

# Sources

## Fish Knowledge

### What makes a fish a fish?

#### Background Information

- Busch Gardens-Sea World, "Anatomy and Physiology of Bony Fish," [seaworld.org/animal-info/info-books/bony-fish/anatomy.htm](http://seaworld.org/animal-info/info-books/bony-fish/anatomy.htm) Accessed: December 2008.
- Kent Simmons, University of Winnipeg. "Perch Digestive System," [kentsimmons.uwinnipeg.ca/16cm05/16labman05/lb8content](http://kentsimmons.uwinnipeg.ca/16cm05/16labman05/lb8content) Accessed: December 2008.

#### Activity

- Adapted and expanded from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.

### Which fish is this?

#### Background Information

- Manitoba Fisheries, "Adaptations in Fish," [gov.mb.ca/conservation/sustain/adapt](http://gov.mb.ca/conservation/sustain/adapt) Accessed: December 2008
- Fish Base, [fishbase.org](http://fishbase.org) Accessed: December 2008.
- University of Wisconsin Center for Limnology, Wisconsin Department of Natural Resources, University of Wisconsin Sea Grant Institute, "Wisconsin Fish Identification Database," [wisfish.org/fishid](http://wisfish.org/fishid) Accessed: December 2008.

#### Activity

- Adapted from Ice Fish Cruise 2004 (a partnership of National Science Foundation, Raytheon Polar Services Corporation, and Northeastern University), "A Tree Made Out of Fish," [www.icefish.neu.edu/classroom/K12/14\\_up/treeoffish.pdf](http://www.icefish.neu.edu/classroom/K12/14_up/treeoffish.pdf) Accessed: December 2008.

## Fish Food

#### Background Information

- Fish Base, [fishbase.org](http://fishbase.org) Accessed: December 2008.
- Michigan Sea Grant, "Fish Habitat," [miseagrants.umich.edu/flow/unit3.html](http://miseagrants.umich.edu/flow/unit3.html) Accessed: December 2008.
- Sally Ellingboe, "Weave a Web" extension activity submitted to the Wisconsin Department of Natural Resources Angler Education Program.

#### Activity

- Adapted from Farallones Marine Sanctuary Association, "Coastal Ecosystem Curriculum: Food Web," [farallones.org/education/materials\\_and\\_resources.php](http://farallones.org/education/materials_and_resources.php) Accessed: December 2008. Used by permission.

## Water of Life

#### Background Information

- City of Boulder, Colorado and United States Geological Survey, "General Information on Dissolved Oxygen," [bcn.boulder.co.us/basin/data/COBWQ/info/DO](http://bcn.boulder.co.us/basin/data/COBWQ/info/DO) Accessed: November 2008. [gvsu.edu/videticp/stratification](http://gvsu.edu/videticp/stratification)
- Grand Valley State University, "Seasonal Lake Stratification," [gvsu.edu/videticp/stratification](http://gvsu.edu/videticp/stratification) Accessed: November 2009. [faculty.gvsu.edu/videticp/stratification.htm](http://faculty.gvsu.edu/videticp/stratification.htm)
- Water on the Web, [waterontheweb.org](http://waterontheweb.org) Accessed: November 2008.
- U.S. Geological Survey, "Water Resources of the United States," [water.usgs.gov](http://water.usgs.gov) Accessed: November 2008.
- WWF-World Wide Fund for Nature, [faculty.gvsu.edu/videticp/stratification.htm](http://faculty.gvsu.edu/videticp/stratification.htm) "Hot, Hungry, and Gasping for Air: Climate Change Puts Fish at Risk," [worldwildlife.org/who/media/press/2005/WWFPresitem819.html](http://worldwildlife.org/who/media/press/2005/WWFPresitem819.html) Accessed: December 2008.
- Terry Daulton and Dolly Ledin, Paradise Lost? Climate Change in the North Woods Exhibition, University Wisconsin—Center for Biology Education.

- “Understanding Lake Data” by Byron Shaw, Lowell Klessig and Christine Mechenich, University of Wisconsin-Stevens Point. Available on-line at [dnr.state.wi.us/lakes/publications/under/mixing](http://dnr.state.wi.us/lakes/publications/under/mixing) Accessed: November 2009.

### Activity

- Adapted from Inland Seas Education Association, “Lake Stratification,” [schoolship.org](http://schoolship.org) Accessed: December 2008. Used by permission.
- Additional ideas by Jenifer Wroblewski, West High, Madison, WI; Ansel Schimpff; and Theresa Stabo.

## Home Sweet Home

### Background Information

- Michigan Sea Grant, “Fish Habitat,” [miseagrant.umich.edu/flow/unit3.html](http://miseagrant.umich.edu/flow/unit3.html) Accessed: December 2008.
- Michigan Sea Grant, “Fish Life Cycle,” [miseagrant.umich.edu/flow/unit3.html](http://miseagrant.umich.edu/flow/unit3.html) Accessed: December 2008.
- Dan Hoffman, “Creating a Spawning Bed” art extension submitted to the Wisconsin Department of Natural Resources Angler Education Program.

### Activity

- Adapted from Keith Wittkopp’s “Aquatic Environment Brochure” submitted to the Wisconsin Department of Natural Resources Angler Education Program.

## People Knowledge

### To the Point

#### Background Information

- Purdue University, “Planning with Power,” [planningwithpower.org/pubs.htm](http://planningwithpower.org/pubs.htm) Accessed: December 2008.

#### Activity

- Adapted from National Oceanic and Atmospheric Association’s (NOAA) National Ocean Service Communication and Education Division, “Where’s the Point?” lesson plan, [oceanservice.noaa.gov/education/classroom/lessons/09\\_coastmanag\\_point.pdf](http://oceanservice.noaa.gov/education/classroom/lessons/09_coastmanag_point.pdf) Accessed: December 2008. Used by permission.

