People and Fish:

Angling Ethics, Fisheries Management, and Folkways

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An Introduction to Teaching Angling Ethics

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This section contains a great deal of background information on angling ethics. It indicates both the importance of angling ethics and recognition that teaching ethics isn't easy. A thorough reading of this section should enable instructors to more effectively lead ethics education activities and help kids learn that it feels good to fish 'right.'

What is Ethics?

Ethics is a system of guidelines for governing our behavior, guiding and enabling us to know and chose the most right thing to do. Ethics is an internal navigational chart and compass, a means of finding and knowing the best course of action. Paul Quinnett, in his book *Pavlov's Trout* (1993), says:

> "...ethics is what you do in the dark, before the game warden shows up...."

While some elements of angling ethics have been formalized in the form of laws or codes of conduct, ethics is driven internally. Laws, mandates, regulations and their enforcement are based upon ethics, rather than being the source of ethics. Ethics is obedience to the unenforceable. Quinnett suggests that many people today are governed more by shame than by guilt.

> "Shame is what you feel when they *catch* you doing something wrong; guilt is what you feel when you do something *you* know is wrong, period. One requires law enforcers. The other requires only the presence of that still small voice...."

Ethics differ from laws because laws usually address the lowest common denominator of ethical bounds in the society. Ethics is the set of guidelines you use even when nobody else is around. Sometimes ethics is a written code, and sometimes it is unwritten, but ethics always includes that internal filter that judges each thought or action on its rightness or appropriateness. Ethics help you determine what the 'most right' course of action will be.

Environmental Ethics

Part of angler ethics involves environmental ethics. In essence, environmental ethics defines our ecological conscience. Environmental ethics is related to the degree to which we value nature, and why we do so as we make choices about how much we change habitats. Like many other creatures, humans alter their habitat to feed and shelter themselves, and to provide opportunities for reproducing and raising young. But, unlike other creatures, humans can make conscious choices about the size and scale of the differences made. As Wendell Berry suggests, if the choices we make involve too small a difference, we diminish our potential as humans. Too great

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a difference diminishes nature, and therefore impacts on our future and potentially our survival as a species. As we confront these difficult choices, environmental ethics help us choose the action most consistent with our environmental values. If we are developing good angling behavior based on a strong ethical framework, environmental ethics and ethics-based stewardship will develop as an inherent and important part of that process.

Ethics Education Grounded in Community

Ethics rests upon a single premise: that the individual is a member of a community of interdependent parts. Our instincts prompt us to compete for our place in that community, but our ethics prompt us also to cooperate (perhaps in order that there may be a place to compete for). Aldo Leopold suggests that ethics is a kind of community instinct in-the-making, because ethical behavior implies respect for fellow members and for the community. Leopold felt that ethics is "limitation on freedom of action in the struggle for existence."

The Purpose of Angling Ethics Education

The aim of angling ethics education is to enable anglers to develop as ***ethically fit and competent outdoors people***. According to Paul Quinnett, an ethically competent individual has the:

> "ethical skills and qualities necessary to operate at the highest levels of ethical behavior."

He states that these skills include:

> "the sensitivity to recognize a situation as posing one or more ethical considerations; the knowledge of what responses are legal versus what responses might be ethical in that situation; the willingness to act; the judgment to weigh various considerations where there are no laws or guidelines; and the humility to seek consultation and additional knowledge to guide one's action."

The outcome of your angling ethics education efforts should be a youngster who can consistently and logically think through an ethical situation, choose the most right course, and act on his or her convictions. You get the youngster to this point by giving them:

- the tools of critical thinking and moral reasoning;
- frequent opportunities to actively use these tools in a setting that is emotionally safe and respectful;
- experiences in seeing you and others behave in numerous fishing settings, over time; and
- the social support of the group, family and community.

How Do You Teach Ethics?

So how do you effectively teach angling ethics? What are the best ways to help youngsters develop and use good judgment when facing and making ethical decisions? Outdoor educators everywhere would love to have a quick and easy answer to these questions, but it just isn't that simple. In fact, we know more about what doesn't work than what does. Unfortunately most of

what has gone on under the guise of outdoor ethics 'education' falls into the 'doesn't work' category.

It seems that if we're going to address something as important as angling ethics education, we ought to do our best to get it right. So, we've put a great deal of time and effort into researching the question of how best to teach ethics. And though we don't have all the answers, we do think we're on the right track.

Outdoor Ethics Strategies -- What Doesn't Work - Why would we bother to tell you about teaching methods that don't work? Why not cut to the chase and tell you what methods the research says are most effective in teaching ethics education and influencing ethical behavior? Because unfortunately the methods which typically are not effective are those still most often in use and we'd like to change this! We've known for over 60 years that traditional, authoritarian approaches using codes of conduct and heavy-handed moralizing do not change behavior. Yet, these still seem to be the methods of choice for many outdoor education programs. By including both those approaches that researchers find do work and those that do not work effectively, we hope to make your ethics education efforts more effective. Most importantly, the strategies identified as most effective in teaching ethics education also help to develop an atmosphere of trust and mutual respect within your group. That creates the type of mentoring program that really helps kids develop and grow toward their potential -- and not just in ethics education!

The methods listed below are typically not effective. They are based on imposing or 'inoculating' knowledge or views upon or into students. As stand-alone strategies trying to achieve long-term ethics-based behavior, they simply are not supported by the research. You'll see that strategies more likely to be effective have much different approaches. Ineffective strategies commonly used in outdoor ethics education include:

- public awareness or promotional campaigns using catchy slogans, pre-established codes of behavior and

techniques borrowed from the advertising sector;

- externally imposed codes of ethics;
- canned ethics lectures (like the 30 minute capsules in too many hunter or sportsman education

courses);

- morality stories;
- authoritarian-style approaches to teaching;

What Does Work - Just as there were common characteristics of ineffective ethics education approaches, common characteristics appear throughout effective ethics education methods. Keep these in mind as you think about how you will approach angling ethics in your program. These key elements include:

- building a sense of community and family, and using this group identity to nurture positive behavior;
- guiding, *not* dictating, in your role as a teacher;
- developing a climate of mutual respect;
- building group consensus and ownership in group norms, including codes of moral behavior;
- using peer teaching, counseling and support;
- using interactive techniques (often centering around ethical dilemmas), including:
- small group discussions, such as 'dilemma' discussions, involving more than one 'right' choice,
- using a decision-making process that identifies choices, outlines consequences and discusses the results;
- trigger films or slide shows that set the stage for ethical decision-making (discussion initiated at the critical points in the film sequence);
- interactive videos using computerized video technology to realistically simulate the situation, with the computer matching the decision with the appropriate consequence;
- role-play and simulations requiring group members to adopt different roles and to play different scenarios;
- building all these elements into a ***sustained, long-term*** effort over a significant period of time (i.e. the use of mentoring approaches like those offered by 4-H clubs, community clubs and organizations, family, and friends).

Properly done, interactive techniques teach more effectively than lectures simply because they ***engage*** students in the learning process and require them to invest more of themselves. Students must think critically, reason morally and discuss, choose and defend the most right course of action. In the right context, within a moral community containing the key elements listed above, interactive approaches offer great possibilities.

A positive social environment for ethics education plays a very significant role in the success of ethics education. Using small groups, guiding them as they assume and share responsibilities,

emphasizing peer activities such as peer counseling and problem-solving, keeping the focus on ethical issues directly relevant to the group, and involving them with community service and action projects addressing these issues hold much promise, particularly when done over a significant period of time. Programs involving mentoring and continuing relationships within clubs or other neighborhood or community structures - building moral communities - appear to offer the best combination of strategies for successfully developing ethical fitness and competence. Developing the positive social environment for learning may be much more important than the specific teaching techniques used. Combining that positive, sustained social environment with interactive teaching techniques creates the most favorable environment for successfully teaching ethics.

Personal Comfort with Approach Important! There is no one perfect strategy for leading ethics education activities. The complexity and diversity of fishing and its deeply personal nature makes most standard codes far too general to make much sense, though they can offer a starting point. Youth need to have these guidelines directly and specifically applied in a relevant manner. We suggest you view each fishing situation in terms of the demands and needs for ethical behavior in that specific situation. Then give your members the tools they need to evaluate the rightness or wrongness of a course of action. From this, the members, as a group, will generalize a universal set of angling ethics, guided by your mentoring. In this way, we hope to develop a new generation of anglers who know how to behave ethically, because they understand how it feels to make the right choices. Using those methods with which you are most comfortable is often the best choice, as long as the methods are interactive and sustained in nature.

For each fishing trip or experience, the group should develop and/or review a set of behavioral expectations ***as a group***. This need not be an ordeal or excessive in length. In fact many brief exposures may be better than fewer longer ones. As the behavioral expectations are developed, practiced and reviewed over time, patterns will become evident. Look for these patterns. Because youth themselves will participate in developing the ethical guidelines, they will have ownership in abiding by them. To maximize the value of your angling ethics education efforts, your example must be strong and consistent. That will help your kids to actualize their guidelines, fish right and feel good about it. This is done through:

1. observing others in ethical situations, and helping members see the ethical choices made;
2. demonstrating appropriate and inappropriate behavior through modeling and role-playing;
3. using scenarios suggested in the activities as a basis for discussing and practicing angling ethics;
4. small group discussions and role-play addressing ethics violations, giving members the critical thinking tools they need to deal effectively with these situations;
5. encouraging members in making the sometimes difficult choices where no single action is necessarily wrong or bad, all choices may be right, and they must choose what is most right;
6. reinforcing and rewarding positive ethical behaviors when your members demonstrate them. Let them know you know they've done right. Be sure to involve the rest of the group in this recognition process. Peer support is a very powerful thing.

How Should YOU Teach Angling Ethics Education?

Ethics can be a heavy topic. We recommend that your ethics discussions be done in small doses (not in lengthy preaching, or lecturing)! Remember, real ethical education results in internally motivated actions. We want youth to learn to develop personal ethical codes, not because we impose them, but because they find that abiding by their ethical codes is satisfying and feels good to the spirit. Heavy-handed approaches are likely to lead to the opposite effect.

Everything we do in this program, both deliberate and inadvertent, will have an impact on ethical development in the young people involved; but several activities in the People and Fish section (see Angling Ethics Lessons) are focused around the effective ethics education strategies listed above -- small group discussions, role playing, and group consensus and ownership building. These lessons provide realistic activities to ***engage*** youth in thinking through ethical dilemmas and decisions. Many of these activities can be done while your group is out fishing or on other learning experiences. The best scenarios for learning are those that your group actually encounters! Remember to take the time to make good use of any teachable moment. You may find that when faced with real dilemmas with real consequences, youths may respond differently than when discussing a hypothetical situation. In addition, the reality of the situation can be more effective in encouraging critical thinking and moral reasoning.

Take Home Your Limit of Litter!

Bruce E. Matthews, Michigan Dept. of Natural Resources; Kelly S. Carter, Michigan State University Adapted from *Aquatic Sampling* (Edelstein & Matthews, 1993).

Best Time: At the end of a fishing outing; as an annual community service event.

Best Location: Outdoors.

Time Required: 1-3 hrs.

Objectives:
Participating youth will:

1. remove litter and debris along a lake or stream shoreline;
2. describe the concepts of biodegradability, decomposition and toxicity and relate them to water and soil quality, and aquatic wildlife;
3. learn how certain waste products can harm the environment and wildlife;
4. have fun while learning.

Youth Development Objectives:
Participating youth will:

1. participate in a community service project;
2. understand their role in maintaining a clean and healthy environment;
3. explore their personal conservation ethic toward natural resources as they respond to
4. issues of pollution, consumerism, and responsible waste disposal.

Evaluation Activities/Suggestions:
1. Have youths write about the litter that they found, including the overall condition of lake or stream site. One good method for gaining perspective of how litter affects wildlife is to write from a specific point of view, for example: how a bluegill, northern pike, turtle, muskrat, or river otter might describe the affects of litter and pollution on their livelihood.
2. Have youth write a news release describing the event for local print media. Take photos to illustrate the area before and after the project.
3. Write a journal entry after completing this project. Share thoughts with other club members or family.

Roles for Teen and Junior Leaders:
1. Pair up with younger members to assist with the removal of large debris and hazardous items such as broken glass and wire.
2. Have older members invite the local media to the event. Their stories or interviews can provide good public relations for the club and could result in bringing in new members!

Potential Parental Involvement:
1. Identify and locate proper dump or recycling facilities in the area.
2. Assist with hauling the trash to the proper dump stations: oil, glass and cans to a recycling center, other materials to the local waste management site.

Equipment/Materials:

- heavy duty plastic garbage bags (clear)
- work gloves and/or rubber gloves (surgical gloves are available by the box and are reasonably inexpensive)
- notebook and pencil
- hip boots or waders
- personal floatation devices if the water is fast-moving, deep or has a drop-off
- first aid kit

Safety Considerations:

1. Leader should be familiar with the clean-up site so that they can provide any necessary safety instructions regarding the topography of the area, currents, drop-offs, and any dangerous wildlife or poisonous plants in the region.
2. Instruct youth to use caution when handling sharp objects such as broken glass or wire.
3. Youths should be cautioned against picking up medical needles.
4. Leaders should check into any applicable regulations governing the disposal of hazardous or other regulated materials.

References:

Center for Marine Conservation. (n.d.). Plastics in the ocean: more than a litter problem. Washington, D.C.

Edelstein, K.L. and B.E. Matthews. 1993. Aquatic sampling. NY Sportfishing and Aquatic Resources Education Program Manual. Cornell U.: Ithaca, NY. 75 pp.

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Western Regional Environmental Education Council. 1992. Project WILD-Aquatic. Bethesda, MD.

Lesson Outline:

Application		**Presentation**
I. Lesson Narrative	-	Read the Lesson Narrative provided and answer any questions your group may have.
II. Choose a waterbody to clean	-	Choose a section of stream or lake shore needing cleaning.
a. Assign teams	-	Assign teams of two to sections of the area.
b. Pick up litter	-	Instruct the teams to pick up all litter and put it in the clear plastic bags (clear bags help participants see the litter inside during later inspection).
c. Assist youths	-	Remind youths to ask for adult assistance when they find litter that is either too large or heavy to remove or is potentially hazardous (e.g. objects with sharp edges such as broken glass and wire; unidentifiable bottles/jugs which may contain harmful chemicals). Advise youths to use common sense while picking up all litter.
III. Reassemble group	-	Reassemble the group after a designated time (45 minutes or so).
a. Describe findings	-	Ask the group to describe what they found.
QUESTIONS: clues	-	*Were there any clues as to who might have been responsible for any of the litter?*
	-	*What does the litter say about the kind of person who left it there?*
b. Public opinion of anglers	-	Discuss impacts of litter on public opinion of those who do the littering. *How does the public feel towards fishing and towards anglers, when the littering is clearly done by anglers?*
IV. Examine litter	-	Choose a few bags of litter and open them up.
a. Empty bags of litter	-	Dump the bags on the ground or on a drop cloth (this is safer than reaching into the bags to pull out litter).
b. List items	-	Make a list of the items contained in the bags.
c. Discussion	-	Discuss the concepts of biodegradability and decomposition (see narrative for definitions).
d. Identify and classify items	-	Identify those items that do not decompose.
e. Impacts of litter	-	Identify what the potential problems or impacts of each item found might be on the fish or other organisms living nearby.
QUESTIONS:	-	*What if something ate the item of litter, or became entangled in it?*

- *What if the litter contributed some chemical or biological element to the ecosystem?*
- *Where might the litter have gone had you not removed it?*
- *When considering the impact on wildlife, what possible effects on the wildlife□s food, water, shelter and space could the litter have had?*

f. Litter prevention strategies

- Brainstorm and discuss strategies your club might use to prevent the area from being littered again. Here are some ideas (before providing examples, encourage their thoughts on this *first*):
- *examples*
- Contact angler groups in local problem areas. Ask them if they would be willing to assist you in a one-day clean-up of area problem sites.
- Measure and weigh collected litter. Sort and catalog litter from anglers, boaters, other recreationists etc..
- Keep records for future comparison. After a suitable period, evaluate progress by measuring litter left since the first clean-up.
  Repeat as necessary, notifying groups (angling clubs, homeowners and lake associations etc.) of results.
- Meet with angler and community groups to discuss the problem. Act as a facilitator, not an authority. Your objective is to move the group to accept Ownership of the problem. Brainstorm ways to reduce or eliminate angler litter with the groups.

  Identify strategies and facilitate the groups as they reach consensus on goals, and what to do to meet them. Assist with group strategies. If needed, work with the groups to maintain a long-term effort.
- Recognize and reward efforts of volunteers. Then recognize and reward again!
- Do something as simple as providing waste containers at the area. Be sure to arrange with the city to have the containers emptied regularly.
- Officially adopt a site. Post a sign with your clubs efforts and or mission to encourage people to follow your clubs lead in litter clean-up (and thus, environmental stewardship).

g. Regulations

- *Are there regulations affecting the dumping of garbage in your region? If so, are they enforced?*

V. Conduct an experiment	-	Set up an experiment to measure decomposition of the various items you found.
a. Choose samples	-	Choose three samples of each item.
b. Select site for experiment	-	Choose a site that is not likely to be disturbed for several months to a year (the side yard area at either the leader□s home or one of the club member□s would work well).
c. Experiment design	-	Place one sample in water, one on top the ground, and bury the last one (6-10 inches or so).
d. Monitor experiment	-	Monitor the decomposition process. Set up a monitoring schedule:
- Records	-	record date
	-	record season or weather
	-	record changes observed, if any
e. Discuss results	-	Discuss the results.

Lesson Narrative:

Years ago, an angler finding litter alongside a stream could reasonably blame it on some thoughtless picnicker or swimmer. Today, the large amount of styrofoam bait containers, plastic lure wrappers and discarded monofilament line provide silent proof that at least some people who fish also litter. This does little to influence folks to think more favorable towards anglers, and a lot to make the rest of the world think that all anglers are slobs.

Non-biodegradable (items that do not break down or decay over time) plastics are among the most damaging kinds of litter. In both marine and freshwater environments, plastic waste materials can negatively impact wildlife. Aquatic animals often mistake some plastics for food. In fact, plastics have been found in the stomachs of whales, dolphins, fish, birds, manatees and turtles. If these foreign materials aren't passed (eliminated in feces), they can accumulate in the intestines and cause the animal's bowels to become blocked, resulting in death. In other cases, wildlife can become entangled in plastic debris such as fishing line and plastic six-pack beverage carriers. Plastic netting lost from commercial fishing fleets may be the greatest hazard to marine life. Once entangled or stuck in the netting, nearly all animals will die because few fish or marine mammals can swim backwards.

Some litter can contribute to chemical pollution and can be toxic (cause death) in certain concentrations. Chemicals leak out of discarded containers (such as motor oil jugs) and leach (pass through by percolation or seeping) into the soil making their way to streams, lakes, and groundwater.

A litter cleanup activity not only improves the appearance of fishing sites but also drives home an important environmental and ethical message - each of us is responsible for maintaining a clean and healthy environment. Litter is evidence that someone has been there before. Like the three bears discovering evidence of Goldlilock's trespassing, your club members can use this activity to discover what type of person has been littering in your favorite fishing hole. Your group might find a clue as to who literally, has been dumping garbage. If enough evidence is found, discuss your findings with law enforcement personnel and encourage them to prosecute the offender. Or, if the litter problem appears to be more widespread, brainstorm and identify possible ways to improve the situation.

Summary Activity:
Youths will participate in a shoreline cleanup activity. They will identify different types of waste items and analyze their effect on aquatic wildlife, water and soil quality, as well as aesthetics of the outdoors.

Exhibit or Sharing Suggestions:
1. Create a display of the trash items that were found. Identify items that are recyclable, biodegradable or toxic and provide information on properly disposing them. Identify where the litter may have come from, or who might have been responsible for the litter. Include information on how the litter affects wildlife in the area.
2. Write an article describing the cleanup project and send it into the local newspaper. Include photos and a description of the group's primary activities (fishing!).
3. Create a display demonstrating responsible consumerism: products packaged in recyclable materials, low volume packaging (not using unnecessary packaging such as boxes, wrapping) the use of refillable containers, etc.).

Community Service and Giving Back Activities:
1. This activity *is* a community service project! Turn it into an annual event and encourage a Local City (yours) clean-up day.
2. Participate in "Adopt-A-Water-body" programs. If none exist in your area, start one!
3. If your community does not currently participate in a recycling program, help start one!

Extensions or Ways of Learning More:
1. Research how your state disposes of hazardous wastes, yard trimmings, and household waste products (states, regions, and cities each may have specific guidelines or regulations for waste disposal).
2. Identify and examine pollution sites within your region or state. Explore the problem. Look at "Areas of Concern" and examine the environmental impacts of the site. Review the "Remedial Action Plans" drawn up by local committees to help remedy the problem.
3. Examine and discuss worldwide pollution problems (air, water, acid rain, hazardous waste disposal etc.). Review events such as the Exxon *Valdez* oil spill in Alaska, radioactive leaks (Chernobyl, Three Mile Island) and others.

