn’t need as much protection because you

would generate your own heat. You should, however, carry extra warm clothes in case of an emergency or while resting. Change or take off layers if they become wet. Getting cold with wet clothing on is a sure way to lose body heat and may lead to hypothermia.

Snowmobile-type suits are very convenient, and many people prefer them for their outer layer.

It cannot be stressed enough how important it is to keep your head covered from the cold. Your head has many blood vessels close to the surface. As the blood cools from exposure, the body tries to maintain its **core temperature,** and starts to restrict the blood flow to its extremities (hands and feet). With this restricted flow of warm blood, these extremities begin to cool. These are the very first stages of hypothermia. The old saying, "Cold feet or hands? Put on a hat," is an excellent rule to follow. The body generates its own heat. It does this as it burns (uses) calories. Like any generator, it needs fuel to work. To most people, any excuse to eat more than normal makes sense! A hearty meal before you go out fuels you up. Hot soup or hot chocolate with a high-energy snack works great after you have been on the ice for a while. If you want to stay warm, "feed that furnace!"

WHAT IS WARMER, GLOVES OR MITTENS?

Mittens are definitely warmer, but much more cumbersome. They let your fingers move freely, but don't allow much dexterity. Most often you will need both. Use gloves to set up for ice fishing and mittens while waiting for action. Because you often need to use bare hands to tie knots and re-bait, a chemical hand warmer like skiers use is a valuable accessory.

WHAT TYPE OF BOOT IS BEST?

Boots that separate you from the ice and trap dead air around your feet are best. They should be waterproof. Many are felt lined with a thick felt insole, rubber-bottom, and leather top. They shouldn't be tight but should fit well enough so you can walk distances comfortably.

WHY ARE SUNGLASSES IMPORTANT?

Two reasons: They protect your eyes from the sun on bright days, and from the wind.

THINGS TO REMEMBER:

Weather can change quickly. Layering your clothes will allow you to be prepared for a variety of temperatures and weather conditions.

Loose-fitting clothes trap air much better than tight ones and allow greater freedom of movement.

Sometimes it's best to dress in

Layered clothing and warm, waterproof "bunny" boots help ice fishers stay warm and dry.

a cool spot after you start putting on your outside layers so you don’t over-heat before going out into the cold.

Use this information as a guideline. Everybody is different, so you might need more or less clothing to be comfortable.

Remember these things in your battle with Old Man Winter. If you control and safeguard your body heat by limiting your exposure, you will have a greater chance of winning the war and enjoying the cold rather than just enduring it.

Possible extension activities

1) (Critical Thinking Exercise) Make a list of temperatures and wind speeds (mph) and figure out what the temperature would feel like to your bare skin.
2) (Critical Thinking Exercise) Describe how you would dress for -10 Fahrenheit. You may want to remind them that it depends on what type of activity they will be participating in. Compare the difference between a cross-country skier and ice fishermen sitting on the ice.
3) (Outside Activity) Go outside with a group in the winter and discuss who is appropriately dressed for the weather or suggest clothing they could wear to be more prepared for the temperature. This is a good activity before you go on an ice fishing field trip.

CHAPTER 3

THE RIGHT TOOL FOR THE JOB (equipment)

One of the best things about ice fishing is it doesn't cost a lot to get started. With just an ax, some line, a hook and some type of bait, fish can be caught through the ice. With some specialized tools an angler can get the job done easier and more efficiently.

The first task is to get to the water. This makes sense because that's where the fish are! You can chop a hole with an ax or an ice spud. Both methods work but require a lot of effort. A better method is to drill a hole through the ice using an **auger**. There are hand-powered and gas-powered augers, capable of drilling holes in a variety of sizes. Size varies from around 4 inches up to about 10 inches. Larger holes are necessary for larger fish.

Ice Fishers using a power auger, above, to drill through thick ice on Susitna Valley Lake. (Photo ©Ken Marsh, ADFG)

No matter what type of tool is used to drill or chip the holes, you will end up with ice chips and slush in and around the hole. Use your boot to clear the ice and snow from around the hole. You will need a **skimmer** to scoop out the slush floating on the surface. If this is not done, it will speed up the freezing process. Some skimmers have a small chisel attached to the handle to aid in clearing holes as they freeze. If holes aren't maintained (kept ice free) the lines will freeze to the ice and you will not know when a fish has taken your bait.

An ice fisher uses a sieve or skimmer to clear slush hole while setting up tip-up.

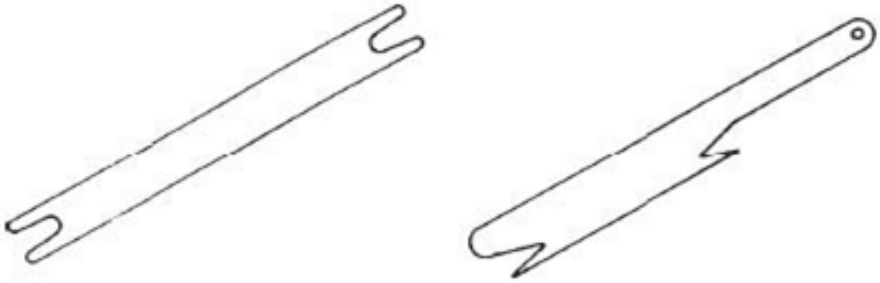
The next tool of choice depends on how you want to fish, what you are fishing for, and the **rules** pertaining to the lake you are fishing. Consider the following options before deciding.

HAND LINES:

A hook tied to a line held by hand. This is the most direct contact to a fish. (Besides holding one!)

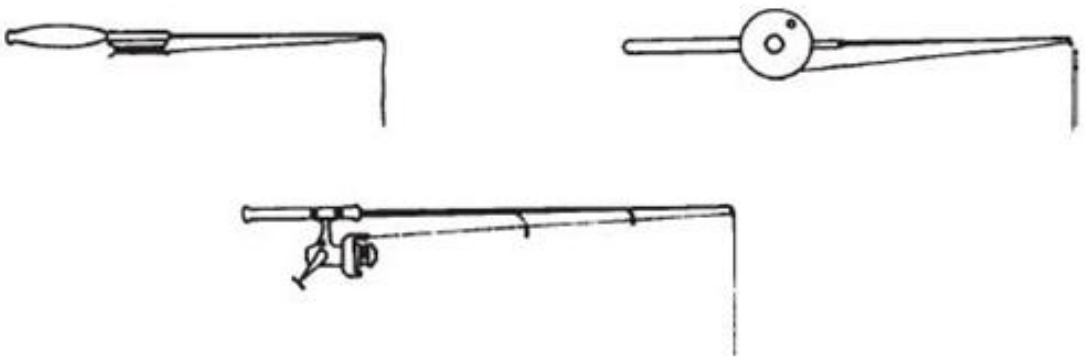
FISHING STICKS/JIGGING STICKS:

A line tied to one of several types of sticks which usually have a place to loop or wind the line.



