discover nature FISHING

Missouri Department of Conservation

Instructor Guide

LORI MUNHOLLON

MDC DISCOVER nature®

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FISHING

Missouri Department of Conservation

Instructor Guide

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Contents

Conservation makes Missouri a great place to fish!

Missourians love to fish. Our state's 1 million anglers spend more than 13 million days afield each year, making fishing one of Missouri's most popular outdoor activities, and we have no shortage of places to go. More than 300,000 ponds dot the state. Public lakes add up to more than 270,000 acres. Missouri has more than 110,000 miles of streams, including the two largest rivers in the country.

The Missouri Department of Conservation's (MDC) nine fish hatcheries produce more than 4 million fish each year, including largemouth bass, bluegill, channel catfish, rainbow trout, and many others. These fish are stocked in lakes, rivers, reservoirs, and ponds all over the state, in both rural and urban areas. In addition to stocking four trout parks and Lake Taneycomo, MDC also manages 120 miles of spring-fed, cold-water trout streams.

Since 1878, when the Missouri Legislature authorized Missouri's first Fish Commission, citizen-led conservation efforts have restored and improved fish populations, habitat, and fishing opportunities all over the state. Today, enhancing Missouri's sport fishing takes many forms: hatcheries and stocking, partnerships for habitat-improvement projects, refining fishing regulations, watershed conservation, science-based research, angler surveys, and increasing fishing access through federal programs.

What is MDC?

MDC is governed by the Missouri Conservation Commission and is responsible for the control, management, restoration, conservation, and regulation of the bird, fish, game, forestry, and all wildlife resources of the state.

Mission

To protect and manage the fish, forest, and wildlife resources of the state and to facilitate and provide opportunities for all citizens to use, enjoy, and learn about these resources.

What do we do?

MDC owns and oversees hatcheries, sanctuaries, refuges, reservations, nature centers, and shooting ranges, and enforces the *Wildlife Code of Missouri*. We use sound science, business, and workplace practices to manage and ensure healthy and sustainable fish, forest, and wildlife resources throughout the state, and manage public lands to ensure continued benefit to citizens. We provide opportunities for active citizen involvement in services and conservation education in both rural and urban areas, and engage partners at all levels (individual, community, county, state, and federal) to enhance natural resources and for effective delivery of conservation service.

Discover Nature Programs

The Missouri Department of Conservation's Discover Nature programs provide hands-on experiences in the outdoors and are designed to deepen your connections with nature and your family and friends. Discover Nature programs are offered in a wide range of outdoor topics and are available through many department facilities and conservation areas. Discover Nature programs have three main goals:

- Increase participant use, enjoyment, and knowledge of Missouri's fish, forest, and wildlife.
- Increase participant skill levels in resource-related outdoor activities.
- Empower participants to continue the activities on their own.

To find Discover Nature programs near you, go to **mdc.mo.gov/discover-nature/events**.

Discover Nature — Fishing

Fishing is a great way for everyone to have fun outdoors, learn about conservation, and make happy memories together. Our Discover Nature — Fishing (DNF) program is free, hands-on fishing instruction that helps Missourians gain the skills and confidence to go fishing on their own.

DNF participants will learn about fishing equipment, casting, rigging a fishing rod, baiting a hook, and proper handling of fish. They will learn about fish identification, fish habitat, and how to stock a basic tackle box. DNF classes are offered in communities throughout the state. To find a DNF class near you, visit **mdc.mo.gov/fishing/get-started-fishing**.

Adaptations for Participants with Special Needs

In compliance with the Americans with Disabilities Act, this program will make all reasonable efforts to accommodate people with special needs.

To find conservation areas that have facilities accessible to people with disabilities, go to **short.mdc.mo.gov/4qM**. Accessible facilities include boat ramps, fishing docks, fishing jetties and platforms, and fish cleaning stations.

To find accessibility information for Missouri State Parks, go to **mostateparks.com/content/accessibility-information**.

Adaptive fishing equipment, like self-casting and self-retrieving reels, and rod holders and harnesses, are available for loan at some conservation areas. Information on adaptive fishing equipment for purchase can be found at **moveunitedsport.org/sports/adaptive-equipment/fishing**.

Instructional Best Practices

Patterns of acquiring and processing information are known as learning styles. While some people have a dominant or preferred style of learning, nearly everyone uses a mix of learning styles. Some people use different styles in different situations.

Instructors should keep in mind that Discover Nature instructor guides are focused on introductory information and techniques for beginners. They are based on instruction methods that engage participants by using five main learning styles: visual, auditory, kinesthetic, verbal, and social.

The methods of instruction modeled throughout this guide include the use of positive language, the use of questions and wait time, demonstration of skills, observation and assessment of participants, and acknowledgment of participant mastery of new skills.

Using positive language includes using clear, direct language; describing concrete, specific behavior; and focusing on the action or technique the participant should perform. Positive language helps participants form a mental image of themselves performing the task or technique, and also helps them form a positive perception of the subject, their experience, the instructor, and MDC. For example, if participants were instructed to place their rods on rod racks but were walking toward the racks holding their rods at their sides with the tips pointing down in front, an instructor would say, "Thank you so much for bringing your rods to the racks. We always keep the tip of rods up to make sure everyone around us is safe and to protect the tips and tackle from getting caught in the grass."

Asking open-ended questions engages participants more than asking yes/no or multiple-choice questions. When asking questions, allow 3–5 seconds for participants to consider the question and think about their answer before repeating the question or providing the answer. Acknowledge all answers in a positive way. Realize that answers will vary and provide opportunities for the instructor to

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assess understanding. The instructor should take the opportunity to build upon participant answers to frame their response and provide the complete answer.

Instructors may add examples or visual aids to clarify points but should keep the focus on the material presented in the instructor guide. Instructors should not significantly add to the material in the instructor guide, leave out topics, or deviate from the presented sequence.

Instructors should model or demonstrate how to do all tasks or skills that are being taught. Instructors should perform the actions using correct methods and techniques, taking care to ensure all participants are able to see the demonstrations clearly. Instructors should verbalize or describe actions while they are being performed and refrain from demonstrating options or alternatives unless they are necessary to accommodate the needs of individual participants.

Instructors should observe participants performing demonstrated tasks or skills. Participants should verbalize or describe steps as they perform them. Instructors should acknowledge participants as they learn and correctly demonstrate new skills. When assistance or coaching is necessary, instructors should use positive language and reinforce specific details of the skill(s) not mastered.

When corrective advice is needed, instructors should remember the initialism CPR, which stands for compliment, positive correction, and review. Instructors should begin by making a positive comment or compliment about a specific action or part of the technique that is being performed correctly. The instructor should then describe the specific desired action the participant needs to perform in order to improve. Finally, the instructor should review the participant's modified technique to ensure participant understanding and determine whether or not improvement was achieved. (Information on CPR instructional practice is reprinted by permission from the National Archery in the Schools Program, NASP®.) Good instructors observe, encourage, and acknowledge success.

A good way to remember many of these instructional practices is to remember the acronym EDOC, which stands for educate, demonstrate, observe, and congratulate.


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Unit Overview

This *Discover Nature — Fishing Instructor Guide* is designed to help instructors and teachers teach kids and families basic fishing skills. Detailed teaching strategies and instructional best practices are provided throughout the lessons to help instructors engage participants mentally and physically, and guide them toward understanding concepts and mastery of skills. The primary goal of Discover Nature — Fishing is to help Missouri kids and families gain the skills and confidence to continue fishing on their own.

This instructor guide is composed of four lessons and 19 activities. Each lesson requires approximately 2 hours, including an optional 1-hour hands-on fishing activity. While the lessons build on knowledge and skills learned in previous lessons, the guide is designed to be adapted easily by instructors and teachers to meet participant needs and time constraints.

For example, several lessons may be taught before the hands-on fishing activity. Discover Nature Schools (DNS) teachers have the option to take students on a DNS field experience, which would include hands-on fishing as part of the culminating activities for the unit.

Activities

Activities provide essential hands-on components of each lesson and engage participants by using teaching strategies that incorporate multiple learning styles. Question-and-answer sections allow participants to process new information and explain it in their own words. Questioning allows instructors to see where participants are in the learning process and check for understanding. It also gives instructors the chance to frame their response and future instruction to meet participants at their current level of understanding and engagement.

Activity Procedure

Steps 1 and 2 of the Activity Procedure section involve greeting participants, introducing the instructor and any volunteers, and explaining the Discover Nature — Fishing program. While these steps are included in the first activity only of each lesson, these steps are necessary any time a group meets for the first time or reconvenes after several days. If an instructor/volunteer(s) plans to teach an entire lesson or more than one lesson, these steps will be necessary only for the initial lesson.

Safety

While safety information is included in the instructor guide only at the beginning of each lesson, safety information should be given to participants any time a group meets for the first time or reconvenes after a long break. Safety reminders should be given as appropriate, especially before activities involving hooks and fish.

Wrap-up and Review

Depending on the next activity, provide participants directions on what to do with their equipment to help with logistics. For example, at the end of Lesson 1, Activity 1.2, instruct participants how to put equipment away if that is the last activity of the day. If instruction moves directly on to Activity 1.3, instruct participants to secure plugs on their rods, cut their plugs off, or place rods on racks for instructor/volunteers to remove the plugs, etc.

Lesson 1: Equipment, Casting, and Proper Fish Handling

Lesson Outline

Parts of a Spincast Fishing Rod and Reel

- Grip
- Rod handle trigger
- Line guides
- Rod tip
- Cover
- Drag adjustment
- Line opening
- Reel handle
- Reel seat
- Release button

Casting

- Casting safety
- Grip
- Stance
- Aim
- Cast
- Release
- Follow through

Basic Tackle

- Line/monofilament
- Hooks
- Weights or sinkers
- Bobbers
- Fasten a sinker and bobber (hands-on instruction)

How to Catch and Release a Fish

- Bobber movement
- Setting the hook
- Playing the fish
- Proper fish handling
- Hook removal
- Proper release technique

Lesson Objectives

1. Learn the parts and function of a spincast fishing rod and reel.
2. Learn how to cast safely and successfully.
3. Learn how to fasten basic tackle to a fishing line.
4. Learn techniques to catch a fish and handle it properly.

Setting

Large open area

Instructor Preparation

- Fix any rods and reels that are in need of repair or maintenance.
- Put up Discover Nature — Fishing signs, if applicable.
- Organize check-in materials, if applicable.

Equipment/Materials

- Spincast combo equipped with a casting plug (one per angler)
- Hula-Hoops or other casting targets (at least four)
- Orange cones (at least four)
- Line samples: Different spools with test strength marked
- Hook samples: Aberdeen, bait holder, and treble hooks
- Sinker samples: Egg weights, bullet weights, and rubber grip sinkers
- Bobber samples: Plastic round bobbers, spring floats, slip floats, and foam torpedo floats
- Needle-nosed pliers (one per participant)
- Fish props — largemouth bass, channel catfish, bluegill, trout
- Bait
- *A Summary of Missouri Fishing Regulations* (current year — one per participant)
- *Introduction to Fishing* and *Know Your Catch/Know Your Knots*

Total Time Required: 2 hours

- Instruction: 45 minutes
- Hands-on Fishing: 60 minutes
- Program Wrap-up: 15 minutes

Group Size

Ideally, no more than 20 anglers per instructor during instruction, and no more than five anglers per instructor/volunteer during hands-on fishing.

Safety Considerations

A wayward casting plug or hook is the greatest safety consideration, particularly if it should hit someone's eye. A casting plug hitting someone's body can also cause a bruise. When walking, anglers should keep the rod tip pointed upward at all times and secure the hook onto the line guide. Anglers should also be aware of what is behind them when casting to avoid hooking someone on the cast.

Activities

Activity 1.1: Parts of a Spincast Fishing Rod and Reel
Activity 1.2: Casting
Activity 1.3: Basic Tackle
Activity 1.4: How to Catch and Release a Fish

Activity 1.1: Parts of a Spincast Fishing Rod and Reel

Estimated Time

10 minutes

Objective

Participants will be able to name the parts and explain the basic functions of a spincast fishing rod and reel.

Instructor Preparation

- Have available one fishing rod and reel equipped with a casting plug.
- Check in participants with designated forms (if applicable).

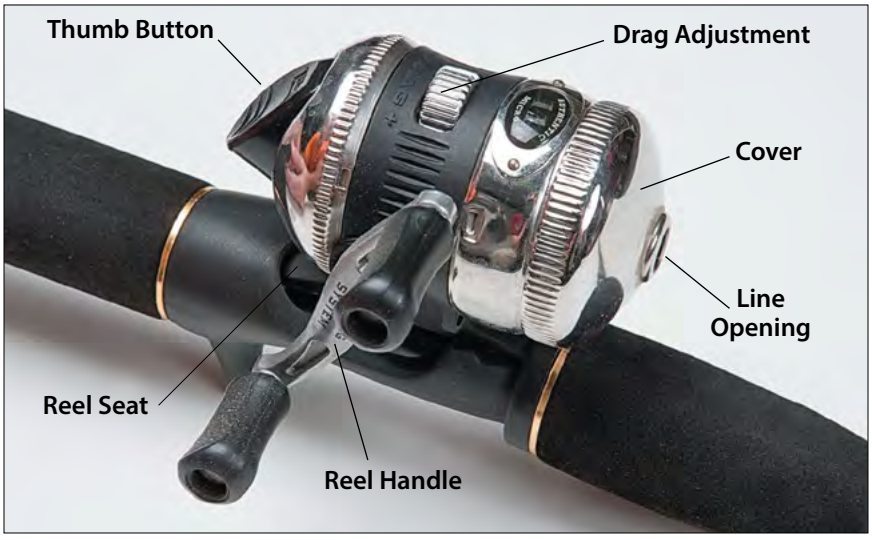
Materials

- One spincast fishing rod and reel with casting plug
- One cane pole (optional)

Procedure

1. Greet the participants and introduce yourself and any assistants. If you are an MDC employee or volunteer, talk about MDC's mission and describe what we do and why it's important (refer to Table of Contents).
2. Briefly explain that Discover Nature — Fishing is a fishing education program designed to give people of all ages basic fishing skills, knowledge, and experience so they can go fishing on their own. Explain that there are four lessons within Discover Nature — Fishing.
3. Explain that participants will learn the parts and function of a spincast fishing rod and reel and do some fishing (if applicable).

Parts of a Spincast Fishing Rod and Reel



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4. Stand in front of the seated participants and hold up a spincast rod and reel equipped with a casting plug. Explain that this equipment is sometimes called a combo because it is a combination of a rod and a reel. A spincast reel may be described as a closed-face spinning reel. It has a nose cone, or hood (front cover), that houses the line and stationary spool. On the cast, after the line has been released from the spool by depressing and releasing a push button with the thumb, the line passes from the spool through a hole in the front of the nose cone. Spincast reels are designed to be mounted on top of a standard spincast or baitcast rod.

Spincast tackle is ideal for beginning anglers because it is easy to use. Spincast tackle is often used to fish for bluegill, crappie, and other fish. However, spincast tackle is not limited to beginners. Specialized models are used by advanced anglers for big bass.

Q: What does the rod or pole do?
A: Extends the reach and power of your arm. (Ask participants to imagine how much farther they could throw a ball if their arm were twice as long as it is now, or as long as their arm plus the length of the rod.)

Q: How is a rod different from a pole? (Option: hold up a cane pole)
A: A rod is equipped with line guides. A rod is typically shorter than a fishing pole and is usually attached to a reel.

5. Point out and name the parts of the rod and explain their function. Include all parts shown in the illustration.

Q: What does the reel do?
A: It holds the line. It lets you send out the line and bring it in with control.

6. Cast the casting plug and reel it in to demonstrate the function of the reel.

Q: Why do you think I can cast farther with this rod than with a cane pole?
A: Because the reel holds more line and allows you to cast farther than with a cane pole.

Q: What do you think is inside this reel cover?
A: Accept answers.

7. Remove the reel cover and walk around so all the participants can see what's inside — a spool of line and a disc that spins as you turn the reel handle, coiling the line around the spool.

8. Replace the reel cover and explain that this type of reel is called a closed-face reel because the spinning disc and spool is closed in beneath the reel cover.

9. Point out and name the parts of the reel and explain their function. Include all parts shown in the illustration.

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Wrap-up and Review

1. Check for understanding by asking if there are any questions.

2. Ask for a volunteer to come up and name three parts of a rod, three parts of a reel, etc. As a quick review you can do anytime, have the participants name the parts of the rod and reel as a group as you point to them.