Links to Other Programs:
Check other 4-H projects for activities or concepts that involve litter, trash, or waste disposal. For example, in agricultural practices such as farming, livestock husbandry and other animal husbandry situations, properly disposal of wastes and chemicals such as fertilizers, herbicides, and insecticides must be taken.

Keeping a Fishing Field Journal

Shari Dann and Ron Howard Jr.

Objectives

Participating young people and adults will:

1. Record fishing experiences in a journal
2. Practice writing observations and outcomes
3. Practice a scientific communications skill
4. Enhance observation and reporting skills
5. Have fun while learning

Youth Development Objectives

Participating young people will:

1. Practice written communication skills
2. Learn the value of self-reflection
3. Develop planning and analytical skills
4. Enhance enjoyment of fishing and outdoor recreation
5. Enhance relationships through shared experiences

Roles for Teen and Junior Leaders

1. Share examples of their journal entries with members
2. Assist members with spelling or sketching entries
3. Share uses they have found for their journals

Potential Parental Involvement

1. See "Roles for Teen and Junior Leaders"
2. Assist members with making journal entries
3. Reinforce use of fishing journals at home
4. Encourage use of journal information to answer questions about fishing and fish

Evaluation Activities/Suggestions

1. Have youths read aloud from their journals if they are willing to share what they have written. Discuss each angler's journal entries.
2. Encourage (but don't require) members to share parts of their journal entries with parents.
3. Observe changes in journal entries with practice.

Best Time: During or after any fishing outing

Best Location: anywhere

Time Required: 10 to 40 minutes

Equipment/Materials

paper (100% cotton fiber is most waterproof)
pencils or permanent (waterproof) pens
clipboard or small 3-ring notebook
newsprint and markers

Safety Considerations

Some youths, particularly early adolescents, may record personal information they would rather not share. Respect their privacy, and encourage them to find some small part of their journal they are willing to share, or to share parts of entries with just one or two other teens.

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Lowenstein, S. 1987. A brief history of journal keeping. Pp. 87-97 in *The Journal Book* (T. Fulwiler, ed.). Boynton/Cook Publishers, Portsmouth NH.

Lesson Outline

Presentation	Application
I. Why keep a field journal A. Fishing related 1. Record of catch 2. Record of effort 3. Record of fish kept, released 4. Record of methods tried and results 5. Record of habitats fished 6. Basis for understanding changes in an area B. Fishery science or management related 1. To assist fisheries managers with 2. data 2. To better understand an area 3. To provide historical data describing fisheries from journal entries C. Personal enjoyment 1. Recording experiences a. Ease of recalling b. Accurate record of experiences 2. Sharing experiences with others	Ask youths to **BRAINSTORM** reasons that an angler might want to record information about their fishing trips? **LIST** their responses on newsprint or on a blackboard, grouping them in a manner similar to the outline. Be prepared for youngsters to list a variety of ideas, mostly concrete ideas such as to be able to find a good fishing hole over and over, and to remember where the big fish are. **USE** probing questions (for example, "Who else might use written notes...and why?") to encourage youths to see other good reasons for writing down information about their fishing outings.
II. What should or could be written about your fishing experiences? A. Working from memory 1. Forgetting important things 2. Losing lessons learned and experiences gained	One-minute field notes exercise [**NOTE**: This must be done after a fishing outing or other outdoor experience.] **ASK** youths to think privately (without talking) about their most recent fishing outing or outdoor experience. **TELL** them that they will have 1 minute to write down as much as possible about where they went and what happened. **NOTE** that spelling and grammar are not important for this exercise -listing everything they can remember or using running phrases is fine. Let them **WRITE** for 1 minute. Have each youth **SHARE** their writing with one or two others. **ASK** how easy it was to remember the details of the fishing experience. **QUESTION** if they have captured enough information to be able to return to the same place and fish in the same way just by reading what they had written 10 years from now. Lead them to **DISCUSS** their perspectives, emphasizing how important it is to record the details of our experiences while they are fresh in our minds. **STRESS** that the field journal is a structured way to keep certain records of our experiences, in order to enable us to return to the same spot time after time, or to remember our experiences and our enjoyment.
A. Heading information: 1. Date 2. Name(s) 3. Location (in detail) B. Body of entry: 1. Anyone who was with you	Ten-minute field journal exercise -- Ask youths to **BRAINSTORM** the types of information they might want to record after going fishing to remember details of their experiences. **RECORD** their responses on a newsprint pad or chalkboard. **HELP** them develop a list that includes: **Where** they were fishing

2. Time of day (and time zone information) a. Often written in the left margin
   b. Show time events occurred
3. Weather conditions
   a. Temperature
   b. Wind conditions
   c. Cloud cover
   d Precipitation
   e. Previous weather influences
   f. Weather changes during outing
4. Water conditions (as applicable)
   a. Water temperature
   b. Depth
   c. Current or tide conditions
   d. Wave conditions
   e. Water clarity (e.g Secchi disk depth)
5. Purpose(s) of your outing.
6. Time progression
7. Habitat descriptions
8. Appearance of fish or wildlife
   a. Markings
   b. Size
   c. Age and sex (if known)
9. Numbers of fish/wildlife
   a. Observed - seen, heard, etc.
   b. Caught or lost
   c. Kept or released
10. Wildlife behavior and surroundings
11. Fishing methods used
   a. Baits or lures
   b. Tackle
   c. Other equipment
   d. Techniques
12. Sketch maps or drawings
13. Notes on the activities of the day
   a. When did most fish hit
   b. Where were most fish caught
   c. What bait, lure, technique was most effective

What they did and observed
-**Where** the fish were located and reasons for their being there **What** methods and other tackle were tired
Any **likes or dislikes** about the experience
Reflections on the experience and things that might alter outcomes under similar conditions
Things to be tried next time

After the group develops their own list of what could be included in field notes, let them take 5 minutes to **WRITE** a journal entry about their last experience. **Optional**: have each youth share parts of his/her entry with one or two other youths.

Twenty-minute journal -- Full scientific format

TELL youths that many anglers choose to keep notes in something called a field journal, a way of keeping notes that is sometimes called a log, a logbook, or an angler's diary. **REVIEW** the format and components of a field journal with them (see Lesson Narrative for additional information). **SHOW** them your field journal, or a few pages of your field notes! (Nothing encourages kids to write like having role models reveal and share their own writing!) **TELL** them that now they will have a chance to write their own notes in full, scientific form. Let them **WRITE** a complete journal entry and **SHARE** their writing with one or two other youths.

CLOSE the session by reading from your own fishing journal entries, and discussing what they mean to you, or by reading from another writers' work (see References).

Summary Activity

1. Do a "One-Minute Journal" as a group or in small groups (see instructions, above, for the 1-minute field notes exercise.)

2. Do a "Memory-Walking" sketch of your fishing experience. Have youths recall where they started on their fishing excursion, and draw a simple line sketch of that place in their notes. Then, have them draw the other places that they visited during this excursion (as though drawing a sketch map). Finally, for each place that was drawn, have them add a few words to describe the place and their experiences there. This exercise is described in more detail in Hannah Hinchman's book: *A Life In Hand: Creating the Illuminated Journal*. It is a good teaching strategy for starting someone in the practice of journal-writing, and a good strategy for people who are visual learners or who enjoy sketching or drawing.

Lesson Narrative

Keeping a Fishing Field Journal

Why Should I Keep a Journal? – "The strongest memory is weaker than the palest ink." This statement, by an unknown source, sums up one value in keeping a field journal, or a fishing log, or diary. As we all know, memories of pleasant events fade with age! Recording observations, feelings, successes and failures, techniques and companions provides both information and enjoyment that cannot be retained from memory alone.

A field journal serves several purposes. First, it provides a detailed record of a field experience. (Of course, the level of detail must be provided by the person recording the experience.) The journal keeper may want to return to a specific, favorite outdoor location and may want to remember the exact conditions of the site and the exact observations of fish or wildlife. The journal keeper may also want to communicate his/her observation, so that any reader can return to the site and make additional observations for comparison. For example, an angler might use the journal to describe fishing conditions, to keep a checklist of fishes caught and methods used, and to make decisions about where and how to fish in the future. He or she also might wish to refer to the field notes to monitor changes in fish catch rates over time in an area. Finally, the angler may wish to share the journal with researchers and fisheries managers. Sometimes, biologists collect and read anglers notebooks to monitor fish populations, or to learn about the amount of fishing effort on a given body of water. Natural history museums or public libraries may even accept donations of well-written, organized field journals for their permanent files. Journals by early explorers, traders, settlers and travelers can provide both historical information and early observations of previously unknown fishes or records of fisheries resources available at the time of their writing.

Finally, and most importantly, a field journal can provide enjoyment for you. You can relive your experiences by reviewing your old field journal entries. By reading a journal entry (yours or someone else's') you can recall a pleasant summer fishing trip even in the midst of a stormy winter day! You'll be amazed, too, at how just writing the journal sharpens your observational skills; you'll see more while you're afield, and you'll have more to reflect upon after your experience.

How Do I Keep a Field Journal?
The style of recording field observations depends mainly on the purpose for which they will be used, and on the preferences of the writer! Above all, the notes should be clear and to the point. The format should be convenient for field use and easy to file and retrieve later. A few tips might be useful to help in maintaining a field journal.

- Use a looseleaf notebook (3-ring binder) for easy filing. (Some prefer file cards or bound notebooks.)
- If possible, use 100% cotton fiber paper (100% rag content); it doesn't disintegrate when wet.
- Try to leave completed journal pages at home. Some of your notes may not be replaceable if lost! You can never reconstruct complete notes from memory, and you may never witness the same event or catch the same fish!
- If you can, use waterproof ink and a drafting pen, not an ordinary ball point pen. (A pencil is a good second choice.) That way, you won't see your notes disappear when you take an accidental dunking or get caught outside in the rain.
- Reread old entries periodically. Besides being entertaining, this activity serves to motivate one to get outdoors more often and to continue keeping field notes!

Tips on Field Journal Format
In order to be useful, field journal notes need to be complete. Yet, the field journal is simply a series of brief entries, like in a diary. Two major components of the journal entry include 1) the heading and 2) the body. The heading should describe the location of your observations very specifically. The description should be detailed enough to allow someone unfamiliar with this area to locate it, now or in the future. Each time you change locations or start a new day or entry in the journal, you should record the following basic information in the heading:

- your name
- the date (written so it is not ambiguous)
- a page number (in case pages become separated) - usually written in the upper right hand corner of the page
- the specific location (distance and direction from nearest town or village, road names, and real name for the location such as the name of the body of water fished -- not a name that is used among your friends, or family members which isn't commonly known).
- the general location (county, state or province, and country if outside the U.S.)

Put this heading in the center of the page, and underline it (some use a wavy underline.) It should look something like this:

Journal — Shari Dann
13 May 2015

<u>Ovid Lake, Sleepy Hollow State Park,</u>
<u>1/4 mi. NE of corner of Price and Shepardsville Rds.,</u>
<u>Ovid Township, Clinton Co., MI</u>

The body of the journal entry should contain other background information, as well as your observation notes. First, be sure that you have included this information:

- describe who else was there with you
- time of day (and time zone information) - often written in the left margin, showing the time certain observations happened
- weather conditions (your observations might be influenced by such things as weather or amount of daylight)
- water conditions: water temperature, water depth, current and tides (if applicable), wave conditions, pH and secchi disk depth (if available)
- purpose(s) of your outing.

Then, write your observation notes as running phrases. Don't worry about grammar, but be sure you have recorded complete ideas. Make note of these types of things:

- time progression, weather changes
- habitat descriptions
- appearance of fish or wildlife: markings, size, age and sex (if known)
- numbers of fish/wildlife observed, caught, heard; numbers of fish kept or released (by species)
- behaviors (and the surroundings of the fish or wildlife as they behave in a certain way)
- fishing methods used: bait, lures, rods, reels, other equipment
- sketch maps, drawings
- notes such as: When (what time of day) did you catch most fish? Where were most fish caught? What bait(s) or lure(s) caught the most? How did you use baits or lures?

Record your notes carefully, and try to avoid changing them once they are recorded. If you change your notes, or try to copy them over, you might re-think your observations, and they may be less accurate! [If you do change something, be sure to record the date and time and to initial it, leaving the original notes as well.] Record your observations as soon as possible, in detailed phrases, ideally while in the field. And enjoy reading them.

What To Do With Younger Writers

Younger writers (and even some older writers) may prefer not to use the usual field journal format. Another popular format for recording field experiences is the checklist. Decide what information you want to record, and design your own checklist.

Birders, anglers, and other naturalists use a variety of types of notes. Some separate their angling or hunting experiences into a separate set of sporting notes. Another format is to write species accounts (observations of particular species of interest); yet another format is a specimen catalog (a listing of the locations, measurements, species and other information about specimens collected). All of these formats are useful. It is up to you to decide what format will be most useful to you and to any readers who see your writing! And, it is up to you to make field journal writing a fun part of outdoor enjoyment!

Exhibit or Sharing Suggestions

1. Publish a community or a club fishing 'newspaper' or submit an article to a local paper, based on your field journal entries and those of other club members.

2. Display your field journal at a local fair or science event. Consider making a poster to accompany your field journal; include such things as fishing techniques used, habitat type fished. Display actual tackle used, too.

3. Type your journal entries into a computer, word-processing file. Add graphics, video, information you collect (from doing readings) on fish species, habitats, etc. Create a multimedia show which is based upon your field notes!

Community Service and Giving Back Activities

1. Visit a housing facility for older citizens. Read your journal entries to someone who once fished or hunted. Share in listening to their memories of outdoor experiences. Help them to record their memories.

2. Write a thank-you note to those who have taken you fishing or who have provided access to a fishing site. Refer to your journal to share your experiences.

Extensions or Ways of Learning More

1. Make your own book for use as a journal. Develop some way to bind your journal pages together. Decorate the cover with sketches from your fishing trips, photos, or a □fish print□. Add quotes from anglers, outdoor and environmental writers, or sketches to some of the pages. Design your own format for journal pages.
2. Contact your state fisheries management agency. Find out if you can particpate in an angler diary program. These programs involve anglers in keeping records of fishing effort, fish caught, water quality conditions, and other important information. Fisheries agencies then use this information to make decisions about managing fish populations and habitats.

3. Read journal entries of other writers (see books by Aldo Leopold, Jimmy Carter, and others in References section of this lesson plan). Learn more about sketching techniques, and incorporate sketches into your journal entries. Set up a pen-pal correspondence with an angler from another part of the world. In your letters, use segments from your field journals. Ask for them to share their fishing field notes. Exchange videos along with your written field notes.

4. Invite a local outdoor writer to speak to your club or interview him/her. Ask about how, as a writer, this person keeps notes on outdoor experiences. Read the writers articles and/or books.

5. Find out if any local museums or libraries hold journals of early settlers or recreationists. Visit to view and read these materials.

Managing the Commons

Bruce E. Matthews[3], Kelly S. Carter[4] and Shari L. Dann[5]

Objectives
Participating young people and adults will:
1. Model and describe the dynamics of fishery communities
2. Model and describe basic concepts of carrying capacity, optimum sustainable yield (OSY), sustainable resources, commons resources and limiting factors
3. Discuss consequences of harvest strategies on commons resources
4. Develop understanding of personal responsibility for maintaining stable, healthy natural resources
Have fun while learning.

Youth Development Objectives
Participating young people will:
1. Understand the impacts of personal decision making
2. Increase communication and cooperation skills
3. Explore their personal conservation ethic
4. Consider personal responsibilities and behavior toward other anglers and other outdoor recreationists

Roles for Teen and Junior Leaders
Assist in setting up models and managing data
Assist with graphing and analyzing data for groups
Lead small group discussions of concepts
Assist groups with harvest strategies as needed

Potential Parental Involvement
See Roles for Teen and Junior Leaders above
Describe a tragedy of the commons event from their experience
Arrange for or provide teaching space. Arrange for or provide transportation
Arrange for or provide teaching materials

Best Time: Before a fishing outing or when studying fisheries management or outdoor ethics. This is a good activity to use when trying to explain the complexities of ecosystem management, stewardship, or simply living within our means.

Best Location: Indoors; outdoors if there is little wind.

Time Required: 45-60 minutes.

Equipment/Materials:
2-3 pounds of peanuts (or kidney beans or similar size objects)
1 package of Goldfish crackers
1 bowl or paper plate for every four participants
Fish Data Tablefor each group of participants
newsprint or chalkboard
pens or chalk
five index cards (optional)
for post-activity version #1
shoe box (with lid)
scissors
spoon

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[5] Assistant Professor and Extension Specialist, Department of Fisheries and Wildlife, Michigan State University, East Lansing, MI 48824-1222

Arrange for or provide refreshments

Evaluation Activities/Suggestions
1. Observe results of harvest data being graphed or placed in tables
2. Observe discussions of fish community dynamics as observed in the models
3. Observe implications drawn from the models and their applicability to fish communities and harvest
4. Observe identification or description of real examples of "tragedy-of-the-commons" or carrying capacity scenarios near home and around the world
5. Observe discussion of impacts of these events and voiced solutions or commitments to change

Safety Considerations
Be sure to provide adequate supervision while using scissors in preparation for the "blind fishing" component of this activity.

Conducting the Activity

Preparation
Prior to the activity, count out sets of fish for each lake to be sampled by the participants. Using peanuts, kidney beans or something similar in size as panfish or forage fish and Goldfish as predatory fish, count out 16 of the smaller and 4 of the larger fish. If desired use a larger number, but keep the ration of 4:1 intact. Prepackage enough of these to stock as many lakes as you will have groups, sealing each set in a sealable plastic bag. Placing a bowl or plate, the fish and all other supplies in a larger bag, makes set up for the exercise quick and easy.

Conducting the Exercise
When the participants assemble, divide them into groups of 4 and have each group sit around a table or in a small circle. Provide each group with a lake (a bowl or plate) stocked with the fish previously prepared. The number provided represents the carrying capacity of the lake. [***Note: if you intend to count out the fish, be sure to keep your counting unobtrusive to avoid calling the participants attention to the significance of the numbers.***] Provide each group with a copy of the Fish Data Table and a writing instrument.

Provide necessary background information, explaining that the container is a local lake or pond, providing a name to enhance the reality of the model. Explain that the lake is at its carrying capacity that is that it is stocked with as many fish of each type as it can support under the present conditions. [***Keep this simple! It is an introduction, not a final exam in ecology***.] Note that the Goldfish and the peanuts or beans each represent fish species. Assign species names that make sense for the area, allowing the peanuts or beans to represent common fish like bluegill, perch, suckers or carp and assigning to the models the Goldfish"

to a sportfish or commercially valuable species like black bass, striped bass, walleye, trout, or a similar species.

The rules for conducting the exercises are simple.

1. No talking while the groups are fishing!
2. Each participant is an angler, and each angler will fish during each bout of fishing.
3. Each angler may harvest from 0 to 3 fish during their turn.
4. The number and types of fish taken are the choice of the angler fishing.
5. Each bout of fishing (every angler fishing once) will represent a year.
6. At the end of each year, a new fish of each species will be recruited (added) for every fish of that species remaining in the lake. [***The original number of fish of each species in the lake, however, may not be exceeded***.]
7. Each angler should keep the fish they catch in front of them. (Anglers will be able to eat their catch later.)

Start the activity by opening the lake/pond/sea to fishing. Remind them that they are not allowed to talk while they are fishing and the maximum number they may take is three fish total. [***This may be a place to introduce the term aggregate that is used frequently in regulations***.] Have each angler keep his or her catch separately. Once each angler has had a chance to fish and take the number of fish they have decided to harvest, have each group record its annual catch (harvest) and the fish population (number of fish of each species remaining in the lake). If the Fish Data Tables are not used, the numbers should be recorded on a newsprint pad or chalkboard for each group. Determine the number of fish that can be recruited (the number of each species remaining, but not more than the original number for that species) and add the annual recruitment to the lake. [**Note that any population that is completely harvested cannot be replenished because that species has been extirpated (completely eliminated) from the lake!**]

Repeat the entire process for another year allowing each angler to determine his or her harvest and to take the fish they chose from the population. Record the annual catch and the fish population on the table, chalkboard or pad; and replenish the population according to the formula with recruited fish.

Remind the young people that they cannot talk until the exercise is over, and repeat the process for the third year. After the harvest has taken place, record the annual catch and fish population and allow recruitment to restock the lake. [***Note the alternative and additional ways of using this exercise listed below***.]

Discussion Ideas

1. Who caught the most fish?
   Refer to the fish each person has in front of them for the answer.
2. Which lake provided the greatest total harvest of fish?
   Refer to the table to determine total catches for each of the lakes in the exercise.
   Why?
   Anglers were able to maintain recruitment and keep the lake at or near its carrying capacity.

3. Which lake was fished out the soonest?
   Refer to the table to determine if any of the lakes were completely fished out or had a species extirpated during the exercise and when that took place.

Why?

If a species was fished to extinction in the lake, it was because the harvest exceeded the recruitment potential of the population.

4. Which species was wiped out first?

Refer to the table for this data.

Why did this happen?

Recruitment could not keep up with the harvest.

5. Why were fish replaced proportionally to the remaining stock and only if some remained in the lake?

Reproduction and recruitment require parental stock.