#### Shared Interests

### Background Information

- National Oceanic and Atmospheric Association National Ocean Service Education, “Get Smart” lesson plan, [oceanservice.noaa.gov/education/classroom/lessons/10\\_coastal\\_getsmart.pdf](http://oceanservice.noaa.gov/education/classroom/lessons/10_coastal_getsmart.pdf) Accessed: December 2008.
- Carleton College, “Starting Point Teaching Entry Level Geoscience,” [serc.carleton.edu/introgeo/roleplaying/whatis.html](http://serc.carleton.edu/introgeo/roleplaying/whatis.html) Accessed: December 2008.

### Activity

- Adapted and expanded from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.

## Aquatic Exotics

### Background Information

- Great Lakes Fishery Commission, [glfc.org](http://glfc.org) Accessed: December 2008.
- Great Lakes United, [glu.org](http://glu.org) Accessed: December 2008.
- Asian Carp Management, [asiancarp.org](http://asiancarp.org) Accessed: December 2008.
- National Atlas, “Zebra Mussels,” [nationalatlas.gov/articles/biology/a\\_zm](http://nationalatlas.gov/articles/biology/a_zm) Accessed: December 2008.
- Minnesota Sea Grant, “Aquatic Invasive Species,” [seagrant.umn.edu/ais/index](http://seagrant.umn.edu/ais/index) Accessed: January 2008.

### Activity

- Adapted from Inland Seas Education Association, “The Lamprey Are Here. Now What?,” [schoolship.org](http://schoolship.org) Accessed: December 2008. Used by permission.
- Sea Lamprey Control cost information updated by Marc Gaden, Great Lakes Fishery Commission, January 2008.

## Restoration Nation

### Background Information

- Trout Unlimited, [tu.org](http://tu.org) Accessed: December 2008.
- Washington Department of Fish and Wildlife, “Stream Habitat Restoration Guidelines,”

[wdfw.wa.gov/hab/ahg/shrg](http://wdfw.wa.gov/hab/ahg/shrg) Accessed: December 2008.

- Center for Watershed Protection's Stormwater Manager's Resource Center, "Stream Restoration: Bank Restoration Practices," [stormwatercenter.net](http://stormwatercenter.net) Accessed: December 2008.
- United States Fish and Wildlife Service and Montana Water Center, "Wild Fish Habitat Initiative," [wildfish.montana.edu](http://wildfish.montana.edu) Accessed: December 2008.

### Activity

- Background information for the Case Study from Trout Unlimited, [tu.org](http://tu.org) Accessed: December 2008) and from Marty Engel, Wisconsin Department of Natural Resources.
- Adapted and expanded from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.

## Taking Stock

### Background Information

- Al Kaas, Wisconsin Department of Natural Resources.
- The Garret Hardin Society, "Tragedy of the Commons," [garretthardinsociety.org/articles/art\\_tragedy\\_of\\_the\\_commons](http://garretthardinsociety.org/articles/art_tragedy_of_the_commons) Accessed: November 2009

### Activity

- Adapted from Habitat Media's "Empty Oceans, Empty Nets" lesson plans. Activity is a freshwater version of "Net Results" lesson plan. [pbs.org/empty\\_oceans/educators/index.html](http://pbs.org/empty_oceans/educators/index.html) Accessed: December 2008. Used with permission.

## Making Decisions

### Background Information

- Kurt Thiede, Wisconsin Department of Natural Resources.

### Activity

- Adapted and expanded from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.
- Additional ideas from Todd Shucha, "What Would You Do?" activity submitted to the Wisconsin Department of Natural Resources Angler Education Program.

## Great Conservationists

### Background Information

- Think Exist, [thinkexist.com](http://thinkexist.com) Accessed: January 2009.
- Quoteland, [quoteland.com](http://quoteland.com) Accessed: January 2009.
- Brainy Quote, [brainyquote.com](http://brainyquote.com) Accessed: January 2009.

### Activity

- Adapted and expanded from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.

## Field Knowledge

### Tackling Tackle

#### Background Information

- South Shore Fishing's Tackle Manufacturers' Directory, [southshorefishing.net/reference/tackle.htm](http://southshorefishing.net/reference/tackle.htm) Accessed: January 2009.
- Fishing Tackle in Wisconsin, [thomasnet.com/wisconsin/fishing\\_tackle\\_82491507.html](http://thomasnet.com/wisconsin/fishing_tackle_82491507.html) Accessed: January 2009.
- Take Me Fishing, [takemefishing.org](http://takemefishing.org) Accessed: January 2009.
- All About Fishing, [aa-fishing.com](http://aa-fishing.com) Accessed: January 2009.
- Judy Hunt, fishing chart recommendations submitted to the Wisconsin Department of Natural Resources Angler Education Program.
- Mike Shoys, Vice President, Wisconsin Manufacturers & Commerce

### Activity

- Adapted and expanded from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.

## Got Skills

### Background Information

- Grog's Fishing Knot Index, [animatedknots.com/indexfishing.php](http://animatedknots.com/indexfishing.php) Accessed: January 2009.
- Bruce Koellen, "Making Lures Work," activity submitted to the Wisconsin Department of Natural Resources Angler Education Program.

### Activity

- Adapted and expanded from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.

## Golden Rules

### Background Information

- Wisconsin Department of Natural Resources, "Guide to Wisconsin Hook and Line Fishing Regulations 2008-2009."

### Activity

- Adapted and expanded from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.
- Elizabeth Rhyner, "Will There Be Fish For Dinner Tonight?" activity submitted to the Wisconsin Department of Natural Resources Angler Education Program.

## Safety First

### Background Information

- Drowning statistics from Poseidon, [poseidon.fr/us/index.html](http://poseidon.fr/us/index.html) Accessed: January 2009.

- California Department of Boating and Waterways, [dbw.ca.gov](http://dbw.ca.gov) Accessed: January 2009.

### Activity

- Adapted and expanded from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.

## Reading the Water

### Activity

- Adapted and expanded from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.

## Fish Out of Water

### Activity

- Adapted and expanded from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.

## Cooking, Cleaning, and Companions

### Background Information

- Recipe from "These Are Fish, They Bite Sometimes," Maureen Mecozzi, et al., published by the Wisconsin Natural Resources Magazine, 1990, pg. 13.

### Activity

- Adapted and expanded from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.