Activity 1.2: Casting

Estimated Time

15 minutes

Objective

Participants will be able to cast safely and successfully.

Instructor Preparation

Have available fishing rods equipped with casting plugs (at least four)

Materials

- Fishing rods equipped with casting plugs (at least four)
- Hula-Hoops or other casting targets (at least four)
- Orange cones (at least four)
- Tennis balls (one per participant)

Procedure

1. Explain that participants will learn how to cast safely and successfully and do some fishing (if applicable).
2. To reinforce casting safety, stand in front of the seated participants and explain that casting plugs can be dangerous. Anglers should always be aware of the location of their plug. Remind anglers to keep their rod tip pointed upward at all times while walking to keep everyone safe, and reel in line so the casting plug is secured at the rod tip.

   On the forward cast, most anglers are aware of other people, but they sometimes forget about power lines and overhanging trees. Tell anglers to be aware of the lines of anglers next to them to reduce the chance of casting over other lines.
3. Explain and demonstrate the six steps to a successful cast — grip, stance, aim, cast, release, and follow-through. Repeat the sequence while demonstrating the motions without a rod.

   Q: Can someone repeat the steps in the correct order?
   A: Grip, stance, aim, cast, release, and follow-through.

   Tell participants they will learn these six steps so they can make accurate casts. Accuracy increases safety, avoids frustration of tangled lines, and improves success as the angler learns to place the bait or lure in the best place on the water to catch a fish.
4. Using a rod and reel equipped with a casting plug, demonstrate the six steps to a successful cast. Do not explain the details of each step, but say the name of the step aloud as you perform it. Repeat.
5. Using the rod and reel, explain the details of each step below, making sure all participants can see you as you demonstrate. Be sure to demonstrate all techniques for both right- and left-handed anglers.

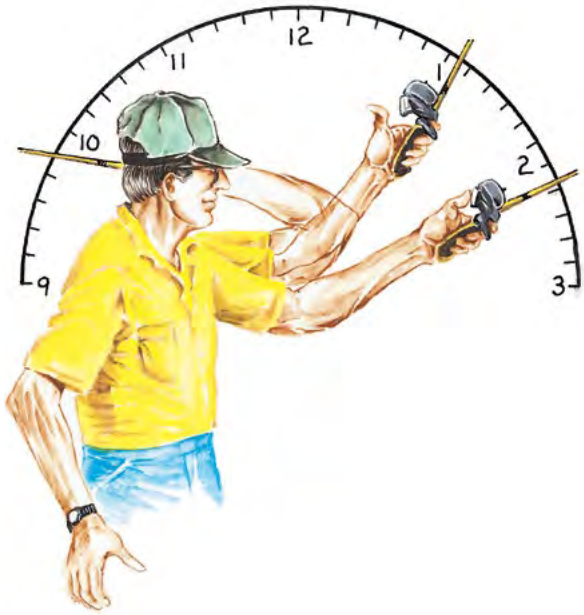

NOPPADOL PAOTHONG

6. Grip — If you are right-handed, grip the rod handle with your right hand, placing your forefinger on the rod handle trigger. Show everyone the rod handle trigger. If you are left-handed, grip the rod handle with your left hand, placing your forefinger on the rod handle trigger. Place your thumb on the release button but do not press it yet.

7. Stance — Face your target with feet shoulder-width apart. If you are right-handed, put your right foot forward. If you are left-handed, put your left foot forward. More of your weight should be on your forward foot, also known as the aiming foot. Show the anglers how to place their aiming foot in the direction they want their bait or lure to land. Keeping their body and target in a straight line increases the angler's chances for a successful cast.

8. Show and explain the position of your arm in reference to the hour hand of a clock. The clock reference will be used in the aim, cast, release, and follow-through steps of casting.

Q: If my arm were the hour hand of a clock, what time would it be?
A: Check for understanding to make sure participants can visualize a clock in the same orientation as yours.



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9. Aim — Aiming has already begun with a proper stance. The casting arm, the rod, and eye need to be in alignment. Place the rod in front of your body, pointing at the target. Keep your elbow bent at approximately a right angle. Keep your eye on the target and not the rod. Make a point to check to see what's behind you. Press the push button with your right thumb (if you are right-handed) and raise the rod to the 2 o'clock position. The right hand, rod, and reel should all be in direct line with the right eye, right foot, and target. This places the rod and lure in natural line with the target. Instruct anglers to keep their eye focused on the target during the entire cast.

10. Cast — Hold the rod so that the tip is at eye level and centered on the target. Your elbow should be close to, but not touching, your body. With a smooth upward motion, start the cast by raising your hand almost to eye level, bending the wrist and elbow so that the rod extends over your head and behind you. When the rod reaches the 11 or 10 o'clock position, the weight of the plug will cause the rod to bend to the rear. As it does, bring the rod forward in a crisp downstroke with the forearm, applying only a slight wrist motion forward.

11. Release — When your forearm, wrist, and rod reach the 1 o'clock position on the forward cast, release the push button with your thumb and allow the plug to travel toward the target. Line is released when the push button is released. The correct release usually occurs when the rod is between 1 and 2 o'clock, but this will take some practice.

12. Demonstrate proper release timing by using a tennis ball. Pretend to throw the ball in slow motion.

    Q: What would happen if I released the ball here (in the 10 or 11 o'clock position)?
    A: The ball would go straight up in the air.

    Q: What would happen if I released the ball here (in the 3 or 4 o'clock position)?
    A: The ball would land in front of my feet.

    Q: What is the best time to release the ball so it goes the farthest?
    A: About 1 or 2 o'clock.

13. Allow each participant to practice throwing a tennis ball toward a Hula-Hoop or other safe target, taking note of the position of their arm when they released the ball.
14. Follow-through — As the plug is released, your arm should follow through to about the 3 o'clock position.
15. Review and check for understanding. Repeat the explanation of the steps and demonstration, if necessary.

    Q: Who can name the six steps to a successful cast?
    A: Grip, stance, aim, cast, release, and follow-through.

    Q: Who can remember the details of the grip step? Stance step?

16. Divide the participants into three or four groups and assign one volunteer to each group. Set up a casting site and casting target for each group, allowing plenty of space between the groups so participants can practice casting safely.
17. Establish a casting site by posting an orange cone. Participants should stand next to the cone when they practice casting. Step 10 paces in the direction you want participants to cast, and place a Hula-Hoop on the ground for a casting target.
18. In each group, have participants practice casting one at a time, standing next to the cone and attempting to cast their casting plug into the Hula-Hoop. Have participants say the six steps aloud as they perform them. Have volunteers review the details of each step, if necessary.
19. Check for proper release timing. If the lure goes straight up into the air, the angler released the line too soon. If it takes a nosedive at their feet, they let go too late.
20. Allow each participant to practice casting at least three times. If participants cast accurately at 10 paces, increase the distance between the casting site and the target, if time allows.
21. **Note:** The cast should begin with the plug hanging about 1 inch below the rod tip. If more casting distance is needed, increase the starting distance from the plug to the rod tip in 1-inch increments, until the desired distance is obtained. The farther the plug starts from the rod tip, the harder it will be to achieve accuracy. Holding the plug against the rod tip can cause excessive wear to the tip guide, which can affect accuracy. The best rule of thumb is to start with the plug hanging 1 inch below the rod tip, and then experiment.

Wrap-up and Review

1. Give participants instructions for what you would like them to do with their fishing rods.
2. Ask if there are questions and review important points of the activity.

Activity 1.3: Basic Tackle

Estimated Time

10 minutes

Objective

Participants will be able to identify basic fishing tackle and fasten it to a fishing line.

Instructor Preparation

- Have available fishing rods with no tackle on the line (one per participant).
- Have tackle samples displayed on a table.

Materials

- Line samples: Different spools with test strength marked
- Hook samples: Aberdeen, bait holder, and treble hooks
- Sinker samples: Egg weights, bullet weights, split shot, and rubber grip sinkers
- Bobber samples: Plastic round bobbers, spring floats, slip floats, and foam torpedo floats
- Fishing rods with no tackle on the line (one per participant)
- Split shot sinkers (at least one per participant)
- Round bobbers (at least one per participant)
- Needle-nosed pliers (one per participant)
- Clear containers with lids for passing around tackle samples
- Oversized hook, if available

Procedure

1. Explain that participants will learn about basic fishing tackle, how to fasten it to a fishing line, and do some fishing (if applicable).
2. As you are discussing each type of tackle, pass around tackle samples in clear containers with lids. Alternatively, use a large sample display board or large photos.

Line

3. Have tackle samples arranged on a table in the order that you will be discussing them. Stand behind the table and ask the participants to come up and view the items as you discuss them. Explain that most fishing line is made from a single fiber of plastic called monofilament. Fishing lines come in a range of colors and diameters, and are rated by their breaking point or test strength. For example, 2-pound test line can hold a 2-pound weight or 2 pounds of pull by a fish. Point out how the line test is marked on the spool.

   Q: What's the purpose of fishing line?
   A: To connect the rod to the hook.

   Q: Which line would be easier to cast farther — thin line or thick line?
   A: Thin line is easier to cast farther because it weighs less and has less wind resistance than thick line. You can cast smaller baits and lures farther with thin line.

   Q: Which line would be harder to break — thin line or thick line?
   A: Thick line is harder to break. It is stronger than thin line.

Q: If I were fishing in an area with big fish, what type of line would I want to use?
A: Thick line — it's stronger and is better at holding big fish than thin line. For most beginning fishing, 6- to 12-pound test line works fine.

Hooks

4. Hooks come in many sizes and shapes. An ideal hook is one that is small enough to slip into a fish's mouth, yet large enough to hold its lip securely. Hooks are measured with a numbering system that runs from No. 20 to No. 0 — the bigger the number, the smaller the hook. For example, a No. 20 hook is much smaller than a No. 6 hook. Show examples.

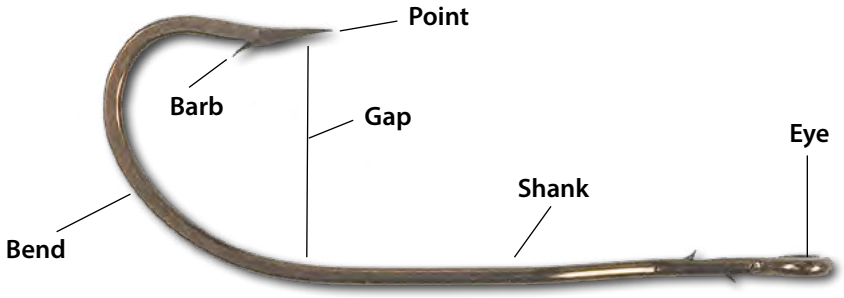
Q: What's the purpose of the hook?
A: To connect the line to the fish.

Q: Which is bigger — a No. 6 hook or a No. 10 hook?
A: A No. 6 hook.

When fishing with natural or live bait, a package with an assortment of hooks ranging from sizes No. 6 through No. 10 is good to have. However, when fishing for catfish or other large fish, larger hooks are needed, such as No. 2 through No. 6. Trout fishing requires small hooks in the No. 14 to No. 20 range.

5. Using an oversize hook or large picture of a hook, point out the parts of a fish hook:

- Eye: where the line attaches to the hook
- Shank: the part of the hook between the eye and the bend
- Bend: the curved part between the shank and the point
- Point: the sharpened end
- Barb: a smaller point below the big point
- Gap: distance between the point and the shank



6. Show participants the differences between an Aberdeen, bait-holder, and treble hook. Explain that the Aberdeen and bait-holder hooks will be used in another lesson.

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Aberdeen Hook

The Aberdeen hook has an elongated shank and wide gap. Mostly used with worms, minnows, and larva baits, the Aberdeen allows for easy removal from a fish, as the shank is usually visible for easy access.

This hook is a good beginner's hook. The long shank helps anglers get a safer feel for unhooking fish, and baiting is easier than if using short-shank hooks.

Bait-holder Hook

Bait-holder hooks are recognizable by a series of two or more barbs on the shank. Anglers who fish with night-crawlers often use them. These barbs help hold the worms on the shank. This keeps bait on the hook longer and limits bait loss from small fish that try to pull the worm off the hook.

Treble Hook

Show how the treble hook is actually three single hooks stuck together. Explain that the treble hook is used most often with lures, but that they are also used to hold doughbait or stinkbait because they hold soft bait better than single hooks.

Weights or Sinkers

Q: What's the purpose of weights or sinkers?

A: They help you cast farther and get bait deeper.

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7. Explain that sinkers are weights that come in many different shapes and sizes to help cast farther and get bait deeper. Sinkers help keep the line tight, which makes it easier to feel when a fish bites. The most important factor to consider when choosing a sinker is the fishing method.

8. Show the participants egg weights, bullet weights, and rubber grip sinkers to make them aware of the most common weights used in freshwater fishing. Show the anglers the split-shot and explain this is the type of weight that will be used in Discover Nature — Fishing.

9. Demonstrate how to attach the split-shot weight to the fishing line.

a. Using pliers or forceps, open the split-shot weight.

b. Lay the fishing line in the slot of the weight.

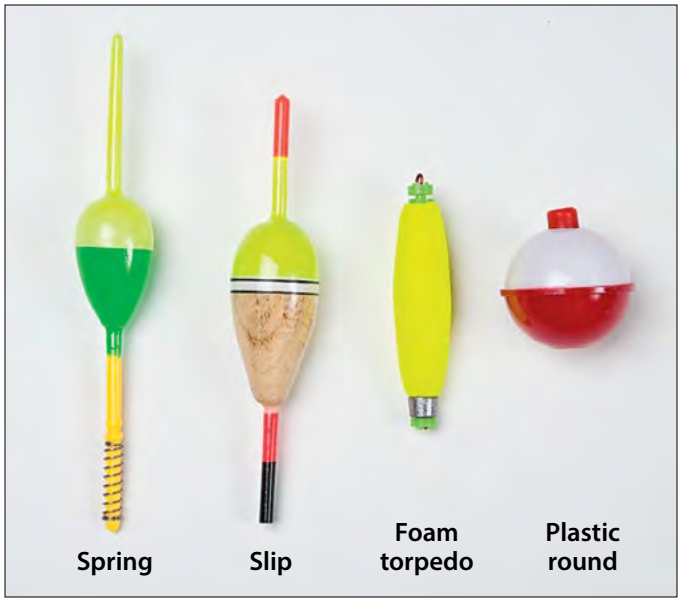
c. Using pliers or forceps, close the split-shot weight, being careful not to close the weight too tightly. Closing the weight too tightly could weaken the fishing line.

Bobbers

10. Show the participants a round bobber and explain that this is the type that will be used in DNF. Show anglers that bobbers (also called floats) come in many shapes and sizes. Common bobbers include plastic round bobbers, spring (stick), slip, and foam torpedo bobbers.

Q: What's the purpose of a bobber?
A: A bobber floats on the surface to keep the baited hook at a fixed depth. Bobbers also indicate when a fish bites the bait.

Q: Why do you think a bobber helps an angler know when a fish bites the bait?
A: The bobber is pulled down into the water or pulled across the surface by the fish.



CLIFF WHITE

11. Explain that for best results, use the smallest, least resistant bobber that will suspend the bait you are using. This will allow the angler to see the bobber move from more subtle bites and reduce the chance of a fish feeling the resistance of an oversized bobber and releasing or losing the bait.

12. Demonstrate how to attach a round bobber to the fishing line.

a. Push the button at the top of the bobber, exposing the wire at the bottom.
b. Wrap two turns of the fishing line around the wire at the bottom of the bobber.
c. Release the button.
d. Push the sides of the button, exposing the wire at the top of the bobber.
e. Wrap two turns of the fishing line around the wire at the top of the bobber. (Be sure to attach the bobber on the line so the button is on top when the bobber floats on the water. This will help the angler see slight movements of the bobber.)
f. Release the button.

Fastening Basic Tackle to a Fishing Line

13. Supply each participant with a fishing rod (with no tackle on the line), needle-nosed pliers, several split-shot weights, and at least one round bobber.

14. Have participants fasten a bobber 2–3 feet from the end of their line and a split-shot weight about a foot from the end of their line. Repeat instructions on fastening tackle, if necessary.

15. Explain that tying the hook to the line will be taught in Lesson 2.

Wrap-up and Review

1. Give participants instructions for what you would like them to do with their tackle and fishing rods.

2. Ask if there are questions and review important points of the activity.

Activity 1.4: How to Catch and Release a Fish

Estimated Time

10 minutes

Objective

Participants will learn techniques to catch a fish and handle and release it properly.