6. Why were fish only replaced to the total numbers that were originally in the lake?

That was established as the carrying capacity of the lake. The lake was not capable of sustaining more that number of each species.

7. What were the best strategies for sustained yield?

Proposed answers will vary, but taking half the fish each year would maximize the number that can be recruited and harvested in this example.

8. How did you feel as you played the game?

Did anyone take too many fish?

How did that make the other anglers feel?

Did everyone try to take as many fish as possible?

Why or why not?

Did fishing strategy change among anglers when fish stocks appear to become depleted?

All of these questions can produce excellent discussions. Be prepared to go with the flow and serve as a monitor for the resulting discussions.

9. What happens when anglers do not use a cooperative fishing strategy?

Fish stocks can be severely depleted or even extirpated leading to the tragedy of the commons as a result of the overfishing.

10. In a natural system, what management strategies might be used to influence populations, for example, managing to have more Goldfish?

Regulations like catch and release, size/bag limits, habitat improvement to increase carrying capacity, stocking, and similar things can be used to augment populations.

11. What kinds of local commons can you think of?

Answers will vary from parking spaces or parks to wildlife populations or seats in a classroom. Be prepared to accept any that are reasonable examples and have teen leaders ready to expand the sphere of thinking if necessary.

Can you think of natural resources that are common in the U.S.?

Allow this list to be as wide-ranging and broad as desired, trying to get it to include both commons resources and proprietary ones and both renewable and non-renewable types, e.g.fisheries, forests, wildlife, pasture and grazing lands, oil, natural gas, coal, water.

How do these resources differ?

Some, like forests, are renewable, while others, like natural gas and oil, are non-renewable.. Some are commons resources, owned by all people corporately, while others are proprietary resources, where possession of the resource may be vested in an individual, group or corporation. Some may be either type depending upon their location. For example, state or national forests are commons resources, while industrial forest or private forested lands are proprietary resources.

Are all natural resources considered commons resources throughout the world?

No, European traditions for fish and wildlife make them proprietary, while North American traditions regard them as commons resources. Water can be considered a commons resource in most of the eastern United States, but in water rights states (most of the western United States) it maybe considered at least partially a proprietary resource.

12. How do natural resources agencies manage commons resources?

As the representatives of the corporate body of the people, these agencies develop and enforce regulations, allocate (set apart) resources to various user groups, and generally control the use of commons resources for the common good, at least until a resource is rendered the private property of a legal taker of that resource, by catching and keeping a legal fish, for example.

13. Think ahead to the future. What advice would you leave for your great-grandchildren about fishing in this lake/pond/sea?

Answers will vary, but they should reflect improved understanding of the interactions of carrying capacity, harvest rates and recruitment and the influence of these factors on commons resources to prevent the tragedy of the commons. They should also reflect cooperative use to maintain sustainable resource populations.

Activity adaptations

VI. Activity adaptations for advanced learners:	- Now that the group is familiar with how this activity works, experiment with other versions listed below. You may want to have each group conduct a different version and compare results after they've fished for another three years. Or, you could have youths create their own versions by brainstorming variables that can affect fish population size (fertility of the system, predation, weather factors, availability of spawning habitat, human regulation, etc.).
A. Write versions on index cards	Write the different versions listed below on (or cut out on dashed lines) index cards and distribute among the groups.
B. Instructions for adapted versions	Instructions for the adapted activity are as follows: -Follow instructions in the original version of this activity, allowing each group to fish for three years. - At the end of each year, stop the groups and have them record their data. - Restock fish as before.
C. Eating the catch	- After three years, reward the anglers by allowing them to eat their catch.

D. Discuss results

- While snacking, have each group report their strategies and results and discuss their scenarios among the whole group.
-Which strategies do they believe provided the best chance for sustained fishing? Why?

Activity Variations:

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1. □Blind□ fishing:
   In this version, the lake's fish population size is unknown. Using a shallow box to represent the lake, cut a hole (two to three inches square) into the lid (a shoe box works nicely). Youths fish by reaching into the box with a spoon to catch their fish. Restock fish populations randomly (remember you don't know how many fish remain in the lake). Point out that this situation is similar to real-life fisheries management where people work from *estimates* of fish populations. Which fishing strategy would work best for this scenario? (cooperative) Why? How can managers regulate uncertain fish populations? (for commercial fishing operations - set quotas, conduct creel surveys, require catch reports; for recreational fishing - set size/bag, and seasons limits).

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2. Fishing with information:
   Conduct the original activity, but use your knowledge gained from playing it the first time (if people take out fish in limited numbers, the fishery has time to keep up with the harvest rate. In the long run, there will be more fish available in the lake. On the other hand, if people take fish too rapidly, people get fish for themselves very quickly, but the fish population does not have time to replenish itself. The fish population soon crashes!). Conduct the activity again with no talking. Did the knowledge gained while playing the original version result in longer, more successful fishing? Why, or why not?

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3. Fishing with strategy provided:
   One good strategy to use is for each person to take 1 or 2 fish most of the time. This will make the population last longer. Youths are free to make their own choice. Play again with no talking. Did this strategy result in more successful fishing? Did all youths cooperate in limiting their harvest? If so, how did this affect the outcome of the activity?

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4. Fishing with communication or cooperation allowed:
   Before beginning this version, take a few minutes to talk among your group about how you can successfully fish in a sustainable manner. During this version, the group may continue talking ask questions and decide together how many fish to harvest. Did this version result in successful fishing? How would this strategy be conducted in real life? (fishing cooperatives, councils, etc.)

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5. Fishing with competition
For this version, each person in the group must have at least one (or two) fish at the end of each year in order to survive. Those without the requisite survival fish must drop out. Play a few rounds, and then add new players to simulate an increase in human population. Play a few more rounds. Discuss the implications of human carrying capacity.

Summary Activity:
Youths will participate in an activity where they learn first-hand the effects of overfishing, fishery dynamics, and how carrying capacity works.

Lesson Narrative:

The Story of the "Tragedy of the Commons"

In colonial times, farmers grazed their animals in a pasture open to all, called a "commons." This pasture area (such as the Boston Commons) was owned by no one person, but held by the community as a whole. Since each farmer wanted to maximize his or her gain by keeping as many animals on the commons as possible, he or she gradually added more and more animals to the pasture. At first, there were few people and few animals, and diseases limited the number of animals. Later, though, there were enough animals added to the pasture to damage the grazing land. If enough damage was done, it could not be used by any of the farmers for their animals. This is the "Tragedy of the Commons." The challenge of avoiding the tragedy is to find ways to agree upon and regulate ways to limit the uses and abuses of commons resources or, in other words, to encourage stewardship of resources that people hold in common.

How fisheries can experience "tragedy of the commons"

In 1608, a Dutch statesman named Hugo Grotius proposed the principle of the freedom of the seas. The open ocean, including its fishes, was declared the property of all people. This statement may seem idealistic, but in 1608, no one could control the oceans because defining boundaries and then protecting them was essentially impossible. Ownership was not necessary in any case because the wealth of the oceans was believed inexhaustible people believed that the oceans held more fish than anyone could ever imagine needing or being able to catch. Since that time, the doctrine of freedom of the seas has been modified throughout history, but has remained the principle for the management of fishes, both marine and inland, as common property to this day.

Each area of land or water (and ultimately the planet), has a limit to the number of plants and animals that it can maintain in a healthy and stable population. Biologists refer to this as carrying capacity-the maximum number of a species that can be supported by the habitat. Carrying capacity is determined (or limited) by weather and season, characteristics such as rate of reproduction and age of maturity, availability or competition for spawning sites and food, disease, predation, and overall habitat quality. Clearly, these limiting factors vary from season to season and from year to year and may result in populations which fluctuate according to habitat and weather. Human activities can also affect carrying capacity by altering the habitat and community characteristics.

Fisheries managers attempt to maintain fish populations near their natural carrying capacity so that an optimum amount of fish can be harvested each year. This amount is called "optimum sustainable yield" (OSY). This rate is considered carefully for each species of commercially harvested fish so that overfishing will not occur and endanger the reproductive stock. To establish optimum sustainable yield,

fishery-specific information is needed about biological, ecological, economic, and sociological aspects of fishery use are considered. OSY recognizes the diversity of aquatic ecosystems and the diversity of human needs in relation to them. Managers regulate recreational fisheries by setting bag and size limits, and establishing seasons. This is so that there will be enough mature fish remaining to reproduce and provide for a stable fishery year after year. When a species is having difficulty maintaining a stable population size, sometimes catch and release restrictions are imposed so that fish populations do not decrease further. Closed seasons and stocking are other ways managers help fish recover from low population densities.

Modern fisheries management requires a mastery of more than the technical problems associated with fish and water. Balancing the system, the habitat, related species, and people is a process that with today's resource demands, usually requires regulations and careful monitoring of populations and human activities. Because fish and other natural resources are considered common property, the cooperation and communication of all people enjoying and benefiting from the resource is important.

"That which is common to the greatest number gets the least amount of care. Men pay most attention to what is their own. They care less for what is common."

- Aristotle

"The frog does not drink up the pond in which he lives."

- Native proverb

Exhibit or Sharing Suggestions:
Create a poster of the activity results to display at a fair or science event. A table is a good format to display this type of information clearly and easily. Youths should consider including a narrative of the scenario to support their data table.

The above display can be enhanced by comparing an actual "tragedy of the commons" or over harvesting event in history. Newspaper clippings, journal articles and photos of an event can be displayed to compare with their activity results.

Identify a similar "tragedy of the commons" within the local community. After researching the issue, write a newspaper article or letter to the editor to help communicate the problem to the community.

Community Service and Giving Back Activities:
Develop a management plan for a local "tragedy of the commons" problem which they have identified within the community (see description under Exhibit or Sharing Suggestions). Attend a local planning meeting and submit the management plan, or join a committee to review the situation and develop strategies to remedy the problem.

Extensions or Ways of Learning More:
Interview commercial fishing operators and compare current harvest rates with historic fishery information researched from local archives.

Have a fisheries symposium at your club. Be sure to invite a varied panel of guests including; commercial fishing operators, retired "old-timers," guides, charter captains, fisheries agency biologists and researchers, and local fisheries and wildlife university faculty or students.

Contact your state fisheries management agency and request annual harvest information on your favorite fish species or lake/stream.

Encourage youths to follow local and worldwide commercial fishery news. Encourage youths to read and clip fisheries articles out of the newspaper, watch television reports, or scan various sources on the internet. Or, have youths research a fishery (either recreational or commercial) and report their findings.

Links to Other Programs:
Check other 4-H projects for activities that involve use of commons resources, such as agricultural projects involving raising livestock.

Link this activity with other 4-H Sportfishing curricula:

- Introduction to Fishing
- Going Fishing
- What to Fish For
- Finding a Place to Fish
- Fishing for Stories
- Regional Fish Foodways

Appropriate links with other programs include:

- Project WILD - Aquatic (see references for source)
  - Where Have All the Salmon Gone?
  - Turtle Hurdles
  - Net Gain, Net Effect
  - Hooks and Ladders
  - Watered Down Waterways
- Aquatic Times

	Number of fish remaining in lake	Number of fish caught per person*	Number of fish caught per group
Lake group :____ Annual catch each year: Annual catch each year - version 1:			
Lake group:____ Annual catch each year: Annual catch each year - version 2:			
Lake group:____ Annual catch each year: Annual catch each year version 3:			
Lake group:____ Annual catch each year: Annual catch each year - version 4:			
Lake group: ____ Annual catch each year: Annual catch each			

*List each person’s catch.

The Collapse of the Commons Activity Worksheet

Estimating Fish Population

In the Classroom

From Missouri Dept. of Conservation
Aquatic Field and Classroom Activities - Conservation Education Series

Rodney Green

Leader note: This lesson is very similar to the Estimating Fish Population unit in the 4-H Sportfishing curriculum – only using bait fish instead of beans.

Overview:

Although sophisticated equipment and training is needed to carry out fish population estimates in streams, ponds, or lakes, a simulation can be effectively implemented in the school laboratory.

In the exercise the students will not manage wild populations of fish in their natural habitats, however, the investigation will allow a practical hands-on understanding of assessing fish population numbers.

Because of variability of the numbers of fish and the size of the tank used in the aquatic system simulation, the teacher should allow the artificial flexibility in the numbers and types of collection devices used to sample the artificial population. A thorough explanation of the activity should prepare students to conduct the exercise within the constraints of individual classroom circumstances. **Note:** Teachers may want to make samples and run through the investigation to better prepare students for variables encountered within the particular study.

Materials:

1. 20 Gallon tank with aerator (a smaller one may by substituted)
2. Small holding container (suitable for holding small numbers of fish for a short period of time)
3. Population of fish (minnows of same species purchased at bait store or, with proper permit sieves from local stream)
4. Aquarium dip net or small strainer (one per group)
5. Notebook and pencil

Leader/ Student Instructions:

1. Prepare a 20-gallon or other suitable aquarium for receiving fish (the size of the tank and the number of fish my be reduced or increased according to availability and expense). Covering the sides of the aquarium with opaque paper may prevent scaring the fish and in crease the accuracy of the estimate.
2. Purchase or otherwise secure 40-50 fish of the same species to comprise the artificial population. A variation could use a mixture of species for a multiple population study. **Remember:** A large population of fish cannot be maintained in an aquarium for a long period of time. Wild fish should be released in a nearby pond or stream as soon as possible after the activity is completed. Commercial minnows might be donated to a local fisherman.
3. Divide students into groups of three or four.
4. Each student group should *independently* make a sample collection from the tank. One complete sweep through the tank with a small strainer or aquarium net should provide an adequate sample. If collections are not adequate using this method us a variation.
    a. Fish collected in the single sweep should be help in another container, and then marked for future recognition by clipping the top of the tail fin.
    b. After being marked, the captured fish should be returned to the “wild” laboratory population. **Remember:** Handle the captured fish with care: some smaller species of fish are particularly subject to stress mortality from capture and handling.

5. Each group should then make a recapture run – one sweep through the tank with the same small strainer or net in the same manner.
    a. Marked fish collected in the recapture should be held in a separate aerated container from those that are unmarked.
    b. Records should be kept as to: **C**= the total number of fish species observed (captured and checked for presence of mark during sample census run) **R**= the total number of marked fish recaptured in the population during sample census. **M**= the number of fish captured, marked, and released, in the system.
    c. Using the Peterson Formula, an estimate of the population size at the time of marking (single species in a closed system), **N** can be calculated (see *Fisheries Management* instructional unit).

Peterson Formula – N = M (C) / R

6. To reflect a more accurate estimate of population numbers, the student groups should carry out multiple recapture runs. Upon recapture, the following data should be collected: C_t = Total number of fish observed for presence of mark on day t

M_t = Total number of fish marked at large on day t

R_t = number of marked fish that were recaptured during day t

$\sum$ = the accumulative sum of

t_n = at given day of capture

The Schnable Formula can be used to calculate population numbers for multiple captures (see *Fisheries Management* instructional unit).

Schnable Formula – $N = \frac{\sum (C_t \quad M_t)}{\sum \quad R_t}$

7. After each recapture run, all fish not previously marked should be marked and returned to the tank as soon as possible.
8. After each recapture run, the date can be plugged into the Schnable Formula for increasingly accurate population estimates
9. Population estimates completed by each student group can be checked against the actual number of fish as determined by the instructor at the beginning of this activity.
10. Return students to sharing circle or classroom for data presentation and discussion.

Discussion Questions

1. What conditions present in a pond or stream were not present in this controlled environment? How might the presence or absence of these factors affect population estimates?
2. How many recapture runs did each group make? Were the estimates of the groups that made more recaptures runs more accurate than those of the groups making fewer runs? If not, what factors might have caused less accuracy in the estimates?
3. How close were estimates to the actual number of fish present in the system? What may have influenced very high or very low estimates?
4. The fish in the exercise were all of similar size. How might a variety of sizes in fish affect a population estimate?
5. Did you notice that the fish gathered in one area, or were they scattered throughout the aquatic system? What effect did it have on your estimates? How can this be related to the pond or stream?

Fish Populations of a Pond

From Missouri Dept. of Conservation
Aquatic Field and Classroom Activities–Conservation Education Series

Rodney Green

Overview:

Every pond, lake, or stream has a specific carrying capacity that determines the maximum pounds of fish that it can support. The carrying capacity varies with the annual fluctuations. The more enriched the system, up to a point, the more fish it will yield.

Most Missouri ponds are stocked with bluegill, largemouth bass, and channel catfish in a balanced ration suitable to the geographic area. Bluegills eat small aquatic invertebrates and zooplankton, and the larger predatory bass feed primarily upon the bluegill, other vertebrates, and larger invertebrate species. Channel catfish are omnivorous feeders that seldom affect the balance of the other two species. If the catfish spawn, their young are quickly eliminated by predation by both bluegill, and bass.

The pond can sustain only a given biomass of fishes. Even if the population of Bluegill and Bass are out of balance, with an overpopulation of either species, the pond still contains the same total poundage of fishes – according to its carrying capacity.

Fisheries management attempts to keep the various fish populations in a balance desired by fishermen. If too many of a species are competing for a given amount of food, most of the food energy is used for basic metabolism rather than growth. This results in a large population of stunted, undesirable fish.

Thus, information about the population's dynamics – numbers, ages, and growth of fishes – in a pond is useful in managing the fisheries of the system. Aging, measuring, and weighing fish and comparing the data to the growth rates of other populations can assess the general conditions of the fisheries. Management plans can then be developed and practices implemented to improve the fisheries of the system.

While the pond or stream as an aquatic system is studied in its entirety to better determine the potential for fisheries management, it is also necessary for the biologist to gain an understanding of the population characteristics f fish in the body of water. A population (members of a single species) in the pond is a reproducing group of individuals of various sizes and ages whose total numbers are constantly fluctuating as a result of fatality and mortality. (Though not naturally important in a pond, migration also affects population numbers in certain species and habitats.)

A healthy population of wild fish in natural waters usually consists of varied sizes and age classes. In smaller, improperly balanced ponds, it is not unusual to find an abundance of uniformly sized fish with a slow growth rate and few older stunted individuals of the same species.

CTENOID SCALES

CYCLOID SCALES

In this activity students will use methods to collect as many fish in a population (members of a single species) as possible in the given situation and time span. Students will age, measure, and weigh the fish that are captured. Since a minimum of 40-60 fish (total for entire class) of the same species is needed for this investigation, a pond with a well-established bluegill population would be an excellent choice for this study. This investigation makes no attempt to ascertain total fish numbers: it merely takes a look at the distribution and condition of individuals that are collected. Contacting a Missouri Department of Conservation fisheries biologist working in your area might provide specimens for your examination.

The minimization of harm to the fish collected and handled must be of primary concern. Each group of students should weigh, measure, with minimal stress to the fish before they are returned to the water. Any surface, including students' hands that contacts the fish should be kept wet to prevent removal of protective mucous layers on the fish's skin. Each group should be reminded to keep their collection container constantly aerated.

Materials:

Each group will need:

1. Fish Seines, minnow seines, or other traps
2. Measuring boards, yardsticks, or meter sticks
3. Accurate weight scales, postage- type preferred, with platform on which to lay the fish to be weighed
4. Fish holding containers –five gallon buckets with aeration source (Water may be strained off and fresh added as needed to maintain proper oxygenation in container.) **Important:** Make sure that the container never held lethal chemicals; fish are extremely sensitive to minute quantities of chemical pollution from residues that might still exist, even after the container is washed many times.
5. Wading equipment (chest waders or sneakers and old clothes, and personal floatation devices where necessary)
6. Paper and pencils – the ink of a ballpoint pen smudges when splashed with water.
7. Small fish scale collection envelopes, one for each fish from which scales will be sampled.
8. Pocketknife or similar fish scale scraping device.
9. Graph paper
10. Laboratory scale ageing equipment: microscopes, hand lens, microscope slides, white glue and detergent.
11. Preservation materials (Formalin in 30 % solution or ethyl alcohol are preferred)

Leader/Student Instructions:

1. Divide students into groups of three to five.
2. Demonstrate the use of each piece of equipment (see *Fisheries Management* instructional unit).
3. Using appropriate methods, collect fish of a single species in as large a number as possible and hold in properly oxygenated containers until data can be collected.
4. Record fishes, other that the target species, caught and returned to water. Describe their general appearance, i.e., size, condition, behavior. While no special attention will be given incidental species, observation of numbers and individual conditions may give valuable insight into total health of populations of the fishes in the system.
5. Working quickly but effectively, each group should make data collections from their samples (remember, keep hands wet during gentle handling to prevent harm to fish).

a. Total length measurements should be taken by laying the fish on a wet measuring board and recording total length from the tip of the snout/ lower jaw to the tip of the dorso-ventrally compressed tail fins.
b. Weight measurement should be taken on a wet scale platform. If fish are very small, several may be weighed together and averaged.
c. Scale samples must be taken with great care so as not to injure the fish, according to methods described in the text of this instructional manual. A couple of scales from each fish, except for obvious young- of-the –year fingerlings, should be placed in an envelope and recorded with the following data:
    i. Group Identification
    ii. Date of collection
    iii. Location of collection
    iv. Length of fish
    v. Weight of fish
    vi. Any other data, such as methods of capture, etc., that the students or teacher requires for continued studies

6. Small samples of fish may be preserved and returned to the classroom for a more detailed examination and identification exercise, as desired.

