

Junior Angler Instructor's Guide



Wisconsin Aquatic Resources Education

Dear Instructor,

What lucky kids! They have a teacher and caring community members who have found a way to take them fishing all in the name of higher education and experiential learning. What more fertile ground for creative writing, than the local fishing hole? How about science and biology at the water's edge? Or an opportunity to affirm that there is life after football for the Packer wannabes in physical education class? And history? The Wisconsin fishing tradition is almost as old as the water that defines our state!

We know it's not always smooth sailing for fisheries and aquatic habitat. There will always be work to be done to ensure that our waters will always be fishable and swimmable. Opportunities abound throughout this program and several complementary programs for your students and club members to get involved in protecting their resources and gaining a sense of ownership. It's really not too hard to see the connections between understanding aquatic resources, loving them and protecting them. We hope that while you're out there leading investigations of Wisconsin's lakes and streams with fishing pole in hand you're having a good time too.

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And many dedicated Angler Education instructors and Fisheries Management and Habitat Protection staff who have provided us with valuable feedback over the years.

Thank you, all.

Objective

Begin the process of learning what supplies anglers need to gather in preparation for a fishing outing.

Life Skill

Planning

WI Academic Standards

Physical Education:
A.4.1, 8.3, D. *4.1, 8.3.

Getting Started

Introduce yourself, your co-leaders, and assistants, and explain the scope of this program. Ask the anglers to introduce themselves if they are strangers to each other, and have them indicate whether or not they've fished before. Get them thinking about what people need to have for a good fishing experience. The list can be long and diverse, from specific tackle to friends and people who care about habitat.

Hands On

Some participants will have had prior fishing experience. Have them bring in a favorite piece of tackle to describe its purpose and relate to a memorable fishing trip. Depending on the group, you may need to collect all tackle at the beginning of the session as a safety precaution. In some cases it will be more practical for anglers to share their fishing experiences and knowledge without bringing in tackle. Anglers can complete the exercise in the booklet during the session or on their own.

Materials

Magazines for cutting
Glue
Art supplies
Pencils

Duration

15-45 minutes depending on the length of the sharing session.

Fish On!

What do you need for a fishing adventure? Look for clues as you go through this booklet. Then, come back to this page to fill in the checklist of things you need for a safe fishing trip. You'll also discover what it takes to make Wisconsin a great state to fish and learn about some of the people who help to keep it so.

Happy Fishing!

Angler's Checklist

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The Complete Angler

Use drawings, photos, or magazine clippings to complete the illustration and show what this angler needs for a successful outing.



Angler's Checklist:

Cut out your completed checklist, put it in a clear plastic bag, and keep it in your tackle box.

If your fishing trip is part of a school program, check your school's policy on bringing knives to school. It may be best to leave your fishing knife at home.

Our state motto is "Forward," but with nearly one million licensed resident anglers in Wisconsin, it could be "Anglers, ho!" You can join the ranks of license holders when you turn 16. These Web sites provide many links to topics on fish, fishing and water resources: dnr.wi.gov and www.asafishing.org.

Web Connection

These web sites open doors to further study and provide many links to topics on fish, fishing and water resources: dnr.wi.gov and www.asafishing.org.

Note

Angler's Checklist: bobber, clippers, pliers, hook, line, sinker, rod, reel, drinking water, hat, sunscreen, buddy, adult, safe place, snack, good fishing habitat, bait, favorite lure, stringer.

Objective

Describe the historical and cultural significance of fishing in Wisconsin.

Life Skill

Inquiry

WI Academic Standards

Social Studies: A.4.4, 8.4, B.4.1, 8.1.

Environmental Education: B.4.5, 4.11, * 8.9, *8.10.

Hands On

Have anglers construct models of pre-settlement fishing scenes or post-European settlement fishing villages. Discuss how fishing has been important to people in Wisconsin and how fishing methods have changed over time.

Inquiry

Interview anglers, merchants and innkeepers in the community. What does fishing mean to them and how has it changed. Have the changes been for the better or worse? Encourage them to extend their inquiry via letter, telephone or e-mail to different communities.

Materials

Art materials if done during the session
Telephone book
Tourism guide booklets

Duration

20-30 minutes for introduction.
Extended periods for research and model construction.

Web Connections

State Historical Society of Wisconsin, www.shsw.wisc.edu.

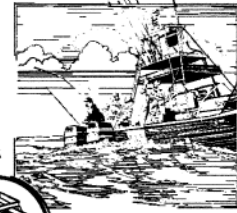
Wisconsin Department of Tourism, www.travelwisconsin.com, 800/432-8747.

Fishing Villages

Fish have been the lifeblood of towns and villages for ages. Millions of people like to catch and eat fish, while others earn their living by selling tackle and providing other services to anglers.

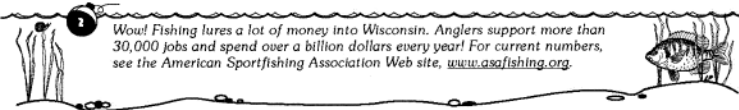


What evidence links fishing to Wisconsin's past?



How many businesses and jobs can you list that are supported by a healthy fishery?

How does angling contribute to local economies?



Objectives

Learn how water played an important role in the settlement of Wisconsin.

Consider how historical events have affected fish and water resources.

Increase knowledge of Wisconsin geography.

Life Skills

Critical Thinking
Map Reading

WI Academic Standards

Social Studies: A.*4.2, 4.4, 4.5, 8.4.

Environmental Education: B.4.5, 4.11,*4.12, 8.5, 8.9, 8.10, 8.11.

Vocabulary

Wisconsin

Hands On

Anglers plot their favorite Wisconsin fishing spots. They also study a map of Wisconsin and make connections between town names and their historical connection to fish and water.

Inquiry

Older anglers can conduct inquiry investigations and write essays based on the questions in the lesson.

Materials

Wisconsin State Highway Map
State relief maps

Duration

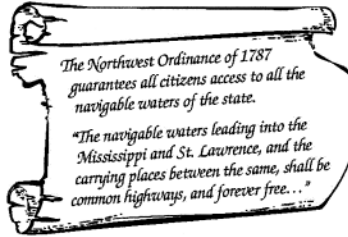
20- to 30-minute introduction.
Extended periods for inquiry-based research and homework.

Web Connections

Lakes are Great!

dnr.wi.gov/org/caer/ce/ee/
Enter *Lakes are Great*
in the search field.

Head for the Water!



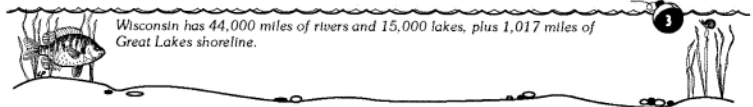
Why were those towns established? What caused their growth and, in some cases, decline? What effect did the activities along the water have on the fish? What effect did the fish have on the town? What does the town's name say about our state's ethnic heritage? How was fishing important to those cultures?



Chart Your Course

Our state abounds with lakes, rivers, streams, and wetlands that are home to over 150 species of fish (native and non-native) and many other types of aquatic wildlife. Where is your favorite place to fish in Wisconsin? Use a state highway map to help pinpoint your fishing "hot spot" on the map on this page. Write an essay describing what makes this place special and illustrate it with pictures of your favorite fish or other aquatic animal.

You don't have to study a map of Wisconsin for long to see that we live in a water-rich state. Water has been important to residents and visitors for ages. The very name *Wisconsin* comes from *Wees-kan-san*, Ojibwa for "gathering of the waters." Many towns share their names with lakes, rivers, and creeks. In other cases, the name somehow notes the significance of water. Two Rivers, Green Bay, and Portage are just a few examples of towns that reflect the water near them. How many more can you come up with?



Resources

Video *Champions of the Public Trust* available from the DNR and local libraries, appropriate for Grades 7 and up.

Wisconsin Lakes, DNR publication #FH-800.

Objective

List the major components of fish habitat.

Life Skills

Observation

Data Interpretation

WI Academic Standards

Science: F.4.1, 8.2, 8.7.

Art: H.4.1, 4.4, 8.4.

Environmental Education:
B.4.4, 4.5, 4.6, 8.8, D.*8.6.

Vocabulary

Habitat

Species

Plankton

Food chain

Getting Started

Ask anglers to name things that animals need to survive.

You're likely to get lots of different responses, but guide the group toward these four basic components: food, water, shelter and space, all in a suitable arrangement. Discuss that different fish have different specific requirements and varying tolerances for habitat degradation.

Hands On

Knowing something about a fish's habitat and food preferences can make a fishing trip more successful, as well as help keep people alert to detrimental changes. There are several options for this lesson: 1.) Research habitat requirements for different species of fish. 2.) Create habitat models or bulletin board displays. 3.) Turn your hallways into an underwater scene. 4.) Check with your local fisheries biologist for habitat project ideas to which your group can lend a hand.

Hooray for Habitat!

All animals (including you!) have certain habitat needs that must be met to ensure survival. Food, shelter, space, and water are four requirements that make up an animal's home (habitat). If habitat needs aren't met, the animal will have a difficult time living and reproducing.

Fish are a diverse group of animals that live in a variety of aquatic habitats in Wisconsin.

Here are some examples of how habitat requirements are met for Wisconsin fish.

Habitat Requirements

Food . . . Fish eat a variety of foods.

Depending on fish species, season, and food availability, fish may prey upon **other fish, insects, plankton, worms and nightcrawlers, and crayfish.**

Water . . . Water that's clean, well-oxygenated, and at the right temperature is essential.

Wisconsin fishes are grouped according to their preferred summer water temperatures: **coldwater** (< 55° F), **coolwater** (55°-75° F) and **warmwater** (> 75° F).

Shelter . . . Shelter (cover) includes **weed beds, logs, stumps, brush and rocks.** Fish need cover to hide or rest and use as ambush points when feeding.

Space . . . Fish need space for their daily and seasonal routines. Although crowding may occur in smaller streams and ponds, space usually doesn't limit Wisconsin fishes.

Using the **bolded** words from the food, water, and shelter habitat definitions above, fill in the blanks on the table below to describe the needs of each fish species listed. Assume these fish are adults found during the summer season. When researching the food and shelter requirements, you may find additional examples. Include them on the table, and be ready to share them with the rest of the group.



Habitat Requirement	Fish Species				
	Bluegill	Brook Trout	Walleye	Muskellunge	Catfish
Food	Fish eggs, insects	Crayfish, fish, insects	Fish, insects, crayfish, worms	Other fish, frogs, almost anything	Plankton, fish, insects
Water	Warm	Cold	Cool	Cool & Clear	Warm
Shelter	Schools, weeds, brush	Logs, deep, pools	Weed beds, rocks	Stumps, weed beds	Deep pool, logs, rocks



Shoebox Habitat

Draw the habitat for your favorite fish, or create a shoebox diorama that shows good habitat for that species. Be sure to include the fish you selected in a likely food chain.



There are about 3,700 dams on Wisconsin's streams and rivers that block the passage of fish to spawning and feeding habitats. Since 1992, over 50 dams have been removed and fish have been welcomed back to restored river habitats.



Inquiry

Fish at School!

Contact your local DNR office for an educational permit to keep gamefish in a school aquarium.

Materials

Pictures of fish

Shoeboxes

Magazines for cutting and other materials for creating dioramas

Duration

60 minutes.

Web Connection

Lakes are Great!

dnr.wi.gov/org/caer/ce/eeek/nature/habitat/lakes.htm

Resources

The DNR has a series of fish fact sheets. Check your materials order form for a list of species and order a set for your classroom.

Wisconsin Fishing, DNR publication #FH-500.

Mapping Fish Habitats, by Katharine Barrett and Cary Sneider (UC Regents, 2005). \$10.50 from www.lhsqems.org.

Objective

Understand that lakes and streams have carrying capacities and that not all species are suited to all waters.

Life Skill

Critical Thinking

WI Academic Standards

Science: A.8.6, B.8.6, C.4.1.

Math: B.4.2, F.4.5.

Environmental Education:
A.8.2, 8.3, B.4.4, 4.6, 8.8.

Vocabulary

Carrying capacity

Limiting factors

Hands On

Anglers "stock their lake" independently in their booklets, or with a partner on butcher paper, or as group at the chalkboard.

Inquiry

Some population experts think that the earth's carrying capacity for humans is 13 billion. Currently there are over 6 billion people on the earth. What does this mean for fish and aquatic resources?

Materials

Fish *Wildcards* - assign pound values to various fish for a group activity

Duration

45-60 minutes.

Web Connection

The Population Connection website, www.populationconnection.org, offers classroom activities on population.

Living Room

What would you need to keep comfortable should a blizzard strike and trap the whole group in your meeting or classroom for many days? What is the one thing in shortest supply (**limiting factor**) right now? How many people can be safely and comfortably seated in the room once all your other needs are met? This is the room's **carrying capacity**.

Lakes and streams have limits to the number of organisms they can support, too. Imagine a one-acre body of water* that has enough food, oxygen and shelter to support 300 pounds of fish. If one of these needs is in short supply, that need becomes the **limiting factor**. The number of pounds of fish that an aquatic system will support is called the **carrying capacity**. When too many fish occupy an area to support healthy growth, that area's carrying capacity is exceeded. Several

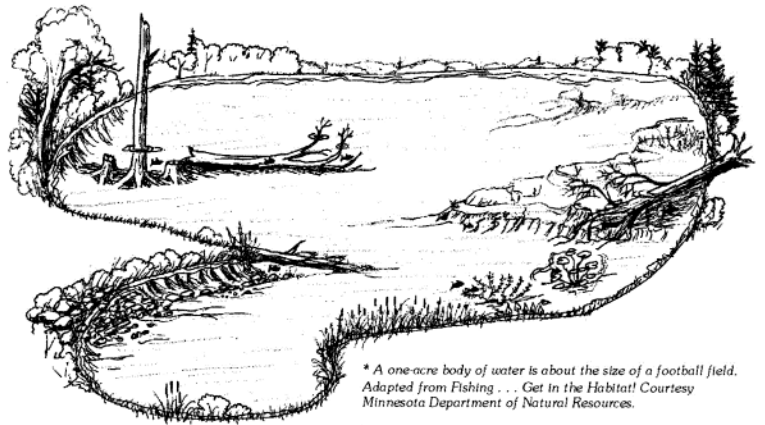
organisms will feel the effects, not just the fish. Area alone may not always be the limiting factor. Food chains can be stretched to the breaking point and oxygen can be depleted.

What kinds of events can affect the food and oxygen supplies and, in turn, the fish? For example, how would a manure spill affect the equilibrium of the system?

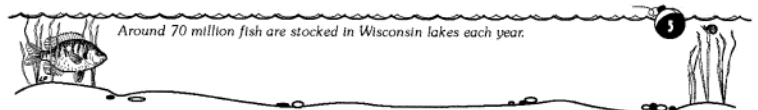


Decide if this one-acre body of water is a pond or a stretch of stream.

Choose the fish you would like to stock from the *Wisconsin Wildcards* and assign them weight values. Be careful to calculate the total weight of the fish you are stocking. Now, consider the fish you stocked. Why did you choose them? Do you like to catch them? Do they share similar types of habitat needs?



* A one-acre body of water is about the size of a football field.
Adapted from *Fishing . . . Get in the Habitat!* Courtesy
Minnesota Department of Natural Resources.



Around 70 million fish are stocked in Wisconsin lakes each year.

Objective

List the values of wetlands.

Life Skills

Observation

WI Academic Standards

Science: E.4.3, 4.7, 8.6.

Social Studies: A.4.4, 4.8, 8.4.

Environmental Education:

B.4.4, 4.5, 4.6, 4.10, 8.2, 8.3, 8.5, *8.6, 8.8, 8.10, 8.19, C.4.1, 4.3, 4.4, 8.1, 8.4.

Vocabulary

Runoff

Sediments

Non-point pollution

Getting Started

Wetlands have long been over-looked for their value to fish and wildlife.

Their value to human communities was dismissed for decades until floodwaters lapped at doorsteps and filled basements. Ask anglers why wetlands are important to fish and wildlife. Use several common objects with anglers to help them visualize the varied roles wetlands play. For example, a coffee filter reminds us of their sediment-holding potential. Round up the items listed below (or a similar collection) and have anglers determine how each object symbolizes wetland characteristics and properties.

Hands On

Visit a wetland with a field guide in hand and have anglers conduct a site inventory. Revisit the site during different seasons. Allow quiet time for sketching or poetry writing. Remind anglers of proper dress and behavior when visiting a wetland. Stay on boardwalks in high-use areas, so as not to damage the delicate plants.

Inquiry

What social forces affect wetlands?

How have people's views toward wetlands changed through the years?



Wetland Habitats

What kinds of plants and animals can you find in a wetland?

Wetlands . . .

- are nurseries for fish, birds and many other animals.
- filter impurities from water before it trickles into drinking water wells.
- catch floodwaters.
- catch sediments in runoff before they enter open water and cover fish spawning beds.
- have plants that hold soil and water and provide food for animals.

Spring rains and snowmelt often flood rivers and spill into wetlands. When wetlands are destroyed, water still spills into the "old wetland." Sometimes homes, shopping malls and farm fields get flooded.



Backyard Fish!
Neighborhoods in Green Bay are awash with spawning northern pike each spring when meltwaters flood backyards. In a natural wetland, northern pike eggs stick to marsh plants which keep them from suffocating in the sediments.