Instructor Preparation

Have available fishing rods with no tackle on the line (one per pair of participants).

Materials

- Fishing rods without any tackle (one per pair of participants)
- One unattached bobber
- Fish props (largemouth bass, trout, bluegill, channel catfish)
- Needle-nosed pliers (one pair)

Procedure

1. Explain that participants will learn techniques to catch a fish and handle and release it properly. The group will also do some fishing (if applicable).

Bobber Movement

Q: What's the purpose of a bobber?
A: A bobber floats on the surface to keep the baited hook at a fixed depth. Bobbers also indicate when a fish bites the bait.

2. Explain that watching the movement of the bobber helps the angler know when the fish has taken the bait. Bobbers could jiggle, plunge downward, or skate across the water. A jiggling bobber usually means a fish has found the bait and is investigating it. A bobber plunging downward or moving across the surface means the fish has taken the bait, and it is now time to set the hook.

Setting the Hook

Q: What's the purpose of the hook?
A: To connect the line to the fish.

Q: What does it mean to set the hook?
A: Lodge the hook inside the fish's mouth.

3. Explain that connecting the line to the fish requires setting the hook. Setting the hook involves making a quick movement of the rod to penetrate the inside of the fish's mouth with the point of the hook so that an effective connection is made between the line and the fish. The ability to know when and how to set a hook is an important skill. Knowing when and how to set the hook will come with experience and practice.

4. Explain that before setting the hook, anglers should have their rod pointed in the direction of the bobber, with no slack in the line. Setting the hook calls for a sharp backward and upward movement of the rod. Fish have tough mouths, so it takes a good sharp action to set the hook. Sharp hooks help ensure that the hook sets well.
5. Demonstrate the rod action required to set the hook. Using a rod without any tackle on the line, point the rod at a bobber placed on the ground and describe reeling in slack line. Demonstrate a sharp backward and upward movement of the rod required to set the hook.

   Q: Why should you reel in slack line before setting the hook?
   A: A tight line will transfer energy from the rod movement to the hook. A slack line will not be able to transfer this energy.

   Q: Why should you point your rod at the bobber?
   A: To help eliminate slack line and to put your rod in the best position to set the hook.
6. Explain that beginning anglers sometimes set their hook too hard, which can break their line, straighten their hook, or pull the hook out of the fish's mouth. Reiterate that the hook should be set sharply, but discourage any attempt to jerk the fish out of the water. A light action or limber rod will require more force to set the hook, and fish like bluegill, crappie, and trout do not require as hard a set as a largemouth bass.
7. Remind participants that a jiggling bobber usually means a fish has found the bait and is investigating it. Do not set the hook. A bobber plunging downward or moving across the surface means the fish has taken the bait, and it is now time to set the hook. When fishing without a bobber, set the hook when you feel a tug or bite. If a fish swallows the hook, the angler waited too long to set the hook.

Playing the Fish

Q: What do you think it means to play the fish?

8. Acknowledge the answer and, if necessary, explain that playing the fish refers to how the angler controls the rod, reel, and line while the fish struggles to get free of the hook. Each species of fish acts differently when hooked, and behavior might include jumping, diving, making long runs, and swimming around obstacles. Playing a fish requires skill and can help keep the line from breaking or the hook from straightening. It can be great fun, too!
9. Explain that the drag on the reel is like a brake on a car. The drag applies different amounts of friction (or drag) to the spool of line that spins as a hooked fish pulls line off. The drag can be set loosely or tightly. The drag adjustment is usually on top of a spincast reel so it is easily accessed and can be adjusted while the angler is playing the fish.
10. Explain that the drag on the reel should be set properly in relation to line test strength. A properly set drag applies just the right amount of resistance to line that is being pulled off the spool by a running fish, and will help prevent breaking the line from a sudden strong pull by the fish. If the drag is set too loosely, the fish will not encounter enough resistance to be controlled by the angler. If the drag is set too tightly, the fish will encounter too much resistance and may break the line.
11. Ask participants to find a partner and give each pair a fishing rod without any tackle. Ask someone in each pair to point to the drag adjustment on their fishing rod.
    a. While one participant holds the rod, have the other participant pull line out of the reel through the line opening on the reel cover.
    b. Have the participant holding the rod adjust the drag while the other participant continues to pull line out of the reel. Increasing the drag will make it harder for the puller to pull line. Decreasing the drag will make it easier.

c. Have participants switch roles so they can both feel the difference the drag adjustment makes.

Q: What's the purpose of the drag?
A: The drag applies just the right amount of resistance to line that is being pulled off the spool by a running fish, and will help prevent breaking the line from a sudden strong pull by the fish.

Q: How do you know if the drag is set too lightly?
A: The angler won't be able to control the direction of the fish and may not be able to reel in line against the pull of the fish.

Q: How do you know if the drag is set too tightly?
A: The fish may not be able to pull line off the spool and may break the line.

Q: How do you know when the drag is adjusted correctly?
A: When the fish is able to pull line off the spool during strong pulls but the angler is still able to control the direction of the fish and reel in line.

12. Explain that after the hook is set, anglers should hold their rod tip high, keeping pressure on the fish. This will keep the fish's head up and will help keep the line tight. Keeping the fish's head up is important because it reduces the chance of the fish getting tangled in rocks, vegetation, or other structures. Keeping the line tight is important because it helps keep the hook embedded in the fish's mouth. If a fish senses slack in the line, it may have a chance to shake the hook free, especially if the hook isn't set well.

13. Explain that playing a fish is fun, but a fish should be brought in as soon as possible if it is going to be released. Shorter playing time reduces fish stress or death, which is important in catch-and-release fishing.

Proper Fish Handling

14. Explain that once a fish is brought to shore, proper handling will help prevent injury to the angler and to the fish. When bringing in a fish, anglers should be ready with necessary equipment like a landing net and needle-nosed pliers or a similar tool for grabbing the hook.

15. Using the fish props, demonstrate proper handling techniques for each species, describing the technique as you perform it.

a. To avoid removing the protective slime coating on the fish, anglers should wet their hands before touching the fish. Leave the fish in the water, if possible.

b. Some fish, like largemouth bass, can be grasped and lifted by their lower lip, which tends to calm them. Larger fish should also have their midsections supported.

c. Anglers should avoid the sharp teeth of some species like trout, and they should be careful not to hook their fingers or hands when they handle hooked fish.

d. Anglers should grasp small fish around the body, flattening the spines as they slide their hand down over the head and midsection.

e. With catfish, anglers should get a firm grip around the midsection, taking care to avoid the sharp spines in the dorsal and pectoral fins.

f. Fish gills can be easily damaged, so anglers should not touch them or lift the fish by the gill covers.

Q: What are ways to handle a fish to help protect it from injury?
A: Use a landing net, wet your hands before touching fish, leave fish in water, use proper handling techniques, avoid lifting fish by gill covers, etc.

Q: What are some things to avoid to prevent injuring yourself?
A: Fish spines, teeth, the hook

16. Ask for volunteers to come up and demonstrate proper handling techniques with the fish props, focusing on the species the participants will most likely encounter.

Hook Removal

17. Explain that most of the time, the fish is hooked through the lip. Do not drop the fish on the ground. Keep the fish in water or directly in the angler's hand. The hook can be removed by carefully backing it out through the hole made in the lip when the hook was set. If the hook is through the lip of a smaller fish, hold the body of the fish as described earlier and remove the hook with the other hand.
18. Explain that sometimes the hook is set deeper in the mouth, throat, or tongue of the fish. In those cases it is good practice to use pliers. Tell anglers that the first thing they need to do is to determine where the hook is located and the direction of the hook's point. Show anglers how they should grasp the hook with the tip of their pliers and carefully remove the hook by running it back out through the hole it made when it went in.
19. Using the fish props and pliers, demonstrate proper fish handling techniques along with the proper technique for hook removal. Explain that this demonstration will be repeated with real fish when the group goes fishing.
20. Explain that with deeply hooked fish, it would do more harm to remove the hook than it would to simply clip the line. In this case, it is preferable to cut the line, leaving the hook still lodged in the fish. Most deeply hooked fish survive if the line is clipped and the fish is quickly released.
21. **Note:** In an effort to reduce fish mortality, hooks are only to be removed by instructors and volunteers at this point. Participants will be ready to remove a hook on their own only after they have seen proper hook removal techniques performed repeatedly and have learned basic fish handling skills. These skills will be taught in another activity.

Proper Release Technique

22. Explain that many people enjoy catching and releasing fish. This can help conserve fish as long as the fish are released properly. The best way to release a fish is to do so without removing it from the water. Handle it as little as possible and release it as quickly as possible.
23. When releasing a fish, do not let the fish flop around on the bank or dock. Instruct anglers to always slide the fish back into the water — never throw it back. Releasing fish properly is an important step in fish management. A properly released fish can survive and grow to be caught again.
24. Ask for volunteers to come up and use a fish prop to demonstrate the proper release technique.

Wrap-up and Review

1. Ask if there are questions and review important points of the activity.

Optional:

DNS teachers may review and practice Lesson 1 techniques in preparation for the end-of-unit fishing field experience.

Hands-on Fishing (60 minutes):

- Volunteers should distribute a fishing rod and reel to each participant in their group and get bait for their group.
- Remind participants about safety and how participants can keep themselves and those around them safe.
- At this point the participants are ready to fish. Volunteers are to assist their group with all fishing-related needs until the completion of the program.
- The lead instructor should instruct the volunteers to bring their group back to the casting site in 60 minutes for Program Wrap-up.

Program Wrap-up (15 minutes):

Ask how many and what kind of fish participants caught. Record this information on the group information sheet.

- Congratulate all participants on their effort and success.
- Explain that they have just completed Lesson 1. Provide times and dates when Lesson 2 is offered, if applicable.
- Briefly list the topics that will be covered in Lesson 2, if applicable.
- Give a brief explanation of what fishing regulations are and why we have them. (See Activity 4.4 for reference.) Distribute copies of *A Summary of Missouri Fishing Regulations* (current year — one per participant)
- Briefly describe and offer *Introduction to Fishing* and *Know Your Catch/Know Your Knots*
- Have participants assist with cleaning the site of all trash.
- Thank the participants for coming.

Program Clean-up (30 minutes):

- Collect and put away props.
- Perform any necessary maintenance on rods or reels.
- Return bait to cooler or refrigerator.
- Take down and put away Discover Nature — Fishing signs, if applicable.
- Place all program paperwork into specified folders.
- The lead instructor is responsible for making sure the facility is clean and secure before leaving the area.

Lesson 2:
How to Tie a Knot and Bait a Hook

Lesson Outline

Tying an Improved Clinch Knot
- Instructor demonstrations
- Participant practice in pairs

Rigging a Fishing Rod
- Review
  - Attaching a sinker
  - Attaching a bobber
  - Attaching hooks

Baiting the Hook
- Earthworms/Nightcrawlers
- Crickets and Grasshoppers
- Dough bait

Handling the Fish
- Removing the hook
- Releasing the fish

Stocking a Basic Tackle Box
- Tackle boxes
- Basic items
- Sunscreen/Insect repellent
- Additional items

Lesson Objectives
1. Learn how to tie a basic fishing knot.
2. Learn how to attach a hook.
3. Learn how to bait a hook.
4. Learn how to stock a basic tackle box.

Setting
Large open area

Instructor Preparation
- Fix any rods and reels that are in need of repair or maintenance.
- Put up Discover Nature — Fishing signs, if applicable.
- Organize check-in materials, if applicable.

Equipment/Materials
- Eye bolts
- Cord
- Hooks
- Sinker
- Bobbers
- Worms (earthworms or night crawlers)
- Fishing rods without tackle
- *A Summary of Missouri Fishing Regulations* (current year — one per participant)
- *Introduction to Fishing* and *Know Your Catch/Know Your Knots*

Total Time Required: 2 hours
- Instruction: 45 minutes
- Hands-on Fishing: 60 minutes, if applicable
- Program Wrap-up: 15 minutes

Group Size
Maximum 20 anglers per instructor during instruction. Maximum five anglers per instructor/volunteer during hands-on fishing, if applicable.

Safety Considerations

Hooks will be the main safety concern in this lesson. Remind participants that the hooks are sharp and that they should be careful not to bump or distract others as they are tying their knots. Fish spines are also a safety concern. Review Lesson 1 methods for safely handling and releasing fish.

Activities

2.1: Tying an Improved Clinch Knot
2.2: Attaching Hooks
2.3: Baiting a Hook and Unhooking a Fish
2.4: Stocking a Basic Tackle Box

Activity 2.1: Tying an Improved Clinch Knot

Estimated Time

15–20 minutes

Objective

Participants will be able to demonstrate the proper way to tie an improved clinch knot.

Instructor Preparation

- Put up Discover Nature — Fishing signs, if applicable.
- Have 10 eye bolts and 10 pieces of cord ready for demonstration and practice.
- Check in participants with designated forms, if applicable.

Background Information

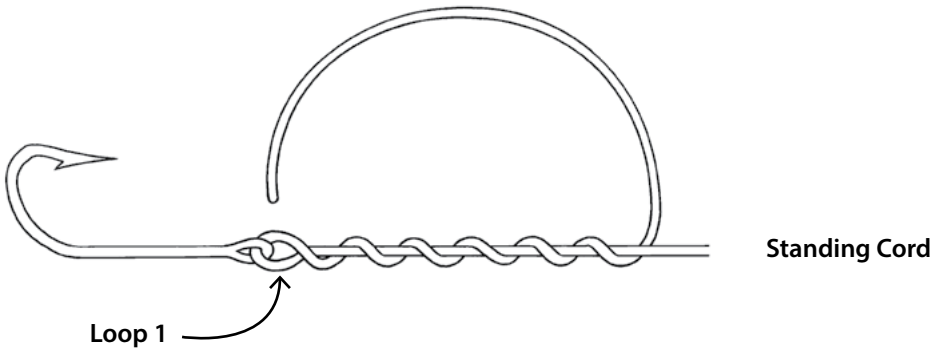
Tying knots correctly is an important part of being a successful angler. The improved clinch knot is simple and one of the most popular fishing knots used today. When tied properly, the improved clinch knot is very strong and won't slip. It is a great knot to use for hooks or lures.

Procedure

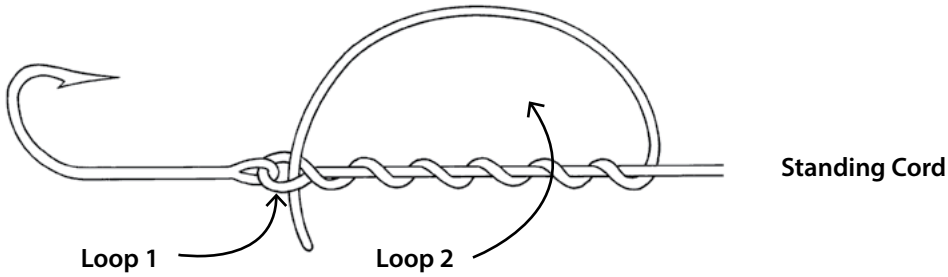
1. Greet the participants and introduce yourself and any assistants. If you are an MDC employee or volunteer, talk about MDC's mission and explain what we do and why it's important.
2. If applicable, briefly explain that Discover Nature — Fishing is a fishing education program designed to give people of all ages basic fishing skills, knowledge, and confidence to go fishing on their own.
3. Tell participants that in this activity they will learn how to tie a knot called the improved clinch knot, one of the most widely used fishing knots. Later, they will use this knot to connect a hook to fishing line.
4. Have an assistant hold one of the eye bolts while you use a piece of cord to demonstrate the following steps. Say each step as it is demonstrated. Ensure all participants are able to see.

   Step 1: Hold the long part of the cord in one hand and pass the end of the cord through the eye or round opening of the eye bolt.

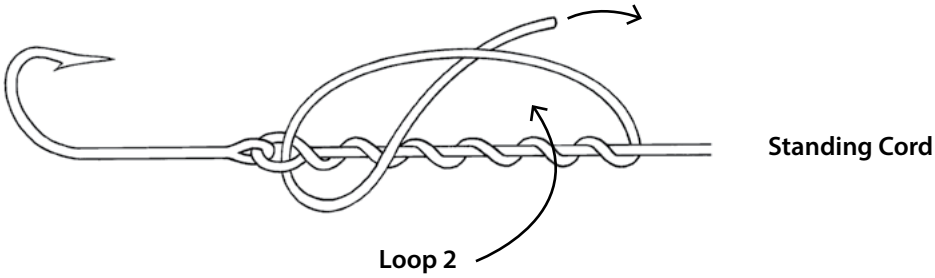
   Step 2: Leaving a loop (Loop 1) near the eye, wrap the end of the cord around the standing (or long piece of cord held in your hand) about five complete turns.