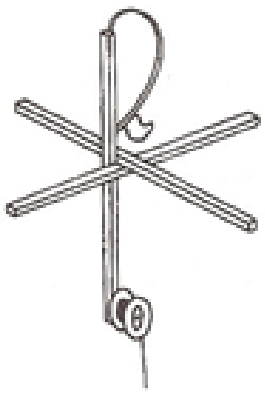
ICE FISHING RODS:

These range from plastic rods with plastic posts for winding the line to cork-handled graphite rods equipped with spinning or spin-casting reels. They come in a variety of lengths from 20 to 38 inches. Sometimes these rods are equipped with spring bobbers or spring steel extensions added to the rod tip.



TIP-UPS:

Tip-ups are sometimes made of crossed sticks that hold the reel underwater. When a fish strikes, turning the reel, a mechanism releases a spring-loaded flag to attract the angler’s attention. There are many different types, though all are based on the same principles. Both tilts and tip-ups are sometimes called traps.



SET LINES:

Set lines are unattended lines that have been set, staked, anchored, or otherwise fixed. Set lines are often used under the ice in rivers. Check the sport fishing regulations to see if this is a legal type of gear in your area.

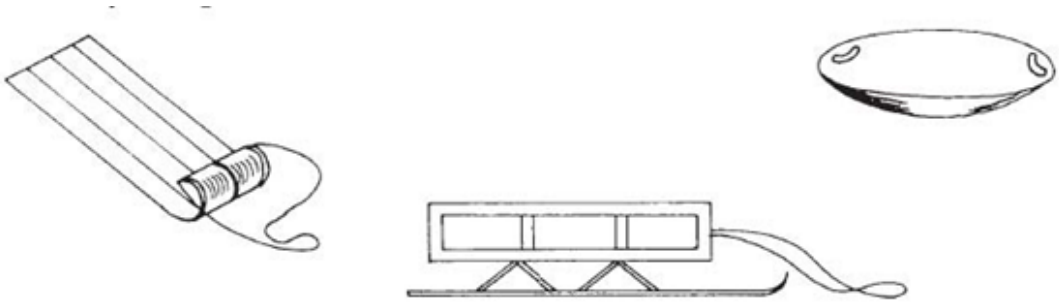
SPEAR FISHING:

Use of a spear to take fish. Spears are often used through large holes in the ice. Check the sport fishing regulations to see if this is a legal type of gear in your area.

ACCESSORIES

Let’s take a brief look at some accessories that can make your trip more enjoyable.

Because walking to the “fishing hole” is required, something is needed to help transport the tools. It is easier to drag the stuff over the ice than to carry it. A toboggan or plastic sled is a good choice.



Even a dish-shaped child's sled will work fine as long as you don't bring too much equipment. A good project is to make your own ice fishing sled using some old skis - just don't use your big brother's new downhill skis!

Many types of containers can be used to hold gear: plastic milk crates, wooden boxes (a little heavy), and 5-gallon buckets like those used by food companies. A favorite is the bucket. Add a sturdy top or turn it over and you have a comfortable seat.

A portable ice shanty on Jewel Lake in Anchorage provides ice fishers shelter from the wind. *(Photo ©Ken Marsh, ADFG)*

Ice shanties, tents, and wind cutters are just a few of the types of protective shelters used by fishermen to ward off the cold wind. Many different kinds are available for purchase and many more are homemade.

Portable depth finders, though relatively expensive, can be an invaluable tool in locating fish-holding structures like drop-offs and weed edges. The old standby, the **depth sounder**, is still the cheapest and most used device. It need be nothing more than a heavy weight that you attach to your line and lower to the bottom.

Portable underwater video cameras allow ice fishers to see if fish activity is occurring around their baits and lures. *(Photo ©Ken Marsh, ADFG)*

Then mark the top of your line and then bring your line up by hand. The amount of line let out indicates water depth. You can estimate the length of your line by comparing it to a known length, like your height. If it is really long then you may have to stretch it out on the ice and measure it by the length of your walking stride or bring a tape measure. Some ice fishers use portable underwater video cameras to see what sort of fish activity is happening around their baits and lures. These units can be expensive and are not necessary for success.

Possible extension activities:

1) (Writing Exercise) Plan out a trip and make a list of all the equipment you will need.
2) (Creative Exercise) Make your own jig stick. Jig sticks can be made out something as simple as card board or wood.
3) (Skill Exercise) Practice estimating the length of a string and then measure the string to see how close you actually are.
4) (Outside Exercise) Go ice fishing and practice using ice fishing equipment.

CHAPTER 4

ENTICING A STRIKE (tackle and bait)

Now that the choices above water have been discussed, it is time to dive below and check the options for the business end of the line. The devices used to entice fish to strike are grouped together under the name **terminal tackle**. Lures, hooks, bobbers, and sinkers all fall into this category. Many lures can be used by themselves, whereas most hooks need some sort of bait. Often, combining lures and bait is the only way to get bites. Before deciding which technique to use, a beginner must have an understanding of what's available.

When you are fishing you must think about what fish like to eat or prey on. The most common diet for fish is other smaller fish and aquatic macroinvertebrates. **Aquatic macroinvertebrates** are water insects that are visible to the naked eye and have a skeleton on the outside of their body. Although fish are opportunistic feeders, they will eat other things when normal prey items are not available. Fish will eat salmon eggs and many artificial bait substitutes. One item you should not use is corn; even though fish will try to eat corn they do not have the ability digest it. What items fish can and cannot eat is an important consideration when choosing baits.

LURE THEM WITH LURES

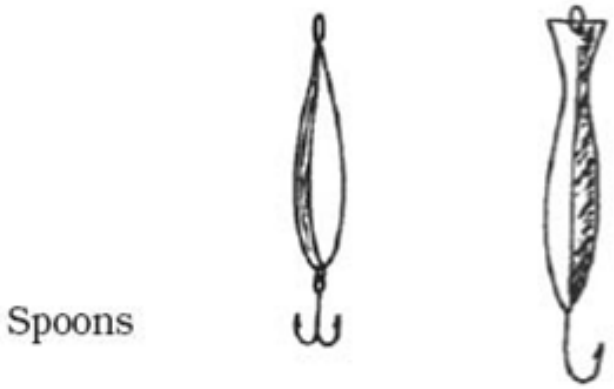
There are times when artificial baits out-produce natural ones. When fish are aggressively feeding, the convenience and speed of using a **lure** can improve your chance of enticing a bite.