We lose a lot when we lose wetlands.

6 Wisconsin now has about half of the 10 million acres of wetlands that were present at the time of statehood, 1848.

Materials

"Wetland Properties"

ObjectSymbolic Wetland Function

spongeflood retention
coffee filtercatches fine sediments
doll cradle.....spawning or nursery areas

sleeping bag...resting area
sieve.....strains coarse sediments

cerealfeeding areas

Field guides

Paper and pencil

Duration

30 minutes for indoor activity and two hours minimum for a wetland visit.

Web Connection

Wisconsin Wetlands: dnr.wi.gov/org/water/fhp/wetlands/index.shtml.

Check out some great field trip destinations: dnr.wi.gov. Click on *Education & Training*, then on *Places to Go & Learn*. Send the kids to *EEK* and have them search for *Wetlands*.

Resources

Through the Looking Glass – A Field Guide to Aquatic Plants, by Susan Borman, Robert Korth, and Jo Temte (WI Lakes Partnership and UW-Extension/Stevens Point, 1997). \$17.95 + shipping.

Guide to Wisconsin Aquatic Plants, DNR publication #FH-173.

Objective

List the values of shorelands.

Life Skills

Observation
Investigation

WI Academic Standards

Science: E.8.6.

Social Studies: A.4.8, 8.4.

Environmental Education:
B.4.5, 8.10, 8.15.

Vocabulary

Runoff
Sediments
Non-point pollution

Inquiry

How has shoreline development changed in the last 60 years?
What have been the effects of this development on fisheries?

Duration

One – two hours

Web Connection

Margin of Error, a downloadable slide show or PowerPoint® program appropriate for middle school and up is available at <http://www.uwsp.edu/cnr/UWEXlakes/humanimpact/marginoferror.pdf>.

Resources

Through the Looking Glass – A Field Guide to Aquatic Plants, by Susan Borman, Robert Korth, and Jo Temte (WI Lakes Partnership and UW-Extension/Stevens Point, 1997). \$17.95 + shipping.

Guide to Wisconsin Aquatic Plants, DNR publication #FH-173.

Golden Guide: Pond Life, by George K. Reid, Ph.D. (St. Martin's Press, 1995).

The Water's Edge, DNR Publication #FH-428-2000.

Shoreland Homes



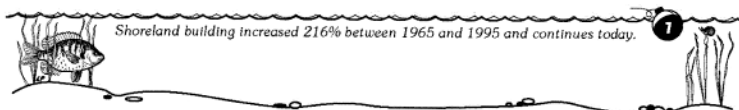
The water's edge is a busy place. Fallen logs and a tangle of plants are home to every manner of splashing, buzzing and chirping thing.



These diverse areas are under pressure from development, as little weekend cabins are replaced with year-round homes and shorelines are "cleaned up."



Find out more about lakes and their inhabitants at:
dnr.wi.gov/org/caer/ce/eeek/nature/habitat/lakes.htm.



Shoreland building increased 216% between 1965 and 1995 and continues today.

Objectives

Identify at least five invasive exotic animals in Wisconsin.

Describe their means of entry.

Identify what individuals can do to limit the spread of exotic species.

Life Skills

Observation

Critical Thinking

Responsible Citizenship

Wise Use of Resources

WI Academic Standards

Science: A.4.5, F.8.8, 8.9.

Social Studies: A.4.7, 8.4.

Environmental Education: D.4.6, 8.6.

Vocabulary

Exotic

Alien

Non-native

Weeds

Eradicate

Getting Started

Ask anglers to define the term exotic. Where have they seen non-native plants and animals? How have they used them? Have they been annoyed by any? Which ones?

Inquiry

Have anglers research how exotic species entered Wisconsin waters, how they continue to spread, and how they affect species composition of our waters.

Duration

One or two sessions for library or Internet research and one session for reporting.

Web Connections

dnr.wi.gov/org/caer/ce/eek/earth/aliens.htm and

dnr.wi.gov/invasives/.

Alien Invasion!

Exotic. Alien. Non-native. Whatever you call them, plants and animals that make their way to new places can compete with native species for habitat and be hard to eradicate.

Some exotics entered Wisconsin waters as stowaways on freighters, while others swam into the Great Lakes from the ocean through the Welland Canal. Well-meaning people thought they could improve on what nature offered. The Fisheries Commission, for example, stocked carp to increase food production before understanding how carp would adversely affect native fish habitat.

Ports of Entry for Exotics

Find out how these exotic species got here by visiting the Department of Natural Resources Web site, dnr.wi.gov/eek/earth/aliens.htm.



Sea Lamprey



Zebra Mussel



Rusty crayfish



Spiny water flea



Alewife



Ruffe



Carp

Welcome Introductions

Salmon and trout were first introduced in the late 1800's for sport, then in the 1960's to devour alewives that were washing up on beaches. Still stocked today, these exotics are a thrill to catch!

Unscramble the names of these exotic fish. Hint: all are two-word names.



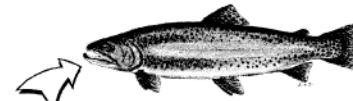
kaohilsonmcno



nhoacmloso



rwtonrbuto



toiburontarw

Take a look at the egg collection facilities, where we roll out the welcome mat for some exotics, dnr.wi.gov/org/water/fhp/fish/pubs/3wafish.htm.

There are 161 exotic species in Wisconsin's waters, including the Great Lakes; 19 are fish. In 1882, the City of Ripon passed an ordinance "prohibiting fishing in all waters within the city limits for two years" to ensure the survival of carp.

Objectives

Identify at least three exotic plants that are considered *invasive* in Wisconsin.

Explain how invasives were introduced and became established.

List ways that individuals can limit the spread of invasive plants.

Life Skills

Observation

Critical Thinking

Responsible Citizenship

Wise Use of Resources

WI Academic Standards

Science: A.4.5, F.4.2, 8.8, 8.9.

Social Studies: A.4.7, 8.4.

Environmental Education: D.4.6, 8.6.

Vocabulary

Decompose

Herbicide

Invasive

Restore

Hands On

Anglers meet with a nearby landowner or public property manager to plan and participate in a purple loosestrife removal and/or native plant restoration as a service project. The Purple Loosestrife Bio-control Program uses beetles to eradicate this pesky plant. Contact the project manager in Madison at 608/221-6349 to find out more.

Materials

Gloves

Trash bags

Garden clippers

Duration

At least one session to plan a service project related to exotic control and one session to carry it out.

When a Plant Becomes a Weed ...

Aquatic plants release oxygen into the water for fish to use and provide places for fish to hide and spawn. Exotic plants choke out native species and can grow in stands so thick that fish can't maneuver. Fish are robbed of oxygen when excess plants die and decompose.

We have many exotic plants in Wisconsin. Some exotics were accidentally introduced, while others were planted in gardens and soon grew out of control. Now many are considered *invasive*.

Removing exotic plants is a big job, often requiring the use of mechanical harvesters, fire, or herbicides. If you'd like to help, get involved with a local conservation organization.

Report sightings of these plants to the Department of Natural Resources:



Purple loosestrife

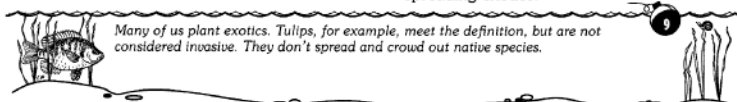
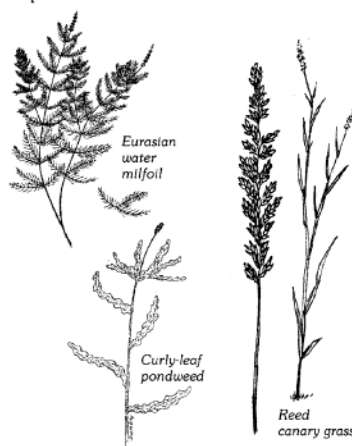
One plant that everyone can help remove is purple loosestrife.

Follow these steps:

1. Make a positive identification.
2. Get permission from the landowner or property manager to remove plants.
3. Cut flower tops off before they go to seed.
4. Wrap plant parts and place in trash so the plant doesn't spread.
5. Report the location to the aquatic plant manager at your nearest DNR regional office.
6. Plant and restore native species in the area.

You can prevent the spread of exotics.

1. Always remove plants and animals from your boat, trailer, and fishing equipment before you leave the fishing area.
2. Share your extra minnows with another angler instead of dumping them in the lake or stream.
3. Never dump aquarium pets or plants into lakes or streams.
4. Never move fish, plants, or water from one lake or stream to another; you might be spreading exotics.



Many of us plant exotics. Tulips, for example, meet the definition, but are not considered invasive. They don't spread and crowd out native species.

Web Connections

dnr.wi.gov/org/caer/ce/eek/earth/aliens.htm and

dnr.wi.gov/invasives/.

Resources

Through the Looking Glass – A Field Guide to Aquatic Plants, by Susan Borman, Robert Korth, and Jo Temte (WI Lakes Partnership and UW-Extension/Stevens Point, 1997). \$17.95 + shipping.

Guide to Wisconsin Aquatic Plants, DNR publication #FH-173.

Objectives

Explore career options.

Recognize Wisconsin environmental and conservation heroes.

Life Skills

Planning

Interviewing

WI Academic Standard

Environmental Education: B.8.22.

Vocabulary

Lunkers

Getting Started

Wisconsin has a long legacy of conservation and environmental activism. Discuss how the Department of Natural Resources and partner agencies monitor and manage natural resources. Hundreds of groups, from garden clubs to local chapters of national organizations, advocate for healthy ecosystems. Who are the anglers' environmental heroes? How many conservation groups can they name and describe?

Inquiry

Pick a Wisconsin environmental or conservation hero and research his or her contributions to protecting natural resources. Interview a natural resources professional or advocate.

Duration

15 minutes for worksheet.

One or two sessions for research or interview.

One session for reporting.

Web Connection

dnr.wi.gov/ee/.

Enter *Get a job* in the search field.

Resources

Video *Champions of the Public Trust*, available from the DNR and local libraries, appropriate for middle school and up.

Friends in the Field



Many people at the Department of Natural Resources work hard to keep the fishing lively. Match each drawing to an activity listed below.

- A. Improve habitat
- B. Land use planning
- C. Research and restoration
- D. Measure and count fish populations
- E. Educate
- F. Raise and stock fish

"Conservation" means using our fish, water, forests, wildlife, air, and land wisely so that we will always have them to enjoy. Conservation

"Conservation" means using our fish, water, forests, wildlife, air and land wisely so that we will always have them to enjoy. Conservation wardens enforce rules that protect our natural resources from damage. If you see a problem that threatens our natural resources, call the TIP (Turn In Poachers) Hotline: 1-800-TIPWDNR (1-800/847-9367).

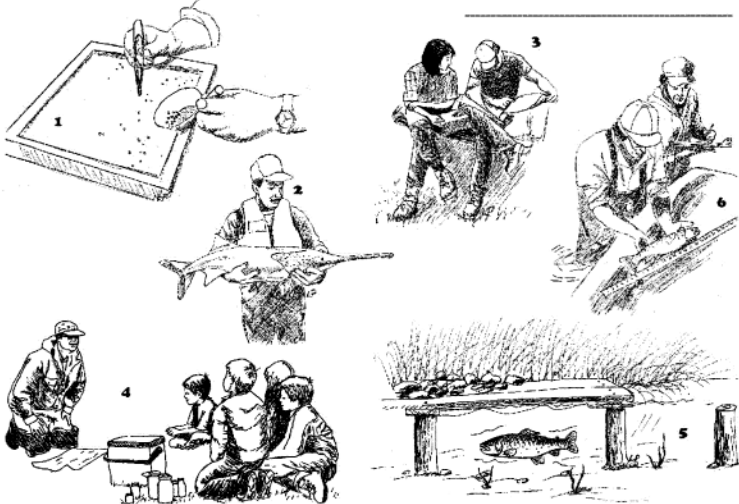


You can find out who your warden is by calling your local DNR office or 608/266-2141.



The conservation warden for my area is:

Telephone number:



10

Wisconsin has pioneered many conservation ideas and techniques. Conservation leaders such as John Muir, Aldo Leopold, Frances Hammerstrom and Gaylord Nelson have called Wisconsin home as well as distinguished biologists like Arthur Hasler, C.D. "Buzz" Besadny, and many more. Who's your conservation hero?



Objective

Understand the odds of a fish hatching from an egg.

Life Skill

Cooperation

WI Academic Standards

Science: F.4.3, 8.5, 8.8.

Math: A.4.3.

Vocabulary

Spawning

Phytoplankton

Getting Started

Ask anglers to take a guess at how many eggs a fish will lay. Sturgeon and salmon will lay from 3,000 to 7,000 eggs while bluegill will deposit upwards of 60,000. Why so many?

Hands On

Anglers play a board game to follow fish egg development.

Materials

Game markers

Coin

Pencil

Paper

Duration

30 minutes.

Web Connection

Visit a hatchery or egg collection facility. For a listing, go to: dnr.wi.gov, click on *Education & Training*, then *Places to Go & Learn* from the drop-down menu.

Adapted from *Fishing . . . Get in the Habitat!* courtesy Minnesota Department of Natural Resources.

An Egg-citing Race!

Fish lay thousands of eggs at a time. Animals and other fish eat many eggs, while disease or pollution destroys others. Witness the perils that await a mass of eggs. See how many survive long enough to hatch. You'll need a coin, a partner, a token for each of you, and

pencil and paper to keep track of your egg totals. Remember that eggs are only saved or lost, but never added to the initial total.

To play, take turns flipping a coin to move along the eggs.

Heads = 1 space
Tails = 2 spaces

Start with 1,000 eggs.

Eggs too small for garlie' snake to see... Go ahead 4 spaces.

Turtle eats 50 eggs.

Crayfish nibbles eggs for dinner... Lose 50.

Frog swims by, but doesn't see eggs.

Eggs washed in by storm water from city streets, stranded in poor habitat... Lose 50.

Round goby, an exotic, devours eggs... Lose 100 eggs.

3rd grader steps on 100 eggs.

Fish unable to jump dam to reach spawning grounds Go back 3 spaces.

Skinny minnow eats 50 eggs.

Fungus attacks eggs... Lose 100.

Snail can't find eggs, eats phytoplankton instead.

Dart removed, fish can swim upstream to spawn. Move ahead 3 spaces.

Wood duck swims by splashing away silt and saving 50 eggs.

A boater accidentally spills motor oil in the water near eggs... Lose 50.

Ruffe, an exotic, gobbles 100 eggs.

Same 3rd grader picks up litter in water... saves 100 eggs.

Go ahead 2.

Go back 3.

Kids throw rocks into water... squish 50 eggs.

Sucker slurps 50 eggs.

Raccoon swims by, distracted by old cookie lying on shore.

Eroded soil buries 100 eggs.

Water insects chomp 50 eggs.

Big bass heads straight for eggs... chomps a little pumpkinseed instead.

A good day to hatch!

How many eggs survived long enough to hatch? What are their next stages of life, and what hazards await them there?

Wisconsin has fourteen state fish hatcheries and three main egg collection facilities that work together to ensure recreational fishing opportunities.

Objectives

Understand basics of fish anatomy.

Identify key adaptations.

Life Skills

Observation

Problem Solving

WI Academic Standards

Science: F.4.1, 8.1, 8.2.

Vocabulary

Adaptation

Camouflage

Barbel

Slime

Mucous

Adipose

Lateral line

Getting Started

Ask anglers what makes a fish

a fish and list their responses.

Features they're likely to list

(such as fins, gills, slime, etc.)

are called adaptations. How do

they help fish live in water?

Hands On

Pin the fins on the fish. Anglers learn which fin is which in a remake of an old parlor game. Tape a

cardboard cutout of a generic fish

body to the board. Have anglers

take turns attaching cutouts of

fins to the proper location and

describe the function of each fin.

Using the list of adaptations they

generated and the *Wildcards*,

have anglers create a graph to

classify fish. Put the adaptations

on the x-axis and the number of

fish that share them on the y-axis.

Examples of adaptations to graph

include down-turned mouth, vertical

markings, horizontal markings,

barbels, adipose fin, prominent

lateral line, torpedo-shaped

body and pan-shaped body.

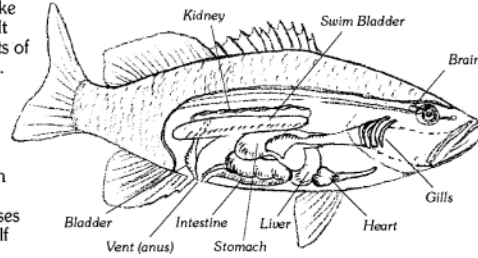
Fish Inside...

What makes a fish a fish? Fish have special adaptations that make them suited for life in the water. It helps to know the distinctive parts of fish as you learn to identify them.

Fins... Fins allow the fish to balance, move and aim itself. The dorsal, pelvic and anal fins balance the fish and keep it upright. Pectoral fins help a fish position or aim itself. Pectoral fins also act as breaks. A fish uses its tail (caudal) fin to propel itself forward. Trout, salmon and bullheads also have a small fleshy fin near the tail, called an *adipose fin*.