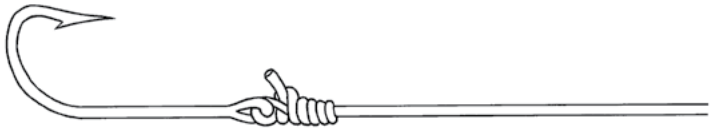
Step 3: Pass the end back up through Loop 1 (the loop beside the eye). This creates another loop (Loop 2) between the standing cord and Loop 1.



Step 4: Pass the end down through Loop 2 and out along the side of the standing cord.



Step 5: Pull the end to tighten the knot. When you use actual fishing line to tie an improved clinch knot, use line cutters or fingernail clippers to trim the small left over end you pulled to tighten the knot.



5. Ask participants to provide step-by-step instructions to you as you demonstrate the improved clinch knot several more times.
6. Have participants work with a partner. Distribute an eye bolt and a piece of cord to each pair of participants. Have Partner 1 hold the eye bolt and coach Partner 2 while Partner 2 uses the cord to tie the knot. Have them switch materials and roles.
7. Observe participant pairs and encourage/acknowledge positive coaching of partners and successful knot tying. Observe participants to assess knot-tying understanding and ability. Ensure all participants are able to tie the knot before moving on to the next activity. If more practice is needed, have participants work with new partners.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.
2. Have a few participants take turns asking questions pertaining to information learned in Lesson 2. After waiting three seconds, allow other participants to provide the answers. Congratulate and coach (if necessary) respondents.

Activity 2.2: Attaching Hooks

Estimated Time

15–20 minutes

Objective

Participants will be able to demonstrate the proper way to rig a fishing pole by attaching a sinker, a bobber, and a hook onto a fishing line.

Instructor Preparation

- Have one fishing rod without tackle for each participant.
- Have one hook, one sinker, and one bobber for each participant.
- Have an eye bolt and some cord available for demonstration, if necessary.
- Have rod racks or caddies available.

Procedure

1. Tell participants that in this activity they will rig their fishing rods.

   Q: Who would like to tell us what it means to rig a fishing rod?
   A: To rig a fishing rod means attaching a sinker, bobber, and hook to fishing line.

   Q: In Lesson 1, you learned how to attach a sinker and a bobber. How would you attach a hook to the fishing line?
   A: Tie it on with an improved clinch knot.

2. Distribute one fishing rod and one sinker to each participant. Instruct them to attach the sinker to the fishing line. Observe participants as they do this. Using positive language, encourage and coach participants as needed and acknowledge everyone's success.
3. Distribute one bobber to each participant. Instruct them to attach the bobber to the fishing line. Observe, encourage, and acknowledge success.
4. Distribute one fishing hook to each participant. Remind them that these hooks are sharp and that they need to handle them carefully. The eye of the hook is much smaller and the fishing line is much thinner than the eye bolts and cord they used earlier to practice the improved clinch knot. Have an eye bolt and some cord nearby in case participants wish to see the knot demonstrated several times before attempting the hook and fishing line.
5. Have students move through each step as you slowly say each step aloud. Observe and assess participants. Use positive language to provide coaching, if necessary, and acknowledge everyone's successful tying of knots and rigging of rods.
6. Demonstrate how to secure a hook onto a line guide.

   Q: Why would we want to attach the hook to a line guide?
   A: Loose hooks are dangerous because they can swing around and catch on us, on others, or on objects around us.

7. Have participants secure their hooks on line guides and instruct them to bring their rods up to the racks. Remind them to keep the rod tips upward at all times while walking. Observe, encourage, and acknowledge success.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.
2. Have a few participants take turns asking questions pertaining to information learned in Lesson 2. After waiting three seconds, allow other participants to provide the answers. Congratulate and coach (if necessary) respondents.

Activity 2.3: Baiting a Hook and Unhooking a Fish

Estimated Time

15–20 minutes

Objectives

- Participants will be able to demonstrate the proper way to bait a hook using worms.
- Participants will be able to describe the proper way to remove a hook from a fish and release a fish back into the water.

Instructor Preparation

- Participants will use the fishing rods they rigged in Activity 2.2.
- Have a supply of earthworms and/or night crawlers.
- Use the illustrations on this page of grasshoppers/crickets and dough bait on hooks.
- Have worms and several hooks available to demonstrate different ways to bait a hook with earthworms/night crawlers.
- Have 3-D fish props available.
- Have needle-nosed pliers available when discussing hook removal.

Background Information

This activity focuses on using earthworms/night crawlers as bait but mentions grasshoppers, crickets, and dough bait. Pinching store-bought or homemade dough bait around a treble hook can be very effective at catching fish that rely mainly on scent to find food. Dough baits are convenient to use and easy to make at home. A simple recipe involves spreading peanut butter on a slice of bread, cutting the crust off, and then adding just enough water so the mixture may be formed around a treble hook.

Procedure

1. Explain that this is the third activity in Lesson 2 of Discover Nature — Fishing. Tell participants that in this activity they will bait their hooks and review the proper ways to remove a hook from a fish.

Q: What might an angler use to bait a hook?
A: Earthworms, night crawlers, crickets, grasshoppers, and bait made of bread dough are favorite foods of most freshwater fish.

Dough bait

Grasshopper

DAVID BESENGER

LESSON 2

2. Explain that there are several ways to bait a hook with worms. Demonstrate each technique as it is explained.

Technique 1

Thread the whole body of a small worm (or smaller pieces of a large worm) onto a hook. Keep the worm from sliding off by pushing the point and the barb of the hook into the end of the worm.

Technique 2

CLIFF WHITE

Thread a large worm onto a larger hook by running the hook through the worm at several places on the body. Leave one end of the worm dangling to attract fish.

3. Pass out worm pieces to each participant and instruct them to bait their hook using one of the techniques that was just demonstrated. Remind them that their hooks are sharp. Observe participants as they do this. Using positive language, encourage and coach participants as needed and acknowledge everyone's success.

4. Let's say you've cast your line, got a fish to bite, played the fish, and reeled it in.

Q: How should you handle your fish?
A:

- Be ready with a net to scoop the fish up and needle-nosed pliers to grab the hook.
- Wet your hands and avoid over-handling the fish to protect the slime coating on the fish.
- Leave the fish in the water, if possible.
- If you've caught a largemouth bass, grasp and lift it by its lower lip. If it's a large fish, hold it like a baby to support its midsection.
- Remember that some fish have sharp teeth and sharp spines on their top (dorsal) and bottom (pectoral) fins.
- Grasp small fish around the body, flatten the top (dorsal) spines, and slide your hand down over the head and midsection.
- Never touch or lift fish by the gill covers.
- Avoid dropping a fish on the ground.

Q: How would you remove a hook?
A:

- If a fish is hooked through its lip, carefully back it out through the hole it made in the lip.
- If the hook is set deeper in the mouth or throat, use needle-nosed pliers to grasp the hook with the tip of the pliers and carefully back it out through the hole it made when it went in.
- If the hook is deep within the fish, it would be better to clip the line and release the fish back into the water.

Q: You've successfully removed the hook. How do you release the fish?
A:

- Handle it as little as possible and release it as quickly as possible back into the water.
- Avoid dropping the fish or letting it flop around on the bank or dock.
- Gently slide the fish back into the water. Never throw it back.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.
2. Have a few participants take turns asking questions pertaining to information learned in Lesson 2. After waiting three seconds, allow other participants to provide the answers. Congratulate and coach (if necessary) respondents.

Activity 2.4: Stocking a Basic Tackle Box

Estimated Time

15 minutes

Objective

Participants will be able to list basic items used to equip a tackle box.

Instructor Preparation

- Have several examples of basic tackle boxes.
- Have materials ready to give away for stocking a tackle box, if applicable.
- Have one tackle box fully equipped with the following basic items:
  - *A Summary of Missouri Fishing Regulations*
  - Bait and lures
  - Hooks
    - Size 6
    - Size 16–20
  - Sinkers
    - Assorted sizes of split shot
    - 1 package of three bell sinkers, ½ ounce
  - Bobbers
  - Spare fishing line
    - Monofilament line, 6- to 12-pound test
    - 4-pound test or less
  - Needle-nosed pliers and nail clippers
  - Tape measure
  - Stringer (or fish basket)
  - Landing net
  - First-aid kit
  - Sunscreen and insect repellent
  - Area map
  - *Know Your Catch/Know Your Knots*
  - Other miscellaneous items that would never be part of a tackle box (for example, rubber ducky, dog toy, silly nose and glasses, etc.)

Procedure

1. Explain that this is the fourth activity in Lesson 2 of Discover Nature — Fishing. Tell participants that in this activity they will learn about the basic items most anglers stock in their tackle boxes.
2. With the various tackle boxes displayed clearly for participants:

   Q: Which of these tackle boxes is the best one to use?
   A: All of them would work well to hold a supply of basic fishing tackle plus some other important items.

   Q: Based on the activities you've done in Lessons 1 and 2, what items do you think you would want to keep in your tackle box and why?
   A: Have participants name an item, step forward and choose that item from the table, explain why that item should be in the tackle box, and place it into one of the empty tackle boxes. Repeat until all the legitimate items have been identified, have had their purpose explained, and have been placed in a tackle box.

CLIFF WHITE

3. As participants choose items such as sunscreen and insect repellent or if these items are not chosen, explain that they may not be necessary to catch fish but they are important items that protect us when we engage in all outdoor activities.
4. Open and display the pre-filled tackle box as another example of how a tackle box might be packed.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.
2. Have a few participants take turns asking questions pertaining to information learned in Lesson 2. After waiting 3–5 seconds, allow other participants to provide the answers. Congratulate and coach (if necessary) respondents.

Optional:

DNS teachers may review and practice Lesson 2 techniques in preparation for the end-of-unit fishing field experience.

Hands-on Fishing (60 minutes):

- Volunteers should distribute a fishing rod and reel to each participant in their group and get bait for their group.
- Remind participants about safety and how participants can keep themselves and those around them safe.
- At this point the participants are ready to fish. Volunteers are to assist their group with all fishing-related needs until the completion of the program.
- The lead instructor should instruct the volunteers to bring their group back to the casting site in 60 minutes for Program Wrap-up.

Program Wrap-up (15 minutes):

Ask how many and what kind of fish participants caught. Record this information on the group information sheet.

- Congratulate all participants on their effort and success.
- Explain that they have just completed Lesson 2. Provide times and dates when Lesson 3 is offered, if applicable.
- Briefly list the topics that will be covered in Lesson 3, if applicable.
- Give a brief explanation of what fishing regulations are and why we have them. (See Activity 4.4 for reference.) Distribute copies of *A Summary of Missouri Fishing Regulations* (current year — one per participant)
- Briefly describe and offer *Introduction to Fishing* and *Know Your Catch/Know Your Knots*
- Have participants assist with cleaning the site of all trash.
- Thank the participants for coming.

Program Clean-up (30 minutes):

- Collect and put away props.
- Perform any necessary maintenance on rods or reels.
- Return bait to cooler or refrigerator.
- Take down and put away Discover Nature — Fishing signs, if applicable.
- Place all program paperwork into specified folders.
- The lead instructor is responsible for making sure the facility is clean and secure before leaving the area.

Lesson 3: Five Common Missouri Fish — Their Anatomy, Habitat, and Life Cycle

Lesson Outline

Aquatic Ecology

- Aquatic Food Web

Five Common Missouri Fish and How They Live

- Bluegill
  - External Characteristics/ Anatomy
  - Life Cycle
  - Habitat
- Hybrid Sunfish
  - External Characteristics/ Anatomy
  - Life Cycle
  - Habitat
- Largemouth Bass
  - External Characteristics/ Anatomy
  - Life Cycle
  - Habitat
- Channel Catfish
  - External Characteristics/ Anatomy
  - Life Cycle
  - Habitat
- Rainbow Trout
  - External Characteristics/ Anatomy
  - Life Cycle
  - Habitat

Lesson Objectives

1. Learn about aquatic food webs.
2. Learn about the external characteristics of five common Missouri fish.
3. Learn about the life cycle, habitat, and favorite foods of five common Missouri fish.

Setting

Large open area

Instructor Preparation

- Have all materials and props organized or displayed.
- Fix any rods and reels that are in need of repair or maintenance.
- Put up Discover Nature — Fishing signs, if applicable.
- Organize check in materials, if applicable.
- Check in participants on designated forms, as applicable.

Equipment/Materials

- Fish Identification/Life Cycle card set
- Poster — Aquatic Food Web
- Poster — Missouri Pond Life
- Fish Anatomy Diagram
- Poster — Life Cycle of the Largemouth Bass
- Fish Props — sunfish, largemouth bass, channel catfish, rainbow trout
- Yellow fish ruler
- It would be ideal to have items (rocks, sacks with sand, potatoes, etc.) weighing 0.5 lb., 0.75 lb., 1 lb., 4.5 lbs., and 15 lbs. to provide a strong hands-on element to the fish identification activity.
- Spincast rod and reel combinations outfitted with bobbers, hooks, and sinkers, if applicable.
- *A Summary of Missouri Fishing Regulations* (current year — one per participant)
- *Introduction to Fishing* and *Know Your Catch/Know Your Knots*

Total Time Required: 2 hours

- Instruction: 45 minutes
- Hands-on Fishing: 60 minutes
- Program Wrap-up: 15 minutes

Group Size

Maximum 20 anglers per instructor during instruction. Maximum five anglers per instructor/volunteer during hands-on fishing, if applicable.

Safety Considerations

If hands-on fishing follows the instructional activities, remind participants to be careful whenever they are using hooks and whenever they are around others using hooks. Remind them to avoid walking behind anglers who are casting, avoid distracting anglers when they are fastening tackle or baiting hooks, and always keep their rod tip up and hook secured while walking.

Activities

3.1: Aquatic Food Webs
3.2: Fish Anatomy and Fish Life Cycle
3.3: Bluegill
3.4: Hybrid Sunfish
3.5: Largemouth Bass
3.6: Channel Catfish
3.7: Rainbow Trout

Activity 3.1: Aquatic Food Webs

Estimated Time

10–15 minutes

Objective

Participants will be able to describe components of aquatic food webs and explain how all food web components are interconnected.

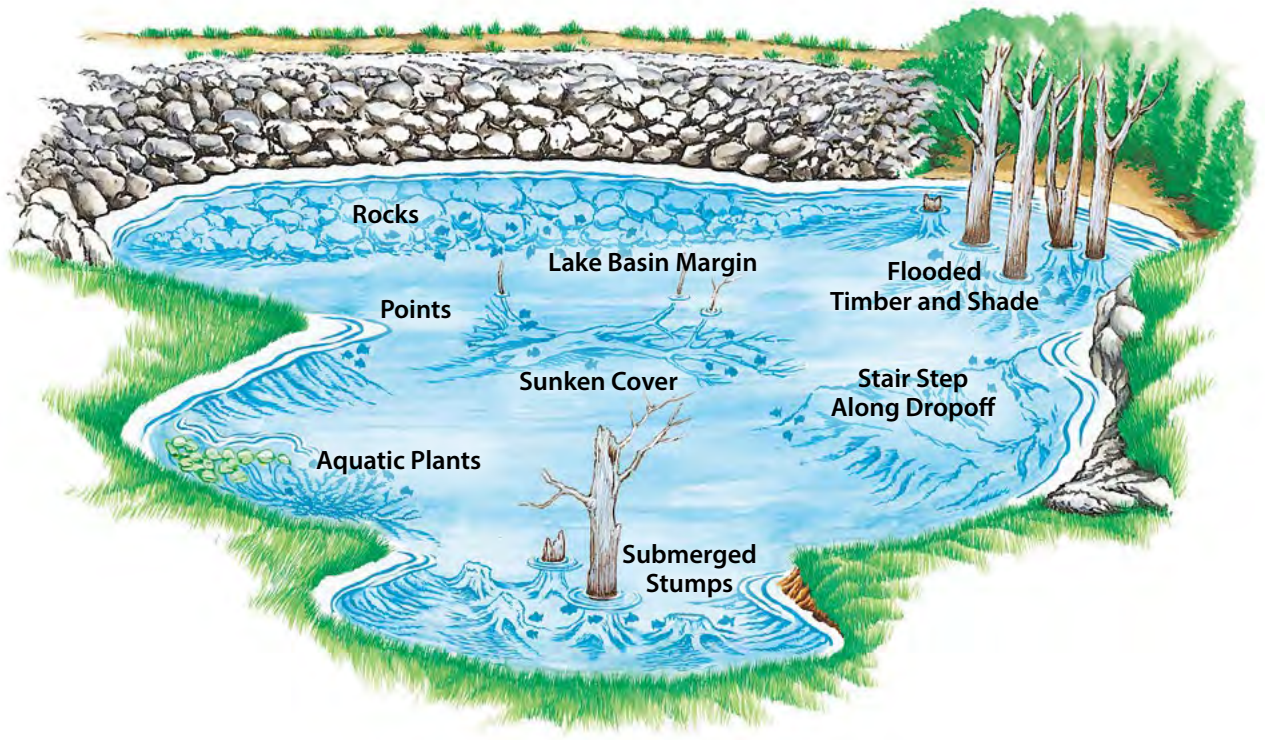
Instructor Preparation

- Put up Discover Nature — Fishing signs, if applicable.
- Display the Aquatic Food Web and Missouri Pond Life posters.