7. After field investigations are complete, the scales can be aged through the use of a low power microscope. The scales should be washed in detergent, dried and fixed with white glue to microscope glass slides, which can then be labeled for identification. **Remember:** Annual growth rings, annuli that accumulate on fish scales are not always easy to distinguish. Extremely low growth die to diet, unusual climatic conditions, or severe system disruptions can cause the development of false annuli. If problems arise in aging the scales, a Missouri Department of Conservation fisheries biologist can be consulted.
8. Data accumulated by each group should be shard with the
9. class for population graphing which will result in a truer population composite (experiment with line, bar, and dot graphs to see which best illustrates the information)
    a. Graph the weights of the fish (x axis) / lengths of the fish (y axis)
    b. Graph lengths of the fish (x axis) / number of fish in each length range (y axis)
    c. Graph lengths of the fish (x axis)/ age distribution of fish (y axis)

2 years

3 years

Discussion Questions:

Teacher: This exercise is only one part of the complex web of diagnosis of a fisheries population. Don't be alarmed if concrete conclusions do not result: The First steps of inquiry and understanding have been initiated.

Still working in small groups, answer the following questions:

1. How many age classes of fish resulted from the collections?

2. **Remember:** A healthy population of wild fish in natural waters is usually an assemblage of varied sizes and age classes. But it is not uncommon to find an abundance of uniformly sized fish, most often stunted, such a bluegill or bass in ponds. Did the entire populations show up separated according to the age classes (refer to the "Length- Frequency Method" section in the *Fisheries Management* instructional unit)?
3. From general observation, did the entire population of just certain age classes appear stunted? **Remember:** Stunted fish result from too much competition for available food and a system out-of-balance for desirable fisheries production.
4. Explain the significance of the three completed graphs – weights/ lengths, lengths/ numbers, and lengths/ age distribution—in understanding the fisheries dynamics of the pond.
5. What management practices would you implement to make the bluegill population produce fewer but larger individuals?
6. After discussing these questions, small groups should present their data, answers, and conclusions, to the entire class for total class discussion.

If Tackle Could Talk, Oh, What (Big Fish) Tales it Would Tell

Kelly S. Carter , Michigan State University

Objectives

Participants will:

- Identify and categorize tackle box items
- Learn and describe different tackle purposes
- Use information found in tackle box to describe the tackle box owner
- Have fun while learning

Youth Development Objectives

Participating youth will:

1. Practice and develop observation skills
2. Practice and develop deductive reasoning skills
3. Practice and develop the art of story telling
4. Gain confidence and self-esteem as they interact in a group

Roles for Teen and Junior Leaders

1. Assist younger members with identifying and describing tackle gear.

Potential Parental Involvement

1. Bring in their tackle boxes and other fishing equipment and paraphernalia for youth to identify.
2. Relate actual fishing stories to youth in a walk down memory lane.

Evaluation Activities/Suggestions

1. Youth should be able to identify and describe tackle gear and type of fishing it is used for.
2. Youth are able to describe how other members of their group like to fish.

Best Time: Early in the formation of your group, as a mixer to get acquainted.

Best Location: Anywhere

Time: Dependent on size of group. Allow 5-10 minutes for each person of the group.

Equipment/Materials

Each member:

- ✓ Tackle box or a supply of fishing gear (this activity works best if tackle box belongs to participating members-but borrowed gear from someone they fish with or know well will works too)
- ✓ Fishing related paraphernalia (i.e. fish postcard, hats, recipes, etc.)
- ✓ Paper and pens - for each member (optional) Younger youth may need to write their thoughts down, older youth may feel more comfortable-talking in the group spontaneously
- ✓ Paper bags (optional)

Note: It helps to have someone available who is knowledgeable about tackle and tackle history.

Safety Considerations

The atmosphere should be open and respectful. Members should be careful while handling hooks and other sharp objects. Members should take care when handling old, valuable, or delicate items.

Reference

This activity has been adapted from the 4-H Sportfishing *"Museum in a Box"* activity by Lu Anne Kozma.

Recommended Reading

Lyons, Nick, 1974. *The Legacy* in Fishing Widows, Crown Publishing Inc. New York, NY 154 pp

LESSON OUTLINE

Presentation	Application
1. Collect tackle boxes	When your group first meets together, **COLLECT** their tackle boxes and set them aside with the leader. You may want to put the tackle boxes inside paper bags-the idea is that youth don't know which box belongs to whom.
2. Gaither in a circle	Have youth **GATHER IN A CIRCLE** (table is optional)
3. Distribute tackle boxes (and pens and paper if needed) A. Respect for tackle box items	Randomly **DISTRIBUTE** the tackle boxes or gear to each member. Be sure that a member does not receive their own gear **EMPHASIZE** that each participant should **RESPECT** the tackle boxes and gear. Treat items with care and attempt to maintain the original order
4. Explain the activity A. Record thoughts	**EXPLAIN** that they will be looking through the tackle boxes and examining the gear to determine who the box belongs to. Have them **RECORD** their thoughts on a slip on paper (they will leave this recording of the "Fish Tale" in the tackle box for the owner to keep, revisit and enjoy later).
B. Respect for tackle box owner	**EMPHASIZE** that the participants should demonstrate a **RESPECT** for the owners feelings while reviewing the tackle items and describing the owner: what is said about them, etc.
C. Things to consider while examining the boxes	**ADVISE** youth that they don't shout out whose box/gear they think they have, this will keep the activity interesting for the whole group. This activity should be done with talking kept to a minimum. Youth will have plenty of time to share the treasures that they find amongst each other when it comes time for them to tell their "fish tale". Suggest that youth look at the type of tackle in the box and consider the following questions: • What type of fishing does the owner like to do? • How is the tackle organized (or not organized) Does this say something about the type of person this tackle belongs to? • Can they decipher any "stories" out of the gear or other items they find in the tackle box? (i.e.

fishing license-maybe it's out of state, maybe it's new or extremely old…)

- What type of box is the gear in? Why might this be? Does it suggest how the owner likes to fish? Or what the owner fishes for?

5. Exchange "fish tales"
   A. Keep the box
   B. Describe the gear
   C. Spin a "tale"
   D. Guess who
   E. Reveal owner's name after the tale

One at a time, have each youth tell their "**Fish Tale**" by describing the gear in their tackle box: what the gear means and what it says about the owner. They should keep the box in front of them, pull out tackle and other items and talk about these treasures! They will return the box to the owner after the whole group has taken a turn talking.

Also, it can be more suspenseful and fun if they **GUESS WHO** the owner is *after* discussing all the gear and **TELLING** their Fish Tale.

Example: *"This person is probably a bass angler. See, they have plugs and spinner baits. Look at this old Devle Bug (or old Heddon River Runt)! Geez, you don't see many of those around. Maybe this angler is older…maybe 60 or so…or maybe their dad or mom or grandparent gave it to them. They either don't want wrinkles, are fair skinned or just safety conscious because they have a tube of sunscreen in their tackle box. They have a tape measure in their box, so they are either an ethical angler--want to be sure that they are following size limits, or, maybe they just like to see if they've caught a trophy fish. This person is really organized. Just look at this box!..or this person is more interested in the fishin' than in how his/her box is organized…from what I see, I think that this box belongs to…_____."*

Leaders Note: It is helpful to have someone available that is knowledgeable about tackle and tackle history

While youth are exchanging "fish tales" the Leader should make sure that youth don't get rude or disrespectful. The leader should also advise youth that someone else will be "analyzing" their box, and making assumptions about what the tackle says about them as well.

6. Return boxes to owners

Once each member has had a turn at telling their tackle tale have them **RETURN** the tackle boxes or gear to the rightful owner. Don't forget to have the storyteller leave their "fish tale" in the tackle box!

7. Tackle box owner describes themselves and their fishing interests

The rightful owner should reveal him/herself. They can take a minute or two to **TALK** about themselves and how they heard themselves

described, or about specific tackle items that were highlighted.

Summary Activity

Using observational skills, youth will identify, categorize, and describe the tackle in someone else's tackle box. They will use this information to determine what type of fishing this person enjoys, and how the tackle and other paraphernalia in the box can leave clues about other interesting characteristics about the tackle box owner.

LESSON NARRATIVE

"…What was here to be found was not a thing. Things separated from their stories have no meaning. They are only shapes. Of certain size and color. A certain weight. When their meaning has become lost to us they no longer have even a name. The story, on the other hand, can never be lost from its place in the world for it is that place."

- Cormac McCarthy, 1994 in *The Crossing*

Read *The Legacy*, by Nick Lyons in Fishing Widows. This is a wonderful story about a young man who has a chance to learn about his absent father after inheriting his fishing gear.

Exhibit or Sharing Suggestions

Create a tackle box display, writing the "tackle tale" on small cards next to the tackle items.
Write about your "tackle tale" and submit it to a local newspaper or place it in your journal for future reading.

Community Service and Giving Back Activities

Help a local museum or library create a fishing display (use local or regional made fishing gear, photos, and "stories" (either published or those your write up after interviewing local anglers, "old-timers" or fishing celebrities), home-made tackle (lures, flies, etc).

Extensions or Ways of Learning More

1. Conduct the following 4-H Sportfishing People and Fish activities: "Museum in a Box" and "Fishing for Stories".
2. Invite "old timers" to your meeting and have them tell tales about their fishing experiences. Encourage them to take a "walk down memory lane" by bringing their boxes, describing their tackle, where they got it, fish they caught (or didn't catch) with it and other interesting stories related to fishing.
3. Collect lures and other memorabilia

Fishing for Stories

LuAnne G. Kozma, Michigan State University Museum

Objectives
Participating young people and adults will:
1. Describe a folk tradition related to fishing
2. Practice interviewing someone about fishing experiences
3. Investigate fishing traditions
4. Have fun while learning

Youth Development Objectives
Participating young people will:
1. Enhance interpersonal communication skills
2. Practice active listening
3. Enhance cultural awareness
4. Practice oral and written communication skills
5. Expand understanding of diverse traditions and cultures

Roles for Teen and Junior Leaders
1. Assist younger 4-Hers in developing good questions
2. Assist younger members with interviews
3. Assist in writing reports based on group interviews
4. Assemble interviews into collected stories

Potential Parental Involvement:
1. See □Roles for Teen and Junior Leaders□ above
2. Suggest people to interview
3. Arrange for interviews with local anglers
4. Accompany interviewers with local visits
5. Provide editorial advice and support

Evaluation Activities/Suggestions
1. Have 4-Hers listen to the tape-recorded interviews with other club members and note what kinds of questions could be asked in a follow-up interview.
2. Determine ways to improve interviewing methods.
3. Observe insight and communications of participants.
4. Observe teamwork and cooperation among youth.
5. Observe intergenerational communication in the program

Best Times: First meeting: at a club meeting
Second meeting: At a library
Interviews: On a fishing trip or visiting bait or tackle shops

Best Location: Inside, away from distractions

Time Required: 6-8 hours total

Equipment/Materials
Recording device
Plug-in Microphone (opt)
camera
pen or pencil and paper
maps of local area
computer and printer
filing box (opt)

Safety Considerations
Youth should not interview alone; encourage members to go in pairs or small groups, gain permission to enter homes and workplaces, and have adult supervision.

Lesson Outline

Presentation	Application
I. What is folklore? A. Traditions shared in common by people 1. Learned informally by word of mouth 2. Types of folklore or folklife a. Traditional foods b. Stories c. Songs d. Sayings e. Beliefs f. Games g. Arts and dance h. Work skills I. Crafts j. Celebrations k. Architecture B. Shared cultures yield shared folklore 1. Traditions shared by different groups 2. Multiple sets of folk traditions 3. Constantly changing a. Old and new combined b. Living tradition	**PREPARE** the group by playing a game of "telephone." Have members sit in a circle. Whisper a short story to the first member and have them whisper it to the next one until the story makes it around to the last member. Have the last member tell what they heard to the whole group aloud. Repeat the original story. Ask how the story was changed with the telling. **EXPLAIN** what folklore is and that everyone has some such traditions. **DISCUSS** some of the types of traditions that can be investigated.
II. Types of folklore to investigate. A. Techniques and tactics 1. Kind of fishing being done 2. Local materials or procedures B. Words, phrases, sayings and gestures C. Customs and rituals D. Beliefs 1. About good or bad luck 2. About weather and its influences E. Oral traditions 1. Personal experiences	**BRAINSTORM** some of the folkways that your group can investigate using small groups, then larger ones to build your list. **USE** the list provided as a starting point if desired.

2. Fishing stories of all kinds
  a. Songs
    b. Legends
    c. Rhymes and limericks
    d. Jokes and tall tales
  F. Local names
    1. Local place names
    2. Local names for wildlife
      a. Fish species
      b. Waterbirds
      c. Other animals
  G. Food traditions involving seafood
  H. Folk medicines or treatments
    1. Seasickness
    2. Injuries
  I. Celebrations
    1. Blessing the fleet
    2. Opening day
    3. Community seafood festivals
  J. Materials made for fishing
    1. Boats
    2. Nets
    3. Traps
    4. Lures
    5. Anchors
    6. Bait containers
    7. Buildings
      a. Net lofts
      b. Shucking houses
      c. Bait camps or bait shacks
      d. Fish camps
    8. Fishing clothing
III. Finding folklore
  A. Finding someone to interview
    1.Relatives, neighbors and friends first
    2. Sources for new people
      a. Bait and tackle shops
      b. Marinas
      c. Commercial fishing locations
      d. Fishing clubs
      e. Local fishing areas
  B. Someone you feel comfortable with

BRAINSTORM people who could be asked to be interviewed, identifying at least one person for every two members on the group so members can interview in teams.

1. Friendly and willing to talk
2. Explain your purpose
   a. Investigating traditions
   b. Permission to tape record or write

C. Background research
1. Learn more about the person
2. Learn about their fishing
   a. Locations and methods
   b. Type of fishing being done
3. Other areas for research
   a. Library
   b. Historical society
   c. Museum
4. Research topics
   a. Fishing techniques
   b. Environment of the area
   c. Life cycles of the fish being caught
   d. Community history and other facts
      1) Maps and nautical charts
      2) Other background information

D. Conduction an interview
1. Get permission first
   a. On tape
   b. Consent form or letter
2. Basic questions first
   a. Full name
   b. Where and when born
   c. Parents□ names
   d. Where grew up
3. Person and traditions being studied
   a. Who, what, where, when, why, how, and which
   b. Encourage explaining
4. Limit interview time
   a. About an hour maximum
   b. Go back again if necessary
   c. Thank you note to person
5. If recorder used
   a. Familiar with equipment

REVIEW basic interviewing techniques.

ASSIST participant teams in writing interview questions for their interviews. **START** with a standard list of basic questions, then develop specialized questions now or in the next meeting.

CONSIDER using a mock interview to prepare the participants for live interviews with their interviewees.

REVIEW protocols and use of the equipment before the participants hold a live interview.

FOLLOW UP with the interview, writing up the interview and collating them into a composite.

b. Extra tapes
c. Record one side only for durability

Summary Activity
Use as many meetings as needed to prepare participant teams for their interviews, conduct the interviews, write them for sharing and share them with each other. Be sure to include a glossary of words or phrases used by the interviewees with their meanings or definitions.

Lesson Narrative
Everyone who fishes knows a wealth of information. To tap that knowledge, try interviewing someone who has fished for a long time to learn about fishing traditions and culture directly from an expert a tradition bearer.

What Is Folklore?
Folklore, or folklife, includes the traditions we share with people who have something in common with us. We learn traditions informally by word of mouth or by example, from other people rather than from books or in classes. Folk traditions include foods, stories, songs, sayings, beliefs, games, art, dance, work skills, crafts, celebrations, and architecture. Because we share different kinds of interests with different people, we may share different kinds of folk traditions with each group. For example, you might celebrate a birthday in your family by playing a practical joke, use a saying you share only with your friends, eat a certain dinner only at your grandparents' house, share a dialect with other people in your region, and tell a joke on a fishing trip that only other anglers would understand. Folklore is both old and new--it changes all the time. As you can see, it's not just something our ancestors did; it is the living traditions we do today.

Types of Fishing Traditions to Investigate
The types of fishing traditions to investigate are almost unlimited. The techniques involved in a particular kind of fishing, even the use of the tackle and materials and the steps used in the process are one example. Specialized language, canonized phrases or sayings, or even the gestures used in telling fishing stories are a rich field of experience. Every type of fishing and every region has customs and rituals that are associated with their angling experience. Beliefs about good or bad luck, best times and locations to catch a particular type of fish or even the influence of weather are common and very strong. Oral traditions, like stories of personal experiences, jokes, and much more can be part of the tradition as well. Local place names, colloquial names for fish, waterbirds and other animals are also a rich area for folklore investigation. The food traditions with fish and seafood are common among many localities and groups. Folk medicines or treatments for problems like seasickness, spine stings, poison ivy, stinging nettle or other challenges confronted by anglers might be interesting to the folklorist.

Local celebrations and traditions within the society as well as local foods, fishing related crafts or architecture can also be rich areas to study. Blessing of the fleet, community seafood festivals, local traditions in building boats, boat houses, nets, anchors, bait containers, traps or other tackle or buildings as well as clothing is a very fruitful area for research.

Finding Someone to Interview

Talk to relatives, neighbors, and friends first. If you want to interview someone completely new, try asking at the local library, bait and tackle shop, marine supply store, commercial fishery, marina, seafood outlet, or fishing club. Select someone you feel comfortable with, who is friendly and willing to talk. Explain that you would like to tape-record the interview and get their permission to do so.

Doing Background Research

Once you've selected who you will interview, learn a little more about the person and the places he or she fishes so that you are better prepared to ask good questions. Spend some time in the local library, historical society, or museum to learn more about the kind of fishing you are investigating, the natural environment of the area, the life cycles of the species of fish involved, and the community in which the person lives. Look at maps and nautical charts that might help you better understand the region and the water.

Conducting the Interview

Get the interviewee's permission to be interviewed, and have the person sign a consent form or brief letter. You can make your own form, with wording like: "I agree to be interviewed by (name of 4-Her) on June 14, 2015, for the purposes of her 4-H project." Then have the person sign the form.

It's best to ask some basic questions first, such as: What is your full name? Where and when were you born? What were your parents' names? Where did you grow up? The rest of the questions can be about the person and the tradition you are investigating. Start questions with words like who, what, where, when, why, how, and which. This encourages the person to explain the answers, rather than just answering "yes" or "no."

Use a recording device. Practice using your equipment before you arrive at the interview. Keep your interview to one hour or so. Interviewing is a tiring experience for both of you. Send a thank you letter to the person soon after the interview.
You could go through a mock interview using yourself and another leader, teen leader, or one of the members to demonstrate the beginning of an interview.

Make calls to the interviewees and/or have your members make the calls to interviewees to set up interview times after the date of your next meeting. Make arrangements with a local librarian to meet your group at the library for your next meeting.

Doing Background Research
Ask the librarian to help your group look at all available sources that might help them learn more about the fishing tradition they are about to investigate. Look at local history sources to learn about the local area, from maps and nautical charts to photographs, newspapers, business records, advertisements, and telephone books. Books about luremaking and fishing might be helpful.

Preparing Members
Help each member add to their list of interview questions and prepare them for their interview experience. What special questions might you ask this individual? Go over the details of when, where and with whom they will conduct this interview. Try to calm any anxieties they may have.

Conducting an Interview
Each member or group conducts an interview with parental supervision. The best places to conduct interviews are in the places the interviewee works, lives, or fishes. Go on location! If the person makes lures from a basement workshop, that's the place to be. If the person tells jokes and stories while fishing, accompany him or her on a fishing trip. The interview itself is an exciting, fun-filled experience. Make sure each interviewee is asked permission to be recorded at the beginning of the interview. Use a written permission form that describes how and why you are going to use the contents of the tape (i.e. " . . . for a 4-H fair exhibit" or as part of a 4-H folklore project)

Writing about It
Each member should write something based on their interview experience: a biography of the person interviewed; a newsletter article about the person and his or her fishing tradition; the recipe for a fish food tradition; a glossary of terms used with definitions for each word; a journal entry by the member describing what the experience was like from a personal point of view. If possible, collate the interviews and make them available to the interviewees and others who may be interested in the folklore of fishing. Publishing pamphlets or books about the fishing traditions of your community may lead to activities similar to the *Foxfire* series or simply to the preservation of folklore in a retrievable form for later use.

Exhibit or Sharing Suggestions
1. Share your interview experiences with others in your club or group.

2. Invite interviewees to a club meeting where their interviews will be shared.

3. Prepare a transcript and interpretation of the interviews for local publication, giving a copy to each of those who were interviewed.

4. Prepare an illustrated talk on the folkways you were able to document.

Community Service and "Giving Back" Activities

1. Consider donating your interview results to a local library or museum with the permission of the interviewees. If they are unwilling to share the content of the interview with others respect their wishes.