Ice fishing lures are made to resemble small prey fish and insects:

Lures can be divided into three basic categories:

JIGS –

FLASH LURES:



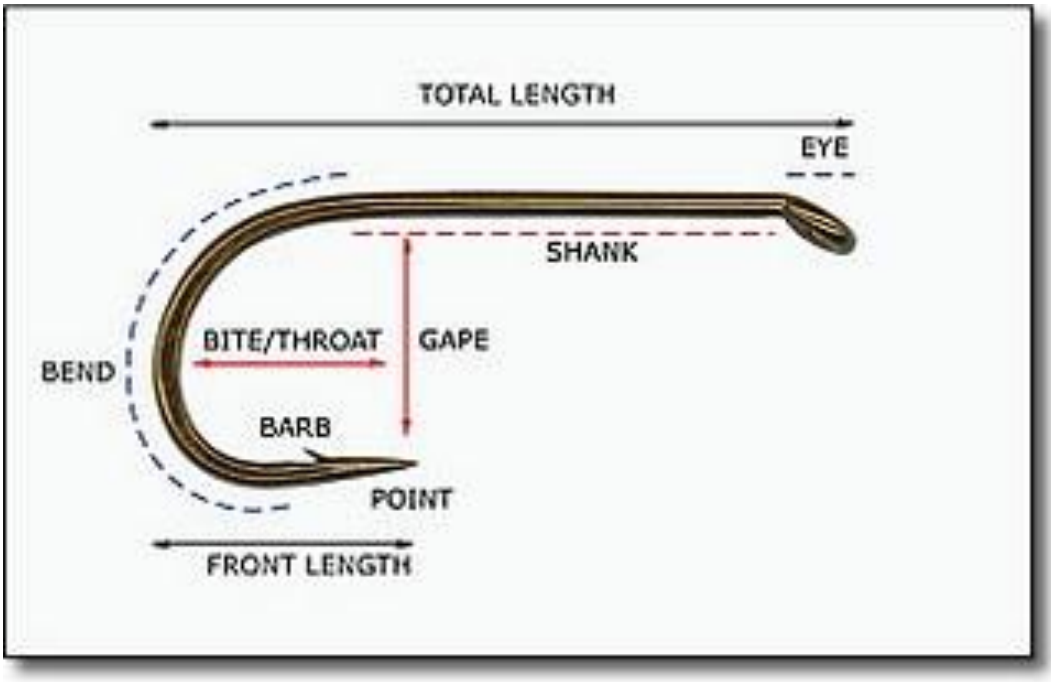
TEAR DROPS/ICE FLIES:

Bobbers are important tools in addition to lures and baits. Bobbers keep baits suspended in the water at a known depth and alert anglers to a bite.

BOBBERS:

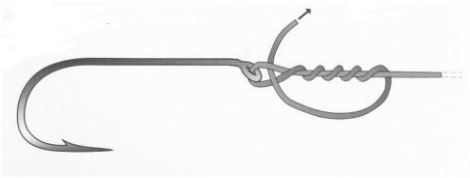
Lures and bobbers are important, but you won’t catch anything without a hook. Hooks come in various sizes and shapes depending on what you are trying to catch.

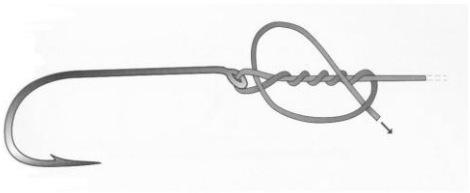
Here is a general hook anatomy to help you in searching for the right hook.

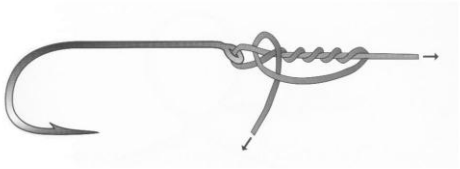


Anglers use a variety of knots to attach hooks to their lines. Poorly tied knots can cause fish to break away and escape. Here are two useful knots:

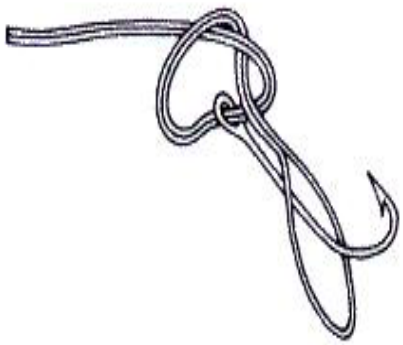
Improved Clinch Knot







Palomer knot



Knots should be wet before tightening to reduce friction and to keep from weakening the fishing line.

Possible extension activities:

1) (Skill Exercise) Take some line and hooks (or substitute eye bolts) and practice tying knots. Discuss with a partner what happens if water (lubricant) is not added to the line.
2) (Creative Project) Make lures out of construction paper and decorate the walls with the lures. Describe why you decorated the lures the way you did, and what you were trying to imitate and catch.
3) (Creative Project) Paint blank, unpainted jigs or lure and use them to go fishing.

CHAPTER 5

WINTER HABITS AND HABITATS (fish in the winter)

Days grow shorter, trees lose their leaves, and cold winds from the north send shivers down your spine. You change your actions. You slow down a bit. You're not as likely to wander far from home. Fish make similar changes. Fish are **coldblooded**, which means their blood temperature is the same as the temperature of the surrounding water. Fish are more active in warmer water. As water cools, a fish's activity decreases; therefore, its **metabolic** needs are reduced. In other words, because the engine (the fish) doesn't have to go too far (less active) it needs less fuel (food). Some species are affected more than others by colder temperatures. Because fish don't need as much fuel, they eat less often. So, chances are you won't often find them in an aggressive feeding mode. But they still need to eat, and can still be caught, if you do a few things to increase your chances.

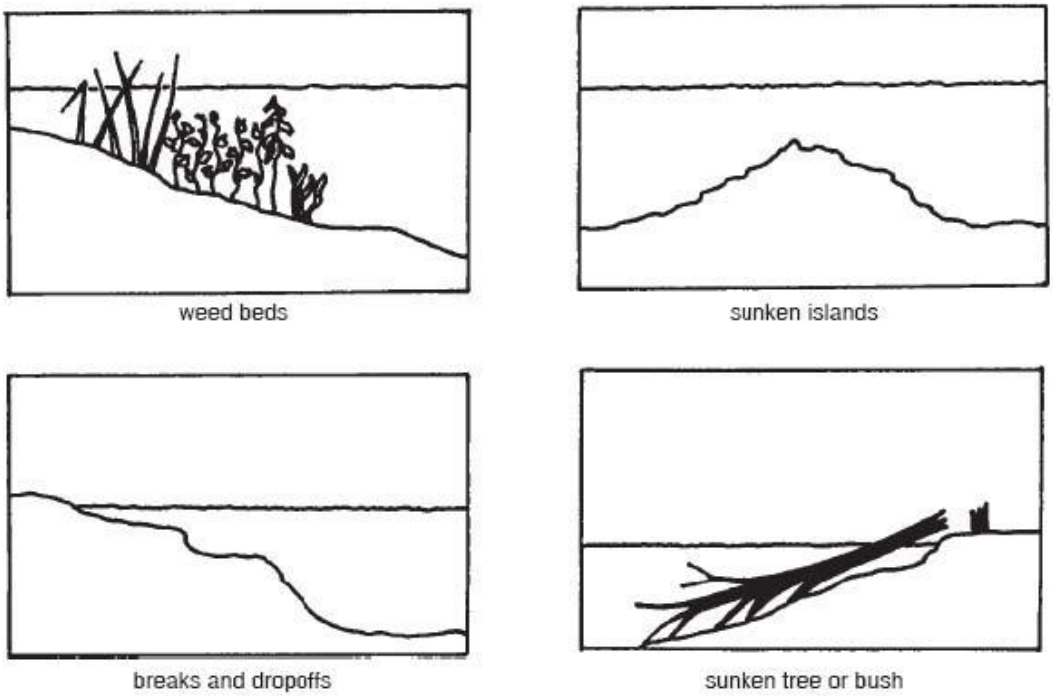
One thing that is common for most fishes is their tendency to "hang around" some type of **structure**. This structure could be a weed bed, a land point extending into the water, or an abrupt change in depth. Structure helps fish hide from predators or helps them find prey. Tests have shown that fish placed in a child's wading pool wander randomly. When anything is placed in the pool (rocks, wood, etc.) fish congregate at that spot. Even a line painted on the bottom

of the pool could act as structure and draw fish to it. This is important to remember any time of the year: *Fish usually "hang around" some type of structure.*

Another thing to remember is that both humans and fish have **habitat** requirements that must be met. These include food, shelter and space. Fish don't have the convenience of getting into their car and driving to the supermarket, so they must live close to a food source or swim around looking for their food. They can't lock their doors and windows from dangerous (predators), so they need some type of shelter in which to hide or escape. Rocks and weeds are two examples. Deep water is another possibility. They also need space. Just like humans, if they are too crowded, or if they don't have enough space, their quality of life will suffer.