Procedure

1. Greet the participants and introduce yourself and any assistants. If you are an MDC employee or volunteer, talk about MDC's mission and explain what we do and why it's important.
2. If applicable, briefly explain that Discover Nature — Fishing is a fishing education program designed to give people of all ages basic fishing skills, knowledge, and confidence to go fishing on their own.
3. Explain that this is the first activity in Lesson 3 of Discover Nature — Fishing. Tell participants that in this activity they will learn about aquatic food webs that are made up of many aquatic food chains.
4. In Missouri, both ponds and lakes provide fish, plants, and other aquatic organisms different kinds of habitats.

Q: What is a habitat?
A: A habitat is the physical environment that a species needs to survive. Habitat is more than a place.



DAVID BESENGER

LESSON 3

Q: What are the main things habitats provide to all living things?

A: Food, water, shelter, and space arranged in different ways and available in different amounts. Good habitat provides different kinds of cover, or shelter, and food.

Habitat can be stumps, brush piles, rocks, aquatic plants, and hollow logs. It can be deep and shallow areas in a pond or lake, quick or slow moving current, varying levels of water quality, etc. Different fish prefer different habitats, but all fish (and all living things) need proper, healthy habitat to survive and thrive.

5. Hold the Missouri Pond Life poster up for all participants to see. Explain that this is a picture of a pond which is one example of an aquatic or water habitat.

Q: Where do you see examples of habitat (or food, water, shelter, space, and arrangement/amount) here?

A: There's a large amount of water. Plants, fish, insects, etc., are food. Plants, rocks, holes, and the muddy bottom offer shelter. There is space for fish, insects, and turtles to swim and hide. This habitat has more water than the forest habitat in the background.

Q: What do you notice about where the fish are in this pond?

A: Different fish are in different places. A catfish is near the bottom. A bluegill is hiding behind the stems of water plants, and the bass is swimming in the open water.

Q: Why would a healthy habitat be important to these fish?

A: Healthy habitat is important because it provides shelter to escape predators and the elements, food, and space needed for hunting, reproducing, and protecting young.

6. Healthy aquatic habitats mean healthy fish. Healthy fish mean good fishing.

Q: What items would not be beneficial to fish?

A: Items such as trash, tires, plastic bags, etc.

Q: How might anglers help to keep fish and aquatic habitats healthy?

A: Anglers can help to keep aquatic habitats healthy by cleaning up trash, reporting chemical spills, joining a Stream Team, and assisting with local habitat projects. Purchasing fishing permits helps to fund fisheries management, which includes stocking fish in ponds and lakes for Missourians to catch.

7. Discuss food chains.

Q: What are food chains, and why are they important parts of any habitat?

A: A food chain shows how energy from the sun moves from producers (plants) to herbivores (plant eaters) to carnivores (meat eaters) and omnivores (plant and meat eaters). Food chains show what eats what. However, because most animals eat many different kinds of plants or animals, different food chains are interconnected.

8. Show the Aquatic Food Web poster.

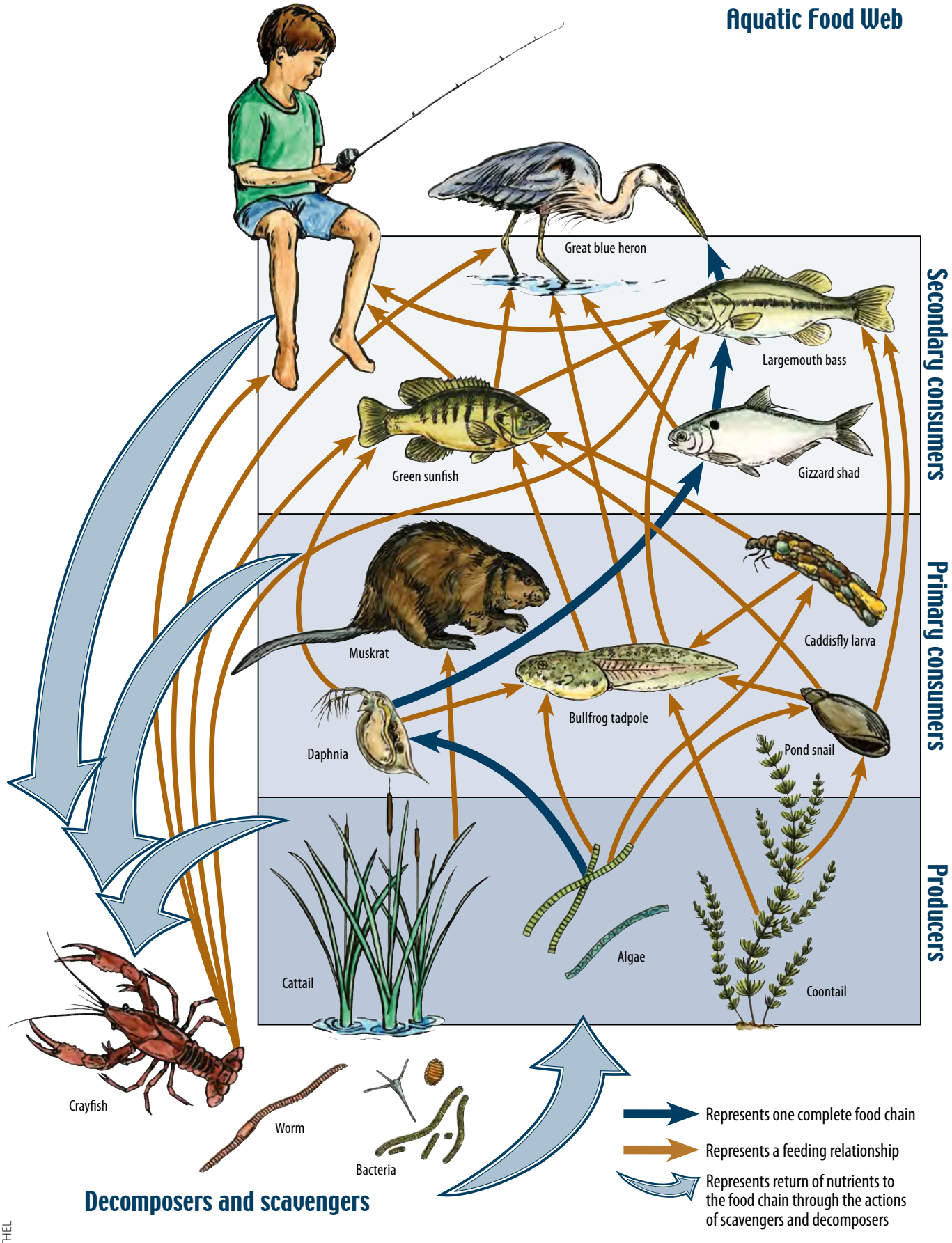
Q: What provides the energy for food chains and food webs?

A: Aquatic communities run on sunlight. Plants capture the sun's energy and use the process of photosynthesis to turn sunlight, carbon dioxide, minerals, and water into food and oxygen.

Q: What do you have when you have all of these different food chains?

A: Food webs, which are interconnected food chains.

Aquatic Food Web



MARK RAITHEL

9. Refer to each of the colored arrows on the Aquatic Food Web poster.

Q: What do these dark blue arrows illustrate?
A: The dark blue arrows show one complete food chain.

Q: What do these brown arrows illustrate?
A: The brown arrows show how species eat or are eaten by other organisms.

Q: What do these gray arrows illustrate?
A: Gray arrows show how nutrients are returned to the food chain through the actions of scavengers and decomposers (animals that search for dead and decaying food).

10. Point to the picture of the coontail (bottom right on the poster) and ask participants:

Q: What would happen if all the coontail plants died off?
A: The snails and tadpoles would not have this food source, which would mean that the other animals that eat the snails and tadpoles (green sunfish, great blue heron, largemouth bass) would have less food.

Q: What would happen if all the tiny *Daphnia* disappeared?
A: The gizzard shad and green sunfish would have less food. Without *Daphnia*, there would be fewer organisms eating the algae. Algae are an important food source in an aquatic ecosystem, but too much algae can cause problems in a pond such as blocking sunlight and causing the water temperature to change. Losing any link in a food web may upset the balance of the whole.

11. Wrap-up aquatic habitats discussion.

Q: How can understanding aquatic habitats and food webs help us be successful at catching fish?
A: If you know what makes a fish a fish (its anatomy and how it uses its body parts to move, etc.), what your fish looks like (fish identification), where it likes to live and hide (its preferred habitat), and what it likes to eat, you will know where to find it and how to catch it.

12. Tell participants that in the next activities, they will learn about the basic anatomy and life cycle of fish.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.

2. Hold up identification cards and have participants take turns to:

- Name the fish
- Describe its physical characteristics
- Name its preferred food, shelter/location, etc.

Activity 3.2: Fish Anatomy and Fish Life Cycle

Estimated Time

5–10 minutes

Objective

Participants will be able to name the external parts of a fish and explain how fish use these parts.

Instructor Preparation

- Have the Fish Anatomy poster.
- Have Life Cycle of the Largemouth Bass poster.
- Have the fish props (sunfish, largemouth bass, channel catfish, rainbow trout).

Procedure

1. Explain that this is the second activity in Lesson 3 of Discover Nature — Fishing. Tell participants that in this activity, they will learn about the external anatomy (outside body parts) of fish and how fish use these body parts.
2. All fish are cold blooded. They are vertebrates and have many of the same internal organs as we have: a heart, intestines and stomach, a kidney, a liver, a gall bladder, and a spleen.

   Q: What does it mean for a fish to be cold blooded?
   A: The body temperature of fish depends on the temperature of the water around them.

   Q: What does it mean to be a vertebrate?
   A: Vertebrates are animals with a backbone. Fish have backbones.
3. Refer to the fish anatomy poster and point to the body parts on a fish prop as participants name them or as you ask them questions about them.

   Q: Looking at this picture and this sunfish (prop), what external (or outside) body parts can you name and would a fish use them?

   A:

   Gills: All fish have gills to get oxygen from the water. A flexible bony plate called a gill cover protects the gills. Water is inhaled through the mouth, passes over the gills, and is exhaled from beneath the gill cover.

   Muscles: About 80 percent of a fish's body is made of muscle packed along its sides. These muscles give a fish most of its forward swimming power. A fish swims forward when a side-to-side wiggle it starts at the front moves toward its back.

   Fins: Fish use their many fins to hold their position, move, steer, and stop.

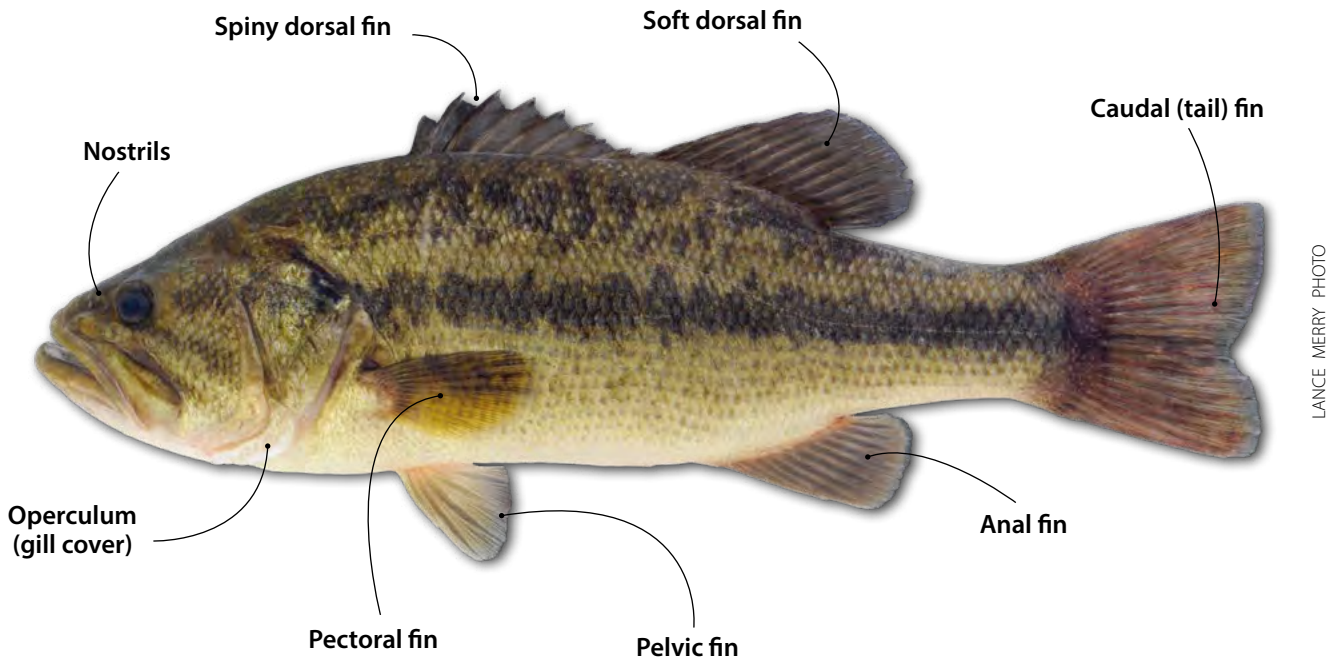
   Dorsal fin: The dorsal fin is located along the back of a fish and helps keep it upright and stable. Some fish have split dorsal fins.

   Anal fin: The anal fin is located on the bottom of the fish towards the tail fin and helps primarily to keep the fish upright.

   Tail fin: This fin is also called the caudal fin and is the main fin for propulsion to move the fish forward.

   Pectoral fins: A pair of pectoral fins are located on the fish's chest. These fins move independently and give fish the ability to move quickly in any direction. They help the fish to steer, stop, or hover.

Largemouth bass



LANCE MERRY PHOTO

Pelvic fins: Most fish use their pair of pelvic fins (located along the sides) to steer, stop, or hover. These fins also work independently and act as brakes or rudders to help the fish stop, turn, or go up, down, or sometimes, backward.

Q: What can anyone tell us about some of the bluegill and catfish fins?
A: (Refer to the fins on the fish props as these are named.) Bluegill have sharp spines in their dorsal and anal fins. Catfish have very strong, sharp spines in their dorsal and pectoral fins. These spines discourage other fish from eating them.

Scales: Most fish are covered with scales that protect them, just as roof shingles protect a house. Fish don't grow more scales as they get older — the scales just get bigger.

Slime: Fish are coated with slime. Slime helps reduce friction as they swim through the water and helps protect them from disease, bacteria, parasites, and fungus.

Q: Why should we wet our hands before handling fish?
A: Fish should be handled with wet hands when possible. Dry surfaces remove a fish's protective slime. Wet hands remove much less slime than dry hands.

4. Humans have five senses. (Have participants name them.)

   Q: What senses do fish have?
   A:
   - Fish have senses to see, hear, smell, taste, and feel — some fish have better senses than others.
   - Fish can see colors, but if they feed at night or live on the bottom of a pond or lake, they rely more on their sense of smell.
   - Fish have super hearing and have ears located under the skin on either side of the head.
   - Some fish use their sense of smell or taste to find food. Others feed mostly by sight.
   - Fish have nostrils that detect odors in the water. Catfish use their barbels or "whiskers" to smell and taste.
   - Fish have lateral lines that run along each side from the gill covers to the base of the tail. Lateral lines let fish sense water vibrations coming from each direction. They are usually visible as faint lines like racing stripes.