2. Put together a program on fishing traditions for your club, other youth or adult groups or the community at large.

Extensions or Ways of Learning More

Consider learning more from your interviewee over a longer period of time. Arrange for a second interview or a continuing series of interviews to expand your knowledge of angling traditions and folklore. Investigate crafts of equipment that you can make with the assistance of a person who knows how to make traditional lures, flies, boats, nets, or other angling equipment. Ask if you could learn this technique or tradition as an apprentice. Some states have folklife apprenticeship programs in which a master artist and apprentice may apply for grant funds to help defray the costs of apprenticeships. Contact the American Folklife Center, Library of Congress, Washington DC 20540-8100 for the name and address of your state's folklife program. You might also contact the American Folklore Society, 4350 North Fairfax Dr, Suite 640, Arlington, VA 22203. Some maritime museums have similar apprenticeship programs as well as demonstrations and classes in traditional maritime crafts. Contact your local maritime museum to find out.

Look at a state map and see what place names for towns, rivers, lakes, etc, are named after fish or fishing traditions. Find out how the place got its name at your local library or create your own story about how you think the place was named. (Some examples: Fish Creek, Wisconsin; King Salmon, Alaska; Menominee, Michigan; Fishkill, New York)

Links to Other Programs

See *4-H FOLKPATTERNS Leader's Guide* for more detailed information on how to conduct interviews with family and community members. The 4-H photography project materials are excellent links that assist in recording folkways and folklore. These activities can help significantly in the understanding of other people and other cultures and traditions. Links to leadership programs, community service activities, and many other programs come readily from the foundation of curiosity and enquiry which is fostered in this program.

Museum in a Box

LuAnne G. Kozma

Objectives
Participating young people and adults will:
1. Identify and organize fishing related objects
2. Organize objects into meaningful collections
3. Understand and appreciate tackle they use
4. Use proper vocabulary when describing objects
5. Organize and categorize like items
6. Identify similarities and differences in fishing equipment
7. Distinguish among functions of fishing gear
8. Have fun while learning.

Youth Development Objectives
Participating young people will:
1. Enhance written and verbal skills
2. Enhance categorization and classification skills
3. Enhance vocabulary and language skills
4. Enhance self-esteem and self-awareness
5. Enhance social skills and cooperation

Roles for Teen and Junior Leaders:
1. Assist members with tackle identification
2. Assist members with cataloging objects
3. Assist members with setting up exhibits
4. Assist members in researching information

Potential Parental Involvement
1. See "Roles for Teen and Junior Leaders" above
2. Assist in collecting and inventorying tackle
3. Provide guidance in collecting tackle
4. Arrange for or provide additional tackle
5. Arrange for or provide exhibit space6. Arrange for or provide transportation
7. Arrange for or provide refreshments

Evaluation Activities/Suggestions
1. Evaluate classification and display of tackle
2. Conduct a quiz bowl of fishing equipment
3. Observe interactions among members
4. Observe use of proper terminology

Safety Considerations
Discourage the use of cleaning chemicals, glues, or other adhesives.

Best Time: Any time after fishing about a year

Best Location: Any comfortable location

Time Required: 3-5 hours over several weeks

Equipment/Materials
examples of fishing gear (about 5 items per member)
index cards or paper boxes
pencil measuring tapes
rulers
fishing encyclopedia or other reference book
acid-free tissue paper for wrapping objects
markers and cardboard for making small signs
Optional: Computer, camera and film

References:

Museum Registration Methods, third edition. Dudley, D. H., I. B. Wilkinson et.al. Washington, DC: American Association of Museums, 1979.

Identification and Value Guide to Old Fishing Lures and Tackle. Luckey, Carl F. Florence, Alabama: Books Americana, 1980.

Standard Fishing Encyclopedia. McClane, A.J. New York: Holt, Rinehart and Winston, 1965.

Modern Fishing Tackle Craft. Pfeiffer, C. Boyd. New York: NY: Lyons & Burford, 1993

Hook, Line and Sinker--The Complete Angler's Guide to Terminal Tackle, Souche, Gary. New York, NY: Henry Holt & Co., Inc., 1988.

Family Folklore. Tucker, C. and M. MacDowell. East Lansing, MI: Michigan 4-H Youth Programs, Cooperative Extension Service and MSU Museum, 1989.

Good Show! A Practical Guide for Temporary Exhibitions, second edition. Witteborg, L. P., Smithsonian Institution Traveling Exhibition Service, 1991.

Lesson Outline

Presentation	Application
I. Collections as a hobby	
A. Start with what you have	**SUGGEST** that each participant bring in about 5 items that are interesting to them from their personal collection or (with permission) from other family members.
1. Tackle	
a. Rods and reels	
b. Lines or spools	
c. Lures	**BRAINSTORM** some ideas on things that might be possible items to collect. If necessary, **PLANT** a few ideas to expand the thinking of the participants beyond tackle.
d. Terminal tackle	
2. Memorabilia	
a. Post cards	
b. Stamps and licenses	
c. Lure packaging	
d. Photographs	
3. Clothing	
a. Fishing hats	
b. Fishing shirts	
c. Other clothing items	
4. Other items	
a. Magazines	
b. Catalogs	
c. Travel guides or maps	
d. Souvenirs or trinkets	
B. Use your imagination	**NOTE** that the first value of a collection is to the collector. Anything that interests the youngster should be encouraged.
1. Think broadly	
2. It's your collection	
II. Inventory your collection	Inventorying your collection
A. Arrange all treasures on a flat surface	Divide your group into small work groups of 3 or 4 members. Give each group about eight of your objects to work with as their collection.
1. Arrange in similar classes	
a. Paper items	
b. Lures	
c. Things made of wood, etc.	Tell them they are a fishing museum. First, ask them to write on an index card or paper a list of all the objects in their "collection."
B. Create a list of the items	
1. List by categories	
a. Two hand tied flies	
b. One postcard	Based on the types of objects in their museum's collection, ask each group to make up a name for their museum. What is the museum's purpose? Who would visit such a museum? Encourage them to be creative and think of zany names. It doesn't have to be realistic. (An example might be: "The Smelly Bait Museum" whose purpose is to collect bait-related items and actual bait. Visitors can only attend at night with flashlights.) Have fun!
c. Five angling trophies	
d. Two tackle boxes	
e. One pair of boots	
2. Record items on cards	
.	
III. Catalog and classify your collection	Have the group practice cataloging objects by describing and measuring them. If you have enough reference books

	for each group, have each group use books to identify and describe the objects. Use measuring devices (rulers, tape measures, scales) to measure each object. Use the categories described below in the Lesson Narrative. Older teens can help each group
IV. Storing your Collection	Gather the entire group together again and show them some storage techniques. Bring in the original boxes in which items were purchased, bring in acid-free tissue paper, and demonstrate how to store items safely, away from light, dust, moisture and heat. If you have an example of a fishing item that has been damaged due to improper storage, show it to the group and use it as a point of discussion of what not to do with valuable fishing gear. Have each member practice rolling a small object in tissue paper.
V. Creating a display	Working in teams again, have your members cooperatively create a display of the objects in their "collections." Each museum can create a sign and a few labels for the objects using markers and cardboard. Encourage them to think of creative ways of displaying an item using easily found materials (to display a fishing cap, how about putting it on a soccer ball draped with a cloth, rather than simply laying it on a table?). Have each museum group visit all the other groups' museums.
VI. Processing the activity	Now that your group has practiced putting together a "museum" of fishing items, have them turn to their own personal possessions and do the same activity at home individually or in small groups at the next club meeting. They can work on each step with each other as helpers and mentors. Share reference books and other equipment

Summary Activity

When all club members have completed a small collection of their own fishing memorabilia, have each member bring in his or her "Museums in a Box" to share at a club meeting. Create a club fishing museum with the individual collections and invite parents, families, and other 4-Hers to visit the museum at a meeting.

Lesson Narrative

Collecting objects that relate to another hobby or interest is a fascinating hobby in itself. You don't need to go out and purchase expensive antique fishing tackle to do this project. If you have already tried fishing, you probably have a few items at home that you used on your trip. Start with your own experiences with fishing and search for things to put in your collection.

What to Collect

The most obvious things would be tackle, rods, reels, and other objects used to catch fish. Think about other, less obvious items, like a post card you bought, the hat or shirt you wore when you went fishing, or the photograph of you and your catch. Also consider: fishing newsletters, books and magazines, travel brochures and guides, the packaging from lures you bought, ticket stubs, trophies, a pin or key ring from a bait shop, a bait bucket, scoops, and even advertisements and calendars from bait shops, charter fishing boats, or tackle manufacturers. Something brand new that you save now may someday become a valuable antique!

Inventory Your Collection.

Set all your treasures on a table and begin writing down what you have. Sort like things together (paper items, lures, things made of wood, etc.). Make a list of what you have (2 tied flies, 1 postcard, 5 trophies, 2 tackle boxes, 1 pair boots).

Catalog and Describe Your Collection

For each object, write down on an index card or piece of paper (or use a database or spreadsheet program on a computer if you have one) the following categories:

- object name
- other names for object
- object type
- owner's name
- owner's address
- maker's name
- maker's address
- date collected
- where collected
- price paid
- date made
- where made
- date(s) used
- where used
- how used
- description of object
- materials
- dimensions: height, width, length
- sources used

Using the categories, describe each object in your collection. Use a measuring tape to measure the height, width, and length. Ask a parent, 4-H leader, or other fishing source for help in identifying and describing your objects.

Storing Your Collection
Now that you've gathered your collection, how will you store all of it? Depending on the sizes and types of objects, you will need an assortment of storage boxes. A simple, low-cost method of storing objects is in old shoe boxes. Wrapping objects in acid-free tissue paper and then placing them in boxes offers protection against scratching and effects of acid in the boxes. You could also consider purchasing acid-free boxes from museum supply companies. To store your objects in a way that also displays them, consider using glassed shadow boxes, or arranging them on a wall or a shelf. Keep any display away from direct sunlight and heat. Keep flat paper items, like catalogs and brochures, laying flat.

Creating a Display
To display your collection at a 4-H club meeting or other temporary event, keep your idea simple. For example, select a few objects that relate to each other and choose a theme (such as "my ice fishing trip" or "kinds of lures.") For an easy way to display objects, simply arrange objects on a table. Use decorative paper, fabric or small boxes as background for your objects. Avoid using glues or dry mounting or any other process you can't undo; you might damage your collection.

Exhibit or Sharing Suggestions:
Put your "Museum in a Box" on the internet or World Wide Web and enjoy sharing with others through the computer.

When entering your collection or exhibit in a county fair, choose a different focus or theme to your collection each year. (ie: this year, rods and reels, next year, fishing photographs)

When displaying objects that are handmade, consider photographing and interviewing the maker and including the photographs and tape-recorded interview as part of your display.

Community Service and "Giving Back" Activities:
1. Help your local museum to identify, catalog, clean, or exhibit their fishing-related collections.
2. Consider making an exhibit of your collections as part of a National Hunting and Fishing Day celebration or at a similar event.
3. Get involved with a local angling group and any collectors in that group.

Extensions or Ways of Learning More:
1. Visit a museum and take a tour of their archive or collection area. Ask questions of the curator on proper storage methods.
2. Help a tackle dealer organize some of the fishing items that are important to the local area and help organize a display.
3. Make tackle or other equipment using traditional or historical methods.
4. Try collecting fishing license stamps or postage stamps depicting fish or fishing-related activities.
5. Consider making a larger collection of something that interests you. Keep that collection cataloged and stored properly.
6. Go to a local flea market or swap meet and try to locate some fishing memorabilia that interests you.

Links to Other Programs:
This project is clearly related to other aspects of the 4-H Sportfishing program, like collecting insects or photographs of local fishes. It can also link to sewing projects or woodworking projects though making storage bags or boxes.

Collecting Stuff

Gerry Snapp, University of Missouri Extension (ret.)

Note: This unit can be used as a "stand alone" lesson or is probably more effective when used as a supplement with *Museum in a Box* and/or *If Tackle Could Talk.*

Objectives:

Youth Development Objectives:

Roles for Teen and Junior Leaders:
1.

Time: 60 minutes

Location: inside location

Lesson Outline

I. Introduction to Collecting
- A. Hobby
- B. Human Pursuit
- C. Why people collect
  1. Camaraderie
  2. Nostalgia
  3. Investment
  4. Knowledge
  5. Challenge

II. Hookin' Em - Discussion
- A. What kind of collection do you and/or your friends have?
- B. Do your parents collect anything? What?
- C. Is there a purpose or reason behind your decision to collect this particular item? What is/was it?
- D. Have your collecting goals changed over time?
- E. What item(s) of your collection do you value most?
- F. What addition to your collection do your wish most for?
- G. Is there a difference between a "collector" and an "accumulator"? explain

III. What kind of "Stuff"
- A. Tackle
  1. Lures
     a. wooden
     b. metal
     c. brand name
     d. novelty
     e. other
  2. Reels
     a. fly reels
     b. bait casting
     c. wooden
     d. other

3. Rods
    a. fly rods (bamboo)
    b. steel
4. Tackle Boxes

B. Memorabilia
1. Old magazine adds
2. Catalogs
3. Other

C. Art
1. Prints
    a. Antique/vintage
    b. Contemporary
        1. Open edition
        2. Limited editions
2. Carvings
3. Castings - bronze, ceramic, etc
4. Other

III. Share sample "collections"
A. Your own
B. Students
Have students bring in samples from their collections -approximately 5-7 items
Students explain the "what", "why", and "how" of their collecting
Ask them to share "learning experiences" relevant to the hobby of collecting.
Make sure they address discussion questions above (II. C,D,E,F)

Content

Introduction

Hobby: An activity or interest pursued outside one's regular occupation and engaged in primarily for pleasure.

Collecting is a popular hobby. It is believed that one in three people collects something. People collect just about anything. You name it, and someone probably collects it. This is particularly true for fishing related stuff -lures, tackle, and other memorabilia. What is the reason for collecting? Why do people spend time, energy, and money to pursue this hobby?

Collecting is a human pursuit. Even early man was a collector. The oldest collection may be an estimated 80,000-year-old collection of pebbles found in a French cave. Collecting is a common behavior, but people collect for different reasons. Some begin collecting by accident after receiving a gift. Some collections tie people to their ancestors or ethnic group.

Whatever the reason for collecting, it fulfills emotions that lie at the heart of our personalities. Listed below are some of the reasons why people collect or why they enjoy collecting.

- *Camaraderie - Camaraderie a way to spend time with friends and family. Camaraderie is an important benefit to many collectors. Others enjoy the fellowship that develops at collectors' shows and club events. The Internet has made worldwide communication between collectors possible and has sped up the flow of information and trade of items between them. The Internet has fostered these relationships by bringing together people with like interests.*

- Nostalgia - Nostalgia can be defined as a longing for things, persons, or situations of the past. Ever wish for or hear someone else wish for the "good ole' days"? Collecting can be a way of reliving the good memories of "days gone by". Nostalgia, though usually the domain of middle age and older, can also infect the relatively young who look backward to their own particular "good times".

Childhood is a magical time. Adults often look back at childhood with fondness and search for ways to replicate those experiences. Some baby boomers collect toys and movie memorabilia to recapture happy moments from their youth. Many regret getting rid of their childhood toys and long to have them back. Younger individuals may just want some kind of "connection" to those earlier times of which they have read, heard, or seen on television or movie screen.

- Investment - Most collectors look for pieces priced below market value. However, a collector will pay more depending on how badly he or she wants a piece. With the availability of the Internet and programs such as PBS's *Antiques Road Show*, more and more people are looking to collect as an investment or hoping that what they already have is valuable.

  This kind of collector recognizes the potential value of their collections and envisions the day when they might be sold or cashed in. The collecting impulse is so strong and so widespread that companies now market goods specifically to collectors. Examples of these collectibles include Franklin Mint, Avon decanters and Ty Beanie Babies. While these items are often mass produced, many collectors delight in building a complete set. A limited edition run of collectibles is even more likely to catch the attention of collectors.

- Knowledge Quest - A successful collector is a knowledgeable collector. To assemble an exceptional, valuable collection requires a wealth of knowledge. A knowledgeable collector understands identification, history, rarity, grading, variations, value, etc. This accumulation of knowledge can takes years of study, observation and experience. Some individuals never acquire the knowledge to assemble a great collection. To others, the pursuit of the knowledge required to build the superior collection drives them as much or more than the "collection".
- Challenge - For some individuals, the "thrill of the hunt" is the attraction of the hobby. For these people, a quality collection is actually secondary to the challenge of searching for and finding the "forgotten treasure" or discovering the "bargain in the barn". The "hunt" is the driving force, not the pleasure of a fine collection. Often their "prize" is soon sold and they are off once again in search of the next great treasure. This works out great for those that don't have the time to hunt material to add to their collection.

Definitions

Vintage: Characterized by excellence, maturity, and enduring appeal; classic

Collectible: an object that is collected by fanciers; *especially*: one other than such traditionally collectible items as art, stamps, coins, and antiques

Antique: In general, anything very old - specifically, an object having special value because of its age, especially a domestic item or handicraft esteemed for its artistry, beauty, or period of origin.

Memorabilia: Objects valued for their connection with historical events, culture, or entertainment. Things remarkable and worthy of remembrance or record.

Value

Collector value is determined by:

- Rarity - older usually correlates to rare
- Condition
- Demand -usually based on the previous 2 - but this is the X factor - Brand name - What's hot

Personal Value determined by:

- Special Meaning to You -"just like Grandpa's" - made in your hometown - family/name connection- A "favorite"
- Nearing completion of an extensive collection
- How long you've been waiting/looking
- Discretionary money/relative wealth

References

Old Fishing Lures and Tackle: Identification and Value Guide, 6th edition, Carl F. Luckey

Fishing Tackle Antiques and Collectibles: Reference & Evaluation, Karl White, general pricing

Fishing Lure Collectibles: An Identification and Value Guide to the Most Collectible Antique Fishing Lures, 2nd edition, Dudley Murphy and Rick Edmisten (pre-1940)

Fishing Lure Collectibles: (Fishing Lure Collectibles); 2nd Edition, Dudley Murphy and Rick Edmisten, (post-1940)

Antique & Collectible Fishing Reels: Identification, Evaluation, and Maintenance; Harold Jellison and Daniel B. Homel.

Informative Websites

http://www.antiquelures.com/Articles.htm

http://www.angling-artifacts.com

http://www.tacklecollecting.com

Making Fish Prints

Mary Jamieson – **Michigan State University**

Objectives

Participating young people and adults will:
1. Review external anatomy of fish
2. Identify characteristics of fishes being printed
3. Relate form to function in external anatomy
4. Have fun while learning.

Roles for Teen and Junior Leaders
1. Assist with teaching area set up and break down
2. Demonstrate fish printing
3. Assist members as needed
4. Lead discussion of anatomy and function
5. Assist with labeling as desired

Potential Parental Involvement
1. See Roles for Teen and Junior Leaders above
2. Arrange for or provide teaching space
3. Arrange for or provide teaching materials
4. Arrange for or provide fish for printing

Youth Development Objectives
Participating young people will:
1. Enhance hand-eye coordination
2. Enhance fine motor skills
3. Expand science awareness
4. Relate form and function in living things
5. Practice cooperation

Evaluation Suggestions
1. Observe group behavior and interactions
2. Observe ability to follow simple directions
3. Observe ability to relate anatomy to function

Best Time: Following a fishing experience or as an introduction or summary activity for a fish anatomy lesson

Best Location: Anywhere comfortable location where paint spills will not be a problem

Equipment/Materials
Fish banners or pictures
whole clean fish
newspaper
large soft paint brush about one inch wide
paint containers (plastic dishes, pie pans, or baby food jars (number needed depends on the number of colors you will be using.)
markers
tempera paint
Fish T-shirts
acrylic paint
permanent clothing additive
hangers
permanent markers

Safety Considerations
Be careful of younger youth putting paint into their eyes and mouths.
Make sure following this activity youth wash their hands.

References
Aquatic Sampling. NY SAREP Program Manual. Edelstein K. L. and B. E. Matthews.1993. Cornell University: Ithaca, NY. 75 pp.
Nature Crafts for Kids. Fish Print. Krautwurst G&T. . 1992
Fishes: an introduction to ichthyology. 3rd ed. Moyle, P. B. and J. J. Cech Jr., 1996.. New Jersey. Prentice-Hall, Inc. pp 18-20.