Shape... Moving through the water is hard work! Many fish, like trout, are streamlined to allow them to easily slip through the water. Others, like bluegill, are flatter so they can hide in weeds and dart away from predators.

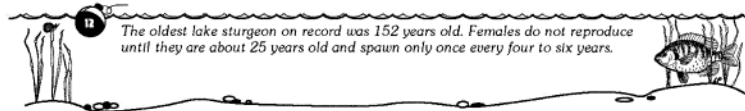
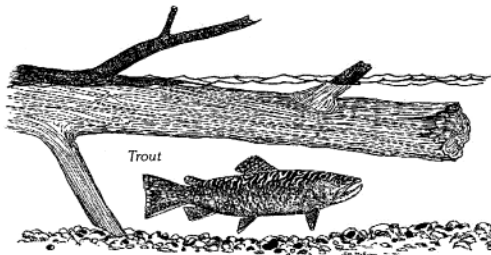
Color... Whether they are predator or prey, fish need to go undetected by other fish. Markings and color patterns camouflage fish in weeds and murky waters.



Bullheads are dark on top and blend in with dark water, making them hard to see from above.

Their light-colored underbellies blend in with the light sky above, making them hard to see from below.

Gills... Fish breathe through gills that remove oxygen from the water. Water flows through the fish's mouth, over its gills, and out through gill vents.



The oldest lake sturgeon on record was 152 years old. Females do not reproduce until they are about 25 years old and spawn only once every four to six years.

Materials

Cardboard cutout of a fish body and fins

Tape

Fish *Wildcards*

Paper

Colored pencils for graphing

Duration

30 minutes.

Web Connections

There are good kids pages on fish anatomy at www.seagrant.wisc.edu.

Objectives

Continue study of fish anatomy and adaptations with a focus on senses.

Learn to identify fish through various games and activities.

Life Skill

Observation

WI Academic Standards

Science: F.4.1, 8.2.

Getting Started

Ask anglers to name the senses and consider how fish use them. Once anglers can identify various parts of a fish's anatomy, they can begin to identify the different species of fish. Use games to reinforce their knowledge.

Hands On

Have anglers play *20 Questions* to guess the name of a fish taped to their backs. They can use the key on the next page to zero in on their fish or a different line of questioning such as, "Am I a predator? Do I live in rivers more than lakes? Do I prefer weedy areas?"

Tape flash cards to fish targets during casting practices to test their knowledge. Add a regulations element to the game by taping a size of the fish on the target.

Which of these fish have they caught?

Materials

Fish Wildcards

Backyard Bass or other targets

Wisconsin Fishing, DNR publication #FH-500

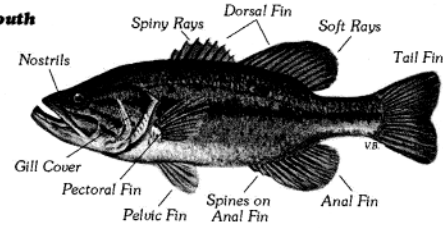
Wisconsin Fishing Regulations

Duration

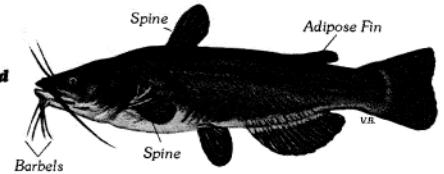
30-60 minutes.

... and Out

Largemouth Bass



Brown Bullhead



Sensory Organs

Eyes . . . Fish can move their eyes in opposite directions.

Some fish have well-developed sight, while others depend on other senses, especially if they live in murky water.

Smell . . . All fish have nostrils, and most have a good sense of smell. Smell is excellent in fish that have poor eyesight, like catfish.

Hearing . . . Fish have ears, but they are located inside the body of the fish. Some fish use these ears for hearing, but they are mostly used for balance. Fish also have a lateral line located along each side of their bodies. This organ senses pressure changes and vibrating sound caused by things like the movement of another fish or the splash of a lure.

Taste . . . Fish have taste buds in their mouths and on the outside of their bodies. Catfish and bullheads have taste buds on their whiskers (barbels) and skin, so they can taste before they even take a bite!

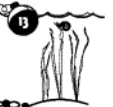
Protective Coverings

Most fish have scales for protection. Some scales are large, like those on the carp, while other scales are very small, like those on the trout. Sturgeon have thick bony plates that act like a coat of armor. Catfish and bullheads rely on their thick, tough skins for protection.

A coat of slime covers most fish for added protection from disease, fungi and parasites. When practicing catch and release, anglers should wet their hands to minimize removal of this slime.



Fish do not have eyelids, and therefore, do not blink. The purpose of blinking in mammals is to spread moisture over the eyes. Since fish live in water, they have no need for this adaptation.



Resources

Audubon Society Field Guide to Fishes, Whales, and Dolphins by Audubon Staff (Alfred A. Knopf, 1983).

Fishes, A Golden Guide by Herbert S. Zim, Ph.D. and Hurst H. Shoemaker, Ph.D. (St. Martin's Press, 1987).

Fishes of Wisconsin by George C. Becker (University of Wisconsin Press, 1983).

Note

There are positive aspects to either order of these identification lessons. You could save the games until after the classification key activity on the next page, or you could do them now with a focus on habitat and behavior, rather than on physical features.

Objective

Learn to use a dichotomous key.

Life Skill

Observation

WI Academic Standards

Science: B.4.1.

Getting Started

Ask anglers why it is a good idea to learn to identify fish. There are legal reasons as well as taste preferences. Now that they are familiar with some identifying characteristics, they can learn to use a dichotomous key - a skill useful in many areas of nature study.

Hands On

Explain how to navigate through a key. Begin with the first set of characteristics and decide whether choice (a) or choice (b) is true for that fish. At the end of each line there will be either instructions to go to another clue or the name of a fish. If it's the name of a fish, they've solved that puzzle and can try another one. Anglers should key out more than one fish.

Materials

Fish Wildcards

Duration

30 minutes (minimum).

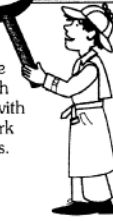
Notes

Learning to use and make keys is a good way for anglers to be aware of the world around them. Take this activity further by having them create keys to classify everything from aquatic plants to cookies or shoes.

Classified Information

Scientists use dichotomous (die-cot-o-mus) keys to classify and identify everything from plants to bugs to fish. Choose a fish from the **Wisconsin Wildcards** collection to key out. (Hint: Only cards with a are represented on this key.) Start with the first pair of characteristics. Work your way step by step through the key until you have identified your fish. You can make a key of your club

members or classmates. Remember to give two choices for the same characteristic in each pair of statements. Start with broad distinctions and work toward specific differences.



A Key to Common Wisconsin Fish

1. a. Body does not have large bony plates.....Go to #2.
b. Body has several rows of large bony plates.
Face has whiskers (barbels) and a sucker-like mouth ⇨ **Lake Sturgeon**
2. a. One dorsal fin; **no** adipose fin.....Go to #3.
b. Two dorsal fins that may be separated or joined and have distinct spines and soft rays; **or** may have one dorsal fin **and** an adipose finGo to #7.
3. a. Dorsal fin is short, much less than half the body length.....Go to #4.
b. Dorsal fin is nearly half the body length or longer⇨ **Bowfin**
4. a. Teeth are very visible and sharp (Pike Family) Go to #5.
b. Teeth are not visible; mouth is fleshy and sucker-like ⇨ **White Sucker**
5. a. Tips of tail fin are roundedGo to #6.
b. Tips of tail fin are pointed⇨ **Muskellunge**
6. a. Cheek and gill cover fully scaled.....⇨ **Grass Pickerel**
b. Cheek and only upper half of gill cover are scaled.....⇨ **Northern Pike**
7. a. Adipose fin present.....Go to #8.
b. Adipose fin absentGo to #19
8. a. Whiskers (barbels) are present.....Go to #9.
b. Whiskers are absentGo to #13.
9. a. Tail rounded or slightly indented.....Go to #10.
b. Tail deeply forked⇨ **Channel Catfish**
10. a. Lower jaw does not protrude beyond upper jawGo to #11
b. Lower jaw protrudes beyond upper jaw. Body has patchy, mottled markings.....⇨ **Flathead Catfish**

Wisconsin counts 141 native species of fish, plus several hybrids. Forty-three are listed as species of concern, threatened, or endangered. Exotic fish species total 19 at last count. Six species have been extirpated (wiped out) from Wisconsin.



Important Key Notes

Without actual specimens, some key characteristics of fish may be difficult to discern from an illustration. Here are some hints you may want to share with the group to keep them from getting stuck as they make their way through the key.

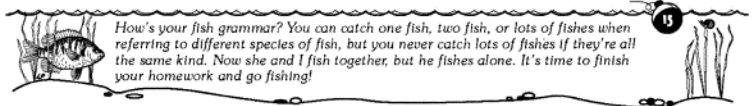
Single dorsal fin v. two dorsal fins – Some fish clearly have just one dorsal fin and some clearly have two distinct dorsal fins. Others have two that may be joined together with a spiny anterior part and a soft posterior part. The adipose fin is something different altogether.

Visible sharp teeth – This is tough to see in an illustration. To help anglers get on the right track, ask them what kind of fish come to mind when they think of toothy predators

Fin rays and fin spines – For some species the number of rays or spines may be the clincher in distinguishing one species from another. You can see these by looking at a good illustration and counting carefully.

11. a. Anal fin has 15-24 rays; barbels are gray to black; tail fin is squarish and slightly notched Go to #12
 b. Anal fin has 24-27 rays; barbels are whitish; tail fin is rounded ⇄ **Yellow Bullhead**
12. a. Side is mottled; pectoral fin spine has strong saw-like "teeth" ⇄ **Brown Bullhead**
 b. Side is not mottled; pectoral fin spine is "toothless" or has poorly developed "teeth" ⇄ **Black Bullhead**
13. a. Tail is deeply forked Go to #14.
 b. Tail only slightly forked or is not forked Go to #16.
14. a. Mouth is not turned down Go to #15
 b. Mouth is turned down ⇄ **Lake Whitefish**
15. a. Back and sides have densely-mottled marking pattern ⇄ **Lake Trout**
 b. Back and sides not densely-mottled (have scattered spots instead) ⇄ **Coho Salmon**
16. a. Back lacks worm-like markings; lower fins lack white edge Go to #17
 b. Back has worm-like markings; lower fins have white edge ⇄ **Brook Trout**
17. a. Lower fins are not speckled Go to #18
 b. Lower fins are speckled ⇄ **Chinook Salmon**
18. a. Lateral line is pink and prominent ⇄ **Rainbow Trout**
 b. Lateral line not pink or prominent ⇄ **Brown Trout**
19. a. Anal fin has two or fewer spines on leading edge (Perch Family) Go to #20.
 b. Anal fin with three or more spines on leading edge (Sunfish Family) Go to #22.
20. a. Teeth are not noticeable; tail lacks white tip Go to #21.
 b. Teeth are very large; tail has white mark on lower tip ⇄ **Walleye**
21. a. Dorsal fin is polka-dotted ⇄ **Sauger**
 b. Dorsal fin lacks polka dots ⇄ **Yellow Perch**
22. a. Anal fin has four or more spines Go to #23.
 b. Anal fin has three spines Go to #24.
23. a. Body is silver with random black scales ⇄ **Black Crappie**
 b. Body is not silver; black scales form lateral rows of spots ⇄ **Rock Bass**
24. a. Mouth is very large; back of upper jaw extends to below or beyond eye Go to #25.
 b. Mouth is very small, back of upper jaw does not extend to eye Go to #26.
25. a. Tip of upper jaw extending beyond eye ⇄ **Largemouth Bass**
 b. Tip of upper jaw not extending beyond eye ⇄ **Smallmouth Bass**
26. a. Red spot is present at tip of gill flap ⇄ **Pumpkinseed**
 b. Gill flap is all black ⇄ **Bluegill**

Adapted from a fish key by WDNR Fisheries Biologist Steve Gilbert



Objectives

Identify basic fishing equipment.

Assemble a fishing pole and rig it with simple tackle.

Properly care for and store fishing equipment.

Life Skills

Planning

Organization

Responsibility

Safety

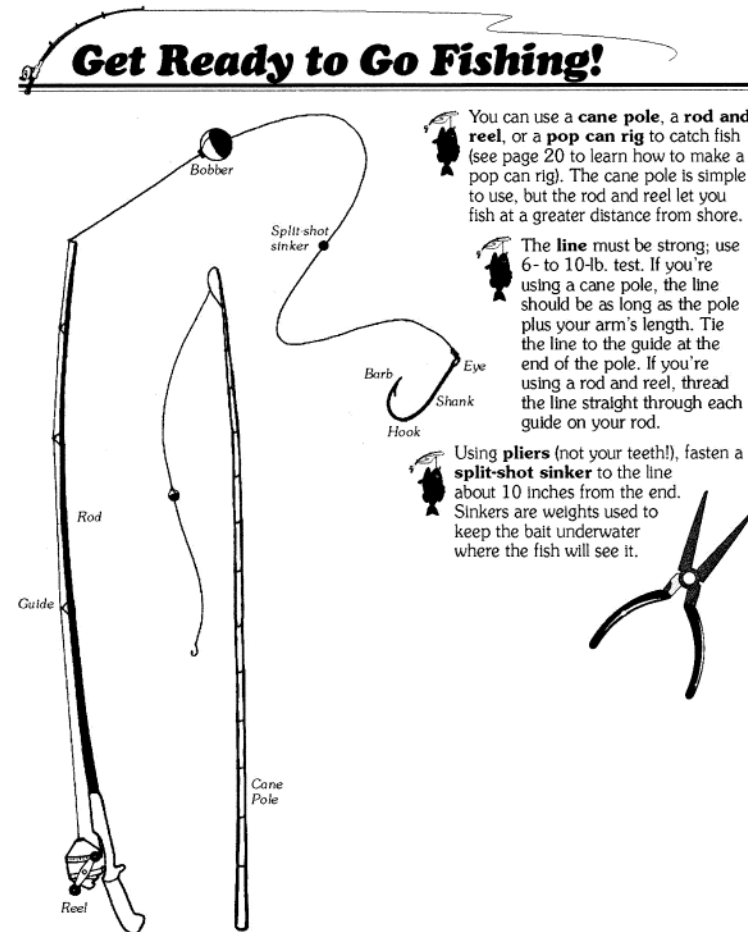
Getting Started

Read the story on page 17, *Fishing for Answers*, to the group and use the questions at the end as the basis for a short discussion. Next, demonstrate how to string a fishing rod. Loaner equipment often comes to you all set to go, so the anglers miss out on this part of the learning process. With older, capable anglers, allow time for them to unstring and restring the rod.

Hands On

Pass equipment around and encourage anglers to push the buttons on the bobbers, note the sharpness of the hooks, etc. Check their knowledge of tackle by setting up numbered stations around the room with various pieces or pictures of equipment. Have anglers record the name of each item next to the appropriate number on their paper. Next have them rig gear for a fishing outing and demonstrate how to properly care for it. Arrange for a visit to the local sporting goods store for a first-hand look at the vast array of tackle choices.

Get Ready to Go Fishing!



You can use a **cane pole**, a **rod and reel**, or a **pop can rig** to catch fish (see page 20 to learn how to make a pop can rig). The cane pole is simple to use, but the rod and reel let you fish at a greater distance from shore.

The **line** must be strong; use 6- to 10-lb. test. If you're using a cane pole, the line should be as long as the pole plus your arm's length. Tie the line to the guide at the end of the pole. If you're using a rod and reel, thread the line straight through each guide on your rod.

Using **pliers** (not your teeth!), fasten a **split-shot sinker** to the line about 10 inches from the end. Sinkers are weights used to keep the bait underwater where the fish will see it.

16 Until recent years, anglers could buy only lead sinkers. Sinkers are now also made from tin and from bismuth. These options help to reduce lead poisoning in wildlife, particularly waterfowl. They're safer for you to handle, too. Since tin is lighter than lead, you need more of them to weight down your bait.

Materials

Station props and labels:

- Line
- Bobber
- Sinkers (in plastic bags)
- Hooks (in plastic bags)
- Rods
- Reel
- Stringer
- Lure
- Plug
- Jig, etc.

Duration

60 minutes, plus optional field trip.

Web Connections

Need tackle to take your class fishing? Learn about the Tackle Loaner Program: dnr.wi.gov/fish/kidsparents/loanerequipment.html.

Get access to discount prices for educators through www.asafishing.org.

Note

Beginning anglers should learn to fish with a closed-face, push-button reel first.

Fishing for Answers

Skip, Jack and Barb have gone fishing. Listen to their tale and see what you can learn from their experience.

Skip was puzzled as well as a little discouraged. He was almost out of bait and all he had to show for a day of fishing was sunburn. His friends Jack and Barb meanwhile were suffering from tired arms from reeling in so many fish. He swallowed his pride and walked over to where they were fishing. "You two always seem to *catch* fish while I have done nothing but *feed* fish. What's your secret?" asked Skip.

Barb, comfortably situated on a nice log and eating a sandwich, smiled at him and said, "Let's see what you're using. Here's part of the problem. This pond is full of panfish, but you're using equipment for whales. Your rod, reel, and line are way too big for these fish. Try a lightweight rod. It will act as a spring and keep your line from snapping if a big fish is pulling on it. Replace your thick, heavy fishing line with 6-pound test line. Lighter line will help you cast farther and more accurately with light-weight panfish tackle."