   Q: What kind of teeth do fish have?
   A:
   - Catfish have small teeth that feel like a rough area at the front of the mouth.
   - Bass, bluegill, and other sunfish have bands of small teeth that capture and hold food.
   - Trout have very sharp teeth that help them hold on to prey.

5. Explain to participants that, now that they know the basic body parts of fish and how fish use them, the next thing to learn about fish is their life cycle.

   Q: What is the first stage in the life cycle of fish?
   A: Fish start out as eggs deposited by a female and fertilized by a male. This is called spawning.

   Q: Who can tell us what certain male fish are busy doing even before the female lays eggs?
   A: The male builds a shallow, circular nest by sweeping away debris over a hard surface like sand or gravel.

   Q: What happens after the male and female have spawned?
   A: Certain males guard the clutch of eggs and fan their tails over them to aerate them.

   Q: What happens once the eggs hatch in a few days?
   A: The young fish, called fry, are born with a yolk sack that provides them food for 4–5 days. Sometimes the fry stay over the nest in a tight school, guarded by the male, for about a week before swimming away.

   Q: What are all the stages of a fish life cycle?
   A: Egg, fry, juvenile (1–4 years), adult (4 years and older). Adult males prepare nests, spawn with females and begin the cycle again.

6. Check for understanding by pointing to different life cycle stages on the Life Cycle of the Largemouth Bass poster and asking participants to offer information on those stages.
7. Tell participants that in the next activity, they will learn about how to identify five common Missouri fish, their preferred habitats, and their favorite foods.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.
2. Hold up identification cards and have participants take turns to:
   - Name the fish
   - Describe its physical characteristics
   - Name its preferred food, shelter/location, etc.

Activity 3.3: Bluegill

Estimated Time

5–10 minutes

Objectives

- Participants will be able to identify bluegill.
- Participants will be able to describe the habitats and food preferences of bluegill.

Instructor Preparation

- Have all the fish props available and displayed where all participants can see them.
- Have the Fish Identification/Life Cycle cards.
- Have a yellow fish ruler available.
- If possible, have items available that weigh: 0.5 lb., 0.75 lb., 1 lb., 4.5 lbs., and 15 lbs.

Procedure

1. Explain that this is the third activity in Lesson 3 of Discover Nature — Fishing. Explain that in this activity participants will learn how to identify a bluegill and learn about its habitat and favorite foods.

2. Have all the fish props and identification cards displayed for all to see and ask for a participant to pick out the bluegill (either on the identification card or as a prop).

Acknowledge the correct choice and ask the same or another participant to stand in the front of the group with you and point to the details on the ruler, weighted items, fish prop, or card as you discuss them:

a. Average bluegill adult size: 6–9 inches

b. Average bluegill weight: 0.5 pound

c. Maximum bluegill size: 11 inches

d. Maximum bluegill weight: 1 pound

Have the participant(s) demonstrate these lengths on the yellow fish ruler for everyone to see and have them choose and pass around the 0.5- and 1-pound objects to the group.

LANCE MERRY PHOTO

3. Bluegill are sunfish, and to recognize a bluegill, look for these identifying characteristics:
   a. Bluegill have flat bodies and a small mouth.
   b. The upper jaw does not reach past the front of the eye.
   c. Chin and sides of its head are blue.
   d. Chest and belly are yellow or reddish-orange.
   e. Back and sides are dark, olive-green with bright green and brassy specks.
   f. Sides often have dark, vertical bars.

   Have participant(s) point out these details on the fish prop or identification card.
4. Bluegill life cycle:
   a. Bluegills live from 4–6 years.
   b. Males build mostly gravel nests May through August.
   c. Spawning peaks in June.
   d. Males protect the nest until the eggs hatch but do not guard the fry once they leave the nest.
5. Bluegill habitat:
   a. Bluegill thrive in warm, fairly clear waters with little or no current: ponds, stream pools, quiet backwaters of large rivers, etc.
   b. Bluegill are carnivorous (eat other animals) and eat insects, small crustaceans such as crayfish, small fish, etc.
6. As participants return the bluegill prop, card, and weights to the table, explain that the next fish they will learn about will be the hybrid sunfish.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.
2. Hold up identification cards and have participants take turns to:
   - Name the fish
   - Describe its physical characteristics
   - Name its preferred food, shelter/location, etc.

Activity 3.4: Hybrid Sunfish

Estimated Time

5–10 minutes

Objectives

- Participants will be able to identify hybrid sunfish.
- Participants will be able to describe the habitats and food preferences of hybrid sunfish.

Instructor Preparation

- Have all the fish props available and displayed where all participants can see them.
- Have the Fish Identification/Life Cycle cards.
- Have a yellow fish ruler available.
- If possible, have items available that weigh: 0.5 lb., 0.75 lb., 1 lb., 4.5 lbs., and 15 lbs.

Procedure

1. Explain that this is the fourth activity in Lesson 3 of Discover Nature — Fishing. Tell participants that in this activity they will learn how to identify hybrid sunfish, their habitat, and food preferences.

2. Have all the fish props and identification cards displayed for all to see and ask for a participant to pick out the hybrid sunfish (either on the identification card or as a prop).

Acknowledge the correct choice and ask the same or another participant to stand in the front of the group with you and point to the details on the ruler, weighted items, fish prop, or card as you discuss them:

a. Average hybrid sunfish adult size: 7 inches

b. Average hybrid sunfish weight: 0.5 pound

c. Maximum hybrid size: 9 inches

d. Maximum hybrid sunfish weight: 0.75 pound

Have the participant(s) demonstrate these lengths on the yellow fish ruler for everyone to see and have them choose and pass around the 0.5- and 0.75-pound objects to the group.

JIM RATHERT PHOTO

3. To recognize a hybrid sunfish, look for these identifying characteristics:

a. Hybrid sunfish are the result of the eggs of female green sunfish being fertilized by male bluegill (usually done in hatcheries).

b. Hybrid sunfish have larger mouths than bluegill.

c. A hybrid sunfish upper jaw extends to about the middle of the eye.

d. There are usually turquoise streaks on the cheek areas.

e. Back and sides are bluish-green; belly has shades of pale yellow or white.

f. Sides often have dark, vertical bars.

Have participant(s) point out these details on the fish prop or identification card.

4. Hybrid sunfish life cycle:

a. Hybrid sunfish live from 4–6 years.

b. Most hybrid sunfish are bred in hatcheries. Those that do reproduce in the wild, have similar spawning behaviors as other sunfish.

5. Hybrid sunfish habitat:

a. Hybrid sunfish thrive in warm, fairly clear waters with little or no current: ponds, stream pools, quiet backwaters of large rivers, etc.

b. Hybrid sunfish are carnivorous (eat other animals) and eat insects, small crustaceans such as crayfish, small fish, etc.

6. As participants return the hybrid sunfish prop, card, and weights to the table, explain that the next fish they will learn about will be the largemouth bass.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.

2. Hold up identification cards and have participants take turns to:

- Name the fish
- Describe its physical characteristics
- Name its preferred food, shelter/location, etc.

Activity 3.5: Largemouth Bass

Estimated Time

5–10 minutes

Objectives

- Participants will be able to identify largemouth bass.
- Participants will be able to describe the habitats and food preferences of largemouth bass.

Instructor Preparation

- Have all the fish props available and displayed where all participants can see them.
- Have the Fish Identification/Life Cycle cards.
- Have a yellow fish ruler available.
- If possible, have items available that weigh: 0.5 lb., 0.75 lb., 1 lb., 4.5 lbs., and 15 lbs.

Procedure

1. Explain that this is the fifth activity in Lesson 3 of Discover Nature — Fishing. Tell participants that in this activity they will learn how to identify largemouth bass, their habitat, and food preferences.

2. Have all the fish props and identification cards displayed for all to see and ask for a participant to pick out the largemouth bass (either on the identification card or as a prop).

Acknowledge the correct choice and ask the same or another participant to stand in the front of the group with you and point to the details on the ruler, weighted items, fish prop, or card as you discuss them:

a. Average largemouth bass adult size: 10–20 inches

b. Average largemouth bass weight: 0.5–4.5 pounds

c. Maximum largemouth bass: 24 inches

d. Maximum largemouth bass weight: 15 pounds

Have the participant(s) demonstrate these lengths on the yellow fish ruler for everyone to see and have them choose and pass around the 0.5-, 4.5-, and 15-pound objects to the group.

LANCE MERRY PHOTO

3. To recognize a largemouth bass, look for these identifying characteristics:
   a. Largemouth bass have large, long bodies.
   b. Largemouth bass have a very large mouth.
   c. A largemouth bass upper jaw extends far beyond the rear edge of the eye (except in small young).
   d. Upper body parts are greenish.
   e. Lower sides and belly are white without dark spots or with spots that are irregularly arranged.
   f. The middle of each side has a broad, dark stripe.
   g. Cheek scales are the same size as body scales.
   h. Tongue is smooth (without a rough patch).

   Have participant(s) point out these details on the fish prop or identification card.
4. Largemouth bass life cycle:
   a. Largemouth bass live from 10–15 years.
   b. Largemouth bass spawn from mid-April into late May or June.
   c. Males build the nest with rock or gravel.
   d. Males guard the eggs even after the fry have formed a tight school and moved above the nest.
   e. Males will eat their young after the fry leave the nest.
5. Largemouth bass habitat:
   a. Largemouth bass thrive in warm, fairly clear waters with little or no current, lakes and ponds of all sizes, permanent stream pools, quiet backwaters of large rivers, etc.
   b. Largemouth bass are carnivorous (eat other animals) and eat fish, crayfish, large insects, and occasionally, frogs, mice, snakes, or other small animals.
6. As participants return the largemouth bass prop, card, and weights to the table, explain that the next fish they will learn about will be the channel catfish.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.
2. Hold up identification cards and have participants take turns to:
   - Name the fish
   - Describe its physical characteristics
   - Name its preferred food, shelter/location, etc.

Activity 3.6: Channel Catfish

Estimated Time

5–10 minutes

Objectives

- Participants will be able to identify channel catfish.
- Participants will be able to describe the habitats and food preferences of channel catfish.

Instructor Preparation

- Have all the fish props available and displayed where all participants can see them.
- Have the Fish Identification/Life Cycle cards.
- Have a yellow fish ruler available.
- If possible, have items available that weigh: 0.5 lb., 0.75 lb., 1 lb., 4.5 lbs., and 15 lbs.

Procedure

1. Explain that this is the sixth activity in Lesson 3 of Discover Nature — Fishing. Tell participants that in this activity they will learn how to identify channel catfish, their habitat, and food preferences.

2. Have all the fish props and identification cards displayed for all to see and ask for a participant to pick out the channel catfish (either on the identification card or as a prop).

Acknowledge the correct choice and ask the same or another participant to stand in the front of the group with you and point to the details on the ruler, weighted items, fish prop, or card as you discuss them:

a. Average channel catfish adult size: 12–22 inches

b. Average channel catfish weight: 1–15 pounds

c. Channel catfish as large as 45 pounds have been caught outside Missouri.

Have the participant(s) demonstrate these lengths on the yellow fish ruler for everyone to see and have them choose and pass around the 1- and 15-pound objects to the group.

LANCE MERRY PHOTO

3. To recognize a channel catfish, look for these identifying characteristics:
   a. Channel catfish (like all catfish) have smooth, scale-less skin.
   b. Channel catfish have barbels (whiskers) around the mouth.
   c. A channel catfish has a deeply forked tail with dark spots.
   d. The anal fin has a rounded edge.
   e. Young have spots that disappear with age.

   Have participant(s) point out these details on the fish prop or identification card.
4. Channel catfish life cycle:
   a. Average channel catfish live for 6–7 years, but some have lived more than 20 years.
   b. Channel catfish spawn from late May through July.
   c. Males select and clean the nest sites of debris by vigorously fanning their tails, leaving a sand or gravel bottom.
   d. Channel catfish nest in dark, secluded areas, such as natural cavities around piles of logs, undercut banks, burrows of muskrats and beavers, etc.
   e. Males chase the female away from the nest after spawning but return to tend to the eggs. Initially, males use their fins to aerate the eggs.
   f. Eggs hatch in about a week.
   g. Males guard the fry until the fry leave the nest 7–8 days later.
5. Channel catfish habitat:
   a. Channel catfish prefer lakes with sand or gravel bottoms or large streams with low current.
   b. Channel catfish are omnivorous (eat both plants and animals) bottom feeders. They eat insects, mollusks, crustaceans, fish, and plant material.
   c. Channel catfish less than 4 inches in length eat mostly small insects.
   d. Channel catfish find food mostly by taste and smell.
6. As participants return the channel catfish prop, card, and weights to the table, explain that the next fish they will learn about will be the rainbow trout.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.
2. Hold up identification cards and have participants take turns to:
   - Name the fish
   - Describe its physical characteristics
   - Name its preferred food, shelter/location, etc.

Activity 3.7: Rainbow Trout

Estimated Time

5–10 minutes

Objectives

- Participants will be able to identify rainbow trout.
- Participants will be able to describe the habitats and food preferences of rainbow trout.

Instructor Preparation

- Have all the fish props available and displayed where all participants can see them.
- Have the Fish Identification/Life Cycle cards.
- Have a yellow fish ruler available.
- If possible, have items available that weigh: 0.5 lb., 0.75 lb., 1 lb., 4.5 lbs., and 15 lbs.

Procedure

1. Explain that this is the seventh activity in Lesson 3 of Discover Nature — Fishing. Tell participants that in this activity they will learn how to identify rainbow trout, their habitat, and food preferences.

2. Have all the fish props and identification cards displayed for all to see and ask for a participant to pick out the rainbow trout (either on the identification card or as a prop).

Acknowledge the correct choice and ask the same or another participant to stand in the front of the group with you and point to the details on the ruler, weighted items, fish prop, or card as you discuss them:

a. Average rainbow trout adult size: 12–32 inches

b. Average rainbow trout weight: 1–15 pounds

c. Rainbow trout as large as 48 pounds have been caught outside Missouri.

Have the participant(s) demonstrate these lengths on the yellow fish ruler for everyone to see and have them choose and pass around the 1- and 15-pound objects to the group.

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3. To recognize a rainbow trout, look for these identifying characteristics:
   a. Rainbow trout are torpedo-shaped and have small scales.
   b. Rainbow trout have a small adipose (or fatty) fin behind their dorsal fin close to their tail.
   c. They are generally blue-green or yellow-green in color with a pink streak along their sides, white underbelly, and small black spots on their back and fins.

   Have participant(s) point out these details on the fish prop or identification card.
4. Rainbow trout life cycle:
   a. Average rainbow trout live for 4–6 years, but some have lived more than 20 years.
   b. The majority of trout in Missouri are spawned and raised in state or private hatcheries.
   c. When hatchery-raised trout reach around 12 inches, they are released in certain streams.
   d. Naturally reproducing populations of rainbow trout:
      - Spawn in riffle areas.
      - Spawning females fan their tail fin to make a depression in some small gravel and lay some of their eggs.
      - Males fertilize the eggs.
      - The female covers the nest with gravel and moves on to make and lay eggs in several other nests.
      - There is no parental care of the fry and predation is very common.
      - Eggs hatch in about 28 days.
5. Rainbow trout habitat:
   a. Rainbow trout prefer gravel-bottomed, clean, cold and clear water streams with current, and multiple types of cover.
   b. Undercut banks and overhead vegetation, boulders, vegetation, and deep pools are ideal trout habitat.
   c. Rainbow trout are carnivorous (eat other animals) and eat grasshoppers, aquatic insects, crustaceans, and small fish.
   d. Rainbow trout locate food primarily by sight, taste, and smell.
   e. They are opportunistic and position themselves facing into the current to catch whatever comes their way.
6. Explain that Missouri has several types of trout fishing areas, each with its own special rules. Point out the Trout Fishing section in the summary, and advise participants to read this section if they plan to fish for trout.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.
2. Hold up identification cards and have participants take turns to:
   - Name the fish
   - Describe its physical characteristics
   - Name its preferred food, shelter/location, etc.

Optional:

DNS teachers may review and practice Lesson 3 techniques in preparation for the end-of-unit fishing field experience.