Another habitat requirement that we share with **fish** is water. It's easy to take water for granted because that's where fish live. But neither fish nor people can thrive without clean, unpolluted water.

Even though sometimes it seems fish are everywhere (or nowhere),



we can increase our chances of finding them by trying to find transition zones or edges. Simply stated, a **transition zone** is where the bottom changes. Changes might be: one type of weed to another, sand to gravel, mud to silt, or from shallow water to deep water. In other words, a transition zone is where a change occurs.

One more thing to consider is the lack of an edge or transition area that is available when the water is warmer. The **thermocline**, or horizontal dividing line between warm and cold water, helps concentrate fish in their preferred temperature range. As discussed in an earlier chapter, much of the water under the ice has a uniform temperature. This causes the fish to scatter more than they would if the water temperature was stratified (layered).

OK. Let's see …

Fish slow down as temperatures cool.

Fish need structure for habitat.

Fish need food.

Fish need space.

So if you find an area that has all of these conditions then you should be able to catch fish whenever you want ... right? Don't forget to use the right type of bait or lure.

HELPFUL HINTS

Think small: Chances of success will increase by offering a morsel rather than a meal. With a smaller bait you will attract both small and large fish.

Be a nomad: If fish are not being caught after 20 minutes at the first hole, then move. Go deeper or shallower. It is often quicker to find the fish than hope they find you.

Set the hook: After you feel the initial bite, it is best to set the hook. This helps lodge the hook into the fish's mouth to keep it from coming out. This can be done by raising your rod quickly and then start reeling and fighting the fish. How fast you pull will depend on the size of fish, strength of line and the size of hook you are using.

Know your fish: If you are fishing for lake trout in an area where they don't live (wrong habitat), you are decreasing your chances. The person who knows WHO, WHAT and WHERE usually goes home a happy angler.

The KISS method: (Keep it simple, Sally.) You have been on the ice all day and finally get that humdinger of a bite, only to lose it because the ice froze around your tip-up or your hook wasn't sharpened enough, or your knot slipped. Forgetting the basics can make the difference between fishing and catching.

Move it:	Don’t forget that you create the action in artificial lures, so it is best to use a rod with them.
Make scents of it:	It is a good idea to put some kind of scent (shrimp oil, herring oil or salmon egg) on the tip of the lure for extra attraction.
Where are they?	Remember those spots where you were catching fish in the summer: the edges, drop-offs, points and weed beds. Those are also good places to start in the winter. Work your way toward deeper water until you find fish.
Start here:	Most often, fish will hold near the bottom. Start by setting your lure about a foot off the bottom. If after a while you get no bites, move it up the water column until you find the correct depth where the fish are holding.
Work together:	While fishing with your buddy, it will save time if you each fish at different depths. When one of you starts catching, concentrate at that depth.

Hard water: The cold weather that allows you to stand on ice will also freeze anything that gets wet. Keep your equipment off the ice.

Hot hole: Catching a lot from one hole? Cut some more holes around it.

Hey Peg! Push-button bobbers used in the summer are often too buoyant for winter use. A small peg-style bobber works much better and is easier to use.

Split the difference: If you balance your bobber with split shot, weight it so that it just barely floats so that fish will feel less resistance.

What a drag: In warm water we use the drag on our reel to protect our line from breaking. In the winter when playing a fish while holding the line, our fingers are the drag. If the fish surges, you must let the line slip through your fingers or it could break. If you are using a mechanical drag fishing reel make sure your drag is just tight enough to slow line from being pulled out.

CPR: Don’t forget C.P.R for your fish: Catch – Photograph – Release! You’ll need to keep your camera warm and make sure your batteries are good.

Look into the water: Lay over the “ice fishing hole”, block out all of the light, and look into the water. When fishing shallow water you can often see the bottom and sometimes see bottom habitat and fish.

Tip up: When using a fishing pole always keep your tip up. This will reduce the chances of your line breaking.

CHAPTER 6

WHITE ICE IS NICE (ethics)

Nate could hardly hold in his excitement while driving with his father to the river cove where last year he did so well. Thinking back, he recalled how the fish seemed to never stop biting. Nate's heart beat faster just remembering how proud he was when he held up that five-pound trout for the photo. He thought, "With the new rod I got for my birthday and all I've learned from reading books and fishing magazines, this year should be even better!"

His first thought on seeing the gate was: "We must be at the wrong place." But after a closer look, he recognized the big boulder where he had caught so many fish just one year ago. Nate then saw the bright red "NO TRESPASSING" sign.

"What's this?" Nate asked his Dad. "We could fish here last year. What are we going to do now?"

"I don't know," Dad muttered. "I guess we'll go back toward home and see if anything is biting at Town Park."

"We never catch anything there," protested Nate. "This just isn't fair!" As they started to pull away, a rickety old pickup truck pulled

up, driven by a man Nate guessed was even older than his grandfather.

“Good mornin’, fellas,” he said. “Can I help you with something?”

“Hi,” replied Nate’s father. “I’m Bill Francis and this is my son Nate. We just drove a couple hours from Anchor town to fish this spot, only to find that somebody put up this fence and the no-trespassing signs.”

“Well that somebody is me,” said the old man. “I put them up last year about a month after the fishing season ended!”

“How could you do that!?” blurted out Nate. “This was the best fishing spot I’ve ever been to!” His father’s icy stare let Nate know he shouldn’t have been so disrespectful. The old man let Nate squirm for a moment before he began his reply.

“Son, I can understand your disappointment. The land around here has been in my family since my grandfather was your age. We’ve hunted and fished here all that time. It was right over there where I caught my first fish. I took my first moose just down the road. I can’t begin to tell you how much joy and satisfaction I’ve received from this land.”

As the old man continued, Nate could see his eyes light up and he began to realize that the old man had stronger feelings for this land than even he did.

“We’ve never minded when somebody stopped by and asked for permission to hunt or fish or picnic by the river. We met many a fine person over the years and always felt proud to share our beautiful land.”

A frown came upon his face as the man went on: “With the passage of time, we started to see a change. As the population around the state increased, more and more people started coming up. We never minded too much when we had to pick up a bait container or hook package, but when we started to have to pick up cans, bottles and all sorts of trash it began to really bother us. How could they see the beauty of this place and still trash it?”

