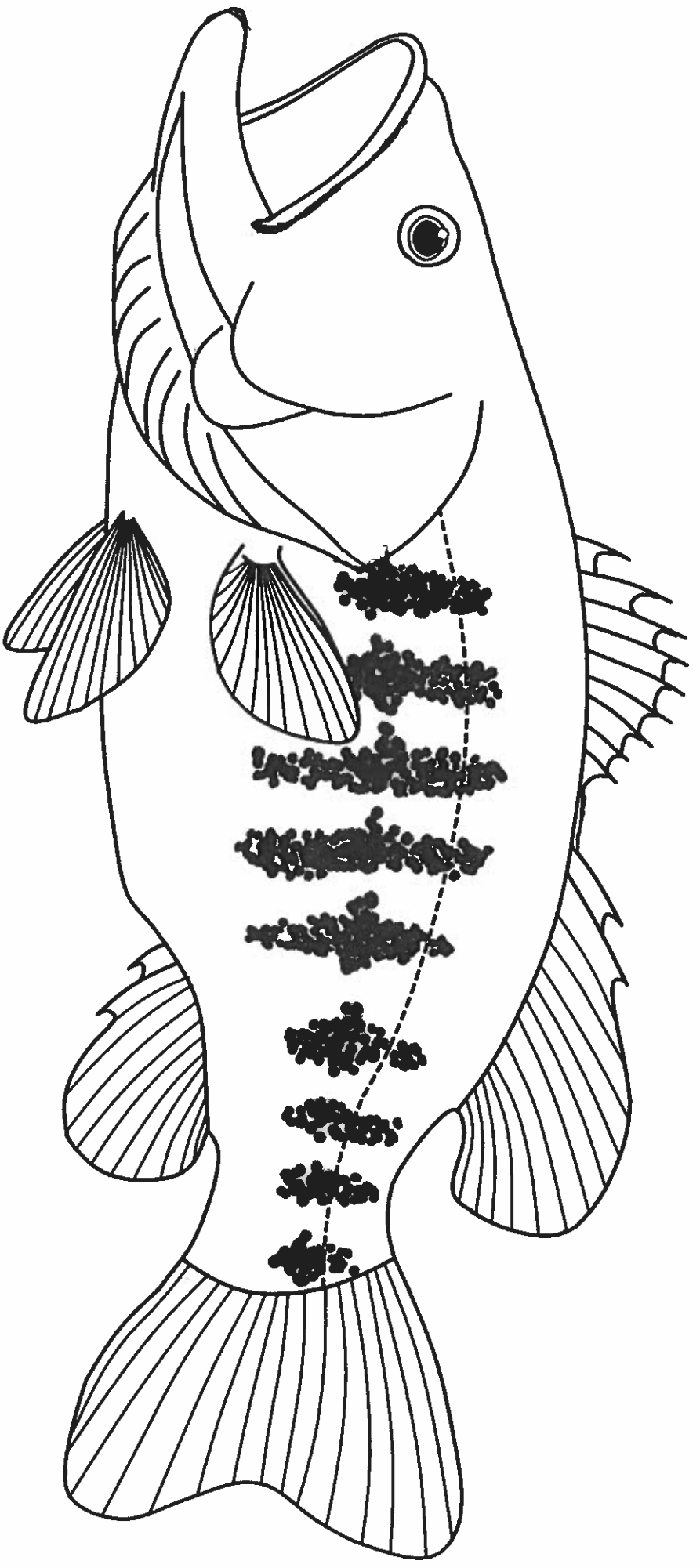


Is this a smallmouth or largemouth bass? _____

What characteristics led you to your answer? _____

Color the bass based upon your answer.



Is this a smallmouth or largemouth bass? _____

What characteristics led you to your answer? _____

Color the bass based upon your answer.

Fashion a Fish

Summary

Students design fish with unique forms, shapes and behaviors to discover the benefits of these adaptations.

Objectives

Students will...