Lesson Outline

Presentation	Application
I. Introduction A. Preparing the fish B. Painting the fish C. Printing the fish D. Labeling the fish E. Finishing the banner	Fish prints are an excellent way to save a memory of a fishing trip with a special picture. Anyone can learn to make a fish print, and the fish can still be eaten if it is kept fresh and non-toxic inks or paints are used. Individuals may select their own fish or a couple selected specimens may be used.
II.. Preparing the fish for printing A. Removing the slime 1. Mild vinegar solution 2. Wiping with a cloth or paper towel 3. Making a couple of prints	Coarse scaled fish often make more interesting prints, but all slime must be removed. Use a mild vinegar solution to rinse the fish and dry it with a paper towel or cloth. Several treatments may be required.
B. Painting the fish 1. Work from head to tail 2. Leave fins and eyes paint less for now 3. Apply a very thin layer of paint a. Less is generally better b. Thin as required 4. Paint fins and tail last	**DEMONSTRATE** the fish painting process. **EMPHASIZE** using a thin coat of paint applied from the head toward the tail. Be sure the fish is placed on a protective surface to catch extra paint or drips. **PAINT** the fins and tail last, just before printing. **EMPHASIZE** the importance of keeping the paint thin and the coverage light. There is a strong tendency to apply too much paint.
II. Printing the fish A. Moving the fish 1. Avoid smearing the paint 2. Position the fish to show features	**DEMONSTRATE** moving the fish to a clean, dry piece of newsprint, keeping the painted side up. This prevents having extra spots of paint on the finished print. NOTE the need to work rather quickly to avoid letting the paint dry on the fish.
B. Making the print 1. Lay printing material gently on fish a. Newsprint b. Dampened rice paper c. Tee-shirt with newsprint liner	**DEMONSTRATE** the use of several printing media, allowing the youngsters to select the type they wish to have. While rice paper is more expensive, it makes a more permanent and artistic print. **CAUTION** shirt printers to insert a layer of newsprint between the layers of the shirt to prevent strike-through of the paints.
2. Press printing material firmly against fish a. Caution to avoid moving the material b. Need to contact all parts of the fish	**NOTE** that over-handling can result in smearing the print, but that full contact is needed to get all parts printed.
C. Removing the print from the fish 1. Peel printing material away from	

fish with a smooth motion

Slowly and smoothly **PEEL** the printing material away from the fish. **AVOID** sliding the material across the fish body.

2. Fill in eye with a small brush, avoid smearing wet paint or ink
3. Sign prints to avoid confusion
4. Set aside or hang securely until dry

USE a small brush to fill in the eye on the print. A little extra time here will prevent possible misunderstandings or confusion later.

D. Preparing the fish for the next print
1. Prints often improve with use
2. Remove paint and dry thoroughly

III. Labeling the print

USE regular markers to label prints or banners and fabric pens to label shirt material.

A. Why label?
1. Increase knowledge of fish characteristics
2. Identification of unknown fishes
3. Label to meet objectives
a. Fish biology and anatomy
b. Fish art and trophies

NOTE that labels can be used for many purposes, from simple identification and dating of artistic prints or trophies to scientific or educational labels of external anatomy. The latter creates a learning aid to enhance knowledge of fish characteristics and function.

B. External anatomy and function
1. Median fins

REVIEW the median fins found on the fish being used in the exercise. **NOTE** that their names come from Latin or Greek names for the location or composition of the fin. For example, dorsal means back, caudal means tail and anal means near the anus, while adipose means fatty.

a. Dorsal fin(s)
1) Spiny dorsal
2) Soft dorsal
3) Functions
a) stability in the water
b) positioning
c) communication

NOTE that the dorsal fins can be of different types. Spiny dorsal fins have hard spines supporting the membrane, while soft dorsal fins have softer rays supporting the membrane. Both types are used for stability, minor position adjustments, and communication. **ASK** what type of dorsal fins are present and how many spines are present on the specimen fish.

b. Caudal fin
1) Tail fin
2) Many types and shapes
a) Homocercal
b) Heterocercal
3) Function - propulsion

NOTE types of caudal fins if appropriate to the audience. Homocercal (equal top and bottom) tails are nearly equally divided by the fish's spine, while the spine extends into the upper lobe of a heterocercal (unequal top and bottom) tail. Also **NOTE** that primary propulsion is by this fin.

c. Anal fin
1) Variable in type and shape
2) Primary function -stabilization

d. Adipose fin

NOTE the location behind the anal opening and that the primary function is similar to the dorsal fin -- stability and attitude adjustment in the water.

2. Paired fins
   a. Primary steering fins in motion
      1) Vertical movement
      2) Horizontal movement
   b. Pectoral fins
      1) Shoulder fins or arms
      2) Right behind operculum
   c. Pelvic fins
      1) Hip fins or "legs"
      2) Locations vary
         a) Throat area - jugal
         b) Chest area - thoracic
         c) Abdominal area - abdominal

NOTE that the function of the fatty tab-like fin is not clearly known, although it may be important for movement in fry. Adipose fins are present in only a few families.

NOTE that the paired fins are used for steering as well as communication. They adjust movement laterally and vertically, making the fish maneuverable. Pectoral fins are the shoulder fins or arms of the fish, while the pelvic fins are the hip fins or legs. Pelvic fins may be positioned at the throat, thorax or toward the back of the belly.

3. Other external organs
   a. Mouth
      1) Food gathering
      2) Type, location and size aid identification
   b. Barbels
      1) Sensory organs
      2) Present in some families
   c. Operculum
      1) Opening behind gills
      2) Protect gills from damage
   d. Eyes
      1) Visual organs
      2) Location indicates feeding strategy
   e. Nares
      1) Chemical receptors
      2) Nose holes
   f. Lateral line organ
      1) Chemical and vibration receptors
      2) Line of sensory pores

Briefly **REVIEW** other external organs that can be observed in the fish prints or on the specimens used. **NOTE** that the location, size and type of mouth helps in identification and determining the feeding strategy of the fishes.

NOTE that barbels are located in some families of fishes and that they serve as chemical receptors to aid in locating food.

POINT OUT the operculum and note that it covers and protects the gills.

NOTE that the fish's eye is similar in function to our own. **STRESS** that their location and size give clues to habitat and feeding strategies.

INDICATE the external nares and their chemical reception function.

IV. Finishing the banner or shirt

A. Finishing the banner
1. Turn banner face down
a. Fold along top edge
1) Width adequate for suspending rod
2) Stick along edge with rubber cement
b. Fold along bottom edge as above
2. Insert dowel or bamboo rod
3. Attach cord or yard to hang banner
B. Finishing the shirt
1. Iron in paint before wearing

ASK how a fish hears or picks up vibrations in the water. **NOTE** that the lateral line organ acts as both a chemoreceptor and a vibration receptor. **ASK** how this sense might be useful under dark or murky conditions.

Lesson Narrative

Fish Print History

After a good day of fishing, anglers like to revisit the day's events and discuss their catches and losses. Although much of the fun in this story telling results from embellishment in the re-telling, recording the catch can also be fun. One of the ways of recording a good day's catch can be to create a fish print of their own as a reminder, a learning aid, or even a trophy.
Fish printing dates back to Japan over 100 years ago. Anglers made fish prints to record their catches and to save information on fish biology. The Japanese term for fish printing is "gyotaku" (pronounced ghio-ta-koo), and it is an art form that can be useful in other ways as well. Although this method of printing does not provide the best avenue for fish identification, it can be very useful for learning external anatomy as well as recording a catch effectively.

The traditional Japanese method of fish printing used rice paper as a medium for the print, but prints can be made on other types of paper or cloth, including tee-shirts. Block printing paper makes excellent prints, but drawing paper, white paper, tissue paper or even plain newsprint can be used. Shiny, slick finished paper does not hold the paint or ink well, however.

Material Tips

The best location to purchase the necessary supplies for this activity is your local arts and crafts store. Most of these stores will carry the paint, paper, glue, etc. T-shirts can either be purchased or have the participants bring one from home. The T-shirts should either be white or light colored.

Although nearly any fish can be used, fish selection is important to the success of the activity. Fish with laterally compressed bodies are easier to handle, and those with relatively coarse scales and minimum amounts of slime are easier to print. Flounder, bluegill, perch, rock bass, crappie or similar shaped fishes are easiest for beginners to use. As they develop some skill in fish printing, they can use larger specimens and species with more rounded body shapes. Fish that

are too large are difficult for youngsters to handle effectively, while those that are too small may lose some detail in the printing process.

Since the fish must be still, clean and dry to produce effective fish prints, the specimens must be dead before they are used. The potential benefits of having the dead specimen must be weighed against returning the fish to the water, just as the benefits of keeping a fish must be weighed against catch and release. Once the decision to keep the fish has been made, the animals should be killed humanely with minimum damage to their external characters. Freezing is an effective method of killing the fish without damaging them, although larger specimens may be killed with a sharp blow to the head. As in other uses of fish, avoid keeping the fish in conditions where they can begin to decompose if they are to be used in fish printing. Before the fish can be used for making prints, it must be free from slime, clean and dry. Some fishes will require treatment with a mild vinegar solution and being wiped down several times before they are ready to use in printing. Often the quality of the prints will improve with use as the slime layer is depleted.

Paint or inks should be applied sparingly, covering the body before applying material to the fins. The tendency is to put too much paint or ink on the fish rather than not enough. Paint the fins last, just before making the print. Leave the eye blank and paint it in by hand after making the print. This permits some artistic license and may allow an artist to make the eye look livelier by using some white space in the painting.

Color Selection

Although black ink on pale rice paper is the tradition, color adds to the attractiveness of the fish print and allows some artistic expression on the part of the printer. Allow group members to be creative in their painting schemes. The print need not represent the color pattern of the live fish, and the addition of color personalizes the print made by each youngster. That aids in identification of their own work and enhances interest. Remember that light coatings are MUCH better than heavy ones when print quality is concerned. A thick layer of paint will result in a poor replication of the fish.

Labeling

The use of this lesson should determine the type of labeling that takes place. If the specimen fish is a trophy that is being saved as a fish print before going into the family larder, labeling with the location, date, species, size and angler may be all that is needed. If it is to be a learning aid, labeling the external anatomy can prove very useful. In the latter case, forming small groups and providing some suggested labels can be very instructive. Providing quality leadership while they determine the locations of the various parts and how to label them is key to getting the information correct and neatly represented. Once the groups have come to independent conclusions on matching the labels to the fish anatomy on the prints, go over the parts and their functions with them. If possible, take the time to use a discovery approach in outlining the functions of the external features.

Use and Display

Once the paintings, banners or tee-shirts are completed, take the time to make them ready for use or display. Note that the tee-shirts should be ironed with a damp towel over the paint before wearing them or placing them in the laundry. Banners can be hung for display or matted and framed for the use of the maker.

Exhibit and Sharing Suggestions

1. Develop a group or individual display of fish prints representing local species for your county or state fair.

2. Develop a group demonstration for a fair or similar event, assisting others in learning to make fish prints or prints of other things - like flowers, leaves, or animal tracks.

3. Set up a display highlighting the external anatomy of different species of fish and how they differ.

4. Create a set of teaching posters to assist other young people in learning the external anatomy of local fishes. Make your teaching materials available to your leaders or volunteer to instruct other young people in external anatomy and identification.

Community Service

1. Volunteer to make fish prints with participants at a local fishing derby or national hunting and fishing day celebration.

2. Use the fish printing approach to teach fish anatomy with young children in a community setting.

Links to Other Programs

Links to other elements of the Sportfishing Program can be made easily, particularly with fish biology and ecology and with the angling skills areas. This lesson also can be used to develop artwork that can be shared in communications and artistic expression projects. The content can be used in other areas of conservation education, and the program fits well with elements of Project WET and Aquatic WILD, particularly with *Water Messages in Stone* (Project WET), *Water Plant Art*, *Micro Odyssey*, and *Fashion a Fish* (Aquatic WILD).

Regional Fish Foodways

LuAnne G. Kozma

Objectives:
Participating young people and adults will:

- be able to describe a fish foodways tradition from their own region or community
- be able to identify two other fish foodways traditions from other places
- understand that food traditions vary from place to place
- taste one example of a local fish food tradition

Youth Development Objectives:
Develop better cultural awareness as they learn about people and groups who may be different than themselves

Roles for Teen and Junior Leaders:
May help with the cooking demonstration.

Potential Parental Involvement:
May be asked to be the cook and demonstrate their version of a local foodways custom

Evaluation Activities/Suggestions:
In a group discussion afterwards, while eating the food, the club can talk about what they learned.

Best Time: After a fishing outing, after catching a fish so you can work with your catch. Or a club meeting.

Best Location: In a kitchen facility

Time Required: 1 to 2 hours

Equipment/Materials:
A kitchen with oven, stove, sink, and table or other food preparation area. Room enough for a club to gather in and watch a cooking demonstration. If the foodways tradition involves outdoor cookery (on a beach, alongside a river, etc) it would be best to try to do the demonstration where the tradition usually takes place, rather than bringing it to a kitchen facility. About ten spices and condiments used in preparing and eating fish, to talk about (such as catsup, mustard, lemon, horseradish, crab boil, butter, garlic, onion, curry, Tabasco sauce).

Safety Considerations:
Having young 4-Hers prepare and cook food requires adult supervision. For example, help with knives, filleting, and cooking. How to properly keep fish fresh, how to safely handle fish and and safe clean-up methods should be covered by leaders and those teaching the cooking demonstration. Consult food safety experts at your Extension office.

Lesson Outline

Presentation	**Application**
1. Ways we eat fish	**Make a list** with members of all the ways one can eat or prepare fish and seafood. Use the list below to help you. **Bring** in some spices and condiments from home that you might use when cooking or eating fish, to **use as discussion points**, such as catsup, mustard, lemon, horseradish, crab boil, butter, garlic, onion, curry, Tabasco sauce.
2. Regional fish Food ways	**Describe** a few traditions from different regions using foodways, the traditions described below, or some that are familiar to you.
3. Demonstration of a local fish foodways tradition	For the remainder of the meeting time, allow your special guest to **demonstrate** his or her food custom. Ask the cook to **involve** your members as much as possible in the preparation of the food, such as in cleaning the fish, preparing side dishes, or adding spices in the right amounts. **Have fun**, and encourage members to **ask questions** of the cook. This should be an interactive, educational exchange.
4. Processing the activity	When done, all participants can **taste** the food. **Discuss** how this food is different or the same as foods the members eat at home. What local or regional variations or personal preferences are there in your group?

Summary Activity

Visit a fish market and interview the person selling or cleaning the fish. Or, visit a nearby community fish food event such as a festival or dinner in which fish foodways are served. If possible, host or help out at a community event involving a fish food tradition.

Lesson Narrative

Ways we eat fish. The ways we eat fish and seafood are numerous! The "right" way to cook fish in Louisiana may be different than the "right" way to cook the same fish in Massachusetts. Fish and seafood dishes may be different county to county, town to town, family to family, person to person. With your group, create a list of methods by which fish is prepared. Some words you may come up with include: baked, fried, raw, boiled, steamed, casseroles, stews, soups, chowders, salads, sauces, sandwiches, dried, smoked, pickled, salted, grilled, planked, pan-fried. Encourage members to talk about the exact kinds of fish they eat. Now create another list of food events or celebrations that revolve around seafood or seafood customs. Some celebrations you may come up with include: clambake, booya, fish fry, crab derby, oyster roast, fish boil, crab boil, lobsterbake, chowder feast, oyster shucking contest.

Regional fish foodways. Of course, there's more to it than that! Talk about the following fish foodways traditions in various parts of the country.

Bay Port Fish Sandwiches: In Bay Port, Michigan, the Engelhard family, then co-owners of the local commercial fishery, came up with an idea in the late 1940s to help sell herring at a local chamber of commerce festival: fried fish sandwiches. They sold the sandwiches from a stand in their front yard. Battered and then fried in peanut oil, the fish is placed in hotdog buns and served with mustard, ketchup, or tartar sauce, and coleslaw on the side. The sandwich was so well liked that they began selling the dinners from their stand throughout the summers in the 1950s. Bay Port became known as the place for the "famous Bay Port fish sandwich." After the children were grown, the Engelhards stopped the practice. In the 1970s, the chamber of commerce again approached the family to see if they would be willing to introduce the fish sandwich at a community festival. They did, and the response was so overwhelming that now the community hosts an annual Bay Port Fish Sandwich Festival on a weekend in August. The Engelhard family is still in charge of the secret batter. With the depletion of herring in Saginaw Bay, suckers (known locally as "mullet") are used, prepared in such a way that includes the fish bones in the sandwich. What started as a family tradition, shared with a community, has become a community festival in which many members take part.

New England Clambake: This community and family food event is a long tradition in New England, passed on by Native American peoples to the colonists. Each group that holds a clambake has its own set of customs and traditions. No two are exactly alike. The group divides up the tasks: gathering rockweed or other fuel found along the ocean shore for the fire; the digging of a large pit for the clambake; preparing other food such as clam chowder to feed everyone while clams, corn and other foods are baking in the pit. The pit is lined with rocks which are heated by fire, then filled with layers of rockweed and clams, lobster, and corn. After slowly steaming and baking for several hours, the group eats the meal. At some bakes, a toast , prayer or blessing is said for the bake and all the workers who helped over the two or three day affair. While people work, they also share a lot of fun by telling jokes and stories, reminiscing, boasting, and chatting. Many aspects of a clambake can change over time. For example, a group may not dig its own clams as it once did if clams are not available, but they can buy the clams and still hold the bake. By helping with a clambake, participants feel linked to their region's cultural heritage and connected to each other, and share in the joy of keeping this custom alive.

Ozark.Catfish Balls Bake or steam catfish. Remove fish from bones and flake. To every 2 pounds flaked, add 2 cups mashed potatoes and 1 egg. Salt and pepper to taste. Mix well. Shape in balls and fry in deep fat

Southern-Fried Bass -Serves: 2 Prep Time: 1 1/2 hours

- 1 ½ lbs. Bass fillets
- 1 qt. Buttermilk
- salt
- 1 qt. Peanut oil
- 1 lb. Cornmeal (extra fine)

Cut fillets in strips 1 inch wide. Soak fillets in buttermilk for 1 hour (frozen buttermilk is best). Remove fillets from buttermilk and season with salt to taste. Pour enough oil in frying pan to cover fillets completely. Dredge fillets in cornmeal, then place in heated oil. Using extreme caution, drop a kitchen match into heated oil to determine proper cooking temperature. If match ignites, oil is ready. Do not turn fillets while cooking. When fillets float in heated oil, remove and serve. (*G. Downs - Ozark, Alabama)*

Smoked Bass Fillet - Serves: 4 Prep Time: 30 minutes

- 1 lb. bass fillets
- ½ cup liquid smoke
- ¼ cup prime rib rub
- 2 T butter or margarine

Preheat oven to 350 degrees. Pour liquid smoke into shallow dish. Dip fillets in liquid smoke, soaking both sides. Place fillets in shallow baking pan, making sure fillets are not touching. sprinkle prime rib rub on fillets and place in oven. After allowing it to bake 5-7 minutes, lightly brush melted butter on each fillet. Bake until they flake easily, about 10-15 minutes. *(J. Hodgdon - Kansas City, Missouri)*

Demonstrate a local fish custom or food. Invite someone to your meeting you has made a particular recipe for a long time, and who learned it in a traditional way. Bring all the supplies needed for the demonstration. Ask the cook to demonstrate as many of the steps in the process as possible within your time period. Have him or her talk about the tradition, and encourage your members to ask questions. Your group can sample the results. If it is not possible to bring someone in to your meeting, consider bringing your club to the place where the person cooks (restaurant , home, etc).

Exhibit or Sharing Suggestions

Enter your fish foodways project at a fair and be sure to include the background information on it. Prepare the food, give the recipe, and provide a description of the tradition.

Community Service and "Giving Back" Activities

If your community or local organization is planning to publish a cookbook, volunteer your club to help collect fish foodways recipes. Interview fish cooks to learn more about who is doing the cooking and how they learned the tradition.

Extensions or Ways of Learning More

Look for community cookbooks with local recipes from people in your community for examples of local fish dishes.

Links to Other Programs

See *4-H FOLKPATTERNS Leader's Guide* and Foodways.
See 4-H outdoor cookery project materials.
See 4-H nutrition and food-related project materials.

Fish Cookery

Slyvia Howard, volunteer, Brazos, Texas

Objectives

Participating young people and adults will:
1. Experiment with several types of fish cookery
2. Sample several types of fish cookery
3. Enhance nutritional knowledge
4. Experience ways to enhance the use of fish in their diets
5. Have fun while learning

Youth Development Objectives

1. Develop self confidence and self concept
2. Develop cooperation and communication skills
3. Enhance hand-eye coordination
4. Enhance basic survival and independent living skills
5. Enhance critical thinking and leadership skills

Evaluation Activities/Suggestions:

1. Interactive instruction should be used
2. Observation of cooperation and participation in group activities
3. Review of group activity outcomes
4. Comments and discussion following tasting session

Roles for Teen and Junior Leaders

1. Demonstrate techniques and procedures
2. Lead small preparation groups
3. Assist less experienced youth as needed
4. Supervise safety practices
5. Serve small portions during the tasting exercise
6. Assist with set up and arrangements
7. Discuss favored fish dishes wiith the group
8. Assist in preparation activities as needed

Potential Parental Involvement

1. See "Roles for Teen and Junior Leaders"
2. Provide teaching/cooking sites
3. Provide necessary equipment
4. Support teen leaders in working with preparation groups
5. Provide fish and other ingredients for the dishes being prepared
6. Demonstrate favored cooking techniques
7. Assist in preparing the taster's meal
8. Provide accompanying dishes for taster's meal
9. Discuss personal experiences in fish cookery

Equipment/Materials

Fact Sheets: A Checklist for Fish Cookery Lessons
Selected Recipes
Fish Selection and Nutritional Information

Safety Considerations

1. Check for any known food allergies among the participants. Know the signs of allergic reactions and be prepared to transport anyone with a severe reaction to suitable medical care.
2. Teach and practice food safety (handling, temperature control, potential for cross contamination, personal hygiene) at all times.
3. Teach and practice safety around fires, hot oil, and other hazards associated with cooking.
4. Be sure any outdoor cooking fire is contained properly and that firefighting materials are at the cooking site.
5. Have ice available as an immediate treatment for minor burns.
6. Have a well-stocked first aid kit on hand and know how to use it.
7. Consider teaching individual lessons to teen leaders or adult volunteers before they assist in teaching the members.