The old man looked even older as he continued. “I’m getting up in years and I just can’t be cleaning up after people who misuse my property. I just can’t understand how they can treat it this way.”

“The final straw came last year about a month after fishing season closed. I was driving by and saw a group fishing over there. I was more concerned that they were fishing out of season than that they were on my land. Sometimes people just don’t know the law, so I went to tell them and they told me to mind my own business and get lost.”

“I made up my mind right then and there. I knew that it would affect **responsible sportsmen**, but I didn’t know what else to do.”

It was quite a while after they left the old man before Nate finally talked. “You know, Dad, I’ve been thinking about what happened back there. He certainly had a right to do what he did, but I sure wish it hadn’t happened. We lost our **privilege** to fish on that man’s property because of someone else’s actions.”

“You’re right Nate, too many people think they have a right to do what they choose. When we are guests on private or public property we are responsible for our actions, both legally and socially. Do you understand?”

"I sure do. No matter where we are, we should honor the law and behave with respect to other people and the spot we're visiting."

Unfortunately, scenes like this are becoming more and more common. With the ever growing population, the demand on a limited resource becomes greater. If anglers are not careful about the way our resources are used they could see them continue to be lost. *Very rarely does a fence come down once put up*.

THE FOLLOWING ARE SOME DIFFERENT PROBLEMS AND COMMON SENSE RESPONSES TO THEM.

Where can you fish?

Alaska is blessed with many lakes, ponds, rivers and streams that hold a variety of fish species. Most waters have **public access** points, but many are surrounded by private lands. If these are posted, they should not be fished, no matter how tempting they look. But you might get permission to fish them, if you ask.

How do you go about asking?

Most people would have a hard time saying no to a neatly dressed person who politely introduced him or herself and asked about the water body, if it had fish in it, and would it be all right to fish it. If they say no, thank them for their time and leave. If they say yes, you might have found your best honey hole. A time-honored tradition is to volunteer some help with a chore in return for the privilege of using their property.

What are your responsibilities?

The way another person perceives you is most often from your appearance and your actions. If they see you acting in a manner they think is correct, they usually will think kindly of you. If they see you honoring the laws, respecting the resource and other outdoorsmen, they have no reason to be concerned about you.

What can you do to help?

There is an old saying that goes something like this: “Be part of the solution, not part of the problem.” Even if you always follow the rules and always act politely, you can still do a little more to make your outdoor experience even nicer. If somebody else littered, pick it up. If you see someone with a problem, offer to help. When you go somewhere that is already crowded, make sure you don’t intrude or get too close to the early birds.

How close is too close?

When fishing on a trout stream the distance between fishermen can be much greater than when ice fishing. When casting to spooky trout in shallow water, it is important to be stealthy in your movements. If someone charged in making a big racket, they would scare the fish, making the fish uncatchable. On the other hand, with a layer of ice insulating the fish from surface noise, it is not necessary to keep such a distance. In any case, if you are not sure how close to fish to your fellow fishers, show respect by giving them plenty of room, or ask them. Many anglers don’t mind having some company, especially when ice fishing.

Is conservation and preservation the same?

Conservation and preservation are often used interchanging but they have subtle but important differences between the two. Conservation is the responsible use of resources by multiple users. Preservation attempts to keep resources in its current state with limited or no-impact from humans. Both preserving and conserving care about protecting our resources from injury, harm or destruction but preservation tries to preserve resources at their current state. Conservation is done with planned management to protect against abuse or overuse. The limits on the number of fish you can keep and how long the fishing season lasts are examples of how fisheries resources are conserved. These rules and regulations are designed by scientists and biologists to prohibit the over **harvest** of any species. If too many fish of one species are caught and kept, there might be too few fish left to reproduce. This could lead to that species' extinction. For a conservation program to work, it takes both well planned management and **ethical** behavior on the part of the users. If a lake is closed to all users and there is not plan to open this lake, these waters are being "preserved."

What is the most important tip?

Have fun and be safe! It has been said that half the fun of a trip is the planning. It's the same with a fishing trip. Reading mail order and fishing magazines, shopping for lures (even if just to look) and organizing your equipment are all part of the fishing experience. When we finally get to the water (or ice), that is the topping on the cake. If you try hard to learn all you can, obey the rules, use **common sense**, be safe, respect the resource and your fellow anglers, you will develop a hobby that will give you a lifetime of joy and relaxation.

Possible extension activities:

1) (Critical Thinking Exercise) Define what it means to be an Ethical Angler? What does it mean to conserve vs. preserve? What can you do to help keep a fishing area nice?
2) (Outside activity) Go to a local fishing spot and describe what you find? Clean up the area.

CHAPTER 7

WHAT LUCK? (sustainability)

“How did you do?” “Any luck?” “Catch anything?” These are usually the first greetings offered to an angler returning from a fishing trip.

One person might reply, “Great! I caught my first Arctic char ever! Boy, did it put up a fight. You should have seen its colors! Wow!”

The next might have answered, “What a day! I caught enough landlocked salmon to feed my whole family. I can’t wait to show my folks!”

Different anglers judge successful trips differently. For some, it’s catching their first fish or the thought of a delicious, nutritious meal. For others, it’s the trophy of a lifetime or finally outwitting an elusive, hard-to-catch species. Sometimes a tough day of catching might still be a real good day of fishing. The answer to, “How did you do?” could have been, “Great, I saw a fox, an eagle, and a moose. I hope I have luck like this next time!"

It’s no wonder the fishing gives so much joy to so many different people. As our country grew, the availability of water determined where our new towns and cities would be located. This was good for future generations of anglers because within hiking or biking distance or a short drive from our homes we could find a variety of

different types of places to fish. However, with **aquatic resources** so close to the majority of the population, pressure on the resource (many people trying to catch a limited amount of fish) could have caused some species to be overfished to extinction.

Luckily, sportsmen and government officials had the foresight to envision the steps needed to stop this from happening. Fish-and-game departments, with the help of scientists, biologists and public input, have developed rules and regulations to ensure species survival.

These guidelines can make clear many decisions that we will encounter in our sport. Either it's legal or it's not. We must abide by the **seasons** and **limits** specified. Many times, making the right choice is much more difficult. Let's say you're fishing by yourself and catch a humdinger of a fish, and you know it's in season and legal to keep. You're so proud of your catch you just can't wait to show someone. But you also know that it's a fish that not too many people like to eat. Would it be a responsible use of the resource to let it go to waste just so you can show off?

What if you are fishing and find a school of landlocked salmon, a fish almost everybody finds tasty? Before you know it, you catch your limit. As you start lugging your heavy bounty home, you begin to think about how much work it's going to be to clean all those fish. Oh boy, now what do you do?

The smart angler plans ahead. He or she knows what they're fishing for, whether to keep or release what's been caught, and if taking some fish home, how much is enough. Some people practice catch-and-release, returning all fish back to the water, taking every

precaution not to harm a single fish. For others, the only reason to fish is to catch something to eat.

Is one right and the other wrong? Is there a middle ground?