## Glossaries

### Definitions

- Merriam Webster, [merriam-webster.com](http://merriam-webster.com)
- Biology Online, [biology-online.org](http://biology-online.org)

All lessons are based on background information from Wisconsin Department of Natural Resources, Master Angler Program, Theresa Stabo, et al., Outdoor Empire Publishing, 1991.

# Master Materials List

## Profile of a Swimmer

- Appendix A: Wisconsin's Game Fish

## What Makes a Fish a Fish?

- Fish Wildcards/Fish Field Guide\*
- Appendix B: Salmonid Dissection Guide
- Appendix B: Fish Anatomy Transparency
- Appendix B: Speaking Anatomically

## Which Fish is This?

- Appendix C: A Key to Common Wisconsin Fish
- Appendix C: Credits for Fish Drawings
- Appendix C: Fish Images
- Fish Wildcards/Fish Field Guide\*

## Fish Food

(One set for each group of four to six students.)

- Appendix D: Steady State? Game handouts
- Stopwatches
- Scissors (if materials are not pre-cut)

## Water of Life

- Appendix E: Field Trip Record sheet
- Distilled water
- Salt
- Three 400 ml glass beakers or pint-sized canning jars
- 25 x 200 mL tube with screw cap
- Large syringe
- Drinking straw
- Blue, yellow, and red food coloring
- A means to rapidly heat and cool water

## Alternate Demonstration Materials List

- Honey
- Vinegar
- Grape juice concentrate

- Salad or olive oil
- Herbs
- Pint-sized canning jar with lid

## Home Sweet Home

- Appendix F: Field Trip Record sheet
- A variety of travel brochures
- Research materials
- Computers

## To the Point

- Topographic map of your area\*
- Map and information about your local watershed
- Internet access or handouts

## Shared Interests

- Appendix G: Field Trip Record sheet
- Butcher paper or poster board
- Markers
- A local zoning map

## Aquatic Exotics

- Appendix H: PowerPoint Presentation: Invasive Images

## Restoration Nation

- Optional: Guest speaker

## Taking Stock

One set for each group of six students.

- Appendix I: Balancing Act Game handouts
- Open top containers
- Dried pinto beans (approximately one pound or 2 cups for each group)
- Graduated cylinders (250 ml or larger)
- Measuring spoon sets
- Cups
- Papers rolled into cones or funnel with large opening

• If you have downloaded this booklet, please see the appendix that follows for additional materials.

## Making Decisions

- Appendix J: Sample Resolutions
- Internet/computer access

## Great Conservationists

- Pencil

## Tackling Tackle

- Appendix K: Tackle Craft Instructions
- Appendix K: Tackle Craft Pictures
- Appendix K: Tackle Cue Cards
- Appendix K: Tackle Transparencies
- A wide sampling of tackle\*
- Tackle craft supplies
- A clear tank with water
- Fishing line

## Got Skills?

- Appendix L: Knot-testing Experiment
- Appendix L: Getting Rigged
- Rope for practice knots
- Eye bolts or shower curtain rings
- Hooks and fishing line\*
- A sampling of tackle\*
- Tires/hoops/Backyard Bass®\*

## Golden Rules

- Appendix M:  
A Key to Common Wisconsin Fish
- Appendix M: Fish images
- Appendix M: Fish Identification Cheat Sheet
- Scraps of paper
- DNR fishing regulations\*
- Three boxes or bowls

## Safety First

- PFDs
- Rods and reels\*

- Paddles
- Other skit supplies

## Reading the Water

- Appendix A: Wisconsin's Game Fish
- Lake chart for a local lake
- Fish reference books\* or Internet access

## Fish Out of Water

- Tackle\*
- PFDs
- Fishing licenses
- First Aid kit

## Cooking, Cleaning, and Companions

- Fillet knives
- Spoons/fish scalers
- Plastic bags/newspaper
- DNR's Choose Wisely guide\*
- First Aid kit
- Recipe supplies

## \* Materials Notes

- Fish Wildcards available from the DNR.
- *Fish of Wisconsin* by Dave Bosanko is a pocket-sized, inexpensive field guide.
- The Website [wiscfish.org](http://wiscfish.org) is an excellent tool for identifying fish and learning morphology.
- Maps of the state can be ordered for a low price from the Wisconsin Geological and Natural History Survey.
- Current Fishing Regulations and the *Choose Wisely* guide can be found on the DNR Website or wherever fish licenses are sold.
- A limited selection of tackle is available for classroom use through the Tackle Loaner program. Go to the DNR Website at [dnr.wi.gov/fish/kidsparents/loanerequipment](http://dnr.wi.gov/fish/kidsparents/loanerequipment) for more information.
- Backyard Bass® can be purchased from [ironwoodpacific.com](http://ironwoodpacific.com) or borrowed from many DNR tackle loaner sites: [dnr.wi.gov/fish/kidsparents/loanerequipment](http://dnr.wi.gov/fish/kidsparents/loanerequipment).

● If you have downloaded this booklet, please see the appendix that follows for additional materials.

## Environmental Education

Students will	Hook, Line, & Thinker: Science Guide								Hook, Line, & Thinker: Field Guide										
	What Makes a Fish a Fish	Which Fish is This	Fish Food	Water of Life	Home Sweet Home	To the Point	Shared Interests	Aquatic Exotics	Restoration Nation	Taking Stock	Making Decisions	Great Conservationists	Tackling Tackle	Got Skills	Golden Rules	Safety First	Reading the Water	Fish Out of Water	Cooking, Cleaning, & Companions
<b>A.8.1</b> Identify environmental issue questions that can be investigated using resources and equipment available											X								
<b>A.8.3</b> Use techniques such as modeling and simulating to organize information gathered in their investigations						X													
<b>A.8.4</b> Use critical-thinking strategies to interpret and analyze gathered information			X		X		X		X	X									
<b>A.8.5</b> Use the results of the investigation to develop answers, draw conclusions, and revise their personal understanding						X		X	X	X					X				
<b>A.8.6</b> Communicate the results of investigations by using a variety of media and logically defend their answers						X													
<b>A.12.1</b> Identify questions that require skilled investigation to solve current problems cited in literature, media, or observed through personal observations											X								
<b>A.12.3</b> Evaluate personal investigations and those of others, critiquing procedures, results, and sources of data and suggest improvements to the investigation						X		X		X	X								
<b>A.12.4</b> State and interpret results of their investigations to groups concerned with the issue										X					X				
<b>A.12.5</b> Communicate the results of their investigations to groups concerned with the issue						X					X								
<b>B.8.1</b> Describe the flow of energy in natural and a human-built ecosystem using the laws of thermodynamics			X	X															
<b>B.8.2</b> Explain how change is a natural process, citing examples of succession, evolution, and extinction	X	X		X															
<b>B.8.4</b> Map the levels of organization of matter		X	X	X															
<b>B.8.5</b> Give examples of human impact on various ecosystems						X	X	X	X										