LESSON OUTLINE

Presentation	Application
I. Fish as food A. Excellent source of protein B. Low fat C. Wide variety of flavors D. Many cooking techniques	Ask participants to **DISCUSS** some of the ways they have eaten fish or the kinds of fish they have eaten. **NOTE** that fish are a healthy form of protein that can be cooked in a many different ways.
E. Fish consumption advisories 1. Contaminant advisories 2. Minimizing contaminants 3. Pregnant women and young people	If any fish advisories are in the area, **NOTE** them and **DISCUSS** their implications. **NOTE** any ways that contamination can be reduced.
II. Fish selection and information A. Matching method to fish 1. Fatty fishes suitable for dry methods 2. Most fishes suitable for moist methods B. Method affects quality of product	Briefly **DISCUSS** matching cooking methods to the fish, testing for freshness, and nutritional information. (See *Fish Selection and Nutritional Information*)
III. Fish preparation methods A. Baked fish - dry method of cooking 1. Moderate oven (350-375□F) - preheated (450-500) 2. Thick fillets - fatty fish - skin on 3. Whole 4. Stuffed - whole or fillets	**Comments**: The oven rack should be in the center of the oven. Bake uncovered. The larger, the thicker the fish - the lower the temperature and the longer the cooking time. The smaller, the thinner the fish - the higher the temperature and the shorter the cooking time. Check frequently for doneness. **Don't OVERCOOK!**
B. Braising 1. Moderate (375) to very hot oven (425-450□F) - dry or semi-dry 2. Baked in stock, not submerged 3. Baked uncovered or lightly covered 4. Thin or small fillets 5. Lean fish	**NOTE** that the same conditions apply for braising as for baking above.
C. Planked fish 1. Fillets or butterflied fish 2. Fish cooked and served on a wooden plank - dry method of cookery 3. Indoor (baked) or outdoor (broiled) preparation 4. Fatty or lean fish	**Comments:** Same as above except preheat oven and plank at higher temperatures and reduce heat when placed in oven. Additional basting may be needed for lean fish and attention to cooking time and doneness for smaller or thinner cuts. If they are available, show examples of specialized cooking boards for making planked fish, noting that the grooves are designed to capture and hold any juices that are produced as the fish cooks. If not available, show plank and shallow pan.
5. Plank soaked in water 30 minutes, warmed in oven and treated with oil	**NOTE** that the seasoning process must be repeated every time the plank is used for cooking.
6. Fish placed on plank skin side down a. Season to taste b. Cook until opaque and flaky	**WATCH** the fish to avoid overcooking. Done when opaque and flaky.
7. Garnish with vegetables 8. Serve using plank as serving plate 9. Outdoor method	

a. Nail fish to plank;
b. Follow general instructions
c. Prop planked fish near coals
d. Turn to keep cooking even
e. Adjust proximity to coals

D. Broiled or grilled
1. Direct, dry heat
a. Broiler in oven
b. Coals for outdoor preparation
2. Fatty. fillets or steaks
3. Small whole fish
4. Lean fillets with basting
5. Not good for thick cuts - cooks unevenly

REMIND participants that woods like cherry and willow may have a bitter flavor that will strike through the fish (particularly if the wood is green), while maple or ash is almost flavorless. If the wood is to be covered with foil any type of wood and be used, including resinous woods like pine or spruce.

SHOW participants broiler trays, wire broiling baskets, skewers or any other specific broiling equipment. **REMIND** participants trays, baskets, grills (cooking surfaces or holders) should be oiled thoroughly to prevent sticking, and oven and cooking utensils should be preheated before putting seasoned fish in/on for broiling. Also **REMIND** them that small delicate fish and lean cuts should be cooked at greater distances from the heat source and basted frequently. **AVOID** very thick cuts of fish since broiling tends to make the outside leathery and the inside is barely warmed.

E. Pan fried or sautéed
1. Large, heavy gauge, hot skillet
2. Butter, margarine or cooking oil
a. Butter or margarine at foaming stage
b. Oil about 1/8 inch deep
c. Peanut oil or canola oil preferred
3. Brown fish on both sides
4. Small, whole or pan-dressed fish
5. Small or thin fillets
6. Plain, floured or battered

CAUTION participants about care and techniques useful to prevent spattering and burns. **SUPERVISE** young or inexperienced members carefully - one on one. **DEMONSTRATE** cooking one first before participant does one. **STRESS** and **PRACTICE** all safety procedures. **CONSIDER** using safety goggles for younger members.

F. Deep fat frying
1. Popular method for many types of fish
2. Hot cooking oil (360-380□F)
3. Fish completely submerged in hot oil
4. Use fryer or deep pot with wire basket
5. Smaller pieces or small whole fish
6. Seasoned corn meal or flour
7. Corn meal/flour batter
8. Tempura batter

SHOW participants related equipment and tools and **EXPLAIN** their use. **USE** a thermometer, wire basket or slotted skimmer for emersion and removal. **STRESS** safety and demonstrate as above.

G. Poached, steamed or boiled fish
1. Poached
a. Pre-heat cooking medium
1) Court bouillon
2) Salted water
3) Tomato juice
4) Milk
b. Submerge on perforated rack
2. Steamed
a. Not submerged

SHOW participants poaching equipment and **DEMONSTRATE** how it is used. If available **SHOW** various fish poaching kettles specifically made for this method of cookery. **EXPLAIN** various cooking mediums and ways poached fish may be used and served and uses of stock.

b. Liquid in bottom of pan
c. Fish on rack above liquid
d. Fish cooked in steam

3. Boiled fish
a. Covered pot or kettle with rack
b. Fish kettle designed for this purpose
c. Submerge in medium
d. Simmer about 10 to 30 or 40 min
1) Consider size
2) Consider thickness

4. Save stock for other dishes

H. Soups, stews and chowders; fish cakes, casseroles and other dishes
1. Many outstanding types
2. Most fish suitable
3. Fish may be precooked by an above method or added raw in cooking process

I. Salads
1. Poached or steamed fish; boned and chilled
2. Many salad types

Have participants **DISCUSS** various recipes they enjoy. **SHARE** any other methods or dishes that are unusual or interesting.

ENCOURAGE participants to use a cooking method they've not tried before.

DISCUSS ways of preparing and serving fish. See ***lesson narrative*** for suggested activities with kids cooking fish.

IV. Let's get to it!!!!
A. Divide participants into cooking groups
1. Assign teen or Jr. leaders to groups
2. Provide materials and ingredients for task

B. Intervene ONLY if necessary
1. Promote kids cooking
2. Watch safety
3. Assist as required

C. Follow time plan
D. Participants run the show
1. Cook and prepare
2. Serve and EAT!
3. Clean up

PROVIDE recipes, necessary ingredients, cooking utensils, etc; but let the kids get what they need for their dishes. **REFRAIN** from "helping" too much! **REMEMBER** we all learn more by actually doing than by hearing and seeing someone else do it.

.Leaders - Don't rob participants of the joy of owning what they are learning. Even the clean up chores will be fun unless we tell them otherwise!

V. Feast time
A. Arrange side tables attractively
B. Provide side dishes and drinks
C. Enjoy a taster's feast

REMEMBER to compliment the chefs and the anglers on their catch, cooking and hard work!

Summary Activity

If a variety of fish cookery methods and types are included in your lesson presentation or workshop, finish it with a taster's feast. Serve the various dishes in small amounts to allow all the participants and

adults to sample each dish. Develop critique cards that will allow each person to evaluate their impressions of the dishes they sample. Summarize the comments and present them at a later meeting.

LESSON NARRATIVE

Fish cookery is an exciting and rewarding skill to add to a person's culinary skills. There are a number of ways to introduce a novice to learning these no matter the age, skill level, experience, or location. Fish cookery can be done as a single lesson of can be stacked with a series of lessons or piggybacked with other activities. If fish is to be purchased for cooking, comparison shopping of fresh, frozen, canned, etc., nutritive values as a source of protein and price compared to other meats and a variety of lessons can be added. If the fish you are cooking are the ones you have caught, even better! Lessons can be added on cleaning your catch, various ways for preparing it for cooking, etc. Whether you are out on a club fishing or camping trip, or at home there are a few basics to follow. Care should be taken in the selection, handling and preparation of fish for freshness and flavor. These will be covered in greater detail later.

Fish lend themselves well to a variety of cooking methods.

baked - suitable for any size or cut
planked fish - elegant for whole fish
broiled or grilled - for fillets and small whole fish
pan-fried - for small game fish; trout, perch, sunfish, and crappies
deep fat fried - perfect for fillets
poached fish - for steaks and large pieces of fish
steamed fish - for steaks and large pieces of fish
soups, stews, chowders, and salads

All these cooking methods are adaptable to indoor or out-door cooking, whether over a grill on a deck or back yard, at a nearby park, or at some campsite or stream side, lakeside or seashore. Whether broiled, baked, steamed, or poached, fish is an excellent quick-cooking, low-calorie main dish. To determine which cooking method to use, check the fat content of the fish. "Fat" fish have oil throughout the flesh; "lean" fish have a drier flesh. Fat fish can be broiled or baked because their fat helps keep them from drying out during cooking. Lean fish generally are steamed or poached to keep the flesh moist. However, lean fish can be baked or broiled if basted with a little melted butter, margarine or a marinade.

The size of the fish pieces also helps determine the cooking method. Thin fillets are best broiled, whereas thicker steaks and pan-dressed fish are better when they are poached or baked. During cooking, doneness is indicated by a change in flesh color from a translucent pinkish white to an opaque white. To check for doneness, place fork tines into the fish at a 45-degree angle and twist the fork. If the fish resists flaking and still looks translucent, it is not done. At the just-right stage, the fish will flake apart easily when the fork is twisted. It also will have a milky white color. If cooked too long, fish becomes mealy, tough, and dry. Fish cooks VERY quickly, generally just a few minutes depending on its thickness, so careful attention needs to be given.

Probably the single most important factor in cooking fish is freshness! **The fresher, the better!!** The second most important is preparation by following safe handling practices - keep chilled, refrigerated or frozen; thaw in refrigerator or microwave; keep raw fish separate from other foods; wash hands before handling fish and wash working surfaces including cutting boards, utensils and hands after touching raw fish; cook thoroughly; keep hot foods hot and cold foods cold; and refrigerate leftovers immediately or discard. This applies whether cooking indoors or out.

Fish Preparation Examples and General Cooking Instructions

Baked Fish - Baking is ideal for whole or stuffed fish which are to be cooked with skins on, or very thick cuts of fish such as steaks or very thick fillets which might dry out under direct heat. Small fillets of fatty fish and lean fish should be braised or broiled to retain their best flavor and texture. Baking can be done in a very hot oven for a short period, or a moderate oven (350-375) for a longer time, 15-20 minutes for fillets, 20-30 minutes for steaks, 10-15 minutes per pound for whole fish. Select pans to fit the size of the fish. A cooking rack may be useful, particularly for fatty or stronger flavored fishes. Lightly coat the pan and the rack with non-stick cooking spray or oil to aid in handling and cleaning. Thinner and smaller fillets may be cooked at higher temperatures for less time. Check frequently to test for doneness. For stuffed whole fish, lightly fill cavity 2/3 full with favorite stuffing (or see recipe fact sheet) and sew shut or fasten with skewers. For fillets, place stuffing between 2 pieces of fish and hold sides secure with toothpicks or skewers. Stuffed fish should be cooked at lower temperatures and longer times to insure thorough cooking.

Braised Fish -Braising is suitable for smaller fillets of fatty fish and lean fish. Follow directions for baked fish except bake in stock of some kind similar to poaching, but do not submerge the fish. Add a small amount of stock, tomato juice or stewed tomatoes, milk or water, season fish lightly and bake either uncovered or lightly covered. Onions, other vegetables and herbs may be added to the liquid. Increase cooking time slightly or heat liquid before adding.

Planked Fish - Planking is an elegant method for whole fish or butterflied fillets! Find a suitable sized, splinter-free, hardwood plank, bread board or find a suitable sized, splinter-free wooden platter. Soak plank in cold water for about half an hour; put in a moderate oven for 5 minutes or so to warm it up; brush it liberally with a good cooking oil (plank is now ready for use and should be seasoned this way each time it is used). Place whole fish, fish fillets, or butterflied fish on plank, skin side down; spread with melted butter; add salt and pepper and any herbs. Bake or roast in a very hot oven (450-500) for about 5 minutes; reduce heat (350-400) and cook until done (test flaking with a fork) 15 or 20 minutes more (depending on thickness of the fish). Place under broiler for a couple of minutes if not brown enough. Remove plank, garnish with vegetables, more melted butter plus parsley or other herbs and serve using the plank as the dish. If the plank has no drain trough or a depression to catch the juices, it should be put in a shallow pan to catch the juices. For outdoor cooking, use a clean, sweet hardwood plank several inches thick, or any handy slab, shake or other piece of wood of suitable size, sheathing the working side with aluminum foil. The wood should be slightly wider and longer than the split fish. With the skin side toward the back, nail the opened flattened fish to the plank. Spread with butter of cooking oil. Salt and pepper. Prop the planked fish near the fire, turning and basting it occasionally to be sure the fish broils evenly at proper heat. Fish is ready as soon as it is flaky. Use the plank as a plate.

Broiled or Grilled Fish - Broiled of grilled fish is cooked over or under direct, dry heat. This method is great for fatty fillets or steaks. Lean may be used with basting. Fish to be broiled / grilled can be left whole, split, or filleted. Use a broiling tray, grill or wire basket; oil thoroughly. Heat oven and pan before putting in the fish so it cooks evenly. Season fish and broil. Small delicate fish can be broiled, but lean cuts should be cooked at a greater distance from the fire and basted with some complimentary sauce, butter or oil. Avoid very thick cuts of fish since broiling tends to make the outside leathery while the inside is barely warmed.

Pan-frying or Sautéing Fish - Pan-fry in a large, hot skillet with shortening or a good cooking oil (1/8 inch deep) or a little butter or margarine which has been brought to the foaming stage. Sprinkle with salt

and pepper, or with seasoned flour or dipped in batter. Cook over low or medium heat until golden brown. Turn carefully and brown other side, about 10 minutes in all. Drain on paper towels and serve hot. The sautéed skin should be crispy, not burned, and the flesh succulent. Avoid overcrowding and do not use a lid since this will cause steam and the skin will not crisp. If the fish contains too much moisture, the butter will spatter. (one reason not to soak fish in water before frying). Ideal for small fish and fillets. Serve with lemon or lime.

Deep Fat Frying - This is a popular method of cooking for many kinds of fish and is perfect for fillets. Heat cooking oil to 360 to 380F in a deep pot or fryer before adding the fish. The oil should be deep enough so that the fish is completely submerged. They will rise to the surface when cooked. A wire basket is useful for this process. Cook smaller fish or cuts at the higher temperatures. Before frying, fish should be dipped in milk then flour, dipped in batter, rolled in seasoned corn meal, or rolled in flour and then dipped in beaten egg and bread crumbs. Drain fish on absorbent paper and serve immediately. There are a number of fish batters and tempura batter recipes to try.

Poaching/Steaming/Boiling - These moist methods of cooking are great for steaks and large pieces of fish. Small whole fish are or sections of fish are cooked submerged (for poaching or boiling) in a hot court-bouillon, salted water, tomato juice or milk. Add diced onions or herbs if you want and simmer in any suitably sized pot but a long fish kettle designed for this purpose is preferred for larger pieces. Fish kettles may be rectangular, ideal for large whole fish such as salmon, or diamond shaped for fish such as flounder, sole or turbot and have a perforated rack upon which the fish is placed. To prevent a whole fish from breaking while cooking and to aid in handling, wrap the fish in cheesecloth and secure to the rack. The fish will remain intact and flat. Barely cover with hot salted water, tomato juice or milk, or use any number of court-bouillon recipes found in any good cook book. The liquid must submerge the fish completely. Bring the liquid to a boil before adding the fish (the bouillon will cease bubbling for a minute, but when it boils again, reduce the heat), cover and simmer slowly. Depending on the size or cut of the fish, cooking time may be as little as about 10 minutes or as much as 30 - 40 minutes. Cook until the fish is flaky. Remove the fish and serve hot or cold. Steamed are not submerged but are cooked by placing rack with fish above boiling liquid and cook covered in the steam generated. If desired, thicken the remaining gravy by stirring in flour and margarine. An egg sauce is a particularly fitting accompaniment for fish poached in salted water. Melt 2 tablespoons of margarine in a separate pan. Blend in 2 tablespoons of flour. Gradually stir in 1 cup of milk and cook about 5 minutes or until the sauce is thick and smooth. Remove from heat and add teaspoon salt, a sprinkle of black pepper. Add 1/4 teaspoon of paprika and 1 teaspoon of dried parsley for eye and taste appeal. Stir in 2 fine chopped, hard boiled eggs. Pour the hot sauce over the fish and serve. Small fillets are just barely covered with the liquid in a shallow pan and can be used as stock for fish chowders, stews, or bouillabaisse.

Soups, Stews, Chowders, Salads, Fish Cakes, and Casseroles - Poached or steamed fish, chilled may be excellent in salads. Experiment on your own or follow recipes in a good cook book. Soups, stews and chowders may be made from the strained bouillon of poached/boiled and boned fish or make base and add vegetables and hunks of raw boneless fish.

Let's Get To It!!
This is where the fun really begins! This is also where leaders should have it all pulled together, keeping a few key elements in mind and planning around them. A few basic questions are key.

1. What are the objectives? What are we trying to accomplish? Most importantly what are the kids expecting and what do they wish to learn?
2. How many participants will there be and how much cooking experience have they had?
3. What constraints are there (such as time, space, equipment, etc.) and how have they been factored in. (Rather than being hindrances, these can be great tools in incorporating help from parents, volunteers, and others!)

There are a few other factors to keep in mind. It needs to be fun, it needs to be do-able, it needs to be challenging and most of all it needs to be hands on - T**HEIR hands on.** Match the event with what you have and what you are trying to accomplish. Use common sense. If the group is small and has had little cooking experience, match the activity to that situation. Keep it simple. If the group is large and has great cooking skills, match that, too. Always make it challenging or a new learning experience, and you can always make it as complicated as you dare to try. The single greatest thing to remember is that people learn more by doing and the more hands on the group can participate in from planning to execution, the more they will get out of the event and the more they will "own it". This can be as simple as buying a few fish fillets and having a handful of nine year-olds cooking it in your kitchen or as extensive as a camp out, fishing expedition with a large club with a wide range of experiences and ages.

Once these elements and factors are determined we are now ready to begin. Divide the group, if possible, into cooking groups. Consider teaming beginners with slightly more experienced kids and having a teen or junior leader with each group for support. Other instructors should watch for safety problems or food safety problems, correcting them positively and early. Provide brief instructions on what they are going to do, demonstrating as needed. Each group will have recipe cards and any required materials. They will gather equipment for their project, divide the chores to be done, and prepare the dish according to the instructions.

It is vital that leaders only help **when and if they are NEEDED!** Taking over the learning experience robs the kids of ownership and learning. Hold back as much as possible, but be available to answer questions or provide support, while keeping a sharp eye for safety problems.

Try to stick to a time plan as closely as possible, letting the kids do the cooking, serving and clean up. Even this task will be fun if the adults fail to mention that it is work. Be prepared for some water flying and soap being applied to bodies as well as pots and pans.

Feast Time!
Break out the side dishes and drinks, and arrange them on the table as the kids near completion of their cooking tasks. Arrange the food in an attractive manner. Encourage everyone to sample each dish, taking taster's portions at least on the first visit. Enjoy the feast and encourage talk about what was learned during the event - cooking, fishing or everything at once. Use the discussion and observation as evaluation tools. Evaluate the recipes and cooking by having a taster's scorecard. Have everyone comment on the dishes they liked, what they learned about cooking, what they might want to try the next time, and anything else they might want to share.
Example: Our Woods and Waters Club planned an all-day outing by a local lake. In it we included lessons on how to set up camp, several lessons on fishing, fish cleaning and of course we cooked all 3 meals over camp fires. There were also lessons on canoeing, boating, fly tying, lure building, camp fire

building, orienteering and a number of other related subjects. The kids caught all the fish, cleaned them, prepared, and cleaned- up all three meals. We served fish for the meals and tried two or three different cooking methods for sampling at each meal, focusing on new or unfamiliar methods. We tried all kinds of things! Plus other relate foods like baking yeast bread in a Dutch oven, bean-hole beans (digging a hole, add coals and burying a pot of beans to cook all day - they were fantastic!!)

Exhibit or Sharing Suggestions

1. Prepare a dish for a food show using fish.
2. Prepare a fish meal for your family, using a method that is different from those usually used. Ask for their comments on the meal.
3. Prepare a taster's meal as part of a National Hunting and Fishing Day activity, or at a similar event. Have people evaluate the dishes.
4. Give a demonstration on a fish cookery method.
5. Prepare a photographic story featuring fish from the water to the table and exhibit it at an appropriate event.