To answer these questions, we have to understand what happens in a pond, lake, river or stream subjected to angling pressure.

If all large predatory fish in a given body of water were harvested, the threat to the smaller prey fish would be eliminated. With no predators to keep their population under control, they would exceed the **carrying capacity** of their habitat, stunting their growth. You would end up with many fish, but of small size since food and other resources are limited. A similar situation occurs if no predator fish are harvested. If the large predator fish are allowed to go unchecked they will reduce their forage (food). The effects of this would be a less healthy population of predators. They would be thinner and more prone to disease, which would increase the prospect of stunted growth for future generations, unless the prey fish population is re-established.

The key to maintaining a balanced predator prey relationship is to selectively harvest some fish while releasing less abundant species and sizes. To keep only the larger fish (often the reproducing fish) of any species will weaken future generations. If we wisely select which fish to harvest, we can minimize our effect on this renewable resource.

Possible extension activities:

1) (Critical Thinking Exercise) Draw diagrams of different fish populations: include a balanced population with both predator and prey species; (two unbalanced populations) one with prey and no predators; and one with predators and no prey.
2) (Planning Exercise) Plan a trip to a local fishing spot. Get free sport fishing regulations and look up regulations for a sport fishing location.

CHAPTER 8

BIG EAT SMALL (predator-prey)

The rising sun brightens the shallow waters of the pond making the **nocturnal** insects and animals retreat to the depths, or hide in the dense plant growth close to shore. As the sky lightens and the air above the pond begins to warm, another day starts for the **diurnal** species, or those active during the day. Insects become active, birds begin to sing and the creatures of the aquatic world start their day prowling for prey.

Dragonflies and damselflies fly above the water, some hunting, some mating, and some depositing their eggs on the surface film.

A rainbow trout swims along the outside weed edge looking for a meal. Rainbow trout are opportunistic predators; they eat scuds (a fresh water shrimp), small fish, or damselflies.

The trout effortlessly goes to the surface and eats a passing damselfly. Although the northern pike was 10 feet away it noticed the sun light reflecting off the silvery rainbow trout as the trout caught its meal, the damselfly. The pike with its torpedo-shaped body and rearward placed fins was able to reach the trout in not much more than a second. The trout, with its eyes on the sides of its head, saw the approaching northern pike and darted away to the safety of the weeds.

The pike, not ready to give up on the potential meal, stares into the plants. By using its pectoral and pelvic fins, it is able to hover in place, waiting for the trout to accidently give its hiding place away.

After a while the trout feels safe enough to continue its search for more food. As soon as the trout leaves the protection of the weeds the pike resumed its attack. The pike missed when the trout quickly turned to its right and missed again when the trout turned to the left. This was when the trout made its final mistake. It tries to out run the pike.

The trout's body, round and thin, makes it very maneuverable, but it is no match for the speed of the pike. With its forward-placed eyes, the pike zeroed-in like a heat-seeking missile and quickly overtook the trout.

In its simplest form the predator-prey relationship can be explained in three words: Big Eats Small.

As with most rules of nature, this isn't written in stone. For instance, with teamwork, a pack of wolves can take down a moose which is much bigger than the individual wolves. Or a human with rod and reel, can catch something as large as a great white shark.

As anglers, our success depends on how well we understand what goes on below the surface. If we know where a fish lives (its habitat), what a fish eats (its prey), and how it reacts to seasonal changes, our chances of success are greatly increased.

CHAPTER 9

WHO AM I? (general characteristics)

When trying to catch a particular fish, if we know their **environmental niche** and how they have **adapted** to it, we can eliminate many unproductive techniques and locations. As an example, burbot have adapted to living in dark, shadowy lakes and river bottoms by developing a keen sense of smell, and their brownish mottled color provides perfect camouflage.

A fish that is well adapted to the shallow, weedy areas of lakes and ponds is the northern pike. Tolerant of warmer waters, these voracious predators have slender green bodies with chain-like markings that blend in with the environment. Illegally introduced northern pike can be extremely destructive to native fish populations.

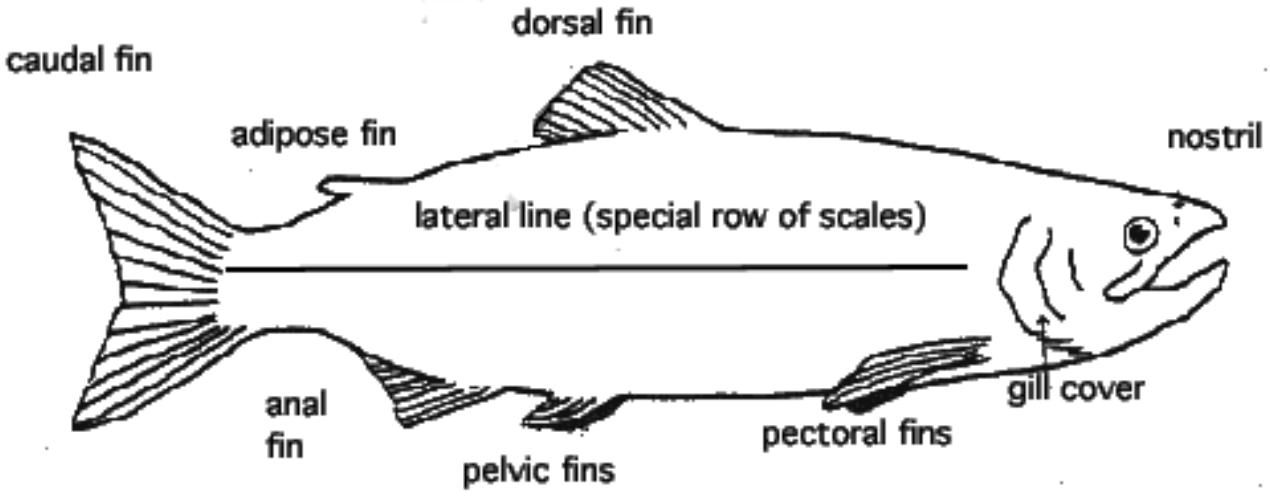
A fish’s color, head and body shape, eye location, mouth and fin shape are all examples of adaptations, characteristics, or features which help the species survive and flourish in certain environments.

It is important that anglers be able to identify the fish they catch, because most laws relate to individual **species**. Laws vary from state to state and between water bodies, so it is crucial to read and understand the rules and regulations booklet before you go out. Laws may range from slot limits, size restrictions, gear restrictions,

closed water bodies, or to species which are illegal to possess. These laws were made after scientific consideration of what is best for the area and survival of the different species.

There are other reasons for recognizing what kind of fish you've hooked. Some fish require special handling, like northern pike. These fish have razor-sharp teeth and if you are unaware of this, you might risk a serious cut. All species have different **characteristics** which separate them from the next. Some have spiny dorsal fins or razor-sharp gill plates. Others have spines in their pectoral fins. Knowing this ahead of time will prevent unnecessary stress on you and the fish.

Recognizing general characteristics on a fish can help you identify species. Different parts of a fish can help you with a fish's identity. Below is a diagram of general external characteristics of a salmon.