# Environmental Education

## Hook, Line, & Thinker: Science Guide

## Hook, Line, & Thinker: Field Guide

### Students will

	What Makes a Fish a Fish	Which Fish is This	Fish Food	Water of Life	Home Sweet Home	To the Point	Shared Interests	Aquatic Exotics	Restoration Nation	Taking Stock	Making Decisions	Great Conservationists	Tackling Tackle	Got Skills	Golden Rules	Safety First	Reading the Water	Fish Out of Water	Cooking, Cleaning, & Companions
<b>B.8.6</b> Describe major ecosystems of Wisconsin					X														
<b>B.8.8</b> Explain interactions among organisms or populations of organisms	X	X			X	X		X											
<b>B.8.10</b> Explain and cite examples of how humans shape the environment			X			X	X		X	X									
<b>B.8.15</b> Analyze how people impact their environment through resource use						X	X	X	X	X									
<b>B.8.16</b> Recognize the economic, environmental, and other factors that impact resource availability and explain why certain resources are becoming depleted										X									
<b>B.8.17</b> Explain how human resource use can impact the environment; e.g. erosion						X	X		X	X									
<b>B.8.18</b> Identify major air, water, or land pollutants and their sources						X	X	X	X										
<b>B.8.19</b> Distinguish between point and nonpoint source pollution						X													
<b>B.8.21</b> Identify and analyze individual, local, regional, national, and global effects of pollution on plant, animal, and human health						X													
<b>B.8.22</b> Identify careers related to natural resources and environmental concerns									X	X									
<b>B.8.23</b> Identify governmental and private agencies responsible for environmental protection and resource management									X	X									
<b>B.12.1</b> Evaluate the relationship of matter and energy and the flow of energy in natural, managed, and built systems		X	X																
<b>B.12.2</b> Describe the value of ecosystems from a natural and a human perspective		X	X	X						X									
<b>B.12.3</b> Evaluate the stability and sustainability of ecosystems in response to changes in environmental conditions		X	X					X	X										

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<b>B.12.4</b> Analyze the factors that determine the number of organisms that can exist in a given area			X	X	X			X											
<b>B.12.5</b> Analyze past and current trends in ecosystem degradation and species extinction	X					X	X	X	X										
<b>B.12.6</b> Predict population response to changes in environmental conditions			X	X					X										
<b>B.12.8</b> Relate the impact of human activities in ecosystems to the natural process of change, citing examples of succession, evolution, and extinction								X	X										
<b>B.12.9</b> Evaluate ways in which technology has expanded our ability to alter the environment and its capacity to support humans and other living organisms							X		X										
<b>B.12.10</b> Identify and evaluate multiple uses of natural resources and how society is influenced by the availability of these resources										X									
<b>B.12.11</b> Assess how changes in the availability and use of natural resources will affect society and human activities										X									
<b>B.12.12</b> Evaluate the environmental and societal costs and benefits of allocating resources in various ways and identify management strategies to maintain economic and environmental sustainability							X	X	X										
<b>B.12.13</b> Analyze how different political and governmental systems manage resource development, distribution a, consumption, and waste disposal.										X				X					
<b>B.12.16</b> Analyze how natural resource ownership and trade influences relationships in local, national, and global economies.							X	X				X							
<b>B.12.17</b> Explain the concept of exported/imported pollution; eg watersheds						X													
<b>B.12.18</b> Analyze cause and effect relationships of pollutants and other environmental changes on human health						X													

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<b>B.12.19</b> Illustrate how environmental quality affects the economic well-being of a community								X	X	X									
<b>C.8.1</b> Define and provide examples of environmental issues, explaining the role of beliefs, attitudes, and values										X	X								
<b>C.8.3</b> Use questioning and analysis skills to determine beliefs, attitudes, and values held by people involved in an environmental issue											X								
<b>C.8.4</b> Evaluate the credibility of information, recognizing social, economic, political, environmental, technological, and educational influences											X								
<b>C.12.2</b> Explain the factors that contribute to the development of individual and societal values											X	X							
<b>C.12.3</b> Maintain a historical perspective when researching environmental issues; include past, present, and future considerations											X								
<b>C.12.4</b> Identify strengths and weaknesses of different approaches to investigating an environmental issue and identify some of the assumptions of each approach								X											
<b>D.8.1</b> Identify options for addressing an environmental issue and evaluate the consequences of each option						X	X	X	X	X	X								
<b>D.8.3</b> List reasons why an individual or group chooses to participate or not in an environmental activity.																			X
<b>D.8.4</b> Explain the political, legal and budgetary options for resolving local, state, and national environmental issues											X								
<b>D.8.5</b> Explain how personal actions can impact an environmental issue						X	X	X				X					X	X	
<b>D.8.6</b> Develop a plan for improving or maintaining some part of the local environment and identify their role in accomplishing this plan						X													