- describe adaptations fish have to their environments
- describe how adaptations can help fish survive in their habitats
- interpret the importance of adaptations in animals

Materials

- one copy of adaptation cards (additional copies with a class of more than 30); cut and separate the cards into groups of four cards each: one coloration, one mouth type, one body shape, and one reproduction in each group
- paper or poster board
- markers, colored pencils or paint

Background

All animals are the product of countless adaptations that occurred over time. Adaptations are features that increase the animals' likelihood of surviving in their habitat. When a habitat changes, either slowly or catastrophically, animals must adapt to those habitat changes to survive. As those adaptations become part of the fish's design, the fish becomes better suited to the habitat in which it lives. Because of the variety of conditions within each habitat, many different fish can live together and flourish. Some species have adapted to such a narrow range of habitat conditions that they are extremely vulnerable to change. These species are usually more susceptible than other animals to death or extinction. In this activity, students design a fish based upon certain adaptations.

Procedure

1. Begin a discussion by asking the class to define what the word adaptation means. An adaptation is a special feature of an organism that increases its chance of survival in its habitat. How do species adapt? Those individuals that are best equipped for life in a specific habitat are more likely to survive to the age where they can reproduce. Therefore, their genes and characteristics are more likely to be carried on to the next generation.
2. Assign students to find a picture or make a drawing of a species of animal that has a special adaptation.

Grade Level

3-12

Subject Areas

Science, Visual Arts

Time

30-45 minutes

Vocabulary

adapt, adaptation, behavioral adaptation, camouflage, characteristic, coloration, habitat, species, structural adaptation

For example: a picture of a giraffe with a long neck for reaching vegetation in tall trees, or an owl with large eyes that gather light to aid with night vision.

3. Conduct a class discussion on the value of different kinds of animal adaptations. As part of the discussion, ask the students to identify different kinds of adaptations in humans.
4. Collect the students' pictures or drawings of adaptations. Categorize them into the following groups:
 - protective coloration and camouflage
 - body shape or form
 - mouth type or feeding behavior
 - reproduction or behavior
 - other (one or more categories the students establish, in addition to the four above that will be needed for the rest of the activity)
5. Break up the classroom into five groups. Pass one complete set of cards to each group of students. There might be five groups with four to six students in each group.
6. Review the adaptations by asking each group what they think the advantages are to the adaptations they were given. Record a list of the advantages to each adaptation on the board.
7. Ask the students to "fashion a fish" from the characteristics on the cards they received. The fish will be fictitious and may not look like a "real" fish. Each group should:
 - create an art form that represents their fish
 - name the fish
 - describe and draw the habitat for their fish
8. Ask each group to report on the attributes of the fish they have designed, including identifying and describing its adaptations. Ask the students to describe how this kind of fish is adapted for survival.
9. Ask the students to make inferences about the importance of adaptations in fish and other animals.

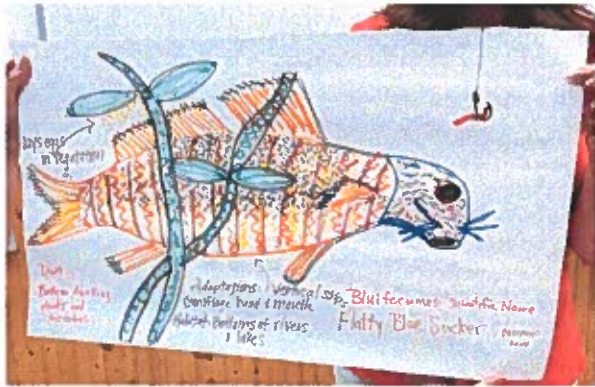
Evaluation

1. Grade the students on their presentations of their drawings to the class and their explanations of the adaptations they incorporated. Is the habitat they drew their fish in realistic for the adaptations they were asked to incorporate in the fish?
2. Have the students invent an animal that would be adapted to live in their community or a different and exotic habitat of their choice. Consider mouth, shape, coloration, reproduction, food, shelter, and other characteristics. Draw and describe the animal. Older grades may write a natural history of the animal – also describing social interactions, life cycle, and general life style.