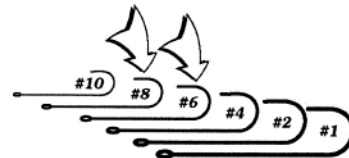
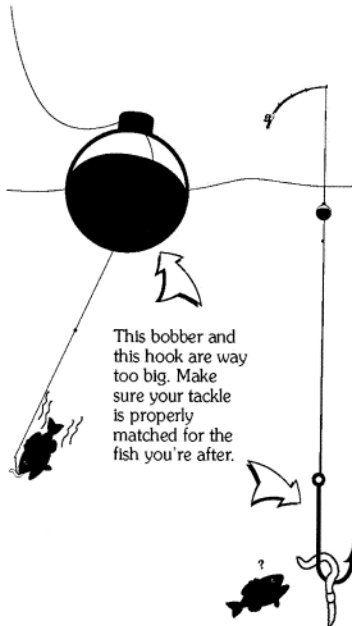
"Take off that huge sinker and just use a small split shot," suggested Jack. "That way a fish will be able to wiggle the line when it starts nibbling on your worm. Also, look at the mouth on this bluegill I just caught. It'd be pretty tough for this fish to get its mouth around that shark hook you're using. Try a #8 hook so a fish can grab the whole bait and not just nip the worms off your hook. It is also easier to hide a small hook with a worm."

Skip was catching on. "I'll bet my bobber should be smaller too, so it will actually move if a fish is pulling on the bait."

Get Organized!

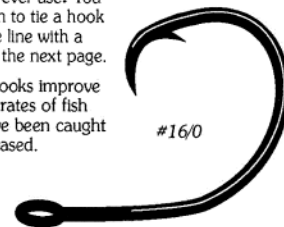
Attach a **small bobber** to the line above your sinker by pushing down on the button and clamping it to the line. The distance between the hook and the bobber determines how deep you fish. To change the depth of your bait, change the position of your bobber. If your bobber sinks, either it has a leak or you need to put on a smaller sinker. The bobber will move or go under water when a fish is biting.

Hooks are numbered by size. The smaller the number, the bigger the hook until you get to Zero. There are no Zero size hooks or negative numbers, but there are the 0's, pronounced "oh" or "naught". So you have 01, 02, 03, etc. with the numbers getting bigger along with the hook.



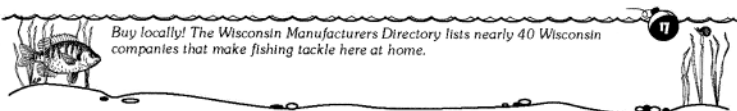
A hook like the one in this picture would be good to use; it's the size of a No. 8. A No. 6 is bigger than a No. 8, but an 08 is bigger than an 06. Got it? It's better to buy a package of hooks of the same size that you will use, rather than a wide assortment with many hooks you aren't likely to ever use. You will learn to tie a hook onto the line with a knot on the next page.

Circle hooks improve survival rates of fish that have been caught and released.



Take care of your fishing gear and it will last a long time.

Sporting goods store owners want to help make sure you get off to a good start and can help you select the equipment that's right for you.



"Right!" said Barb. "Would you like to try using my pole and equipment for a bit?"

"That would be great. Thanks!" Skip cast out and a few minutes later was proudly holding a plump bluegill. "Hey, look at that; I'm catching fish! Being out with you guys is fun, but catching fish is a blast. Thanks for sharing your fishing secrets!" Skip gently removed the hook and released the bluegill back into the pond.

"Hey Skip," said his friends, "get out of the sun for a while."

Answer the following questions based on the story above:

- 1) List the fishing equipment that Skip, Jack, and Barb were using.
- 2) What did Skip need to change about his equipment? Why?
- 3) What bait were the kids using? What else could they have used?
- 4) What general tips about fishing can you learn from this story?
- 5) What hidden messages did you find?

Objectives

Tie at least one fishing knot.

Test knot strength.

Life Skills

Confidence

Evaluation

WI Academic Standards

Physical Education: B.4.1, 8.3.

Math: E.4.1, 4.3, 8.1, 8.2.

Hands On

These knots are excellent standard fishing knots. Teach the one you like best and encourage the anglers to learn the others, but don't try to teach them all at once. Use props anglers can easily see and hold onto. Once they succeed with the prop, have them try it with a snap swivel or hook.

Inquiry

Anglers test knots and determine which method of tying produces the strongest results.

Materials

Knot tying practice kits are available from the Tackle Loaner program and include shower curtain rings and cord.

For the knot testing activity, each angler needs a wooden peg-style clothespin, a screw eye, and fishing line. The leader will need a drill and a small drill bit.

Duration

30-60 minutes. Accomplished knot-tiers can help others or work on the puzzle on page 30 while the rest of the group catches up.

Note

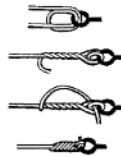
This is a good time to call on volunteers for help.

Tie a Knot - It's Easy!



Every angler has a favorite knot. Pick one knot and learn it so well you can tie it behind your back. Then try another.

Trilene®



The trilene has an extra loop in the hook eye.

For all knots, wet the line before securing the knot.

Anglers often keep a line clipper on a lanyard around their necks so they can quickly clip the line and change lures.



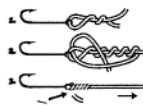
Better Knot

How strong is your knot?

Fishing line breaks at its weakest point, usually just above the knot. With a partner, conduct an experiment to find the ideal number of wraps to make a strong knot. This experiment works best with the improved clinch knot, but you can try it with others.

1. Each partner will need a knot tester. You can make a knot tester by twisting a small screw eye bolt into a wooden clothespin.
2. Draw a random number from the chart on page 19. This number is the number of times you will wrap your line on your first test knot. Your partner will draw a different number.
3. Each partner will tie one end of the same piece of fishing line to a knot tester with his or her knot using the random number of wraps.
4. Pull steady until one of the knots breaks. Record the number of wraps on the chart below and note the "wins" with a "w" in the little boxes. If the line breaks (not at the knot), record the trial as a draw.
5. Follow the instructions on page 19 to determine your next number. Do five trials.

Improved Clinch Knot



Palomar knot



In the Palomar knot, let the hook hang loose and tie an overhand knot in the doubled line - sort of like you're tying your shoe.

Name	Trial 1 Number of Wraps	Trial 2 Number of Wraps	Trial 3 Number of Wraps	Trial 4 Number of Wraps	Trial 5 Number of Wraps

Do more wraps mean a stronger knot? Why or why not?

Why would one knot break before another with the same number of wraps?

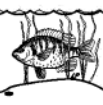
Why are experimental results more accurate when more trials are conducted?

Compile and graph all the data from your group. What is the winning number of wraps overall for the group? Which is the better knot?

Adapted from Go Fish IN, Indiana Division of Fish and Wildlife.



Line strength refers to the minimum weight at which line breaks. Old fishing line gets brittle and weak. Knots and nicks also weaken line, so active anglers replace their line often.



Test Your Knot

Random Number Chart

4	4	3	1	1	4	5	7	4	3	9	4
5	8	9	6	8	8	4	2	8	8	5	5
9	1	6	1	1	7	7	6	6	10	4	1
6	9	1	9	5	4	9	9	9	5	7	5
8	8	5	6	2	7	7	3	2	4	5	8
7	6	3	8	7	5	9	9	8	5	7	5
8	8	7	3	7	9	4	1	8	7	4	8
1	10	4	6	1	4	9	4	7	2	4	3
8	10	4	2	6	3	3	4	9	4	7	1
4	6	5	5	6	10	7	6	7	9	4	8
10	2	6	1	6	9	5	5	8	8	4	2
2	3	6	7	4	3	2	7	7	2	6	9
6	2	9	7	9	2	4	10	8	4	6	6
10	6	3	6	4	6	7	9	3	6	7	7
1	4	2	7	8	3	5	6	8	1	3	2
9	6	4	9	4	2	6	3	3	3	1	2
5	2	6	2	5	3	8	5	3	9	9	9
6	4	6	2	3	7	3	9	3	3	9	7
4	6	9	4	4	4	7	3	2	4	5	2
10	6	5	10	4	10	10	7	3	3	2	4

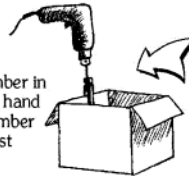
These numbers were selected randomly by a computer. Scientists use random numbers to eliminate bias, or the tendency to choose some numbers more often than others. Do you have a "favorite" number?

How to use the Random Number Chart

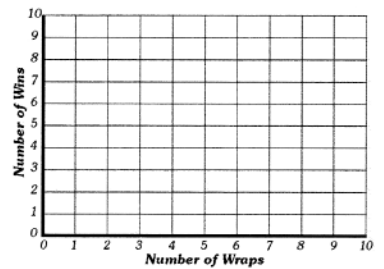
1. Close your eyes and point to a number on the chart.
2. Use that number in the first trial in your experiment.
3. Use the number below your first for your next trial and so on.

If you are at the end of a column, go to the top of the next column to the right.

If you are at the number in the very lowest right hand corner, go to the number in the very uppermost left-hand corner.



Better Knot



Better Knot Class Data and Column Chart

	Number of Wraps	Number of Wins
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

How to make a knot tester:

Materials

- 1 old fashioned-style clothespin for each student
- 1 metal screw eye bolt for each student
- drill
- 1/16" drill bit
- cardboard box

1. Use the cardboard box to hold the clothespins in place while you drill the hole.
2. Drill the pilot hole.
3. Twist the screw eye bolt into the pilot hole.

Adapted from *Go Fish IN*, Indiana Division of Fish and Wildlife.



Sturgeon were once so plentiful in the Mississippi River that they destroyed the nets of commercial fishermen. To deal with this problem, sturgeon were tossed on the sandbars of the river, allowed to dry and burned as fuel by riverboat pilots.

Objective

Learn to make and use inexpensive fishing equipment.

Life Skill

Resourcefulness

Materials

Listed at right, plus practice casting plugs or corks.

Measure the line by pulling six times on a spool of line. Six pulls, each the length of the average adult arm, is equal to about 30 wraps.

Duration

Allow at least 15 minutes to make the pop can rig, depending on how much help you have. Allow time to try out the rigs on the playground.

Resources

Borrow *Backyard Bass* fish targets from the DNR's tackle loaner sites.

Adapted from *Get in the Habitat!*, Minnesota Department of Natural Resources. "Pop" translates to "soda" in Wisconsin.

Make Your Own Equipment!

Pop Can Fishing

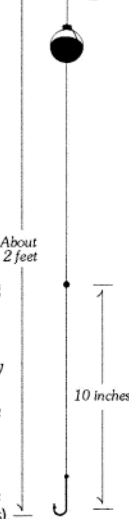
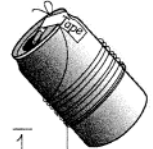
You don't need a lot of fancy or expensive equipment to fish. Once you learn how to tie a fishing knot and attach a split-shot sinker and bobber, you can make your own rig with an empty pop can.

To make a pop can rig, you'll need:

- An empty pop can
- Masking tape
- 6- to 10-lb. fishing line (30 wraps around the can is equal to about 6 arm's-length pulls from a spool of line)
- A hook
- Split-shot sinkers
- A bobber
- Fingernail clippers to cut the line

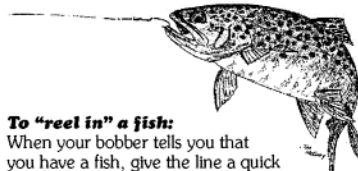
Build your pop can rig like this:

1. Tie the end of the line to the pull-tab, or around the can, with a knot.
2. Securely and smoothly tape the knot and fishing line near the top of the pop can. If the tape is crumpled, it will catch on the line. (You can also try it without the tape.)
3. Wrap the line around the pop can until you reach the last two feet of line.
4. Attach the bobber, split-shot sinker and hook (see page 16-17 for directions).



To cast your line:

1. Hold your finger on the line next to the bobber.
2. Swing your arm back for the wind up.
3. Bring your arm forward and release your finger from the line.
4. Don't let go of the can or you will be littering!
5. The rest of the line should unwind and follow.



To "reel in" a fish:

When your bobber tells you that you have a fish, give the line a quick jerk. Then wind the line around the can, keeping it tight until you can grab the fish.

Remember to recycle your pop-can rig when you finish using it. Aluminum is more valuable to recycling companies than any oil-based, plastic container. Mining and processing new aluminum are very expensive both financially and environmentally. Glass is the best choice for beverage containers, except on field trips.

Objective

Consider the variety of baits available.

Life Skill

Decision Making

WI Academic Standards

Art: E.4.3, 8.3.

Vocabulary

Minnow

Getting Started

There are possibly 10 times as many baits and lures as there are fish. Some are better at attracting humans than fish, but you never know until you rig up with your latest razzle-dazzle creation and give it a try. Remind anglers that fish have a keen sense of smell and don't like sunscreen or bug dope. Anglers should use the backs of their hands to apply any type of lotion.

Hands On

Anglers in Grade 6 and up can make their own lures and jigs. See appendix for supply list and sources. Check any cautionary notes on use of paints.

Lure testing is best done outdoors. Cap off the ends of a rain gutter to make a trough. Fill it with water and watch the lure action as anglers line their creations through the water. Ready-made, store-bought lures are fun to watch, too.

A swimming pool is a good option if you have access to one. Assign a volunteer to bring along a swimming suit to don, if necessary, to retrieve lost lures.

Inquiry

Survey anglers at the local fishing hole to determine the most common bait.

Many anglers collect their own live bait or make their own lures. Interview a lure carver or fly-tier to find out why he or she does it.

Materials

Capped off rain gutter and water. See page 32 for jig painting supplies.

Baiting Your Hook

Be careful not to bait your hook with your finger!



Worms are a favorite fish bait. Dig for them in wet, rich soil. Keep worms fresh in a covered container with damp soil or shredded newspaper.



When fishing for catfish or bass, hook a whole worm in the middle, leaving the end free to wiggle.

For sunfish and other bait-stealers, hook bits of worms at the end.

Minnows used for bait are usually about one to three inches long. Put the hook through the very top of its back, just in front of the fin so that the minnow can swim. Buy minnows only from licensed Wisconsin bait dealers to help prevent the spread of viral hemorrhagic septicemia (VHS), a serious fish disease. You also may use minnows you catch yourself from the same place you are fishing.



It is illegal to dump minnows into the water; you might be introducing an exotic or spreading a fish disease. Nightcrawlers are a concern in Wisconsin woods where they are changing the ecology of the forest floor. Share your extra bait with another angler or throw it in the trash. Do not dump it in the water.

Keep your bait in the shade.

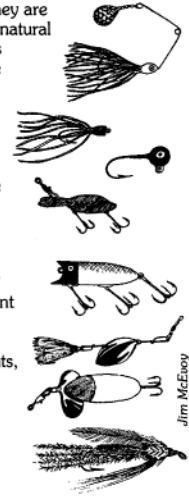


Dough balls are the best bait for carp. You can make them with flour, bread, cornmeal, or flaky cereal, dampened with water and honey. Press them into tight little balls around a fishhook, take off your bobber, and drop your bait to the bottom with a big sinker.



Grasshoppers and crickets are good summer baits you can find in fields and lawns. Slip the hook through the collar just behind their necks; this will keep them lively to attract a fish.

Artificial lures come in all sizes, shapes and colors. They are designed to resemble natural fish food, grab a fish's curiosity, or just make a fish mad enough to bite it. A good rule of thumb is to buy or make one lure at a time and perfect your use of that lure before getting more - unless you just like to collect things.



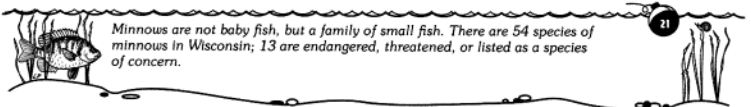
Jim McEnoy



Get artsy! You can paint your own lures. Some tackle shops sell special paints, blank jig heads and parts to make lures.



Is your bait legal? Not all baits and lures are legal everywhere or all the time. Check the fishing regulations to be sure. People are sometimes tempted to use crayfish for bait, but they're not legal in inland waters, so read those **regs!**



Duration

Two 45-minute sessions.

Web Connection

Freshwater Fishing Hall of Fame in Hayward, WI includes a museum filled with antique lures and fishing equipment. Visit their website at www.freshwater-fishing.org.

Please review current protocols for preventing the spread of VHS, on our web site. Go to dnr.wi.gov and search for VHS.

Resources

Wisconsin Fishing Regulations, DNR Publication #FH-301.

Note

Not all baits are legal to use at all times. For example, crayfish are legal to use in the Mississippi River but not in inland waters. Minnows are legal during the summer, but not for ice fishing on certain lakes. In some circumstances, only artificial lures and flies are permitted. Always check the regulations regarding bait before fishing.

The deadly fish virus, viral hemorrhagic septicemia (VHS) is not a threat to people who handle or eat fish. However, it can spread easily to healthy fish that eat infected fish or absorb water carrying the virus.

Objectives

Safely and accurately cast and reel in a fishing hook, lure, or practice plug.