Hands-on Fishing (60 minutes):

- Volunteers should distribute a fishing rod and reel to each participant in their group and get bait for their group.
- Remind participants about safety and how participants can keep themselves and those around them safe.
- At this point the participants are ready to fish. Volunteers are to assist their group with all fishing-related needs until the completion of the program.
- The lead instructor should instruct the volunteers to bring their group back to the casting site in 60 minutes for Program Wrap-up.

Program Wrap-up (15 minutes):

Ask how many and what kind of fish participants caught. Record this information on the group information sheet.

- Congratulate all participants on their effort and success.
- Explain that they have just completed Lesson 3. Provide times and dates when Lesson 4 is offered, if applicable.
- Briefly list the topics that will be covered in Lesson 4, if applicable.
- Give a brief explanation of what fishing regulations are and why we have them. (See Activity 4.4 for reference.) Distribute copies of *A Summary of Missouri Fishing Regulations* (current year — one per participant)
- Briefly describe and offer *Introduction to Fishing* and *Know Your Catch/Know Your Knots*
- Have participants assist with cleaning the site of all trash.
- Thank the participants for coming.

Program Clean-up (30 minutes):

- Collect and put away props.
- Perform any necessary maintenance on rods or reels.
- Return bait to cooler or refrigerator.
- Take down and put away Discover Nature — Fishing signs, if applicable.
- Place all program paperwork into specified folders.
- The lead instructor is responsible for making sure the facility is clean and secure before leaving the area.

Lesson 4: Fishing with Lures and Fishing Regulations

Lesson Outline

Lures and How to Use Them

- Spinnerbaits
- Crankbaits
- Surface lures
- Soft plastics
- Jigs
- Spoons
- Flies

Choosing the Right Lures

- Water temperature
- Light
- Wind
- Barometric pressure
- Rain
- Spawning

Fish Identification Review

- Bluegill
- Hybrid sunfish
- Largemouth bass
- Channel catfish
- Rainbow trout

Regulations and Why We Have Them

- Fishing permit
- Daily limit
- Possession limit
- Length limits
- Measuring a fish
- Seasons
- Live bait
- Trout fishing regulations
- Special area regulations

Lesson Objectives

1. Participants will be able to identify different types of lures and explain basic characteristics of each.
2. Participants will be able to explain how factors like weather and seasonal conditions can affect their choice of lures and decisions about when to go fishing.
3. Participants will be able to describe the features used to identify five kinds of fish (review).
4. Participants will be able to describe fishing regulations that pertain to them and explain why we have them.

Setting

Large open area

Instructor Preparation

- Fix any rods and reels that are in need of repair or maintenance.
- Put up Discover Nature — Fishing signs, if applicable.
- Organize check-in materials, if applicable.
- Ideal teaching methods for this activity would include actual demonstration of each lure as it moves through water in a clear tank, plastic children's pool, pond or lake, etc.

Equipment/Materials

- Optional/Recommended: water source — clear tank, plastic children's pool, pond or lake, etc.
- Spinnerbaits
- Crankbaits
- Surface lures
- Soft plastic lures
- Jigs
- Spoons
- Flies
- Spincast rod and reel combinations, if applicable
- Fish ID cards
- Fish props
- Yellow rulers
- *A Summary of Missouri Fishing Regulations* (current year — one per participant)
- *Wildlife Code of Missouri* (current year — one per participant)
- *Introduction to Fishing* and *Know Your Catch/Know Your Knots*

Total Time Required: 2 hours

- Instruction: 45 minutes
- Hands-on Fishing: 60 minutes
- Program Wrap-up: 15 minutes

Group Size

Maximum of 20 anglers per instructor during instruction and no more than five anglers per instructor/volunteer during hands-on fishing.

Safety Considerations

Hooks will continue to be the greatest safety concern. Stress to anglers not to walk behind other anglers that are in the process of casting, or interfere with fellow anglers while they are fastening tackle or baiting hooks. Anglers should always keep their rod tip up and hook secure while walking. Some lures are weighted and can cause harm if they strike someone. Freeing lures that are snagged underwater can be dangerous to anglers and those nearby if lures suddenly come loose and pop out of the water.

Activities

Activity 4.1: Lures and Their Basic Characteristics
Activity 4.2: Choosing the Right Lures
Activity 4.3: Fish Identification Review
Activity 4.4: Regulations and Why We Have Them

Activity 4.1: Lures and Their Basic Characteristics

Estimated Time

15 minutes

Objective

Participants will be able to identify different types of lures and their basic characteristics.

Instructor Preparation

- Gather lures and arrange them on a table in the order you would like to discuss them.
- Have available examples of the following lure types: spinnerbait, crankbait, surface lure, soft plastic lure, jig, spoon, and fly.
- Ideal teaching methods for this activity would include actual demonstration of each lure as it moves through water in a clear tank, plastic children's pool, pond or lake, etc.
- Check in participants with designated forms, if applicable.

Equipment/Materials

- Spinnerbaits
- Crankbaits
- Surface lures
- Soft plastic lures
- Jigs
- Spoons
- Flies
- Spincast rod and reel combinations for lure casting and retrieval practice, if applicable
- Optional/Recommended: water source — clear tank, plastic children's pool, pond or lake, etc.

Procedure

1. Greet the participants and introduce yourself and any assistants. If you are an MDC employee or volunteer, talk about MDC's mission and describe what we do and why it's important (refer to Table of Contents).
2. Briefly explain that Discover Nature — Fishing is a fishing education program designed to give people of all ages basic fishing skills, knowledge, and experience so they can go fishing on their own. Explain that there are four lessons within Discover Nature — Fishing.
3. Explain that this is the first activity in Lesson 4 of Discover Nature — Fishing. Tell participants that in this activity they will be able to identify different types of lures and their basic characteristics. If time allows, participants will also have the opportunity to demonstrate techniques for using different lures and will also do some fishing (if applicable).
4. Clear views of each lure individually as well as all lures as a group are essential to successful participant learning and understanding. Actual demonstrations of the movement of each lure through water would provide opportunity for increased learning and understanding.
5. Depending on the size of your group, you may have participants come up to a table where you have different lures displayed so they can see the lures while you discuss them. You may also bring lures to seated participants or hold up pictures of the lures while you discuss them. (Specific lures to use as examples are left up to the instructor. Chosen lures should be common examples of the basic lure types listed.)

6. With participants looking at all the lures, begin discussion of lures with some general statements and questions.

Q: These are called fishing lures. Why do you think all these lures were created?
A:

- Live bait may not be available or may not be allowed in some areas.
- Lures are more durable, can be used more than once, and can be stored for long periods.
- Lures look like live bait (worms, minnows, grasshoppers, etc.).
- A lure can fool a fish into thinking it's real food/live bait because of the way it looks, smells, and moves.
- Anglers can use their rods to make lures move or behave like live bait.

Q: Some of these do look very much like real, live worms, grasshoppers, small fish, etc. What about these others (point these out) that do not look like anything found in nature?
A: Once these are moving in the water, they can fool a fish when an angler moves them through water and manipulates a rod to cause them to behave like real bait.

7. Without any equipment, demonstrate each of the following three steps as if you were holding a rod that had a lure on it.

Step 1: When I cast, and the lure hits the water,
Step 2: I begin to reel the line back in (or retrieve it).
Step 3: Depending on how I want the lure "to behave" or how I know the lure will move in the water, I can retrieve slowly, quickly, in quick, jerky movements, or I can use a combination of these.

Spinnerbaits

8. Let's talk about spinnerbaits. (Point one out; have one in your hand; pass some around; etc.) Explain that spinnerbaits come in a variety of weights, sizes, and colors. Spinnerbait lures have blades that spin and flash during the retrieve. Skirts made out of hair or rubber add movement and shape to the lure.


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Q: Why do you think they are called spinnerbaits?
A: They have blades that spin when they are moved through the water.

Q: Why would a spinning movement be something that would interest or fool a fish?
A: Spinning blades create vibrations that may be sensed by a fish's lateral line.

9. Anglers should retrieve spinnerbaits fast and should not allow the lure to sink more than a few inches below the surface. This fast retrieve is a good technique to use for bass around fallen logs, brush, or rock.

Q: What are some ways spinnerbaits attract fish?
A: Vibration, flash, and skirt action

Q: What's the best way to retrieve a spinnerbait?
A: Quickly — not allowing the lure to sink more than a few inches

Crankbaits

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10. Let's talk about crankbaits. (Point one out; have one in your hand; pass some around; etc.). Explain that crankbaits are one of the most commonly used bass lures. No matter how you (or a fish) looks at them, the crankbait's three-dimensional shape looks like prey (or something a fish would want to eat).

Diving crankbaits have a bill or lip. The bigger and longer the bill, the deeper it will dive. Most crankbaits float but others are made to hang in the water or sink. Some crankbaits don't have a bill but are weighted, which allow them to be quickly retrieved near and through hard cover. Crankbaits come in a variety of weights, sizes, and colors, and some contain rattles.

Q: Why would there be rattles put inside lures?
A: Rattles increase vibrations and add sound to attract fish.

11. While participants view crankbaits, begin a discussion of how they could be used.

Q: When using a crankbait, why should you think about how deep the water is and what structures are under the water where you want to fish?
A: You should choose a crankbait lure that dives deep enough to make contact with the structure (a rock, a log, etc.) during the retrieve.

Q: What part of a crankbait determines how deep it will dive?
A: The size of the lip or bill determines how deep the crankbait will go. Small lips or bills are good for shallow dives. Larger lips or bills will cause the lure to dive deeper.

Q: Why should you think about how clear the water is?
A: In muddy water, crankbaits with rattles and bright colors will be more effective than quiet crankbaits with dark colors.

Surface Lures

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12. Let's look at surface lures. (Point these out. Have some in your hand. Pass some around, etc.) Explain that surface or topwater lures float on the surface and cause a disturbance on the top of the water that fish can see and/or hear — even in murky water or in low light. Fish can also feel the lure's vibrations through their lateral line. Lure types in this category include (include only ones that you actually have or have a good picture of): poppers, buzzbaits, jerkbaits, frogs, and floating or suspending minnow imitations.

13. These are all lures that are made to attract fish near or on the surface of the water, but all have different characteristics that attract and fool fish in different ways.

- Poppers have a cupped face that splashes water when moved, creating sounds and vibrations that simulate struggling prey.
- Buzzbaits have blades that spin and cause surface commotion when retrieved quickly across the water surface.
- Jerkbaits are usually cigar-shaped lures that are made to be twitched or jerked on the surface, and some have a side-to-side action.
- Frogs are plastic or rubber and are designed to skip across vegetation or thick cover without getting stuck.
- Floating minnows are designed to mimic the erratic swimming action of injured baitfish.

Q: How would an angler get these lures to attract fish?
A: An angler gives a surface lure its action when the angler pauses between giving the rod jerks and twitches during the retrieve.

14. Don't be surprised if the fish strikes at a surface lure but misses it. Just cast back to that same spot. Often, the fish will strike again.

Q: What are some advantages surface lures have over other lures?
A: They cause disturbance that fish can see, hear, and feel — even in murky water and low light.

Soft Plastic Lures

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15. Let's talk about soft plastic lures. (Point one out. Have one in your hand. Pass some around, etc.) Explain that soft plastic lures are flexible and produce life-like movements. Available in hundreds of shapes, sizes, and colors, soft plastic lures include realistic worms, crayfish, and salamanders. Other forms look nothing like animals seen in the wild, but they move or may be injected with scents or salt to attract fish.

16. Soft plastic lures can be fished on the top, middle, or bottom of the water, depending on whether weights are used.

Q: How would weights make a difference in how soft plastic lures are used?

A: For topwater and shallow water, soft plastics without a weight keep the lure near the surface. For deep water, a weight just above the eye of the hook allows the lure to sink on slack line to the bottom where most bites will occur.

Q: What are some advantages soft plastic lures have over other lures?

A: They are life-like, can be fished with or without weights, etc.

Jigs

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17. These lures are called jigs. (Point one out. Have one in your hand. Pass some around, etc.) Explain that a jig is one of the simplest yet most consistently effective lures. A jig consists of a lead head molded to a single hook. Jigs come in many sizes and colors. Some come ready to fish, with skirts made of rubber or feathers. Others come without skirts, and anglers can rig their own jig head with soft plastic lures or live bait.

18. Jigs are great for casting into a small area of cover, such as submerged wood, under overhanging trees, vegetation, docks, or rock piles. Jigs can also be fished straight down in deep water from a boat or dock.

Spoons

19. Now, we have lures called spoons. (Point one out. Have one in your hand. Pass some around, etc.) Explain that most fishing spoons are metal and are shaped like the bowl of a spoon. Spoons come in a variety of colors, but most are silver and provide plenty of flash. Big spoons are made for bass and larger fish, while small spoons are made for trout and for ice fishing for bluegill.

20. (Demonstrate without equipment as these are explained.) Spoons are commonly used in two ways: vertical jigging or straight retrieves. Vertical jigging involves fishing straight down below a boat or from a hole in the ice. Straight retrieves involve casting the spoon as far as possible and retrieving steadily with irregular twitches.

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Flies

21. Flies are very different kinds of lures normally associated with fly fishing. (Point one out. Have one in your hand. Pass some around, etc.) Flies are extremely lightweight lures, which feature imitation insect or minnow patterns tied onto a single small hook created by using feathers, hair, thread, wire, etc. A variety of natural materials (such as feathers and hair) and human-made materials (such as thread and wire) are used. Most anglers who fly fish use a different kind of rod called a fly rod, but flies may be fished with a spincast rod with the aid of a bobber and/or sinkers.

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22. If time allows, distribute a fishing rod and reel (without attached tackle) to each participant. At a fishing pond or lake, allow participants to tie on and cast several lures (one at a time) and observe how the lures respond in the water to different speeds of retrieve and movements by the rod. Have participants practice techniques for different lures, as discussed.

Option A: Prepare fishing rods before the activity by tying on different types of lures to rods that will be distributed to participants. During lure casting and retrieval practice, participants can trade rods with other participants, leaving the lures attached to the lines instead of changing lures.

Option B: Schedule the lure casting and retrieval practice to occur when the group goes fishing. Have the group practice lure casting and retrieval with different lures before fishing with bait.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.

2. Hold up one of the lures discussed and ask for a volunteer to come up and name the lure type and describe at least one of its characteristics.

Activity 4.2: Choosing the Right Lures

Estimated Time

10 minutes

Objective

Participants will be able to explain how factors like weather and seasonal conditions can affect their choice of lures and decisions about when to go fishing.

Instructor Preparation

Have available some of the lures discussed in Activity 4.1.

Procedure

1. Explain that this is the second activity in Lesson 4 of Discover Nature — Fishing. Remind participants about the different types of lures they learned about in the last activity. Tell participants that in this activity they will be able to explain how factors like weather and seasonal conditions can affect their choice of lures and decisions about when to go fishing.
2. Explain that many factors affect fishing success, but it's the combination of weather, seasonal conditions, and the impact of spawning that is most important.

   Q: What natural factors might affect fish behavior?
   A: Fish behavior is affected by many natural conditions such as water temperature, amount of sunlight, air temperature, wind, storms, weather patterns, and spawning.

3. We're going to talk about how changes in fish behavior can affect our choices about which lures to use and when to go fishing. Explain that the first natural factor to be discussed is water temperature.

   Q: Why should water temperature affect fish behavior?
   A: Fish are cold-blooded. Water temperature influences the fish's body temperature and bodily functions — including how much and when to eat. For most species, lower temperatures slow their activity and decrease food intake.

   Q: How does water temperature affect the amount of oxygen in the water?
   A: High water temperatures can reduce oxygen levels. Cooler water has more oxygen.

   Q: Why does this matter to fish?
   A: (From Lesson 3, Activity 3.2) Fish need oxygen to survive. All fish have gills to get oxygen from the water. A flexible bony plate called a gill cover protects the gills. Water is inhaled through the mouth, passes over the gills, and is exhaled from beneath the gill cover.

   Q: How would knowing this help anglers choose lures?
   A: Generally, an angler would use a lure with a slow retrieve in cold water because the fish are cold, slow moving, and not all that interested in eating. Anglers would use a lure with a fast retrieve in warm water when fish are more active and hungry.

   Q: On a cool day, where might fish be found?
   A: An angler can be successful in the late morning if the sun has had a chance to warm shallow water, especially shallow areas with dark or muddy bottoms that absorb heat more quickly.