Extension

1. Take an adaptation card from any category and find a real fish with that adaptation.
2. Look at examples of actual fish. Describe the fish and speculate on its habitat by examining its coloration, body shape and mouth.

*Adapted from Project WILD Aquatic Activity Guide
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Adaptation	Advantage	Examples
Mouth		
Sucker-shaped mouth	Helps to feed on very small plants and animals on bottom	Sturgeon, sucker, carp
Elongated upper jaw	Helps to feed on prey it looks down on	Channel catfish
Hard plate on lower jaw	Helps to scrape algae off of rocks and the bottom	Chiselmouth
Duckbill jaws	Helps to firmly grasp prey	Northern pike, muskellunge
Extremely large jaws	Helps to completely surround prey	Largemouth bass, grouper
Body Shape		
Torpedo shaped	Increases the speed of the fish	Muskellunge, trout, salmon, tuna
Flat bellied	Allows fish to lay on bottom	Sculpin, catfish, sucker
Snake-like	Streamlines the fish for long distances	Pacific lamprey
Vertical disk	Allows the fish to move easily between vertical plants and feed above or below	Pumpkinseed, crappie, bluegill
Large, spiny dorsal fin	Makes fish look larger, prevents predator attack from behind	Yellow perch
Coloration		
Light-colored belly	Camouflages so that predators have difficulty seeing it from below	Sockeye salmon, perch, sturgeon
Dark upper side	Camouflages so that predators have difficulty seeing it from above	Bluegill, crappie, flounder
Vertical stripes	Allows the fish to hide in vegetation	Tiger muskellunge, pickerel, bluegill
Spotted	Helps the fish hide in rocks and on the bottom	Rainbow trout, cutthroat trout
Mottled coloration	Helps the fish hide in rocks and on the bottom	Black crappie, sculpin, burbot
Reproduction		
Eggs deposited in nest on bottom	Hides eggs from predators, keeps them oxygenated	Bull trout, salmon, most minnows
Defends spawning territory	Eggs are protected by adults	Longnose dace, bass
Cavity spawners	Eggs are hidden from predators	Bullhead catfish
Eggs attached to vegetation	Eggs remain stable until hatching	Carp, perch, northern pike
Migrate to spawn in groups	Helps mix genes to maintain diversity in population	Burbot, grouper

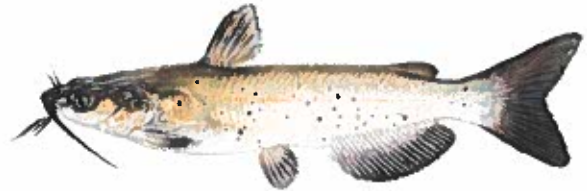


Fish Adaptation Cards

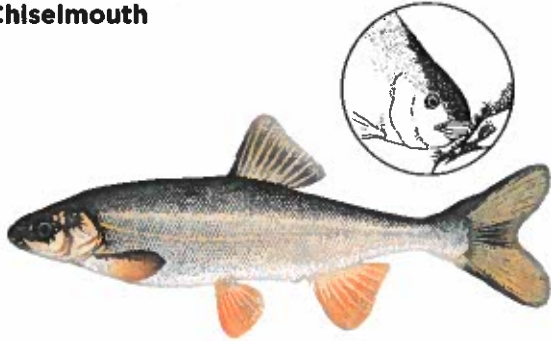
Mouth/Feeding:
sucker shaped mouth
Sturgeon



Mouth/Feeding:
elongated upper jaw
Channel catfish



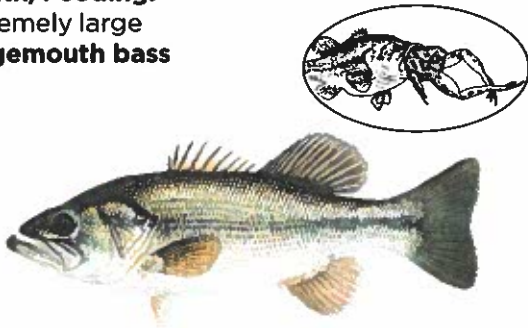
Mouth/Feeding: hard plate on lower jaw
Chiselmouth