## Environmental Education

### Students will

	Hook, Line, & Thinker: Science Guide										Hook, Line, & Thinker: Field Guide								
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<b>D.8.7</b> Identify examples of how personal beliefs can influence environmental decisions										X	X								
<b>D.8.8</b> Give examples of education, economic, and government institutions' influence on an environmental issue, and the role of citizens in policy formation							X	X		X									
<b>D.12.1</b> Identify a variety of approaches to environmental issues, evaluate the consequences of each, and select and defend a position						X	X	X	X	X									
<b>D.12.4</b> Describe the rights and responsibilities of citizenship in regard to environmental problems and issues							X												
<b>D.12.5</b> Develop a plan to maintain or improve some part of the local or regional environment, and enlist support for the implementation of that plan					X														
<b>D.12.6</b> Identify and analyze examples of the impact beliefs and values have on environmental quality											X			X	X				
<b>D.12.7</b> Analyze political, educational, economic, and governmental influences on environmental issues, and the role of citizens in policy formation								X						X					
<b>D.12.8</b> Use cost-benefit analysis to evaluate proposals to improve environmental quality										X				X					
<b>D.12.9</b> Describe regulatory and economic approaches to improving the environment and explain the advantages and disadvantages of each										X									

# Language Arts and Social Studies

## Language Arts

Students will

**B.8.1** Create or produce writing to communicate with different audiences for a variety of purposes

**B.12.1** Create or produce writing to communicate with different audiences for a variety of purposes

**C.8.1** Orally communicate information, opinions, and ideas effectively to different audiences for a variety of purposes

**C.12.1** Prepare and deliver formal oral presentations appropriate to specific purposes and audiences

**F.8.1** Conduct research and inquiry on self-selected or assigned topics, issues, or problems and use an appropriate form to communicate their findings

**F.12.1** Conduct research and inquiry on self-selected or assigned topics, issues, or problems and use an appropriate form to communicate their findings

## Social Studies

Students will

**A.8.1** Use a variety of geographic representations, such as political, physical, and topographic maps, a globe, aerial photographs, and satellite images, to gather and compare information about a place

**A.8.11** Give examples of the causes and consequences of current global issues, such as the expansion of global markets, the urbanization of the developing world, the consumption of natural resources, and the extinction of species, and suggest possible responses by various individuals, groups, and nations

### Hook, Line, & Thinker: Science Guide

### Hook, Line, & Thinker: Field Guide

	What Makes a Fish a Fish	Which Fish is This	Fish Food	Water of Life	Home Sweet Home	To the Point	Shared Interests	Aquatic Exotics	Restoration Nation	Taking Stock	Making Decisions	Great Conservationists	Tackling Tackle	Got Skills	Golden Rules	Safety First	Reading the Water	Fish Out of Water	Cooking, Cleaning, & Companions
<b>B.8.1</b> Create or produce writing to communicate with different audiences for a variety of purposes												X							
<b>B.12.1</b> Create or produce writing to communicate with different audiences for a variety of purposes												X							
<b>C.8.1</b> Orally communicate information, opinions, and ideas effectively to different audiences for a variety of purposes						X													
<b>C.12.1</b> Prepare and deliver formal oral presentations appropriate to specific purposes and audiences						X													
<b>F.8.1</b> Conduct research and inquiry on self-selected or assigned topics, issues, or problems and use an appropriate form to communicate their findings						X					X								
<b>F.12.1</b> Conduct research and inquiry on self-selected or assigned topics, issues, or problems and use an appropriate form to communicate their findings						X					X								
<b>A.8.1</b> Use a variety of geographic representations, such as political, physical, and topographic maps, a globe, aerial photographs, and satellite images, to gather and compare information about a place						X													
<b>A.8.11</b> Give examples of the causes and consequences of current global issues, such as the expansion of global markets, the urbanization of the developing world, the consumption of natural resources, and the extinction of species, and suggest possible responses by various individuals, groups, and nations						X	X	X	X										

## Language Arts and Social Studies

### Social Studies

Students will

	Hook, Line, & Thinker: Science Guide								Hook, Line, & Thinker: Field Guide										
	What Makes a Fish a Fish	Which Fish is This	Fish Food	Water of Life	Home Sweet Home	To the Point	Shared Interests	Aquatic Exotics	Restoration Nation	Taking Stock	Making Decisions	Great Conservationists	Tackling Tackle	Got Skills	Golden Rules	Safety First	Reading the Water	Fish Out of Water	Cooking, Cleaning, & Companions
<b>A.12.4</b> Analyze the short-term and long-term effects that major changes in population in various parts of the world have had or might have on the environment						X				X									
<b>A.12.11</b> Describe scientific and technological development in various regions of the world and analyze the ways in which development affects environment and culture						X	X	X	X										
<b>A.12.12</b> Assess the advantages and disadvantages of selected land use policies in the local community, Wisconsin, the United States, and the world						X	X		X										
<b>C.8.3</b> Explain how laws are developed, how the purposes of government are established, and how the powers of government are acquired, maintained, justified, and sometimes abused											X								
<b>C.8.7</b> Locate, organize, and use relevant information to understand an issue of public concern, take a position, and advocate the position in a debate											X								
<b>C.8.8</b> Identify ways in which advocates participate in public policy debates											X								
<b>C.12.8</b> Locate, organize, analyze, and use information from various sources to understand an issue of public concern, take a position, and communicate the position											X								
<b>C.12.9</b> Identify and evaluate the means through which advocates influence public policy											X								
<b>C.12.10</b> Identify ways people may participate effectively in community affairs and the political process											X								

## Physical Education\*

Students will	Hook, Line, & Thinker: Science Guide							Hook, Line, & Thinker: Field Guide											
	What Makes a Fish a Fish	Which Fish is This	Fish Food	Water of Life	Home Sweet Home	To the Point	Shared Interests	Aquatic Exotics	Restoration Nation	Taking Stock	Making Decisions	Great Conservationists	Tackling Tackle	Got Skills	Golden Rules	Safety First	Reading the Water	Fish Out of Water	Cooking, Cleaning, & Companions
<b>B.8.1</b> Demonstrate competence in modified versions of movement forms such as performing in a variety of simple folk and square dances														X					
<b>B.8.3</b> Demonstrate increasing competence in more advanced specialized physical skills														X				X	
<b>B.12.1</b> Demonstrate competence in an increasing number of more complex versions of different types of movement forms such as outdoor activities														X				X	
<b>B.12.2</b> Demonstrate competence and work toward advanced proficiency in selected activities such as getting nine out of ten arrows in the target from 40 feet														X					
<b>C.8.1</b> Understand and apply more advanced movement and game strategies such as explaining and demonstrating strategies involved in tennis doubles													X	X				X	
<b>C.8.3</b> Identify and apply principles of practice and conditioning to enhance performance such as understanding that conditioning will allow one to play for longer periods of time without fatigue													X	X					
<b>C.12.2</b> Independently apply advanced, movement-specific information													X	X				X	
<b>C.12.4</b> Identify and apply characteristics and critical elements of highly skilled performance to develop movement competence or proficiency such as using internal and external information to modify movement during performance													X	X					
<b>D.8.1</b> Feel satisfaction when engaging in physical activity																		X	X
<b>D.8.2</b> Recognize the social benefits of participation in physical activity such as the joy of participating with a team and sensing team fulfillment																		X	X
<b>D.8.3</b> Enjoy learning new activities																	X	X	X