Explain why it is important to properly dispose of fishing line and demonstrate how to do it.

Life Skills

- Safety
- Wise Use of Resources
- Concern for Others

WI Academic Standards

Physical Education: B.4.1, 4.3, 8.3, 8.4, D.4.1, 4.2, 4.3, 8.1, 8.3, F.4.1, 4.2, 4.4, 8.3.

Vocabulary

Recycling

Hands On

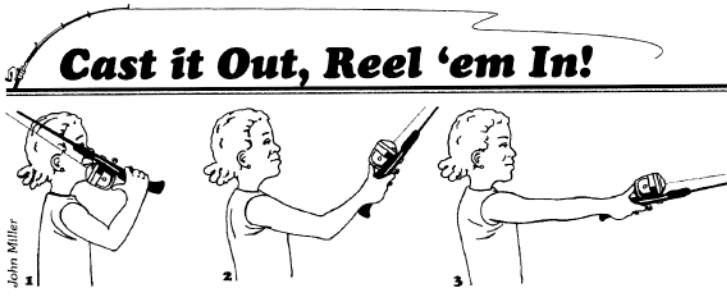
Through casting games, anglers learn that it is finesse, not brute strength, that makes a good angler. Set up a casting course with targets, mini-golf style, in the schoolyard or at a park. Or, keep it real simple and just line them up in any open area. The gym is a good rainy-day option.

Combine casting practice with fish identification by taping a picture of a fish to the back of the target. Anglers identify the fish when they reel them in. Assign a size and season to the fish and have anglers check the regulations to see if the fish is legal.

Inquiry

Anglers find out where they can recycle old line.

Cast it Out, Reel 'em In!



John Miller


Your rod, reel, and line are ready and your hook is baited. Now it's time to find out if the fish are hungry. Before you cast, look around you to make sure no one is nearby. Also, look behind for trees and bushes and above for power lines. Make sure your line isn't wrapped around the tip of the rod.

1. Press the button on your reel and hold it down.
2. Using wrist action (not your whole arm), gently bring the rod straight up over your shoulder.
3. Bring the rod forward and release the button.

Turn the crank forward until it clicks to keep more line from coming out. Reel your line in until your bobber moves; this takes up the slack. When a fish bites, jerk the line quickly to "set" the hook in the fish's mouth.

Don't get yourself in a tangle!

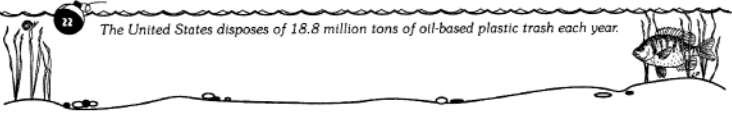
Loose line can trap and injure fish and wildlife. Recycle old fishing line. Some tackle shops collect it for recycling.



Shops near me that collect old line:

Companies that collect old line:

22 The United States disposes of 18.8 million tons of oil-based plastic trash each year.



Materials

- Rods
- Reels
- Casting plugs
- Fish targets
- Fish flash cards are all available at DNR Tackle Loaner sites. You may use almost anything for a target, but the Backyard Bass targets are fun to use. They are available to borrow at DNR loaner sites or to purchase at the Future Fisherman Foundation. See the Appendix for game and score sheet ideas.

Duration

45 minutes (minimum)

Web Connection

Check out the Future Fisherman Foundation: www.asafishing.org.

Note

Put snap swivels on for practice casting to avoid twisting the line. Pieces of garden hose cut with a hacksaw make great practice plugs.

Objective

Learn fish handling skills.

Life Skills

Choices
Observation
Problem solving

WI Academic Standards

Physical Education: F.4.1, 4.2, .4.4, 8.1, 8.3, 8.4.

Vocabulary

Catch and release
Bag limit
Sorting fish

Hands On

With a little luck, the fish will be biting and anglers will have the experience of reeling in fish.

Inquiry

Rusty Hooks

What happens to the hook when left inside a fish? Some people think that the stomach acids in the fish dissolve the hook or rust it out, but many fish have been caught with intact hooks still in them. Other people think the tissue around the hook deteriorates and the fish "coughs up" the hook once the barb loses its grip - much like a sliver works loose from your finger. Have anglers set up a "hook rusting" experiment by soaking different types of fish hooks in different substances, e.g. vinegar, tomato juice, etc. and form their own conclusions. Use pH test strips to compare acidity.

Materials

WI Fishing Regulations
Fishing Ruler
Recommended Instructor Gear:
Protective fillet glove for cleaning demonstration and hook removal.
Jaw spreaders
Needle-nose pliers
Clippers
Forceps
Hemostat

I Have a Fish! I Have a Fish!

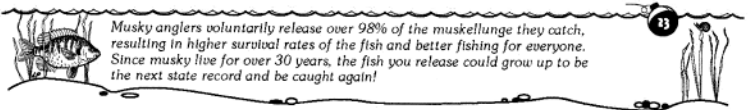
What do I do now?

Slowly reel in the fish, keeping your line tight and your rod tip pointed at the sky. When the fish is close to shore, use a net to scoop it up or lift the rod and gently grab your catch under its belly. Be careful to grasp the fish so its fins lie flat.

Hold the fish under its belly and use a needle-nose pliers to gently remove the hook. If you can't see the hook, cut the line. Sometimes a special hook remover is handy for deeply hooked fish.

Use barbless hooks to reduce the chance of injuring fish. You can buy them or make your own by filing down the barb or pinching it shut with a pliers.

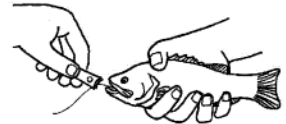
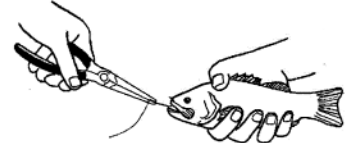
The longer you keep your fish alive, the fresher it will be to eat. Thread a **stringer** under the chin and through both lips. Then, tie the other end to a low branch to let the fish swim in the water. You can also put fish in wire baskets and plunge them in the water, or keep them in an ice chest in the shade.



Musky anglers voluntarily release over 98% of the muskellunge they catch, resulting in higher survival rates of the fish and better fishing for everyone. Since musky live for over 30 years, the fish you release could grow up to be the next state record and be caught again!

Catch and Release?

Is the fish big enough to keep? Are you and your family going to eat it? If not, gently slip it back into the water as quickly as you can. If the fish is deeply hooked and not of legal size, cut the line. **Wet your hands** before handling fish so you don't remove too much of the fish's protective slime.



Measure fish from the tip of the nose to the tail. Any fish you do not immediately release counts toward your daily bag limit, even if you release it later. Remember that it is illegal to sort fish; that is, to exchange a smaller fish on the stringer with a larger fish you catch later.

Hook Rusting Test:

Common acidic liquids (tomato juice, vinegar, cola)
Cups
pH test strips
Hooks made of different metals

Duration

30 minutes (minimum) depending on the cooperation of the weather and fish and your proximity to water.

Note

Debate continues as to whether fish are sentient creatures and, if so, at what level. Some anglers will be highly sensitive to this and should not be forced to fish or bait

hooks with live bait if it clashes with their beliefs. Alternate activities like sketching fish habitat or identifying aquatic plants will still get them outdoors and occupy them while the rest of the group fishes. For anglers and non-anglers alike, acknowledge that a life worthy of respect is being reeled out of the water, and remind them that none of us pass through life without affecting other species. If anglers keep their fish, ensure that someone eats it so that the fish is not wasted. If anglers release their fish, they should handle the fish gently.

Objective

Learn to identify likely fish holds.

Life Skill

Observation

WI Academic Standard

Science: B.8.4.

Vocabulary

Structure

Getting Started

Successful anglers take what they know about good fish habitat and cast their lines in spots most likely to harbor fish. It's not always on the other side of the lake, although it seems that way. What specific locations are good places to look for fish? Weather, season and structure are important factors in determining when and where the fish will be biting. Fish seek structure for food and protection. Deep water holes provide a sanctuary when they are not feeding.

Hands On

Remind anglers to be on the lookout for likely fish hangouts when they approach the water's edge. This is a good time to begin the journal writing exercise on the next page. Anglers can record or illustrate their observations of the fishing area.

Materials

Journals
Pencil
Fishing gear

Duration

Open-ended.

Resources

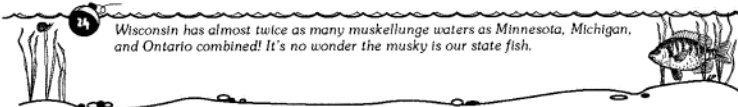
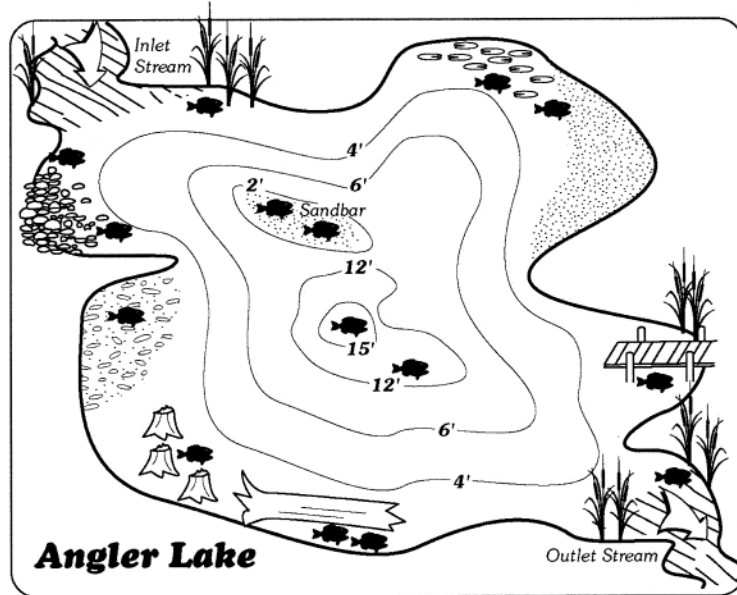
Waterproof *Lake Catch-A-Fish* lake map game by Fishing Hot Spots, Inc, 715/369-5555, Rhinelander, WI.

Reading the Water

What you see above the water provides clues as to what you might catch below. In fishing lingo, fish habitat is called "structure." Rocks, stumps, submerged trees, plants, drop-offs, points and riffles are all places where fish like to hang out. Breaks, or areas where the bottom changes - from weed to sand, sand to gravel - are popular with fish, too. Many fish like to cruise the weedline for a meal. In rivers,

fish rest out of the current in deep holes or behind rocks. Lake maps, available at tackle shops, can help you locate drop-offs and sandbars where fish congregate.

Docks also provide some structure, but too many big docks block the sunlight necessary for plant growth. Fishing clubs can work with the Department of Natural Resources to improve fish habitat and provide good structure.



Objective

Learn to record data and keep a journal.

Life Skill

Observing

WI Academic Standards

Language Arts: A.4.2, 4.3, 8.2, 8.3, B.4.1, 4.2, 8.1, 8.2.

Science: C.4.2, 4.5, 8.2.

Getting Started

Read excerpts from famous journals like the *Journal of Lewis and Clark* and discuss the importance of well-kept journals to science and history.

Duration

Allow 10 minutes for writing after each outing.

Hands On

Have anglers share excerpts from their own journals and expand selected entries into essays, illustrated stories, or poems. Tell a round-robin story where each student briefly adds from his/her journal to the previous contribution, building a whopper of a tale.

Web Connection

A listing of children's environmental literature can be found at dnr.wi.gov/EEK. Enter *Children's Literature* in the search field.

Take Note!



Many anglers keep a fishing log or journal to record their fishing memories. You can use a simple spiral notebook or a stylish hardcover journal. What you put down on the pages is what really counts. The

more detail you include in your journal the more valuable it will be to you as you learn which techniques work and which don't. Photos, illustrations, wildlife observations and notes about plants in bloom will make your journal more interesting to read in the future.

Fishing Log - Date: 8/14/2005

<i>Location: Green Lake - Blackbird Point & in front of church</i>	<i>Species: Largemouth bass</i>	<i>Yellow perch</i>
<i>Time: 6am</i>	<i>Size: 18"</i>	<i>7-10"</i>
<i>Temperature: 72°</i>	<i>Bait/Lure color: spinner</i>	<i>worms/yellow jig</i>
<i>Weather: Sky Partly Cloudy</i>	<i>Number: 1</i>	<i>8</i>
<i>Wind: SW, slight breeze</i>	<i>Method: casting</i>	<i>still-fishing</i>
<i>Precipitation: none, hard rain night before</i>	<i>Depth: 10'</i>	<i>5'</i>
<i>Water Color: greenish, lots of floating pollen</i>	<i>Structure: weeds</i>	<i>pier</i>
<i>Current: none</i>	<i>Bottom type: silty</i>	<i>sand, silt</i>
<i>Waves: calm</i>	<i>Stomach contents: crayfish</i>	<i>dragonfly nymph</i>

Other observations: jewelweed in bloom, lots of blackbirds, brother fell off pier and startled brood of ducklings.



Got a whopper to share? Send your fish tales to EEK, Environmental Education for Kids at EEK@dnr.wi.gov, and they'll get posted on the DNR's Web site.



The Wisconsin Phenological Society studies the "relationship between the stages of plant growth and animal life and physical factors of the environment, particularly weather and climate". Check out their Web site at www.naturenet.com/wisconsin/.

Objectives

Learn to fish safely.

List different uses of aquatic resources.

Explain how some uses might be in conflict with one another.

Propose solutions to user conflicts.

Life Skills

Choices

Cooperation

Empathy

Planning

Personal Safety

Critical Thinking

WI Academic Standards

Physical Education: F.4.1, 4.2, 8.1, 8.3, 8.5.

Vocabulary

Multiple use

Personal watercraft

Getting Started

Safety and courtesy go hand-in-hand on the water. Resource use conflicts and many mishaps can be avoided by being thoughtful resource users. Life jackets are usually not necessary for most shore fishing situations, but it's wise to wear one around deep or swift water. They are required in boats.

Hands On

Have anglers demonstrate safe fishing behaviors. Also have them consider, then role-play problematic and cooperative aquatic recreation situations. In round-robin fashion, discuss inappropriate behaviors shown in the illustration and suggest alternatives.

Inquiry

Some communities have enacted ordinances restricting motor usage to certain hours or banning them entirely. Have anglers investigate statewide rules and local ordinances regarding motors, wakes and noise on local or selected waters.

Safety & Courtesy Near the Water



Remember the rule for helping a drowning victim.
Reach with an object, Throw an object that floats, Row to the victim, Go get help.

NEVER jump in the water to help a person who is drowning.



Always fish with a **buddy**. Let an adult know where you'll be fishing and when you'll return.

Test the banks for stability and watch out for deep holes if you're wading in a stream. Most importantly, when in or near the water, wear a life jacket. Learn how to swim if water activities are a big part of your life. Check with your local Red Cross chapter for a list of organizations holding first aid and swimming lessons in your area.

If you are between the ages of 12 and 16 and you plan to operate a boat while fishing, you'll need to take a boating safety course. For more information, contact the DNR boating safety officer at 608/266-0859 or write Boating Safety, Department of Natural Resources, P.O. Box 7201, Madison, WI 53707-7201. You can also



check out the DNR Web site, dnr.wi.gov, and click your way to "Boating" for more information.

Be a good sport!

Many people use our lakes, rivers and streams in many different ways. What can people do to keep the outdoors enjoyable for everyone?



26 In the year 2000, over half the people who drowned while boating in Wisconsin were not wearing life jackets. With more than 575,000 boats registered in Wisconsin, safety and courtesy are important concerns.



Materials

Life jacket to demonstrate proper fit.

Duration

30 minutes, plus on-going reminders.

Web Connection

Check out the DNR web site for current boating safety course schedules: dnr.wi.gov/org/es/enforcement/safety/boated.htm. Also see www.boatsafe.com. For information on lake issues see www.uwsp.edu/cnr/uwexplakes.

Objectives

Learn to fish safely.

Be aware of basic first aid skills.

Life Skills

Planning

Personal Safety

Critical Thinking

WI Academic Standards

Physical Education: F.4.2, 8.3.

Getting Started

All fishing trips should be the basis for good memories. Common sense can prevent most mishaps, but this trait may still be under development. Frequent safety reminders are necessary during outings. Ask anglers what types of accidents and discomforts can occur while fishing. How can they be prevented?

Hands On

Have anglers demonstrate safe fishing behaviors.

Materials

First aid kit, including hydrogen peroxide – bring to every outing.

Duration

30 minutes, plus on-going reminders.

Note

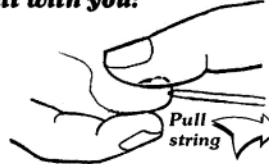
Pinch down barbs on hooks. It's safer for the kids and easier to practice catch and release.

First Aid for Anglers



One of the most common fishing accidents is getting stuck with a fish hook. If only the point of the hook is stuck, just pull it out. If the hook goes in past the barb, the wisest thing to do is to have a doctor remove it. If you are in a remote area, far from a doctor, have an adult remove the hook.