Possible extension activities:

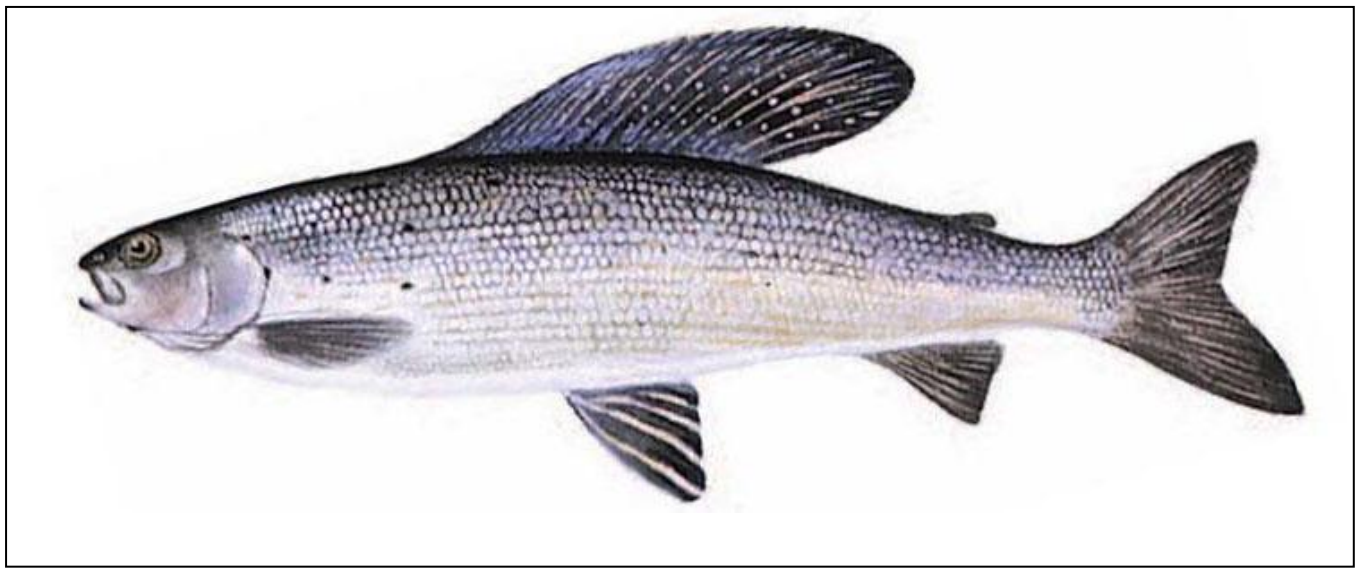
1) (Creative Exercise) Draw a fish and label the external parts of the fish.
2) (Creative Exercise) Design a fish and discuss with a partner the characteristics which make it adapted to its habitat? Where would the fish that you create be found? What color is the fish and why?

CHAPTER 10

WHAT DO I LOOK LIKE? (fish identification guide)

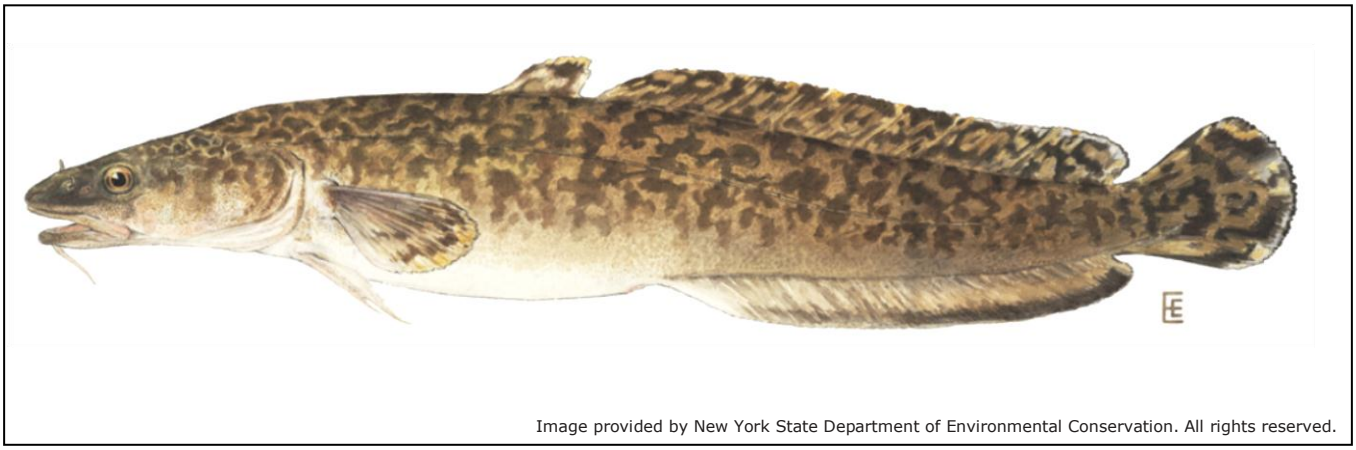
IDENTIFYING CHARACTERISTICS

Identifying Alaska's common sport fish species is easy when you know what characteristics to look for. The images below will help you identify your ice fishing catch.



Arctic Grayling (*Thymallus articus*)

Description: Large, colorful dorsal fin. Fish often winter in lakes connected to streams and rivers where they spend summers eating insects. They are considered excellent eating when fresh.

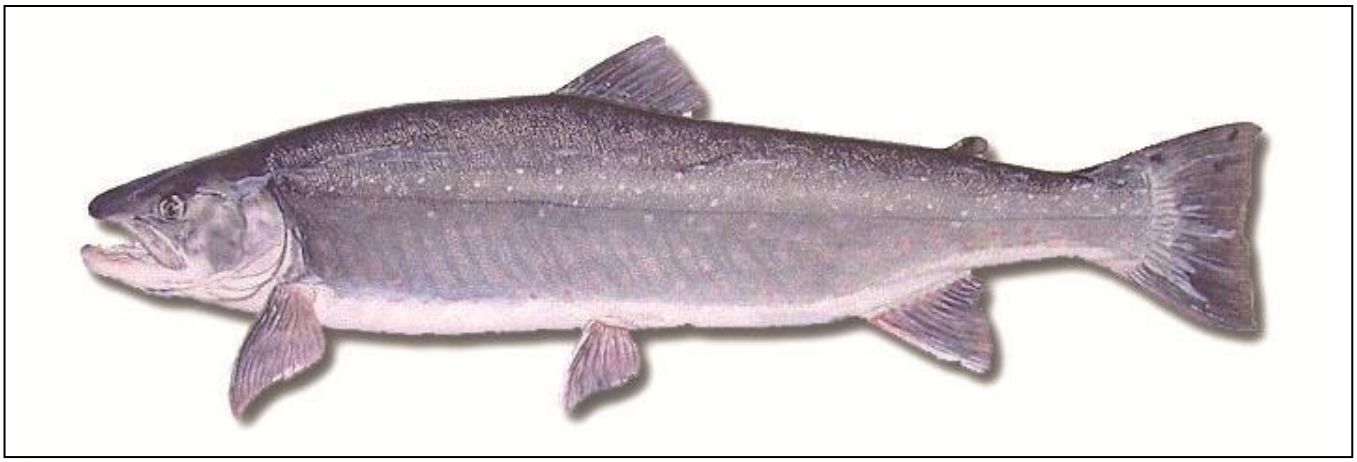


Burbot (*Lota lota*)

Description: Lives in deep rivers and lakes. Found in shallow water when spawning under the ice or while feeding at night. Bottom dweller, diet varies. They are considered excellent eating.