## Physical Education\*

\*Note: Revised Wisconsin's Model Academic Standards for Physical Education are expected in 2010. Standards 1, 2, 5, and 6 apply as they were drafted in early 2010.

### Students will

	Hook, Line, & Thinker: Science Guide								Hook, Line, & Thinker: Field Guide										
	What Makes a Fish a Fish	Which Fish is This	Fish Food	Water of Life	Home Sweet Home	To the Point	Shared Interests	Aquatic Exotics	Restoration Nation	Taking Stock	Making Decisions	Great Conservationists	Tackling Tackle	Got Skills	Golden Rules	Safety First	Reading the Water	Fish Out of Water	Cooking, Cleaning, & Companions
<b>D.12.1</b> Derive pleasure from participating in physical activities in competitive and recreational settings																	X	X	X
<b>D.12.2</b> Pursue new activities both alone and with others																	X	X	
<b>D.12.3</b> Recognize the strengths and weaknesses of teammates and provide opportunities for everyone to enjoy success within skill limitations																	X		
<b>F.8.2</b> Solve problems by analyzing causes and potential solutions														X	X	X	X		
<b>F.8.3</b> Make choices based on the safety of self and others																X		X	X
<b>F.8.4</b> Consider the consequences when confronted with a behavior choice														X	X		X		
<b>F.8.6</b> Work cooperatively with a group to achieve group goals in competitive as well as cooperative settings																X	X	X	
<b>F.12.1</b> Apply rules, procedures, and etiquette in all physical-activity settings														X	X	X	X	X	
<b>F.12.5</b> Take appropriate leadership or supportive roles in activities																X	X	X	
<b>F.12.6</b> Create a safe environment for their own skill practice and group activities																X	X	X	
<b>Revised Physical Education Standards for 2010</b>																			
<b>1</b> Demonstrates competency in motor skills and movement patterns needed to perform a variety of physical activities.														X				X	
<b>2</b> Demonstrates understanding of movement concepts, principals, strategies, and tactics as they apply to the learning and performance physical activities.														X				X	
<b>5</b> Exhibits responsible personal and social behavior that respects self and others in physical activity settings.														X	X	X	X	X	X
<b>6</b> Values physical activity for health, enjoyment, challenge, self-expression, and/or social interaction.																		X	X

# Science

## Hook, Line, & Thinker: Science Guide

## Hook, Line, & Thinker: Field Guide

### Students will

	What Makes a Fish a Fish	Which Fish is This	Fish Food	Water of Life	Home Sweet Home	To the Point	Shared Interests	Aquatic Exotics	Restoration Nation	Taking Stock	Making Decisions	Great Conservationists	Tackling Tackle	Got Skills	Golden Rules	Safety First	Reading the Water	Fish Out of Water	Cooking, Cleaning, & Companions
<b>A.8.6</b> Use models and explanations to predict actions and events in the natural world								X		X									
<b>A.8.7</b> Design real or thought investigations to test the usefulness and limitations of a model										X									
<b>A.8.8</b> Use themes of evolution, equilibrium, and energy to predict future events or changes in the natural world						X													
<b>A.12.1</b> Apply the underlying themes of science to develop defensible visions of the future						X													
<b>A.12.3</b> Give examples that show how partial systems, models, and explanations are used to give quick and reasonable solutions that are accurate enough for basic needs										X									
<b>A.12.4</b> Construct arguments that show how conflicting models and explanations of events can start with similar evidence								X											
<b>A.12.5</b> Show how the ideas and themes of science can be used to make real-life decisions about careers, work places, life styles, and use of resources					X			X											X
<b>B.8.6</b> Explain the ways in which scientific knowledge is useful and also limited when applied to social issues								X	X										X
<b>C.8.1</b> Identify questions they can investigate using resources and equipment they have available											X						X		
<b>C.8.2</b> Identify data and locate sources of information including their own records to answer the questions being investigated											X						X		

## Science

Students will	Hook, Line, & Thinker: Science Guide								Hook, Line, & Thinker: Field Guide										
	What Makes a Fish a Fish	Which Fish is This	Fish Food	Water of Life	Home Sweet Home	To the Point	Shared Interests	Aquatic Exotics	Restoration Nation	Taking Stock	Making Decisions	Great Conservationists	Tackling Tackle	Got Skills	Golden Rules	Safety First	Reading the Water	Fish Out of Water	Cooking, Cleaning, & Companions
<b>C.8.4</b> Use inferences to help decide possible results of their investigations, use observations to check their inferences								X	X										
<b>C.8.6</b> State what they have learned from investigations, relating their inferences to scientific knowledge and to data they have collected.													X					X	
<b>C.8.11</b> Raise further questions which still need to be answered								X	X										
<b>C.12.1</b> Ask questions suggested by...observations of phenomena, build hypothesis...design possible investigations...and describe results that might emerge from such investigations									X										
<b>C.12.4</b> During investigations, choose the best data-collection procedures and materials available								X									X		
<b>C.12.7</b> Evaluate articles and reports...using criteria related to accuracy, degree of error, sampling, treatment of data, and other standards of experimental design								X											
<b>E.12.2</b> Analyze the geochemical and physical cycles of the earth and use them to describe movements of matter				X															
<b>F.8.5</b> Show how different structures both reproduce and pass on characteristics of their group		X																	
<b>F.8.6</b> Understand that an organism is regulated both internally and externally	X																		
<b>F.8.7</b> Understand that an organism's behavior evolves through adaptation to its environment					X														
<b>F.8.8</b> Show 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		X	X			X	X		X										