Here are some tips for the adult with you:



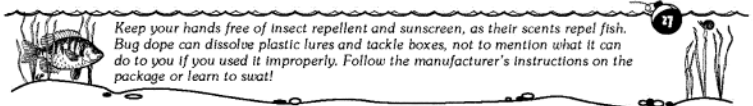
1. Promise to buy the patient a chocolate malt as soon as you get to town.
2. Loop a string around the shank of the hook.
3. Push down on the eye and pull the string straight out. The barb should come out the way it went in.
4. Flush the wound with hydrogen peroxide and advise the parents to have the child get a tetanus shot if he or she hasn't had one in the last 10 years (five, if the wound is particularly deep and dirty).

Most youth up to the age of 12 are protected against tetanus if they are up-to-date on their immunizations.



Watch out for the sun!

Be sure to apply sunscreen. Wear a long-sleeved, light-colored T-shirt, wide-brimmed hat and sunglasses to protect your skin and eyes from the sun's harmful rays. Remember that your body needs lots of **water** on hot days. Soda pop increases the loss of water from your body, so good old H₂O (plain water) is best.



Keep your hands free of insect repellent and sunscreen, as their scents repel fish. Bug dope can dissolve plastic lures and tackle boxes, not to mention what it can do to you if you used it improperly. Follow the manufacturer's instructions on the package or learn to swat!

Objective

Learn that fish is a healthy food choice when properly prepared.

Life Skills

Choices

Teamwork

WI Academic Standards

Social Studies: E.*4.2, *4.4, 8.2, 8.3.

Family & Consumer Education: A.1, A.2.

Vocabulary

Fillet

Getting Started

Ask anglers if they eat fish at home. How do they obtain the fish? Do they know where it comes from? How do their families prepare it? Encourage anglers to bring in family recipes.

Hands On

Adult leaders demonstrate cleaning and preparation, step by step. Teens can give cleaning a try with close supervision. Younger anglers can help with scaling and flouring or breading.

Materials

Fillet knife and pliers.

Ask volunteers to bring shore lunch supplies:

- Flour seasoned with salt and pepper
- Camp stove (two-burner preferred)
- Plastic bowl or bag for flouring fish
- Small paper plates
- Cooking oil
- Forks (optional, fingers are fine for tasting)
- Paper towel
- Frying pan (two)
- Fuel and matches

Fish for Dinner!

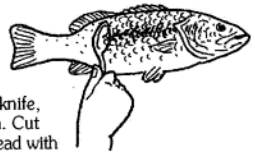
It's fun to learn to clean and cook your fish. Ask an adult for help and be careful with the knife. Keep cleaned fish ice-cold.

Scaling

For most fish, you'll want to remove the scales if they are not skinned.

To scale fish:

Hold the fish by its tail and scrape from tail to head with a fish scaler, butter knife, or tablespoon. Cut around the head with a sharp knife.



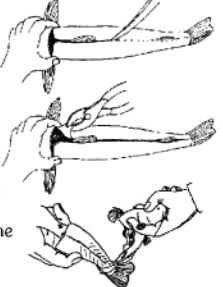
Remove the head and insides.

Skimming

Skin a fillet by placing it skin-side down on the cutting board. Start at the tail and keep a tight grip on the skin. With the knife at an angle, saw the flesh off the skin.



Catfish and bullhead have tough skins and you need a pliers to pull them off. First, cut around the head with a sharp knife, then pull the skin back with the pliers. Finally, remove the head and insides.



Filleting

Always cut away from yourself.

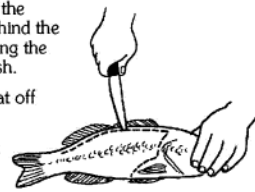
To make boneless fillets:

Cut down to the backbone behind the head and along the side of the fish.

Slice the meat off the bones.

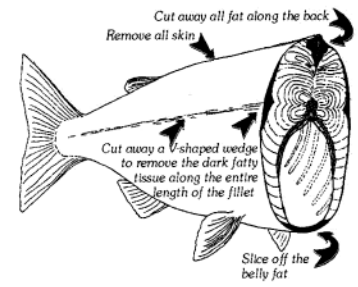
Turn the fish over and repeat.

The cheek meat just behind the eye is a delicacy in some households.



Proper Cleaning

Trimming fat reduces your intake of PCBs, which accumulate in fatty tissue. Mercury accumulates in muscle tissue, the part you eat, so limit your consumption. See next page for more details on mercury and PCBs.



16 Broiled fish is a healthy, low-calorie meal. A 3.5-ounce serving of northern pike is just 88 calories. There is also evidence that natural fish oil is good for the heart. Just go easy on the tartar sauce and drawn butter.

Duration

60 - 90 minutes for demonstration, cooking, eating, and cleanup.

Objectives

List three things anglers can do at home on a regular basis to reduce contamination of water resources and fish.

Life Skills

Choices
Healthy Lifestyle
Disease Prevention
Personal Responsibility

WI Academic Standards

Family & Consumer Education: A.2, D.1.

Vocabulary

Mercury
PCBs
Food chain
Bioaccumulation
ppm (parts per million)

Getting Started

Point-source pollution by early industries and municipalities left a lasting legacy in the rivers they used as sewers. Sewage treatment facilities and the Clean Water Act stopped most point-source pollution but the sediments remain. Current water pollution additions stem from non-point run-off and atmospheric deposition, adding to the toxic mix lodged in sediments. Discuss with anglers this history and what they can do to get us on a clean watercourse.

Hands On

Research origin and history of contaminants in the environment.

Materials

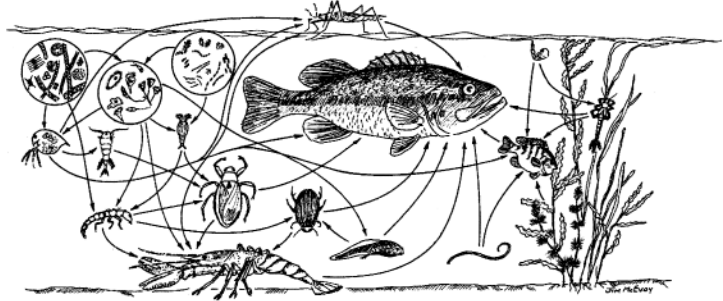
Choose Wisely - A Health Guide for Eating Fish in Wisconsin, DNR Publication #FH-824.

Duration

One session for reporting and discussion of research findings.

Hook into Healthy Fish!

Fish are part of complex food webs



Reel in the facts about mercury and PCBs in fish

Fish are fun to catch and good to eat. High in protein and low in fat, they're good muscle-building foods for growing bodies. But, it's possible to get too much of a good thing. Most fish in Wisconsin waters contain low levels of mercury. Some fish have higher mercury levels, plus polychlorinated biphenyls (PCBs), so care must be taken in preparing them for the table. The benefits of eating fish outweigh the health risks as long as you follow guidelines on how much fish to eat. See **Choose Wisely - A Health Guide for Eating Fish in Wisconsin**, DNR Pub-FH-824, to help you limit your exposure to mercury and PCBs, or check out our Web site at dnr.wi.gov.

Contaminants bioaccumulate (build up) in the food chain. Here's how:

- Contaminants enter the water.
- Small organisms absorb contaminants in the water.
- Small fish eat the contaminated organisms.
- Big fish eat small fish.



Polychlorinated biphenyls (PCBs) were used in the manufacture of electrical transformers, carbonless paper and hydraulic fluids. Though banned in 1976, PCB-laden sediments are still found in the Great Lakes and rivers that served as industrial sewers.

Turn off the light!

Mercury is released into the air by coal-fired power plants, and it drops back down into our lakes and streams.



Pull the plug!

Quick-start or "instant-on" appliances continuously draw current or use electricity.

Leaving on lights and unnecessary appliances not only wastes energy, but increases the risk of mercury contamination. What else can you do to help limit mercury in the food chain?

Turn in mercury-containing items like old thermometers to local hazardous waste collection sites and use newer alternatives.

Web Connection

dnr.wi.gov/eeek/. Enter mercury in the search field.

Objectives

Learn ways that fish habitat can be changed.

List at least two things individuals can do to protect fish habitat.

Life Skills

- Awareness
- Responsible Citizenship
- Wise Use of Resources
- Community Service

WI Academic Standards

Family & Consumer Education: A.2, D.1.

Vocabulary

- Pollution
- Run-off
- Non-point pollution

Hands On

Encourage anglers to complete this puzzle at their leisure or use as a rainy-day activity. Anglers who have accomplished knot tying can work on it while the rest of the group catches up.

Storm-drain Stenciling

provides a community service experience that helps to increase water quality issue awareness. Contact the DNR Water Action Volunteer program office at 608/264-8948 or call your local UW-Extension office for information on obtaining storm-drain stenciling kits. Other action projects include litter patrols, habitat improvement projects, and letter-writing campaigns advocating for healthy fish habitats.

Duration

Allow at least two hours for the storm-drain stenciling option. You can turn it into a half-day adventure, depending on how far you range from your site.

What Can You Find in a Lake?



A Pollution Solution

You never know what you'll catch in **this** lake! It's been littered and polluted with things that could harm native fish and wildlife. Fish out (circle) the words and draw a line through the ones that should not be in the water.



FERJPRETAWMASK
 REPPHSSARGPQA
 ECOGTBSCHOOKSA
 EXLDHIKPBDSVZS
 LNEJNCATFISHTE
 FYCKFFCBIMQSUL
 IEENLLABHGUODT
 SRWESOSOBASSWT
 HUKXOATBLOKECOAT
 GBBOATRBUHTPMBSR
 LTLLPGNEEELFROGA
 WIHTSRGRGKITOADS
 OPTIRESMINNOWPCH
 BNFCGETTLXEEYCA
 ITPAPERKLURESXN
 OIMNOIEIOITWESS
 BTKSHOEFWE
 HEISLPGTUN

Words to find

- Bait Minnow
- Bass Oil
- Bluegill Paper
- Boat Pole
- Bobber Reel
- Bottles Rod
- Cans Shoe
- Carp Sinker
- Catfish Ski
- Coat Soap
- Dough ball Tires
- Fish Toads
- Float Trash
- Frog Tree
- Grasshopper Water
- Hooks Wire
- Line Worm
- Lures

Thanks for helping to clean up Mixed Bag Lake! You've made it a better place to fish.

The Department of Natural Resources tries to protect habitat for all animals, but needs your help. Since we all need clean air and water, healthy food, safe shelters, and space to run, protecting habitat is a good idea for everybody.

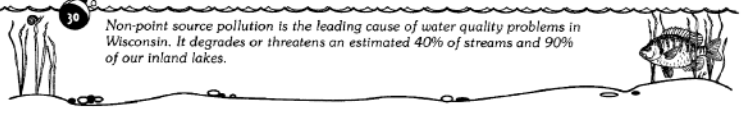
People also change habitat by damming rivers, building too close to the water, removing plants and logs that provide shelter, and polluting food and water supplies.

Sometimes natural disasters like floods, droughts, and fires change a fish's habitat faster than a fish can change (adapt) to survive in those new conditions. When this happens, fish move away, fail to have offspring or die.

How is clean water part of your habitat?

Storm-Drain Stenciling

Educate your neighbors on ways to help keep local waters clean through the Storm-drain Stenciling program. Call the Water Action Volunteer program at 608/264-8948 or call your local UW-Extension office for stenciling kits.



Resources

Video, *Coon Creek's Contribution*, available from the DNR, Angler Education Program office.

Objective

Learn how to read the Wisconsin Fishing Regulations.

Life Skills

Responsibility
Wise Use of Resources
Choices

WI Academic Standards

Physical Education: F.4.1, F.8.1, F.8.4.

Getting Started

As much as we try to simplify things, fishing regulations continue to befuddle the general public. It's important for anglers to understand how to read the regulations as well as understand why they exist.

Hands On

Help demystify the regulations through quiz games. This encourages (okay, it forces) anglers to at least page through those regs. Sample questions are provided to get you and your group started; clues to finding the answers for the first four questions are provided for you.

True or False? Motor trolling is permitted on the Fox River in Outagamie County. To find the answer, anglers learn that the regulations booklet is divided, in part, by counties.

In what years did the Lake Superior Chippewa Tribes cede 22,400 square miles of northern Wisconsin to the United States? To find the answer, look under Ceded Territory towards the front of the regulations. This historical reference may prompt some interesting discussions about our state's past.

When can you fish for bullheads? To find the answer, look toward the back of the booklet under Open Seasons, Length Limits, and Bag Limits.

Regulations Quiz Bowl

Learn the regulations to avoid citations!

Wisconsin's diverse waters do not lend themselves to a one-size-fits-all approach to fishing regulations. Playing *Regulations Quiz Bowl* can help you become familiar with and understand the fishing regulations. In teams or as individuals, come up with statements or questions and have your fellow anglers page through the regulations booklet to find the answers. The team or individual that thinks they've found the answer raises a hand or rings a bell. When they give the answer, they also note where they found it. Here are some sample questions to get you started.

True or False? Motor trolling is permitted on the Fox River in Outagamie County.

In what years did the Lake Superior Chippewa Tribes cede 22,400 square miles of northern Wisconsin to the United States?

When can you fish for bullheads?

True or False? You can use gamefish for bait.

True or False? A warden may seize your boat if it was used in connection with a violation.

How many fish can an able-bodied 18-year-old keep in Greenfield Park on April 3?

What's the difference between possession limits and bag limits?

What's the size limit for snapping turtles?

What is the season for frogs?

How many pounds of clams can a person gather in a day?

The regulations booklet offers other interesting information besides do's and don't's, so take a look.

Remind the adults with you that if they help you cast or reel, they are fishing and need a license.

A Slippery Deal

Something's fishy about these fish facts! Solve the riddles; answers below.

1. If fish lived on land, which country would they live in?
2. Which fish can perform operations?
3. What is at the bottom of the lake and shivers?
4. Why are fish so smart?
5. What fish goes up the river at 100 mph?
6. What happens to frogs in a no-parking zone?
7. What's the difference between a fish and a piano?
8. Where do fish borrow money?
9. What fish has the lowest voice?
10. What kind of fish do you find in a bird cage?
11. Where do fish keep their money?
12. Where can you find the most fish?
13. What fish do kids build in their garages?

1. Finland!
2. The sturgeon!
3. A nervous wreck!
4. They live in schools!
5. A motor pike.
6. They get food away!
7. You can't tuna fish!
8. The loon shark!
9. The bass.
10. A perch.
11. In the river bank.
12. Between the head and the tail.
13. Co - corp.



Do fish "toot"? You bet your beans, but not for the same reason as mammals do! Most fish rely on their swim bladder to stay afloat. As they move up and down, they need to adjust air in their swim bladders to adjust to changing pressure. A duct from the swim bladder in some fish allows for release of excess gas.



True or False? You can use game fish for bait. To find the answer, look toward the front of the booklet.

You can take this lesson further by posing ethical dilemma situations for students.

Materials

Wisconsin Fishing Regulations
Bell (optional).

Duration

30 minutes.

Notes

With proper notice, Department of Natural Resources conservation wardens are available to discuss regulations with your group.

Instructors and volunteers need fishing licenses! If you have volunteers who do not wish to purchase fishing licenses, assign them to non-fishing tasks like knot tying or litter patrol. If they help anyone cast or reel, they are fishing.

Objective

Learn about other fishing options.

Life Skill

Preparedness

WI Academic Standards

Physical Education: A.4.1, 8.3.

Hands On

Painting jigs is a fun activity for middle school students. Be careful with paints, the heat gun, and lead jigs if you use them.

Materials

Blank spoons or jig heads

Special paint

Heat gun to set paint

Web Connection

dnr.wi.gov/eeek/. Enter *ice fishing* in the search field.

Several fishing organizations have websites.

Notes

Jig painting supplies are available at various local tackle shops and hardware stores.

Blank jigs

Reinke Bros. Inc.
3144 W. Greenfield Ave.
West Allis, WI 53214
414/383-5591

Jig molds

Proto Products
414/476-7359

Wet and dry paints

Fleet Farm and many combination tackle equipment-hardware stores.

The Angler Education office has a very small supply of fly rods and reels and fly tying vices if you'd like to give this a try. A few tackle loaner sites have ice fishing equipment.

More Fishing Opportunities

Ice Fishing

Fishing is hot when the lakes are cold!

Fishing doesn't have to stop when winter snaps an icy lid on Wisconsin lakes. Find out more about ice fishing and head out to the nearest ice shantytown! Contact the Angler Education office or any DNR Service Center and ask for *Ice Fishing - What to Know Before you Go*, Publication #FH-751, or contact the University of Wisconsin-Sea Grant for their publication, *Ice Fishing* by Warren Downs.



See EEK for more ice fishing information, dnr.wi.gov/eeek/.



**Thick and blue; tried and true.
Thin and crispy; way too risky.**

Fly-fishing - Poetry in Motion

Learning the graceful art of fly-fishing is a life-long commitment. It requires more specialized equipment and skill than spin-casting, and persistent anglers are rewarded. As in spin-casting, the more you fish, the more you learn about fish preferences and behaviors. You also learn to recognize good habitat when you see it and how you can help remedy problems. Several organizations are ready to help you take the next step and make your first cast with a fly rod.

We need your help!

Want to get involved in protecting Wisconsin's lakes and streams? Local conservation and environmental organizations abound throughout our state. Type in a topic on the World Wide Web and you'll be linked to any number of organizations that share your concern.