Chinook Salmon (*Oncorhynchus tshawytscha*)

Description: Has small black spots on back above lateral line and on both lobes of the caudal fin. Small, landlocked Chinooks are often found in stocked lakes. They are considered excellent eating.



Dolly Varden/Arctic Char

(*Salvelinus malma/Salvelinus alpinus*)

Description: Pinkish, orange, yellow, or red spots on sides. Found in lakes and rivers. Diet may vary. Considered excellent eating.

Lake Trout (*Salvelinus namaycush*)

Description: Often found in deep, cold lakes. Diet may vary. Flesh may vary in color depending on diet. Considered excellent eating.

Rainbow trout (*Oncorhynchus mykiss*)

Description: Color may vary, but pinkish color on the sides along lateral line is common. Diet may vary. Considered excellent eating.

Kokanee/Sockeye (Red) Salmon (*Oncorhynchus nerka*)

Description: Landlocked sockeye salmon are called Kokanee. Lack black spots and have a green head. Kokanee do not get as large as their migrating relative. Meat is bright red and considered excellent eating.

Northern Pike (*Esox lucius*)

Description: Commonly found in found in shallow, weedy waters. Northern pike are considered an invasive species in Southcentral Alaska. They are voracious predators with large mouths filled with sharp teeth. Pike have a unique bone structure involving "Y-bones" and are considered good eating.

Possible extension activities:

1) (Review Exercise) Create cards with the common name of the fish on one side and the description on another card. If a color printer available, print the images and cut out the pictures and on another card write out the description; a matching game can be made out of the cards.

2) (Research Exercise) Look up additional information about a sport fish species. Find information about their geographic range, diet, size range, Alaska state record, etc.

CHAPTER 11

Fish On!

Now you know the equipment needed to go ice fishing, the habitat in the lake preferred by the fish you're seeking, how to identify your catch and, of course, how to fish safely. However, we still need to talk about what to do once you have reeled in your catch.

The first decision you need to make is whether or not you are going to keep your catch. If you decide to release your fish so that one day you might come back and catch it again, you need to know some basic catch-and-release principles.

To Release A Fish:

1) Get the fish up to the edge of your hole as soon as possible. That fish is fighting for its life and you do not want to wear it down too much.

2) Keep the fish in the water.

3) Remove any gloves and wet your hands. Fish are covered with slime which protects them from infections, aids them in escaping from predators, and helps them slide through the water easier. Your gloves or dry hand can harm fish by removing the slime layer.

4) When holding the fish keep your hands away from the gills. Fish use their gills to breath and cannot get oxygen from the air. Gills are bright red because their cell walls are so thin, and any contact with the gills can harm the fish.

5) Handle the fish gently. If you want to hold the fish up for a picture or to show your friend, support the entire fish with wet hands.

6) Return the fish to the water as soon as possible. As a rule of thumb, you should hold your breath when you pull the fish out of the water – this is what the fish is having to do – then breathe again when you return the fish to the water. This way you realize what the fish is going through.

7) Back the hook out of the fish's mouth. Do not just pull on the hook, this will only rip the mouth, scarring the fish forever. Be gentle as possible, and back the hook out.

8) Cut your line if the fish is deeply hooked and the hook cannot be safely removed.

9) Support the fish upright in the water gently moving the fish back and forth, allowing water to flow across the gills until the fish swims away under its own power.

What if you want to release a fish, but it is the biggest fish you have ever caught and you want to have a replica made? What should you do?

Most **taxidermists** no longer require the actual fish to make a replica. They will want you to take many pictures of the fish, and collect many measurements. This is why many anglers keep a camera, flexible tape measure, pen or pencil, and log or journal to record this information. You will want to record the overall length and girth in multiple spots on the fish. You may have to put the fish back into the water in-between taking pictures and recording length and girths to keep the fish alive and healthy.

To encourage anglers to release the trophies they catch, the Alaska Department of Fish and Game, Division of Sport Fish, has created the **Alaska Trophy Angler Catch and Release Program.** Information on this program can be found in the Alaska Sport Fishing Regulations Summary.

Whether you decide to practice catch-and-release or catch-and-keep, hopefully you will enjoy getting outside and ice fishing.

Possible extension activities:

1) (Skill Exercise) Take a fake fish and practice proper holding and catch-and-release techniques.
2) (Final Exercise) Go ice fishing and put together all the skills learned.

Glossary of Terms:

Adapted: to adjust or modify to surroundings.

Auger: a tool used to drill holes.

Aquatic resource: existing or living in water.

Artificial Lure: any lure that is manmade, free of bait, and is used to attract fish.

Bag limit (daily limit): the maximum number of fish an angler can take for the day in the area in which the angler is fishing.

Bait: any substance applied to fishing gear for the purpose of attracting fish by scent.

Bobbers: buoyant plastic, wooden, cork or foam floats designed to float on the water surface and keep baits or lures at a select depth.

Calories: a unit of measure of energy from food.

Carrying capacity: is the population size of the species that the environment can sustain.

Characteristics: A feature that helps distinguish one thing from another.

Frostbite: is an injury to the body caused by freezing body tissue.

Density: the number of certain things in an area.

Homogenized: to make uniform throughout.

Homeothermic: a warm-blooded animal which maintains a constant internal body temperature.

Hypothermia: lowering of the core body temperature affect normal function.

Ice fishing gear: sport fishing through the ice is permitted using two closely attended lines, provided only one hook or artificial lure is used on each line, except for northern pike and burbot as specified in statewide or area regulations.

Ice fishing shanty: a portable tent or hut which protects ice fishermen while fishing.

Ice Spud: an ice chipper.

Lures: any artificial bait used to attract and catch fish.

Macroinvertebrates: Insects that have an exoskeleton and can be seen with your eye.

Metabolic: the use of food to create energy.

Nocturnal: Most active at night.

Nomad: moving about constantly, not having one constant home.

Predator: animals that survive by eating other animals in the food chain.

Prey: animals frequently used for food by other animals in the food chain.

Regulations: rules that are established to protect game and fish from overharvesting.

Skimmer: a large scoop used to remove floating ice from the top of the water in an ice hole.

Species: a unique organism that is able to reproduce with its own kind.

Stratification: the formation of layers.

Structure: A place fish often go to for cover.

Taxidermists: A person who prepares, stuffing, and mounting the skins or replicas of animals for exhibition in a life like state.

Terminal tackle: the hooks, weights, swivels, lures and other tackle attached on or near the end of a fishing line.

Thermocline: the layer of water where temperatures change rapidly.

Wind chill: is the temperature it "feels like" outside and is based on the rate heat loss from exposed skin caused by the effects of wind and cold.

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