# Science

## Hook, Line, & Thinker: Science Guide

## Hook, Line, & Thinker: Field Guide

### Students will

	What Makes a Fish a Fish	Which Fish is This	Fish Food	Water of Life	Home Sweet Home	To the Point	Shared Interests	Aquatic Exotics	Restoration Nation	Taking Stock	Making Decisions	Great Conservationists	Tackling Tackle	Got Skills	Golden Rules	Safety First	Reading the Water	Fish Out of Water	Cooking, Cleaning, & Companions
<b>F.8.9</b> Explain how some of the changes on earth are contributing to changes in the balance of life and affecting the survival and population growth of certain species						X	X	X	X										
<b>F.8.10</b> Project how current trends in human resource use and population growth will influence the natural environment, and show how current policies affect those trends					X	X	X	X	X	X								X	
<b>F.12.5</b> Understand the theory of evolution, natural selection, and biological classification	X	X																	
<b>F.12.6</b> Using concepts of evolution and heredity, account for changes in species and the diversity of species, include the influence of these changes on science		X																	
<b>F.12.7</b> Investigate how organisms both cooperate and compete in ecosystems					X			X		X									X
<b>F.12.8</b> Using science themes, infer changes in ecosystems prompted by the introduction of new species, environmental conditions, chemicals, and air, water, or earth pollution							X	X	X	X									X
<b>F.12.9</b> Using science themes, investigate energy systems to show how energy is stored in food and how energy is released by digestion and metabolism			X																
<b>F.12.10</b> Understand the impact of energy on organisms in living systems						X													
<b>F.12.11</b> Investigate how the complexity and organization of organisms accommodates the need for obtaining, transforming, transporting, releasing, and eliminating the matter and energy used to sustain an organism					X														

## Science

### Students will

	Hook, Line, & Thinker: Science Guide							Hook, Line, & Thinker: Field Guide											
	What Makes a Fish a Fish	Which Fish is This	Fish Food	Water of Life	Home Sweet Home	To the Point	Shared Interests	Aquatic Exotics	Restoration Nation	Taking Stock	Making Decisions	Great Conservationists	Tackling Tackle	Got Skills	Golden Rules	Safety First	Reading the Water	Fish Out of Water	Cooking, Cleaning, & Companions
<b>G.8.2</b> Explain how current scientific and technological discoveries have an influence on the work people do and how some of these discoveries also lead to new careers										X									
<b>G.8.3</b> Illustrate the impact that science and technology have had, both good and bad, on careers, systems, society, environment, and quality of life.													X						
<b>G.8.5</b> Investigate a specific local problem to which there has been a scientific...solution, including proposals for alternative courses of action, the choices that were made...and subsequent community satisfaction								X		X									
<b>G.8.7</b> Show evidence of how science and technology are interdependent, using some examples drawn from personally conducted investigations									X										
<b>G.12.1</b> Identify personal interests in science and technology, implications that these interests might have for future education, and decisions to be considered										X									
<b>G.12.5</b> Choose a specific problem in our society, identify alternative scientific or technological solutions to that problem and argue its merits										X									
<b>H.8.1</b> Evaluate the scientific evidence used in various media to address a social issue, using criteria of accuracy, logic, bias, relevance of data, and credibility of sources										X									
<b>H.8.2</b> Present a scientific solution to a problem involving...life and environmental...sciences and participate in a consensus-building discussion to arrive at a group decision						X		X		X									

## Science and Math

### Students will

	Hook, Line, & Thinker: Science Guide								Hook, Line, & Thinker: Field Guide										
	What Makes a Fish a Fish	Which Fish is This	Fish Food	Water of Life	Home Sweet Home	To the Point	Shared Interests	Aquatic Exotics	Restoration Nation	Taking Stock	Making Decisions	Great Conservationists	Tackling Tackle	Got Skills	Golden Rules	Safety First	Reading the Water	Fish Out of Water	Cooking, Cleaning, and Companions
<b>H.12.1</b> Using science themes and knowledge of...life and environmental sciences...analyze the costs, risks, benefits, and consequences of a proposal concerning resource management in the community and determine the potential impact of the proposal...							X	X			X								
<b>H.12.2</b> Evaluate proposed policy recommendations in science and technology for validity, evidence, reasoning, and implications, both short and long-term							X				X								
<b>H.12.3</b> Show how policy decisions in science depend on social values, ethics, beliefs, and time-frames as well as considerations of science and technology							X												
<b>H.12.4</b> Advocate a solution or combination of solutions to a problem in science or technology									X			X							
<b>H.12.5</b> Investigate how current plans or proposals concerning resource management...will have an impact on the environment, ecology, and quality of life in a community or region												X							
<b>H.12.7</b> When making decisions, construct a plan that includes the use of current scientific knowledge and scientific reasoning								X			X								

Projects WET and WILD are national programs that focus on aquatic resources. Materials are distributed at workshops arranged by the Wisconsin Department of Natural Resources. Please see their Web page on the DNR's Website, [dnr.wi.gov/education/pltwildwet](http://dnr.wi.gov/education/pltwildwet).