What Have You Learned?

Beginning Junior Angler (Grades 4-6)

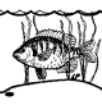
- Assemble basic tackle.
- Tie one fishing knot.
- Cast safely and accurately.
- Identify five species of fish and baits used to catch them.
- Know the name and function of three fins.
- List two fish adaptations.
- Know two fishing safety rules.
- State one fishing regulation and know where to look for more.
- Describe good fish habitat.
- Describe two traits of an ethical angler.

Advanced Junior Angler (Grades 7-8)

- Assemble basic tackle.
- Tie two fishing knots.
- Cast safely and accurately.
- Identify at least 10 species of fish and baits used to catch them.
- Know the names and functions of six fins.
- List seven fish adaptations.
- State three fishing regulations and know where to look for more.
- Describe good fish habitat.
- Describe how fishing is important to Wisconsin.
- List four threats to fish habitat and some possible solutions.
- Describe four traits of an ethical angler.



Walleye are anglers' favorite targets, but panfish are the most frequently caught species.



Appendix

About this Booklet

We hope you find these materials fun and easy to use. The student guide mirrors the instructor guide to help you stay together, and it gives you the answers! Alert the kids to these special icons:



Hands On! There is a special project, activity, or task involved.



Web Connection.

Learn more about the topic on the web.



Fishing Tackle. Add an item to the angler checklist.



Writing Activity.

Sharpen the pencil; there's writing involved!

To avoid clutter, not every icon is shown in all the lessons. Obviously, baiting hooks, casting, and reeling are hands-on activities, but the pages could get busy with all those icons.

Getting Started

Whether you're a camp director, fishing club leader, or a classroom teacher you'll want to embark on this adventure with other capable adults to help you. You'll need chaperones, people to gather materials, and people to share their expertise. The ratio of adults to youth depends on the activity and the age of participants. For activities around water, a maximum of five youth to one volunteer is

recommended. A similar ratio is recommended for knot tying instruction. Most formal educators have built-in requirements for chaperones. The Department of Natural Resources asks non-formal educators to follow standard youth development practices and always have at least two adults present. This will help to ensure child safety and protect

the reputations of the instructors as well as improve logistics.

Some of activities will be done as a group while others will be done individually. See the instructor manual for additional teaching tips and requirements.

Send out a note like this one to get parents or other volunteers to help.

Hello!

We are starting a unit on fishing and could use your help in the classroom with _____ on _____.

We are in need of chaperones for a field trip to _____ on _____.

We need someone to pick up equipment from the DNR tackle loaner site at _____ on ____/____/____ and review it to ensure that it is in proper working order. We also need someone to return the equipment in good working order by _____.

It would be great if someone could assemble these supplies for our knot tying practice session:

We need one for each student.

Eyebolt, shower curtain ring, or shark hook to simulate hook.

One 30" piece of nylon cord with ends fused.

Borrow knot-tying practice kits from DNR tackle loaner sites or recruit a volunteer to make a kit for your group.

Have a volunteer bring in fish fry supplies or have anglers sign up for these various items:

Flour seasoned with salt and pepper
Camp stove (two-burner preferred)
Plastic bowl or bag for flouring fish
Small paper plates

Cooking oil
Forks (optional, fingers are fine for tasting fish)
Paper towel

Frying pan
Fuel
Matches (leader brings)

Backyard Bass

Game Plans

Kids and adults have fun while improving their casting skills.

Practice casting independently.

Have a "tournament" between groups of two to four anglers.

Use the targets to play fish identification games and to teach about fishing regulations.

Supplies

A minimum of three fish for each group of two to four anglers.

One fishing pole for each angler.

One casting plug for each angler. Do not play this game with real hooks!

Set-up

These fish float, so you can practice casting in a lake or swimming pool as well as on dry land.

If playing on land, determine your boundaries and mark them with flagging or cones.

Set up fish and scoring like a mini-golf course.

Assign points to each fish based on distance or difficulty of cast.

Who won?

You decide. Use these suggestions or make up your own rules. Or, skip the contest format altogether and just focus on learning a new skill.

The winner can be the person who:

is first to catch a fish.

has the most points after all the fish are caught.

catches the fish placed in the most challenging position.

catches the most fish.

took the least number of casts to land the most fish.

Be Safe!

Be aware of your surroundings when casting. Always use caution, and never cast at people, pets, or objects that could be damaged. And, NEVER use hooks with Backyard Bass.

More Ideas!

Fish Identification: Tape pictures of fish to the backs of the targets for anglers to identify when they reel them in. Award points for correct answers. Use pictures from DNR's publication, *Wisconsin Fishing*, #FH-500 or *Wisconsin Wildcards*, #FH-923.

Fishing Regulations: On a strip of masking tape list a date and a size for the fish pictured. Anglers have to check the regulations to see if that fish is legal to keep. On the back of the target, tape true or false questions that anglers should be able to answer to fish in their area.

Backyard Bass™ is a product of Ironwood Pacific, Inc.



Backyard Bass

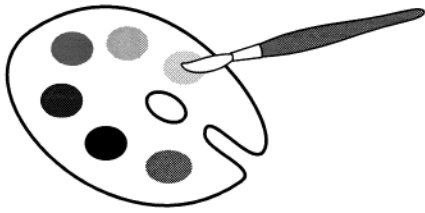
Sample Scoresheets

Fish/Name				
Orange 15 points				
Blue 10 points				
Yellow 5 points				

Fish/Name				
Fish behind bush				
Fish by 2nd Base				
Fish by principal's car 5 points				

Fish/Name & number of casts per station				
Fish #1				
Fish #2				
Fish #3				
Total number of casts. Low score wins.				

Fish and Art



There are many ways to integrate art with angler education. One idea is to make class quilts depicting fishing adventures or habitat. Others include fabric storyscapes, paper mache' fish, sketching, and gyotaku, as described in the next column. Weave in the dramatic arts by having anglers role-play fish in their habitat or fishing ethics dilemmas.

Gyotaku

Pronounced, ghee you tah koo.

Gyo=fish taku=rubbing

The Japanese have been making "fish rubbings" for hundreds of years as an artistic expression and a means to record their catch. Traditional methods used rice paper and block printing ink. A more casual approach lends itself to t-shirts, pillowcases and dishtowels. Experiment with different media as you combine art, literature, and fish anatomy in a fun activity, indoors or out. The steps listed will get you started, and you will likely develop your own special technique. Anglers may enjoy hearing this tale before making their rubbings.

Once upon a time, a Japanese peasant caught a very beautiful silver fish in the lake on the grounds of the emperor's palace. As he was about to gather it up to take it home, he was astonished to hear the fish beg for its life. The fish, it seems, was actually the son of the emperor, transformed by a spell of an evil, ambitious priest. Moved to pity by the fish's plight, the peasant spared its life and asked how he could help. The fish knew that if his enemy, the priest, gazed upon his image, the evil spell would be broken.

"Take me home with you," the fish said, "and I will tell you what you can do."

At the peasant's home, the fish directed his benefactor to lay him upon a piece of rice paper. The peasant so obliged. Then as instructed, the peasant removed the fish. There remaining was a gleaming print of the fish, dazzling and perfect in every detail! The fish then told the peasant to take this print to the emperor, who loved all things beautiful and artistic. The emperor was so pleased with the gift that he rewarded the peasant handsomely and hung the print in the palace. In due time the ambitious priest came to the palace. One day he paused before the fish's portrait. In an instant the prince was restored, stood before the evil priest, and vanquished his enemy.

—Japanese folk tale.

Gyotaku Instructions

Materials Needed for Gyotaku

Rice paper or fabric upon which to make your prints

Non-toxic permanent ink

Paint brushes

Newsprint

Paper towels

Cardboard

Iron to heat-set ink on fabric

Paper to protect your iron

Marking pens

Fish – real or rubber. If you use real fish you will also need:

Modeling clay

Stick pins

Preparing the Fish

1. Select a species with distinctive scales, such as carp or bluegill. Fresh fish can be frozen whole to be saved for this activity.
2. Wash an intact fish with soap to remove slime and grit, and pat it dry. If bodily fluids ooze out onto a print, assure students that it will all come out in the wash.
3. Soften small pieces of modeling clay and roll into snake-like shapes. Fit the clay under the fins to build them up to the level of the body, so everything lies relatively flat.
4. Use stickpins to keep the fins fanned out. You can remove the pins once the fins dry.
5. For a hungry-looking fish, put a tiny ball of clay in its mouth to keep it open.

Printing

Some methods leave the eye unpainted where the light would shine on a living fish. Some fish printers adorn the eyespot with a jewel or paint it bright yellow or orange.

1. Place pieces of paper towel under the fins and tail to cover the clay supporting them.
2. Paint a light coat of paint on the fish. Too much paint obscures the delicate scale pattern. Finish the paint application with a few backstrokes to lift the scales a bit.
3. Remove the paper towel and blot up any splattered ink, so you don't spoil your design.
4. Carefully lay a piece of paper or fabric over the fish. If you're printing a t-shirt, place your hands inside the shirt so it doesn't soak through to the other side.
5. Gently pat the fish, being careful to leave no scale untouched.
6. Lift the material off the fish and set it aside to dry.
7. Re-ink your fish for many more gyotaku.



After Printing

1. Students can draw in aquatic plants and label the fins.
2. Place clean paper over the fish print design and iron for a few minutes to set the ink.
3. If you haven't been working your fish for too long and have used non-toxic ink, you can wash your fish and cook it for supper!
4. If you used rubber fish, scrub them well before storing, or else the scales will be gummed up with paint for the next group that uses them.

Junior Angler Materials List

Divide this list amongst your volunteer team members to begin rounding up supplies for the program. Some items may appear more than once.

Fish On!

Magazines
Glue
Art supplies
Pencils

Fishing Villages

Art supplies
Telephone book
Tourism guide booklets

Head for the Water

Wisconsin State Highway Map
State relief maps

Hooray for Habitat!

*Fish Pictures
Shoebboxes
Magazines
Art supplies
Natural materials for creating dioramas

Living Room

*Fish *Wildcards*

Wetland Habitats

Sponge
Coffee filter
Doll cradle
Sleeping bag
Sieve
Cereal
Field guides
Paper and pencil

When a Plant Becomes a Weed

Gloves
Trash bags
Garden clippers

Friend in the Field

An Egg-citing Race

Game markers
Coin
Pencil
Paper

Fish Inside

Cardboard cutouts of a fish body and fins
Tape
*Fish *Wildcards*
Paper

Colored pencils for graphing

... and out

*Fish *Wildcards*
•Backyard Bass or other targets
*Wisconsin Fishing, DNR Publication #FH-500
*Wisconsin Fishing Regulations

Classified Information

*Fish *Wildcards*

Get Ready to Go Fishing!

Station props and labels:

- Line
- Bobber
- Sinkers
- Hooks
- Rod
- Reel
- Stringer
- Lure
- Plug
- Jig
- Plastic bags for hooks & sinkers
- Other tackle of your choice

Tie a Knot - It's Easy!

Knot tying practice kits:
Shower curtain rings
Cord
Wooden peg-style clothespins
Screw eyes
Fishing line
Drill
Small drill bit

Popcan Fishing

Aluminum can
•Practice casting plugs or corks
•Line

Bait Your Hook

Capped off rain gutter and water
Lures
Blank spoons or jig heads
Special paint
Heat gun to set paint

Casting

•Rods
•Reels
•Casting plugs
*•Fish flash cards or *Wildcards*
•Backyard Bass or other targets
Score sheets

I Caught a Fish!

*WI Fishing Regulations
*Fishing Ruler
•Fillet glove

- Jaw spreaders
- Needle-nose pliers
- Clippers
- Forceps
- Hemostat

Reading the Water

Journals
Pencils
•Fishing gear

Take Note

Journals
Pencils
Safety
Life jacket

First Aid

First aid kit
Hydrogen peroxide

Fish for Dinner

Fillet knife and pliers
Shore lunch supplies:
Flour seasoned with salt and pepper
Camp stove (two-burner, preferred)
Plastic bowl or bag for flouring fish
Small paper plates
Cooking oil
Forks
Paper towel
Frying pan (two)
Fuel and matches

Hook into Healthy Fish

**Choose Wisely - a Health Guide for Eating Fish in Wisconsin.*
DNR Publication #FH-824

What Can You Find in a Lake?

Pencil

Regulations Quiz Bowl

*Wisconsin Fishing Regulations
Bell (optional)

More Fishing Opportunities

Blank spoons or jig heads
Special paint
Heat gun to set paint
*12 Fly rods
*12 Fly tying vices
•Ice fishing rigs (available at a few sites)

* Available from the Angler Education Office
• Available from most DNR tackle loaner sites

WET and WILD about FISH!

Several water education programs complement the Angler Education program. Aquatic Project WILD and Project WET (Water Education for Teachers) are two programs that especially support the themes of Angler Education. Both consist of activity books that are distributed through teacher training workshops. Both programs are administered by the Bureau of Communication and Education of the Department of Natural Resources. Projects WILD and WET activities that correlate to Junior Angler activities are listed below. Page numbers are based on the 2004 edition of Project WILD and the 2003 edition of Project WET.

Fishing Villages

WILD: p. 85 Net Gain, Net Effect
p. 91 Watered Down History
WET: p. 223 .. Color Me a Watershed

Head for the Water!

WILD: p. 29 ... Aqua Words
p. 91 ... Watered Down History
p. 132 . Watershed
p. 190 . Living Research: Aquatic Heroes and Heroines
WET: p. 129 . Branching Out
p. 223 .. Color Me a Watershed
p. 367 .. Choices and Preferences, Water Index

Hooray for Habitat!

WILD: p. 19 Designing a Habitat
p. 43 Hooks and Ladders
p. 170 .. To Dam or Not to Dam
WET: p. 322 .. Macroinvertebrate Mayhem

Living Room

WILD: p. 166 .. Where Have All The Salmon Gone?

Wetland Habitats

WILD: p. 39 Wetland Metaphors
p. 184 .. Dragonfly Pond
WET: p. 129 . Branching Out
p. 133 .. Capture, Store, and Release
p. 212 .. Wetland Soils in Living Color

Shoreland Homes

WILD: p. 52 Blue Ribbon Niche
p. 118 .. Riparian Retreat
p. 184 .. Dragonfly Pond
WET: p. 267 .. Sum of the Parts

Alien Invasion!

WILD: p. 61 Sockeye Scents
p. 163 .. Aquatic Roots

When a Plant Becomes a Weed . . .

WILD: p. 31 Water Plant Art
p. 163 .. Aquatic Roots

Friends in the Field

WILD: p. 190 .. Living Research: Aquatic Heroes and Heroines
WET: p. 360 .. Wet – Work Shuffle

An Egg-citing Race!

WILD: p. 43 Hooks and Ladders
p. 176 .. Silt: A Dirty Word

Fish Inside and Out

WILD: p. 56 Fashion a Fish
p. 61 Sockeye Scents

Classified Information

WILD: p. 8 Fishy Who's Who
p. 56 ... Fashion a Fish

Cast It Out, Reel 'Em In!

WILD: p. 128 .. Plastic Jellyfish

Take Note!

WILD: p. 174 .. Aquatic Times
WET: p. 19 Water Log

Hook into Healthy Fish!

WILD: p. 136 .. What's in the Air?
p. 140 .. What's in the Water?
p. 145 .. Something's Fishy Here!

What Can You Find in a Lake?

WILD: p. 132 .. Watershed
p. 128 .. Plastic Jelly Fish
p. 140 .. What's in the Water?
p. 145 .. Something's Fishy Here!
p. 155 .. The Glass Menagerie
WET: p. 12 Water Actions
p. 267 .. Sum of the Parts
p. 316 .. Humpty Dumpty

Wisconsin's Model Academic Standards

Junior Angler activities have been correlated to Wisconsin's academic standards to help facilitate the infusion of this program into the classroom curriculum. Correlating activities to standards is a subjective and challenging task. Interpretations of the standards and presentation of the activities may differ from one educator to another. Standards are listed with the most basic presentation of the activity in mind. Additional standards may be addressed through extensions and deeper investigations of issues related to the activities. Some of those additional standards are listed in the chart and noted with a *.