Q: On hot, sunny days, were might fish be found?
A: Hot water surface temperatures on hot, sunny days force fish to find cooler, deeper, well oxygenated waters to stay comfortable. Under these conditions, deep fishing baits and lures work best.

4. The amount of sunlight is a factor, too.

Q: How does the amount of light affect fish?
A: Fish prefer to feed during times of lower light levels, so most freshwater fish are most active during the early morning and early evening hours.

Q: How would fishing on a cloudy day improve your chances of success?
A: Clouds reduce the amount of light in the water, which improves fishing because fish search for food more when there is less light.

Q: If it were a bright, sunny day, where would you fish?
A: Bright sun tends to cause fish to hide closely to structures. Overhanging trees, rocks, etc., and underwater structures provide shade and cover for fish. Casting in shaded water and under such structures should provide more successful fishing than casting in bright, open water.

5. Wind can also play a role in fishing success. On windy days, fish sometimes move to the downwind shore of lakes and ponds to take advantage of drifted food that can accumulate there.

Q: How might you fish from the shore on a windy day?
A: When fishing from the shore on a windy day, you should use heavier lures that allow you to cast into the wind.

6. Weather patterns affect fish behavior, too.

Q: What is barometric or air pressure?
A: Air pressure is the force exerted on you by the weight of tiny air molecules. Although air molecules are invisible, they still have weight and take up space. Since there's a lot of "empty" space between air molecules, air can be compressed.

Air pressure is measured by a barometer that can tell us about what kind of weather to expect. If a high-pressure system is on its way, often you can expect cooler temperatures and clear skies. If a low-pressure system is coming, then look for warmer weather, storms, and rain.

Fish are acutely aware of changes in barometric pressure due to storms or changing weather patterns. Many fish feed heavily during the hours immediately before a storm or front, but decrease feeding during and after a front. Fishing after a cold front is usually poor for a day or two.

Warm fronts cause surface water temperatures to increase, which push fish into a feeding mode. Most of this feeding will be on or near the water's surface or shoreline areas.

7. Spawning can increase fish activity.

Q: What is spawning, and why would spawning increase fish activity?
A: Spawning takes place when female fish lay eggs and males fertilize the eggs. Males will strike at intruders coming near their nests. Anglers who know where certain fish make nests and spawn, can use flashing or noisy baits to get these protective males to bite.

Q: Where might an angler find nests of largemouth bass, bluegill, and hybrid sunfish?
A: Largemouth bass and most sunfish prefer shallow water over hard surfaces, such as gravel or rubble.

Q: What do bass, bluegill, and hybrid sunfish nests look like?
A: Bass and bluegill nests look like saucer-sized circles on the bottom of the lake or pond. Nests are lighter colored than the rest of the bottom because fish keep them clean of dirt and algae. Look for fish nests in shallow water in May and June.

8. Check for understanding by asking the following:

Q: On a sunny afternoon in the middle of summer, what would be the best lures and techniques to use?
A: Deep-diving crankbaits, jigs, and soft plastics fished in deep water around structure.

Q: Why?
A: Hot water surface conditions cause fish to move deeper. Bright sun causes fish to hide closely to structure.

Q: Why would a hard rain be a poor time to fish?
A: Hard rains are a poor time to fish with lures since heavy rains tend to muddy the water, making it difficult for fish to find lures.

Q: What would be a good lure to use in muddy water?
A: Fish would be able to find lures with bright colors, flash, and added sound more easily.

Q: What about flooded or rising water?
A: Rapidly rising water levels can make it difficult to find fish that are spread out. But when river water rises, catfishing can be very good.

Q: Generally, what are the best times to go fishing?
A: Early morning and early evening.

Q: Why?
A: That's when fish are most active. It may have to do with reduced light levels or other factors.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.

2. Hold up one of the lures discussed in Activity 4.1 and ask for a participant to come up and name the lure type, describe a condition or time when it might work the best, and explain why.

Activity 4.3: Fish Identification Review

Estimated Time

10 minutes

Objective

Participants will be able to describe the features used to identify five kinds of fish (review).

Instructor Preparation

- Have all the fish props available and placed in a pillow case, cardboard box, or other container so that participants can't view the fish props.
- Have the Fish Identification Cards available but out of view by the participants.
- Have giveaway items available as game prizes (optional).

Procedure

1. Explain that this is the third activity in Lesson 4 of Discover Nature — Fishing. Remind participants about the activity in which they learned to identify five kinds of fish.

   Q: Why is it important to be able to identify the fish you catch?
   A: So you can tell if and how fishing regulations apply to you and your fish.

2. Tell the participants that they are going to play a game to show what they remember about being able to identify fish. Hold up the container of fish props and explain that all five fish discussed in the previous activity are in the container.
3. Ask for a volunteer to come up in front of the group, select a fish prop from the container without viewing it, and show it to the group. The volunteer should then give the name of the fish and describe as many identifying characteristics as he or she knows, pointing to the characteristics on the fish prop as they are described.
4. Acknowledge correct characteristics. Prompt responses, if necessary. Use giveaway items as game prizes (optional).
5. Repeat the activity using the fish props until all five fish have been described. Alternatively, use the identification cards instead of fish props.
6. Review identifying characteristics listed in Lesson 3, if necessary, focusing on the main characteristics that are easiest to notice.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.
2. Hold up one of the lures discussed in Activity 4.1 and ask for a participant to come up and name the lure type, describe a condition or time when it might work the best, and explain why.

Activity 4.4: Regulations and Why We Have Them

Estimated Time

10 minutes

Objective

Participants will be able to describe fishing regulations that pertain to them and explain why we have them.

Instructor Preparation

- Have available copies of *A Summary of Missouri Fishing Regulations* and *Wildlife Code of Missouri* (current year — one per participant).
- Have available fish props and yellow rulers.
- Have giveaway items available as game prizes (optional).

Procedure

1. Explain that this is the fourth activity in Lesson 4 of Discover Nature — Fishing. Tell participants that you will be reviewing fishing regulations and explaining why we have them.

   Q: What are fishing regulations?
   A: Rules that have to do with how, when, and where people may fish, and what kinds and what size fish must be for them to be taken.

2. Ask participants why we have fishing regulations. There are many correct answers, which may include:
   - Regulations are a tool MDC uses to accomplish our mission — "to protect and manage the fish, forest, and wildlife resources of the state."
   - They protect fish from overharvest and underharvest.
   - They maintain and improve the quality of fishing.
   - They ensure that everyone has an equal chance of catching fish.
   - They allow people to help with fish management by taking fish in a controlled way.
   - They allow fish populations to thrive over time while still being used and enjoyed by people.
3. Explain that fishing regulations are established by MDC and are enforced by conservation agents. Agents are MDC employees and are commissioned law enforcement officers.
4. Tell participants that regulations can be found in *A Summary of Missouri Fishing Regulations* and the *Wildlife Code of Missouri*. (Hold copies up so participants may see them.) These publications are free and can be found at most MDC facilities and sporting goods stores.

   Q: Where else can you find fishing regulations?
   A: On signs posted near boat ramps, and on the banks and in parking lots of public fishing areas. Regulations may also be found on MDC's website, **mdc.mo.gov**.

5. Distribute copies of *A Summary of Missouri Fishing Regulations* (one per participant) and explain that while this does not contain all fish regulations, it is a user-friendly publication that covers the vast majority of what most anglers need to know. If anglers need more information, they can:
   - Use the *Wildlife Code of Missouri*.
   - Visit the Missouri Secretary of State's website printed on the first page of *A Summary of Missouri Fishing Regulations*.
   - Contact any MDC facility.
6. Have participants look at their copies of the summary as you discuss main topics and show participants where to find information.

Fishing Permit

7. Point out that everyone who fishes must have a fishing permit and carry it with him or her while fishing. Point out the list of exceptions and highlight several of the main ones:
   - Missouri landowner fishing on their own land,
   - Missouri resident 65 years or older, or
   - Any person 15 years or younger.
8. In the General Rules section, point out the discussion of Daily and Possession Limits and Length Limits.

Daily Limit

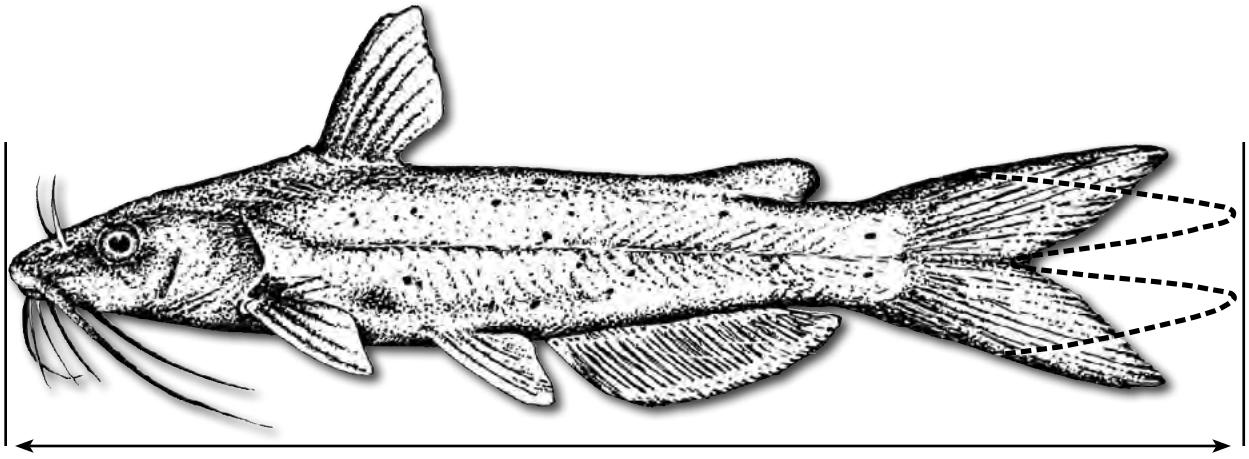
9. Explain that taking fish is an important tool to manage fish populations. However, harvest must be regulated. Harvesting too many fish can lead to population declines, but not harvesting enough can lead to overpopulation and stunted growth. Daily limit refers to the maximum number of fish that may be harvested by an angler in one day.

Possession Limit

10. Point out that the possession limit is twice the statewide daily limit and explain that fish in your possession include fish in your vehicle, cooler, refrigerator, or freezer.

Length Limits

11. Explain that this regulation most often specifies the minimum length a fish must be in order to be legally harvested. However, sometimes:
   - Slot limits specify that fish within a certain range of lengths are protected and must be immediately released unharmed.
   - Maximum length limits specify that fish above a certain length must be immediately released unharmed.



Measuring a Fish

12. Have participants turn to the section in the summary that gives details for how to measure a fish. (This is usually just after the fish identification pictures.)

13. Using the fish props and yellow ruler, demonstrate the proper way to measure a fish, explaining the correct techniques as you perform them.

- Except for the catfish, measure all fish by placing them on their side, flat on the ruler, with mouth closed, and the tail lobes pressed together.
- Explain that total length is measured from the tip of the nose to the tips of the tail lobes (pressed together).
- Explain that catfish will often be agitated and have their pectoral spines locked in the out position, making it extremely difficult to accurately measure while on their side.
- Measure the catfish by placing the fish on its belly and turning the tail fin so that both lobes are touching the ruler. Then pinch the tail lobes together and measure the same way as with the other fish.

14. Ask for a volunteer to come up and properly measure a fish, explaining the correct techniques as they are performed. Alternatively, hand out fish props and rulers, and have participants work in small groups to take turns measuring and explaining how to properly measure fish.

15. Point out the Game Fish and Nongame Fish charts in the summary and how they may be used. Explain that daily limits and length limits vary by species, body of water, and time of year. Point out that game fish are defined in the Definitions section in the back of the summary.

Seasons

16. Explain that although a species may be harvested, the time of year that the harvest takes place can be restricted. Some fish may be harvested year-round while the harvest of other fish may be restricted. Often, restrictions on a fish coincide with the time that species is spawning. Other times, restrictions protect against overharvest.

Live Bait

17. Refer participants to the section in the summary about live bait. While live bait may be collected and used for fishing in some areas, there are regulations about what may be used for bait and how it may be collected. Also, live bait is prohibited in some fishing areas.

18. Emphasize to participants that they should place unused bait of all types in a trash dumpster when the fishing trip is over. Otherwise, unwanted animals and plants can invade local water, damage habitat, and ruin fishing.

Don't dump bait!

It is illegal to dump bait into Missouri waters.

Trout Fishing Regulations

19. Explain that Missouri has several types of trout fishing areas, each with its own special rules. Point out the Trout Fishing section in the summary, and advise participants to read this section if they plan to fish for trout.

Special Area Regulations

20. Explain that most public fishing areas have regulations that are different than statewide rules. Point out the Special Area Regulations sections for large reservoirs and for rivers and streams. Advise participants to check these sections for special regulations in place at their fishing area before they go fishing.

Wrap-up and Review

1. Check for understanding by asking if there are any questions.

2. Play a game in which participants race to find answers in the summary for questions posed by the instructor. For example:

Q: Are bluegill and hybrid sunfish game fish or nongame fish?
A: They are nongame fish.

Q: What is the minimum length limit for black bass at Longview Lake?
A: 15 inches

3. Have winners tell where in the summary they found the answers. Award winners with giveaway prizes (optional).

4. Offer copies of *A Summary of Missouri Fishing Regulations* and the *Wildlife Code of Missouri*.

Optional:

DNS teachers may review and practice Lesson 4 techniques in preparation for the end-of-unit fishing field experience.

Hands-on Fishing (60 minutes):

- Volunteers should distribute a fishing rod and reel to each participant in their group and get bait for their group.
- Remind participants about safety and how participants can keep themselves and those around them safe.
- At this point the participants are ready to fish. Volunteers are to assist their group with all fishing-related needs until the completion of the program.
- The lead instructor should instruct the volunteers to bring their group back to the casting site in 60 minutes for Program Wrap-up.

Program Wrap-up (15 minutes):

Ask how many and what kind of fish participants caught. Record this information on the group information sheet.

- Congratulate all participants on their effort and success.
- Explain that they have just completed Lesson 4.
- Give a brief explanation of what fishing regulations are and why we have them. (See Activity 4.4 for reference.) Distribute copies of *A Summary of Missouri Fishing Regulations* (current year — one per participant)
- Briefly describe and offer *Introduction to Fishing* and *Know Your Catch/Know Your Knots*
- Have participants assist with cleaning the site of all trash.
- Thank the participants for coming.

Program Clean-up (30 minutes):

- Collect and put away props.
- Perform any necessary maintenance on rods or reels.
- Return bait to cooler or refrigerator.
- Take down and put away Discover Nature — Fishing signs, if applicable.
- Place all program paperwork into specified folders.
- The lead instructor is responsible for making sure the facility is clean and secure before leaving the area.

For more information

MO Fishing

mdc.mo.gov/contact-engage/mobile-apps/mo-fishing
This free application shows you the locations of public boat ramps on major lakes, rivers, and streams. The map also shows the exact location of underwater fish structures established by MDC. To help anglers find the best locations, the application includes the annual prospects. MO Fishing can also be used to view, update, and purchase fishing permits.

Fishing Prospects

mdc.mo.gov/fishing/fishing-prospects
MDC's Fishing Prospects webpage gives anglers insight into the best bets for fishing on nearly 100 Missouri ponds, lakes, reservoirs, streams, rivers, and trout parks.

Fishing How-To

mdc.mo.gov/fishing/get-started-fishing
Browse fishing tips by species, learn to fish, and prepare your catch for cooking.

Fishing Events

mdc.mo.gov/fishing/events
Browse news and events, and explore information about fishing, destinations, conservation education, and volunteer opportunities on MDC's regional pages.

A Paddler's Guide to Missouri

Missouri is blessed with many options for canoeing and kayaking, ranging from its nationally recognized spring-fed Ozark rivers to slow-moving rivers of its northern glacial plains. Regardless of your preferred float style, the updated and expanded A Paddler's Guide to Missouri can help you plan your next outing. Whether you're an experienced floater looking for new challenges or a novice looking for help planning a trip, A Paddler's Guide to Missouri can help. This 102-page, spiral-bound guide includes trip planning, equipment, paddling pointers, and maps of 54 Missouri streams and rivers. A Paddler's Guide to Missouri is available for purchase at most MDC facilities or online at **www.mdcnatureshop.com**.

Places To Go

mdc.mo.gov/atlas
The online Conservation Atlas contains information about lands MDC owns, leases, or manages for public use.

DAVID STONNER

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