Community Service and "Giving Back" Activities

1. Consider teaching about fish cookery and using locally caught fish to other youth groups or as an activity at a fishing derby or similar event.
2. Teach food safety or cooking safety to younger kids.
3. Participate in a water awareness program, showing people that what they put in the water at home is important to everyone, including the fish and people who might eat them..

Extensions or Ways of Learning More

Explore ways to tie in with other county, district or state foods and nutrition programs. Consider making a grub box or camp kitchen as a woodworking project. Investigate the fish that live in your area, and learn more about their life histories. Develop your own fish recipes and share them with friends. Let your imagination be your guide to doing more!

Fish Selection Information

Sylvia Susie Howard

Here are a few fish facts:

Fresh fish have clear, bulging eyes, elastic firm flesh, reddish pink gills, and are free from strong odor. If purchasing fresh fish, buy fish stored and displayed on crushed ice ... just before using. (The fresher the better.) Avoid fish with sunken and/or cloudy eyes, flesh that leaves an indentation when pressed (does not spring back when pressed), gills that are dull or not pink, or that has a strong, offensive odor. Fresh fish should have a "clean", fresh watery smell. If it smells or looks bad it probably is bad!

Cook fresh fish as soon as possible, preferably the day you catch it (or buy it). If you can't cook it right away, wrap it loosely in clear plastic wrap, store in zip type plastic bags, or in a loosely covered bowl and refrigerate it up to two days. Frozen fish are available the year 'round (in steaks and fillets). For best results, thaw frozen fish (preferably in refrigerator or microwave) immediately before cooking. **Never refreeze** fish that has been thawed. Prepare as with fresh fish. Properly frozen fish should have the flavor and texture of fresh-caught fish.

Amount to plan per average serving:
whole or round fish.....1 lb. per serving
dressed fish.....1/2 lb. per serving
steaks, fillets, sticks.....1/3 lb. per serving

Smoked fish are delicious plain or very simply prepared (boiled, steamed, baked). Most popular are salmon, whitefish, finnan haddie; but many fatty fish are excellent smoked. Carp, mooneye and many others produce an excellent smoked fish.

Salted cured fish, such as cod and mackerel, require removing excess salt. Soak overnight in cold water. (Or soak for 2 hrs....then simmer in fresh water for 30 min.). Cook as desired.

Fat fish have oil running through all the flesh and are generally best for broiling, baking, and planking. Examples include:

mackerel	pompano	salmon
lake trout	rosefish	herring
barracuda	tuna	shad
sturgeon	whitefish	catfish

Lean fish have a drier flesh with the oil stored mainly in the liver and are generally best for boiling and steaming. When baking, add strips of bacon or pats of margarine or butter or an oil baste marinade; when broiling baste with melted fat or oil or an oil marinade. Examples include:

bass	haddock	pike
carp	red snapper	halibut
cod	buffalo	perch
flounder	whiting	croaker

Both fat and lean fish may be pan or deep fat fried.

Many fish are seasonal delicacies. Other are available all year round. Careful preservation can extend the season for seasonal varieties, like smelt or winter flounder, but many anglers prefer to have an excuse for getting out in all seasons.

Remember fish cooks very rapidly and increasing cooking time does not increase tenderness as it does other meats. In fact it tends to have the opposite effect. Whatever kind of fish you choose or have at hand and regardless of the cooking method selected, **don't overcook** the fish!

For those interested in the nutritional value of fish, nutrient analysis for many fish may be found in general books on nutrition and some diet and health books. Fish provides an excellent source of protein. Some fishes also provide a source of omega-fatty acids, which may combat heart disease. On the cautionary side, be sure to know the waters from which fish are taken. If consumption advisories are issued, weigh the risk factors and abide by those consumption advisories.

Some Fish Cookery Recipes

Sylvia S. Howard

Wayne's Fish Chowder

4 strips thick cut bacon or salt pork diced
1 large onion, coarsely diced
2-3 large potatoes, diced
1 - 1□ pounds fresh fish, boned skinned, cut in 1" cubes
salt and pepper to taste
1 pint half and half
basil
paprika
oyster crackers

In a large, heavy skillet brown the bacon or salt pork. Remove bacon and drain. Add diced onion to the bacon grease and cook until golden. Drain and set aside with the bacon or browned salt pork. While cooking the bacon and onion, dice the potatoes, place in a heavy stock pot or sauce pan and add enough water to cover the potatoes. Bring to a boil and reduce heat to simmer. Add the bacon or salt pork, and browned onion to the simmering potatoes. If necessary, add enough water to cover. Bring the ingredients to a boil, reduce heat and cook until potatoes are nearly done. While the potatoes are cooking, cut fish into cubes about 1/2 inch to 1 inch on a side, removing any bones that are found. Just before the potatoes are done, add the fish to the pot and continue cooking until the fish is cooked. Season with salt, pepper and basil if desired. Remove from the heat and add the half-and-half to the pot, stirring constantly. Correct seasoning and serve immediately with a sprinkle of basil or paprika and oyster crackers. Wayne Carey's original recipe used striped bass (a steak from a 48 pounder caught in Nova Scotia), but it works very well with nearly any mild flavored fish. Using orange-fleshed salmon or trout creates a colorful dish, particularly with a light sprinkle of paprika just before serving. To produce a chowder with much lower fat content, substitute skim milk for the half-and-half and use turkey bacon in place of the traditional pork.

Baked Fish and Stuffed Fish

Most fish which are commonly fried or sautéed will be found fully as delicious, and very much more digestible, when baked. Either whole fish, fish steaks, or fillets may be baked. This method of cooking is suited alike to dry and oily fish, the former often being stuffed before baking. Rich fish such as shad, mackerel and bluefish require little or no basting. Dry fish, haddock being a good example, must either be basted frequently with melted shortening or have strips of bacon or salt pork laid over the surface to prevent drying out. Steaks and fillets may be first dipped in slightly salted milk, the rolled in soft crumbs before baking. With large fish have the oven very hot 450-500E F, for the first fifteen minutes. Reduce heat to 350-400EF for the remainder of the cooking time. Obviously the time of baking will depend on the thickness of the fish far more than on its actual weight. A stuffed haddock will require from three quarters to one and a quarter hours while cod or halibut steaks (one to one and a quarter inches thick) will be cooked in 25 - 35 minutes. Fillets, being quite thin, cook quickly, ten minutes at 500E F usually being sufficient. Place fish on aluminum foil in a shallow baking pan or in a greased shallow pan, or on a rack in a shallow pan. Placing a whole fish flat in the pan for baking will let it lie flat on the platter. Another more attractive method may be to skewer and tie in a curved or "S" shape for cooking and then place the fish upright (as it swims) in the pan.

Stuffed Fish - Heat oven to 350-375E (moderate). Sprinkle with salt, pepper and melted butter. Bake 20 minutes for fillets, 30 minutes for steaks, 15 minutes per pound for whole fish. For whole fish, fill cavity 2/3 full with a favorite dressing (see Garden Vegetable Stuffing below) and sew the abdomen shut. Other suitable stuffings are oyster, shrimp, mushroom and celery. For fillets, place stuffing between 2 pieces of fish, like a sandwich, and skewer shut with toothpicks. Fillets may be spread with stuffing, then rolled and skewered for baking. Increase baking time to make sure the stuffing is cooked through. Treat stuffed fillets as whole fish. Serve with a suitable sauce (see options below). This recipe may be used with other species, particularly other fatty fishes like large trout or salmon. It also works well with marine fishes like fluke, flounder, snappers or sheepshead.

Garden Vegetable Stuffing:
Combine 2 cups fine dry bread crumbs, 1 cup finely grated raw carrots, 1 cup finely chopped onion, sauteed in butter, 1 cup chopped raw mushrooms, □ cup chopped parsley, 1 egg, 1□ Tbsp. lemon juice, 1 clove garlic, minced 2 tsp. salt, □ tsp. marjoram and □ tsp. pepper.
Mix well and pack lightly into the body cavity of 6 to 8 pound fish.

Egg Sauce
(pleasant addition to salmon and other fish)
2 Tbsp. butter □ tsp. salt 1 cup milk
2 Tbsp. flour □ tsp. pepper
Melt butter over low heat in a heavy saucepan. Using a wooden spoon, blend in flour and seasonings. Cook over low heat, stirring until mixture is smooth and bubbly. Remove from heat.
Stir in milk. Bring to boil, stirring constantly. Boil 1 min. Makes 1 cup. Carefully stir in 2 diced hard-cooked eggs and season to taste.

Veloute Sauce (velvet sauce)
Same as above except use 1 cup fish stock in place of milk. Add □ tsp. nutmeg. Do not add diced hard-cooked eggs. Serve hot with croquettes, baked or steamed fish. Makes 1 cup.

Poached Salmon (or Trout)
Make Vegetable Court-Bouillon:
To every quart of water add □ cup of vinegar, 2 stalks of celery including the greens, 1 large onion quartered, 2 whole carrots, a few lettuce leaves, 2 bay leaves, a handful of parsley, 1 teaspoon of dill weed, 8 whole peppercorns, and a tablespoon of salt. Bring to boil, then simmer slowly for 45 minutes. Strain and use stock to poach fish or use broth as is to cook fish.

Use a deep pan or fish kettle suitable in size for the fish with a perforated rack. Wrap the salmon in cheese cloth and secure to the rack. This will help keep the fish intact. The liquid must submerge the fish completely. Bring the court bouillon to a boil before adding the fish, or much of the flavor will be lost. When the fish is placed in the kettle, the bouillon will cease bubbling for a minute. When the boiling point is reached again, reduce the heat. If boiled too rapidly the fish will fall apart. Simmer 10- 15 minutes a pound or until fish is flaky and done. Serve hot or cold with favorite sauce if desired.

Seviche or Rick's Baked Spicy Carp
5-8 pound carp 4 cups tomatoes, diced black pepper (sprinkling)

4 lemons or limes
□ cup chopped cerrano peppers*
1-2 chopped jalapeno peppers*
2 cups onion, diced finely
4-6 sprigs cilantro, minced
1-2 cloves garlic minced**
1 tsp. salt (to taste, go easy)
vinegar (a little)

* substitute finely chopped canned green chilies if fresh peppers are not available (See **WARNING**)
** substitute a sprinkling of garlic powder if fresh garlic is not available

Start with a live carp if possible, bleeding the fish by cutting the gills. If live carp are not available, make sure the fish is fresh. Fillet the fish and remove the skin. Rinse the fillets in cold water and place them in a glass baking pan. Squeeze the juice of one lemon or lime over the top of each fillet. Sprinkle a little salt on the fillets and let them stand in a cool place for 10 to 15 minutes or until the flesh begins to whiten. Turn the fillets over and repeat the process on the other side. While the fish is □cooking□ in the lime or lemon juice, make up the salsa that will be used as a marinade during the baking. Dice tomatoes (about 4 cups) and onions (about 2 cups) finely and place them in a glass bowl. Dice a few fresh cerrano peppers and jalapeno peppers (**BE CAREFUL**: the oils in the chilies stay on your hands for some time. **AVOID** touching your face or eyes or pay the painful penalty!) or one small can of canned green chilies and add them to the mixture. Alter the amount of peppers to make the mixture milder or hotter to your taste. Rick likes to use roasted tomatoes and peppers and to boil the mixture for about 15 minutes before using it. Once the salsa is prepared, cover the fillets with salsa and cover the dish with aluminum foil. Place the fish in a hot oven (400°) and cook for about one hour. The long steaming time allows the salsa to permeate the fillets. Remove from the heat and serve the fish as desired. Watch for the accessory ribs (Y-bones) in the front part of the fillets. Rick□s favorite ways to serve it are over hot rice or cold on crackers. Juan, a Mexican hunting guide at the San Francisco Ranch, is credited with the original recipe which was prepared as a foil meal on a grill over a mesquite fire. You could try it that way, too.

Seafood Gumbo

1 cup oil
2 cups flour
4 cups chopped onion
1 cup chopped bell pepper
1 cup fine chopped fresh parsley
1 cup chopped green onions
1 gallon fish stock or water
2 tablespoons minced garlic
2 tablespoons Worcestershire sauce
Salt to taste
Louisiana hot sauce or ground cayenne pepper to taste
1 pound crawfish tails, cleaned and deveined
1 pound okra, cut fresh or frozen
1 pound shrimp, cleaned and peeled
1 pound fish, cubed
6 crab bodies, broken in half
Other available, seafood

Heat the oil in a large, heavy pot over medium heat, then stir in the flour and make a dark roux; this should take about 45 minutes. (To make the roux, mix the flour and oil in a heavy pot. A black iron skillet or a Magnalite skillet works best. Cook on medium heat slowly as the roux changes from a cream color all the way to a dark chocolate color. After the roux is past a medium brown, stir constantly to keep it from burning. If you do burn the roux, do not use - start over) To the roux add the onions, bell pepper, parsley, and green onions, stirring after each addition. Cook , stirring frequently, until the vegetables are tender, the slowly add 1 cup of the stock, stirring until it forms a thick paste. Stir in the garlic and the remaining stock, then add the Worcestershire, salt and hot sauce, and stir. Bring to a boil, then add the crawfish, shrimp, fish, and crabs. Add okra. Reduce the heat to low and simmer, covered, for at least 2 hours, stirring occasionally. Serve over cooked rice with file. Leftovers can be frozen in smaller portions. Yields 6 to 10 servings.

Fish Stock -

Fish trimmings and bones or shellfish and scraps
Water
2 large onions, coarsely chopped
Louisiana hot sauce or ground cayenne pepper to taste
5 stems parsley
1 small lemon, quartered
Dill (optional)

Put the fish and / or shellfish in large stockpot. Add cold water to cover ; cover and bring to a boil. Skim off any scum that may form. Reduce the heat to low, add the onions, parsley, lemon, and dill, and simmer covered for 3 to 4 hours. Strain into containers, cover and keep well chilled until ready to use. This will keep in the refrigerator for 3 to 4 weeks or can be frozen and kept even longer. Yields about 1 gallon.

Tempura Panfish

1□ cup flour
1□ cup yellow corn meal
1 teaspoon salt
□ teaspoon pepper
Milk, buttermilk, or water
□ - □ teaspoon garlic powder (optional)
1 teaspoon basil , dried
□ - □ teaspoon paprika
1 egg, beaten

In a shallow pan (9X13 or similar size) blend flour, corn meal, salt, pepper, garlic powder (optional), basil, and paprika until well mixed. Measure about □ cup liquid into 2 cup measuring cup. Add egg and beat. Slowly add to flour mixture and stir with a fork to mix well. Gradually add additional milk stirring constantly. Mixture should be thick enough to coat fish pieces , but not too thick or too thin. For best results, keep the batter very cold by using an ice bath. Dip fish fillets or fish pieces in batter and pan fry or deep fat fry. Try 1 piece and check for seasonings. The fish are done when they float to the surface of the oil.

Pike Salad

1-2 pounds pike fillets, flaked
celery chopped
onion chopped
red bell peppers chopped
green bell peppers chopped
mayonnaise
salt
pepper
crab boil

This recipe came from an experiment inspired by A. J. McClane□s writings following an extremely successful day of pike fishing on New York□s Owasco Lake. It started with one fillet from a pike weighing about 5 pounds (bigger fish work even better). Start by bringing water seasoned with crab boil to a rolling boil in a pot large enough to submerge the skinned fillet. Roll the fillet into a loose cylinder and slide it carefully into the boiling seasoned water. Boil 2-3 minutes until the fillet is done and flaky. Remove the fish from the pot and set it aside to cool for a few minutes to make handling easier. Chop celery, onion and peppers (if desired) into a large bowl. Once the fish has cooled enough to permit handling it, turn the fillet so the inside is up. The accessory ribs should be protruding slightly above the level of the flesh. Grasp them with the fingers and pull them free, being careful to get the pieces that were cut off near the head end of the fillet. Flake the fish apart and add it to the chopped vegetables. Add mayonnaise or your favorite dressing, season with salt and pepper and serve.

White Sucker Patties

2-3 large white suckers
2 cups bread or cracker crumbs
tartar sauce

1 large onion	salt to taste	red sauce
lettuce	pepper	buns

The famed Finger Lakes streams sustain an outstanding run of white suckers as well as the rainbows and other salmonids for which they are famous. The spawning suckers strike readily on a wide variety of baits and lures, even bright rainbow flies, and sometimes anglers catch more suckers than trout. These lake-run fish may reach weights up to about 5 pounds, and they give a good account of themselves. Very few are used by anything other than the pike near the mouth of the streams and the raccoons foraging for fish discarded by thoughtless anglers. This recipe was a salvage operation on a couple large suckers. Start with 2-3 large white suckers (or similar species). Fillet and skin the fish. Run the skinned fillets through a food grinder with a fine plate. Chop and onion into quarters and grind it into the same bowl. Run the mixture through the grinder a second time to mix and further grind it. Add bread crumbs, crushed crackers or similar material to the fish along with the egg, salt and pepper, and any desired seasonings. Form the resulting mixture into patties and pan fry them over a modest heat until they are golden brown on both sides. Serve on buns as you would burgers, but with dressings appropriate for a mild fish instead - red sauce or tartar sauce, for example.

Walleye Shore Lunch

walleye fillets (more than you think you need)	light cooking oil
cornmeal cracker crumbs or flour	seasonings (basil, garlic, ...)
salt	onion
pepper	potato
sugar	tea

catsup, red sauce, tartar sauce or other condiments

Shore lunches are a Canadian tradition. Walleye is one of the traditions, but nearly any freshly caught fish can be used - pike, smallmouth bass, lake trout or even panfishes. The pause for lunch allows anglers to stretch their legs while providing sustenance for the rest of the day. One angler can build a fire while another fillets the fish. Allowing the fire to reach the coal stage is best, but the fish can be cooked over flames if a non-resinous wood is used. This is a two skillet and one pot meal. Fill the pot with water and set it on the fire to boil. Tradition uses loose tea that is boiled, but tea bags can be used as well. Brew a strong tea, adding sugar if desired. Pour a little oil in one skillet and set it on the coals or a wire grill to heat. Dice an onion and drop it into the hot oil. Dice enough potatoes to serve the dining party and add them to the skillet. Stir or toss them every few minutes to brown them evenly. Remove them from the heat and set them aside to stay warm until eaten. Season the corn meal, crumbs or flour with salt, pepper and any other desired seasonings. Turn the fillets in the mixture to coat each side lightly and slip them into hot oil in the other skillet. Turn the cooking fillets to keep them from curling too much and lightly brown them on both sides. Remove them to a couple layers of paper towels to drain excess oil from them. Serve hot with potatoes and tea. A bit of a salad may be added for those who want it. Plan a rest to settle the meal before hitting the water for the rest of the day.

Blackened Fish

scaled or skinned fillets	1 teaspoon red or cayenne pepper
peanut or canola oil	□ teaspoon black pepper
1 tablespoon paprika	□ teaspoon white pepper
2□ teaspoons salt	□ teaspoon thyme

teaspoon onion powder teaspoon oregano
1 teaspoon garlic powder

Heat a heavy skillet over high heat for approximately 5 minutes or until a small amount of cooking oil begins to smoke. Dredge the fillets in the seasonings, coating both sides. Lay the fillet(s) in the pan, allowing them to cook until the underside takes on a charred appearance. This should take about 2 minutes or less. Turn the fish and repeat the process (note this will take less time since the fillet is now warm.) These directions are for a fillet approximately to inch thick.

Steamed Trout with Onion and Lemon

heavy duty foil
butter or margarine
dressed trout or large fillets
onion
lemon
salt and pepper

Prepare a large trout by cleaning it and scraping the skin to remove scales and excess slime. Place a few small pieces of butter or margarine in the center of a piece of foil large enough to wrap and seal the fish. Salt and pepper the fish (add any other items you wish). Slice an onion into thin slices and lay them on the fish. Cut a lemon into thin slices and place them over the top of the fish. Seal the fish carefully to seal in the steam. Place the wrapped fish on a grate or wire rack over a moderate set of coals, turning it occasionally as the fish bakes or steams in the foil for approximately an hour. Open the foil package carefully to avoid steam burns! Enjoy!

Susie's Red Sauce

1 cup catsup
Juice of 1 lemon or 3 tablespoons bottled lemon juice
 teaspoon garlic powder
1 teaspoon Worcestershire sauce
2 - 3 drops Tabasco sauce

Stir catsup, lemon juice, garlic powder and Worcestershire sauce together. Add Tabasco sauce 1 drop at a time, stirring and tasting after each drop is thoroughly mixed. Make it as hot as suites your taste. Adjust Worcestershire sauce to suite taste, also. Chill. Use as a dip or sauce for fish.

Tartar Sauce

1 cups mayonnaise
 cup sweet pickle relish
OR cup chopped dill pickle
chopped herbs as desired and to taste*
* capers, parsley, tarragon, chervil
 - 1 teaspoon lemon juice
 - cup chopped mild onions or shallots
salt and pepper to taste
 teaspoon sugar
1 teaspoon mustard

Adjust this recipe to your personal tastes.

The recipes included here are just a minute sampling of the many outstanding recipes available for fish. Let your palate and your curiosity guide you to others. Share new discoveries that you find with your friends.