Standards have been paraphrased to provide a quick summary in a tight space. While every effort was made to preserve the intent of the standards, educators are advised to consult the complete standards available from the Department of Public Instruction, as needed. By utilizing the Junior Angler Program to its fullest, you will have addressed these academic standards with your students:

Art & Environmental Education

	Art Students Will:				Environmental Education Students Will:										
	E.4.3: Communicate basic ideas by producing popular images and objects, such as folk art, traditional arts and crafts, popular arts, mass media, and consumer products.	E.8.3: Communicate complex ideas by producing popular images and objects, such as folk art, traditional arts and crafts, popular arts, mass media, and consumer products.	H.4.1: Study the pattern and color in nature.	H.4.4: Create three-dimensional forms with paper, clay, and other materials.	H.8.4: Create three-dimensional models.	A.4.1: Make observations, ask questions, and plan environmental investigations.	A.8.2: Collect information from a variety of resources, conduct experiments, and develop possible solutions to their investigations.	A.8.3: Use techniques such as modeling and simulating to organize information gathered in their investigations.	B.4.4: List the components of an ecosystem, including the qualities of a healthy habitat.	B.4.5: Describe natural and human-built ecosystems in Wisconsin.	B.4.6: Cite examples of how different organisms adapt to their habitat.	B.4.10: Describe how they use natural resources in their daily lives.	B.4.11: List jobs in the community that result from or are influenced by processing and using natural resources.		
Fish On!															
Fishing Villages															
Head for the Water!															
Hooray for Habitat!															
Living Room															
Wetland Habitats															
Shoreland Homes															
Alien Invasion!															
When a Plant Becomes a Weed . . .															
Friends in the Field															
An Egg-citing Race!															
Fish Inside . . .															
. . . and Out															
Classified Information															
Tie a Knot - It's Easy!															
Baiting Your Hook															
Cast It Out, Reel 'em In!															
I Have a Fish!															
Reading the Water															
Take Note!															
Safety and Courtesy Near the Water															
First Aid for Anglers															
Fish for Dinner!															
Hook into Healthy Fish!															
What Can You Find in a Lake?															
Regulations Quiz Bowl															
More Fishing Opportunities															

Environmental Education continued

	Environmental Education Students Will:																			
	B.4.12: Determine the causes of different types of pollution.	B.8.2: Explain how change is a natural process, citing examples of succession, evolution, and extinction.	B.8.3: Explain the importance of biodiversity.	B.8.5: Give examples of human impact on various ecosystems.	B.8.6: Describe major ecosystems of Wisconsin.	B.8.8: Explain interactions among organisms or populations of organisms.	B.8.9: Explain how the environment is perceived differently by various cultures.	B.8.10: Explain and cite examples of how humans shape the environment.	B.8.11: Describe our society as an ecosystem.	B.8.15: Explain how people impact their environment through resource use.	B.8.19: Distinguish between point and non-point source pollution.	B.8.22: Identify careers related to natural resources and environmental concerns.	C.4.1: Identify environmental problems and issues.	C.4.3: Identify people and groups of people that are involved in the issue.	C.4.4: Identify some of the decisions and actions related to the issue.	C.8.1: Define and provide examples of environmental issues, explaining the role of beliefs, attitudes, and values.	C.8.4: Evaluate the credibility of information, recognizing social, economic, political, environmental, technological, and educational influences.	D.4.6: Develop a plan, either individually or in a group, to preserve the local environment.	D.8.5: Explain how personal actions can impact an environmental issue; e.g., doing volunteer work in conservation.	D.8.6: Develop a plan for improving or maintaining some part of the local environment and identify their role in accomplishing this plan.
Fish On!																				
Fishing Villages																				
Head for the Water!	•			•			•	•	•											
Hooray for Habitat!																				
Living Room																				*
Wetland Habitats		•	•	•	*	•					•		•	•	•	•				
Shoreland Homes								•		•										
Alien Invasion!																		•	•	•
When a Plant Becomes a Weed . . .																		•	•	•
Friends in the Field												•								
An Egg-citing Race!																				
Fish Inside . . .																				
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Reading the Water																				
Take Note!																				
Safety and Courtesy Near the Water																				
First Aid for Anglers																				
Fish for Dinner!																				
Hook into Healthy Fish!																				
What Can You Find in a Lake?																				
Regulations Quiz Bowl																				
More Fishing Opportunities																				

Family & Consumer Education

	Family & Consumer Education Students Will:			
	A.1. Introductory & Intermediate Level: Identify several contributions the family makes in meeting family members' needs for food, clothing, shelter, and economic resources; encouraging development of all family members throughout life; and improving conditions in the workplace, neighborhood, community, and world.	A.2. Introductory Level: Identify and give examples of continuing concerns of the family, such as what should be done to conserve natural resources.	A.2. Intermediate Level: Describe several significant, broad, continuing concerns of the family, such as what should be done to manage human and natural resources wisely in providing for the family's physical needs.	D.1. Introductory Level: Give examples of individual, family, and community action. D.1. Intermediate Level: Explain what it is to take informed, socially responsible action.
Fish On!				
Fishing Villages				
Head for the Water!				
Hooray for Habitat!				
Living Room				
Wetland Habitats				
Shoreland Homes				
Alien Invasion!				
When a Plant Becomes a Weed . . .				
Friends in the Field				
An Egg-citing Race!				
Fish Inside . . .				
. . . and Out				
Classified Information				
Tie a Knot - It's Easy!				
Baiting Your Hook				
Cast It Out, Reel 'em In!				
I Have a Fish!				
Reading the Water				
Take Note!				
Safety and Courtesy Near the Water				
First Aid for Anglers				
Fish for Dinner!	•	•	•	
Hook into Healthy Fish!		•	•	•
What Can You Find in a Lake?		•	•	•
Regulations Quiz Bowl				•
More Fishing Opportunities				•

Language Arts & Math

	Language Arts Students Will:								Math Students Will:							
	A.4.2:	A.4.3:	A.8.2:	A.8.3:	B.4.1:	B.4.2:	B.8.1:	B.8.2:	A.4.3:	B.4.2:	B.4.5:	E.4.1:	E.4.3:	E.8.1:	E.8.2:	F.4.5:
Fish On!																
Fishing Villages																
Head for the Water!																
Hooray for Habitat!																
Living Room																
Wetland Habitats																
Shoreland Homes																
Alien Invasion!																
When a Plant Becomes a Weed . . .																
Friends in the Field																
An Egg-citing Race!																
Fish Inside . . .																
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Classified Information																
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Baiting Your Hook																
Cast It Out, Reel 'em In!																
I Have a Fish!																
Reading the Water																
Take Note!																
Safety and Courtesy Near the Water																
First Aid for Anglers																
Fish for Dinner!																
Hook into Healthy Fish!																
What Can You Find in a Lake?																
Regulations Quiz Bowl																
More Fishing Opportunities																

Physical Education

Physical Education Students Will:

	● A.4.1: Select and participate regularly in physical activities for the purpose of improving skills and maintaining good health.
	● A.8.3: Explore personal interests in a variety of new physical activities both in and out of the physical education class.
	B.4.1: Demonstrate progress towards the mature form of all locomotor (movement) patterns and selected manipulative and nonlocomotor skills such as throwing, catching, and kicking.
	B.4.3: Acquire beginning skills in a few specialized movement forms such as dribbling and passing a basketball to a moving receiver or jumping and landing for height/distance using mature form.
	B.8.3: Demonstrate increasing competence in more advanced specialized physical skill.
	B.8.4: Explain how people can enjoy an activity if they are not gifted athletes.
	★ D.4.1: Experience positive feelings as a result of involvement in physical activity.
	D.4.2: Learn to enjoy practicing activities to increase skill competence.
	D.4.3: Celebrate personal successes and achievements as well as those of others.
	D.8.1: Feel satisfaction when engaging in physical activity.
	● D.8.3: Enjoy learning new activities.
	F.4.1: Follow activity specific rules, procedures, and etiquette with little or no reinforcement.
	F.4.2: Utilize safety principles in activity situations.
	F.4.4: Work independently and "on task" for short periods of time.
	F.8.1: Identify positive and negative peer influence.
	F.8.3: Make choices based on the safety of self and others.
	F.8.4: Consider the consequences when confronted with a behavior choice.
	F.8.5: Resolve interpersonal conflicts with sensitivity to rights and feelings of others; find positive ways to exert independence.

Fish On!

Fishing Villages

Head for the Water!

Hooray for Habitat!

Living Room

Wetland Habitats

Shoreland Homes

Alien Invasion!

When a Plant Becomes a Weed . . .

Friends in the Field

An Egg-citing Race!

Fish Inside . . .

. . . and Out

Classified Information

Tie a Knot - It's Easy!

Baiting Your Hook

Cast It Out, Reel 'em In!

I Have a Fish!

Reading the Water

Take Note!

Safety and Courtesy Near the Water

First Aid for Anglers

Fish for Dinner!

Hook into Healthy Fish!

What Can You Find in a Lake?

Regulations Quiz Bowl

More Fishing Opportunities

Science

	Science Students Will:																				
	A.4.5:	A.8.6:	B.4.1:	B.8.4:	B.8.6:	C.4.1:	C.4.5:	C.8.2:	E.4.3:	E.4.7:	E.8.6:	F.4.1:	F.4.2:	F.4.3:	F.8.1:	F.8.2:	F.8.5:	F.8.7:	F.8.8:	F.8.9:	
	When studying a science-related problem, decide what changes over time are occurring or have occurred.	Use models and explanations to predict actions and events in the natural world.	Use source books, texts, articles, journals, and various other sources to help answer science-related questions and plan investigations.	Describe types of reasoning and evidence used outside of science to draw conclusions about the natural world.	Explain the ways in which scientific knowledge is useful and also limited when applied to social issues.	Use the vocabulary of the unifying themes to ask questions about objects, organisms, and events being studied.	Use data they have collected to develop explanations and answer questions generated by investigations.	Identify data and locate sources of information including their own records to answer questions being investigated.	Develop descriptions of the land and water masses of the earth and of Wisconsin's rocks and minerals, using the common vocabulary of earth and space science.	Using science themes, describe resources used in the home, community, and nation as a whole.	Describe through investigations the use of the earth's resources by humans both in the past and current cultures, particularly how changes in the resources used for the past 100 years are the basis for the efforts to conserve and recycle renewable and non-renewable resources.	Discover how each organism meets its basic needs for water, nutrients, protection, and energy in order to survive.	Investigate how organisms, especially plants, respond to both internal cues (the need for water) and external cues (changes in the environment).	Illustrate the different ways that organisms grow through life stages and survive to produce new members of their type.	Understand the structure and function of cells, organs, tissues, organ systems, and whole organisms.	Show how organisms have adapted structures to match their functions, providing means of encouraging individual and group survival within specific environments.	Show how different structures both reproduce and pass on characteristics of their group.	Understand that an organism's behavior evolves through adaptation to its environment.	Show through investigations how organisms both depend on and contribute to the balance or imbalance of populations and/or ecosystems, which in turn contribute to the total system of life on the planet.	Explain how some of the changes on the earth are contributing to changes in the balance of life and affecting the survival or population growth of certain species.	
Fish On!																					
Fishing Villages																					
Head for the Water!																					
Hooray for Habitat!																					
Living Room		•			•	•															
Wetland Habitats									•	•	•										
Shoreland Homes																					
Alien Invasion!	•												•							•	•
When a Plant Becomes a Weed . . .	•												•							•	•
Friends in the Field																					
An Egg-citing Race!														•						•	
Fish Inside . . .												•			•						
. . . and Out												•				•					
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Tie a Knot – It's Easy!																					
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Reading the Water				•																	
Take Note!							•	•													
Safety and Courtesy Near the Water																					
First Aid for Anglers																					
Fish for Dinner!																					
Hook into Healthy Fish!																					
What Can You Find in a Lake?																					
Regulations Quiz Bowl																					
More Fishing Opportunities																					

Social Studies

	Social Studies Students Will:											
	A.4.2: Locate on a map or globe physical features such as continents, oceans, mountain ranges, and landforms, natural features such as resources, flora, and fauna; and human features such as cities, states, and national borders.	A.4.4: Describe and give examples of ways in which people interact with the physical environment, including use of land, location of communities, methods of construction, and design of shelters.	A.4.5: Use atlases, databases, grid systems, charts, graphs and maps to gather information about the local community, Wisconsin, the United States, and the world.	A.4.7: Identify connections between the local community and other places in Wisconsin, the United States, and the world.	A.4.8: Identify major changes in the local community that have been caused by human beings, such as a construction project, a new highway, a building torn down, or a fire; discuss reasons for these changes; and explain their probable effects on the community and the environment.	A.8.4: Conduct a historical study to analyze the use of the local environment in a Wisconsin community and to explain the effect of this use on the environment.	B.4.1: Identify and examine various sources of information that are used for constructing an understanding of the past, such as artifacts, documents, letters, diaries, maps, textbooks, photos, paintings, architecture, oral presentations, graphs, and charts.	B.8.1: Interpret the past using a variety of sources, such as biographies, diaries, journals, artifacts, eyewitness interviews, and other primary source materials, and evaluate the credibility of sources used.	E.4.2: Explain the influence of factors such as family, neighborhood, personal interests, language, likes and dislikes, and accomplishments on individual identity and development.	E.4.4: Describe the ways in which ethnic cultures influence the daily lives of people.	E.8.2: Give examples to explain and illustrate how factors such as family, gender, and socioeconomic status contribute to individual identity and development.	E.8.3: Describe the ways in which local, regional, and ethnic cultures may influence the everyday lives of people.
Fish On!												
Fishing Villages		•				•	•					
Head for the Water!	*	•	•			•						
Hooray for Habitat!												
Living Room												
Wetland Habitats		•			•							
Shoreland Homes					•							
Alien Invasion!				•								
When a Plant Becomes a Weed . . .				•								
Friends in the Field												
An Egg-citing Race!												
Fish Inside . . .												
. . . and Out												
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Take Note!												
Safety and Courtesy Near the Water												
First Aid for Anglers												
Fish for Dinner!												
Hook into Healthy Fish!									*	*	•	•
What Can You Find in a Lake?												
Regulations Quiz Bowl												
More Fishing Opportunities												

Referenced Resources and More

Angler Education Office Publications:

Please use the order form in your Instructor's Manual. If you need one, contact the Angler Education office at the number below.

You can **fax** your order form to us at 608/266-2244

or **mail it** to:

Angler Education, FH/4

P.O. Box 7921, Madison, WI 53707-7921.

If you need a form or have questions about your order, call 608/261-6431.

Program policy or content questions:

Contact program director in Madison at 608/266-2272.

Project WILD Office

608/264-6280 (Madison)

Project WET Office

608/264-6280 (Madison)

UW Sea Grant Institute Publications

608/263-3259 (Madison)

Department of Public Instruction

800/243-8782

<http://dpi.wi.gov>

State Youth 4-H Program

608/262-1536 (Madison, or contact your local UW-Extension Office)

Nasco

Borrow rubber fish for fish printing from our Tackle Loaner sites or buy your own from Nasco.
800/558-9595

Ironwood Pacific

Borrow Backyard Bass from our Tackle Loaner sites or buy your own from Ironwood Pacific.
800/261-1330

Carolina Biological Supply

800/227-1150

Fishing Equipment

The Future Fisherman Foundation is the educational arm of the American Sportfishing Association - the major tackle industry organization. Non-profit organizations can obtain access to discounts on equipment and educational supplies by registering their group on ASA's web site. Go to www.asafishing.org, click on FTLP and you'll be prompted to register. You'll receive confirmation several days later. **They also carry Backyard Bass and rubber fish.**

School Aquariums

There are laws regarding the keeping of game fish in aquariums. Schools are encouraged to purchase game fish from a licensed privately owned fish hatchery. It is important to keep the receipt on file. A list of private hatcheries is available from the Department of Agriculture, Trade and Consumer Protection (DATCP) in Madison.

If a class wishes to capture the fish themselves, they must obtain a scientific collector's permit from the DNR fisheries expert or biologist in their region. Undersized fish are allowed with a scientific collector's permit. Without a permit, any fish caught and kept must be taken in season, be of legal size, and count toward the teacher's possession limit. Fish raised in a school aquarium cannot be introduced or reintroduced into the wild without approval as it constitutes stocking without a permit. Disease and genetic dilution are the major concerns.

Aquaculture classes are advised to contact DATCP for further information, 608/224-5137.

Scouting Connections

See the Angler Education Instructor's Manual for correlations of Junior Angler activities to Boy Scout and Girl Scout merit badge requirements.

Angler Education Instructor's Manual

Please review your Angler Education Instructor's Manual. It contains important information on program certification, program format ideas, and general teaching tips.

What Have You Learned?

Beginning Junior Angler (Grades 4-6)

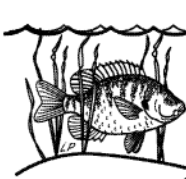
- Assemble basic tackle.
- Tie one fishing knot.
- Cast safely and accurately.
- Identify five species of fish and baits used to catch them.
- Know the name and function of three fins.
- List two fish adaptations.
- Know two fishing safety rules.
- State one fishing regulation and know where to look for more.
- Describe good fish habitat.
- Describe two traits of an ethical angler.

Advanced Junior Angler (Grades 7-8)

- Assemble basic tackle.
- Tie two fishing knots.
- Cast safely and accurately.
- Identify at least 10 species of fish and baits used to catch them.
- Know the names and functions of six fins.
- List seven fish adaptations.
- State three fishing regulations and know where to look for more.
- Describe good fish habitat.
- Describe how fishing is important to Wisconsin.
- List four threats to fish habitat and some possible solutions.
- Describe four traits of an ethical angler.

✓ Angler's Basic Checklist

- | | |
|--------------|---------------------|
| ✓ Tackle box | ✓ Pliers |
| ✓ Rod | ✓ Stringer |
| ✓ Reel | ✓ Sunscreen |
| ✓ Hook | ✓ Drinking water |
| ✓ Line | ✓ Snack |
| ✓ Sinkers | ✓ Hat |
| ✓ Bobber | ✓ Buddy or adult |
| ✓ Bait | ✓ Sunglasses |
| ✓ Lure | ✓ Safe place |
| ✓ Clipper | ✓ Good fish habitat |



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