## Projects WET and WILD

PAGE	ACTIVITY GUIDE	Hook, Line, & Thinker: Science Guide								Hook, Line, & Thinker: Field Guide										
		What Makes a Fish a Fish	Which Fish is This	Fish Food	Water of Life	Home Sweet Home	To the Point	Shared Interests	Aquatic Exotics	Restoration Nation	Taking Stock	Making Decisions	Great Conservationists	Tackling Tackle	Got Skills	Golden Rules	Safety First	Reading the Water	Fish Out of Water	Cooking, Cleaning, and Companions
<b>Wild Aquatic</b>																				
8	Fishy Who's Who		X			X														
19	Designing a Habitat					X														
21	Where Does Water Run?							X												
24	Water Canaries				X															
39	Wetland Metaphors					X														
43	Hooks and Ladders		X		X															
49	Micro-Odyssey		X																	
52	Blue-Ribbon Niche					X	X													
66	Pond Succession					X														
69	Eat and Glow	X																		
75	Edge of Home					X														
85	Net Gain, Net Effect									X				X						
91	Watered Down History						X	X												
110	Water Wings						X													
118	Riparian Retreat					X	X													
121	How Wet Is Our Planet?		X																	
124	Facts and Falsehoods										X									
132	Watershed						X													
136	What's in the Air?						X													
140	What's in the Water?						X													
145	Something's Fishy Here						X		X											
151	Alice in Waterland						X													
158	Fishable Waters									X	X			X						
177	Aquatic Roots								X											
180	Where Have All the Salmon Gone?									X				X						
184	To Dam or Not to Dam								X											
188	Aquatic Times										X									
190	Silt: A Dirty Word						X	X												
198	Dragonfly Pond							X												
204	Living Research													X						

## Projects WET and WILD

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<b>Project WILD</b>																			
23	How Many Bears?			X															
28	My Kingdom for a Shelter					X													
36	Oh Deer!			X															
41	Wild Words																		X
44	We're in This Together						X	X			X								
46	Carrying Capacity			X															
61	Habitat Lap Sit				X	X													
64	Who Fits Here?	X																	
66	Which Niche?	X																	
82	Micro-trek Treasure Hunt						X												
96	What's For Dinner?			X															
105	Energy Pipeline			X															
122	Quick Frozen Critters	X																	
128	Adaptation Artistry	X																	
152	Planting Animals							X	X										
166	Ecosystem Facelift								X										
172	Bottleneck Genes	X																	
203	Ethi-Reasoning																		X
216	Pay to Play									X				X					
267	History of Wildlife Management										X								
270	Wild Bill's Fate										X								
272	Know Your Legislation										X								
297	Wildlife Issues								X										
308	Migration Barriers						X												
310	Shrinking Habitat						X												
321	To Zone or Not to Zone						X												
326	Hazardous Links,Possible Solutions					X													
330	World Travelers							X											
341	Riparian Zone						X												
345	Changing the Land						X												

## Projects WET and WILD

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364	Philosophical Differences										X								
371	Career Critters									X									
385	Wildwork									X									
387	Checks and Balances									X									
434	Litter We Know					X													
440	Improving Wildlife Habitat							X											
443	Enviro-Ethics													X					
446	Can Do!									X									
<b>Project Wet</b>																			
19	Water Log														X				
25	Adventures in Density			X															
79	Life in the Fast Lane				X														
129	Branching Out					X													
133	Capture, Store, Release				X														
166	Just Passing Through						X												
186	Rainy Day Hike					X													
219	A-Maze-Ing Water					X													
223	Color Me a Watershed					X	X												
232	Common Water						X												
Page	Project WET																		
238	A Drop in the Bucket					X													
267	Sum of the Parts					X													
279	Where Are the Frogs?					X													
316	Humpty Dumpty							X											
322	Macroinvertebrate Mayhem					X													
338	The Pucker Effect					X													
388	Hot Water									X									
397	Perspectives									X									
425	What's Happening?									X									
457	Water Write										X								

# Water Action Volunteers

Water Action Volunteers (WAV) is a cooperative program between the University of Wisconsin–Extension and the Wisconsin Department of Natural Resources. All WAV activities can be downloaded from the WAV Website, [watermonitoring.uwex.edu/wav/pubs](http://watermonitoring.uwex.edu/wav/pubs).

*Hook, Line, & Thinker: Science Guide*

*Hook, Line, & Thinker: Field Guide*

Activity Name	Related Lesson Plan
Stream Walk Outdoors	Home Sweet Home
Watershed in a Box: Indoor Service Project with Younger Students	To the Point Shared Interests
Stream and River Clean Up: Service Project	Restoration Nation Great Conservationists
Erosion in a Bottle	To the Point
Urban Runoff Model	To the Point
Biotic Index Survey: Outdoor “Critter Search”	Fish Food
Storm Drain Stenciling: Service Project	To the Point
Human Watershed	Shared Interests

# Fishing Journal

## Date & Time

## Location (DETAILED)

\_\_\_\_\_  
\_\_\_\_\_

## Weather Details

AIR TEMPERATURE: \_\_\_\_\_

WATER TEMPERATURE: \_\_\_\_\_

SKY: Clear Partly Cloudy \_\_\_\_\_ % Cover Overcast

WIND: Direction \_\_\_\_\_ Calm Breezy Windy

PRECIPITATION: None Drizzle Hard Rain Snow

## Catch

1 SPECIES: \_\_\_\_\_ SIZE: \_\_\_\_\_ KEPT?: \_\_\_\_\_  
BAIT: \_\_\_\_\_ METHOD: \_\_\_\_\_  
LOCATION OF CATCH (CURRENT, WAVES, STRUCTURE): \_\_\_\_\_

2 SPECIES: \_\_\_\_\_ SIZE: \_\_\_\_\_ KEPT?: \_\_\_\_\_  
BAIT: \_\_\_\_\_ METHOD: \_\_\_\_\_  
LOCATION OF CATCH (CURRENT, WAVES, STRUCTURE): \_\_\_\_\_

3 SPECIES: \_\_\_\_\_ SIZE: \_\_\_\_\_ KEPT?: \_\_\_\_\_  
BAIT: \_\_\_\_\_ METHOD: \_\_\_\_\_  
LOCATION OF CATCH (CURRENT, WAVES, STRUCTURE): \_\_\_\_\_

4 SPECIES: \_\_\_\_\_ SIZE: \_\_\_\_\_ KEPT?: \_\_\_\_\_  
BAIT: \_\_\_\_\_ METHOD: \_\_\_\_\_  
LOCATION OF CATCH (CURRENT, WAVES, STRUCTURE): \_\_\_\_\_

## Next Time Bring:

\_\_\_\_\_  
\_\_\_\_\_

## Special Notes: (INSECT HATCH, SPAWNING, ETC)

\_\_\_\_\_  
\_\_\_\_\_

# Hook, Line, & Thinker

*INSTRUCTOR GUIDE*

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