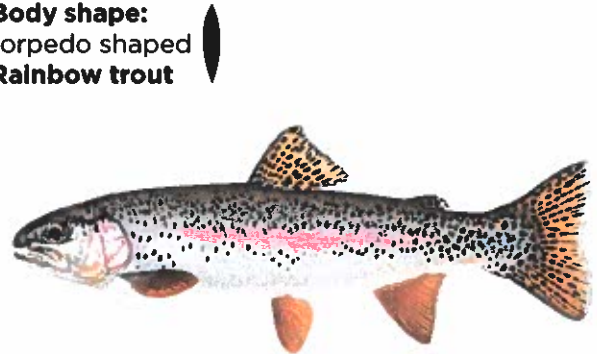
Mouth/Feeding:
duck-billed jaws
Northern pike



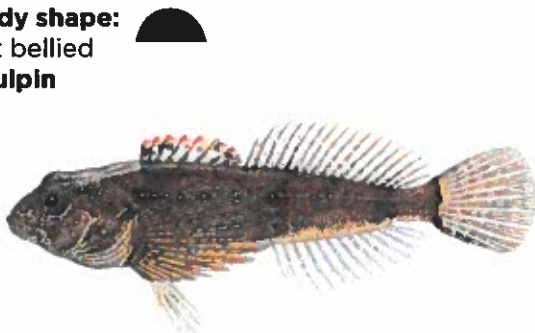
Mouth/Feeding:
extremely large
Largemouth bass



Body shape:
torpedo shaped
Rainbow trout



Body shape:
flat bellied
Sculpin



Body shape:
snake-like
Pacific Lamprey



Fish Adaptation Cards

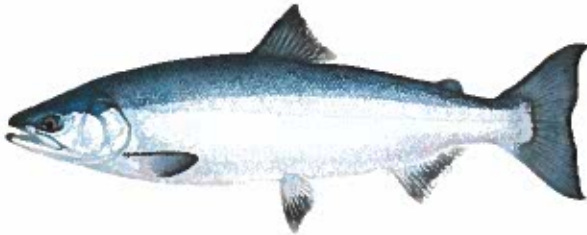
Body shape:
vertical disk
Bluegill



Body shape:
spiny dorsal fin
Yellow perch



Coloration:
light-colored belly
Salmon



Coloration:
Darker on top
Bluegill



Coloration:
vertical stripes
Tiger muskellunge



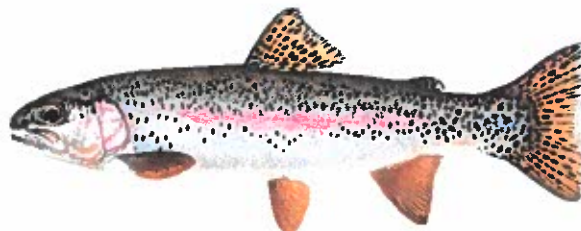
Reproduction: eggs deposited in bottom nests
Bull trout



Coloration:
mottled
Black crappie



Coloration:
spotted
Rainbow trout

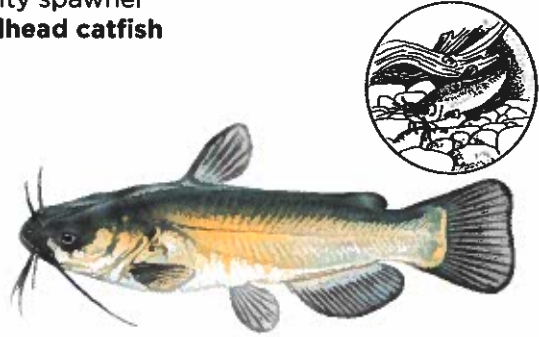


Fish Adaptation Cards

Reproduction:
defends spawning territory
Longnose dace



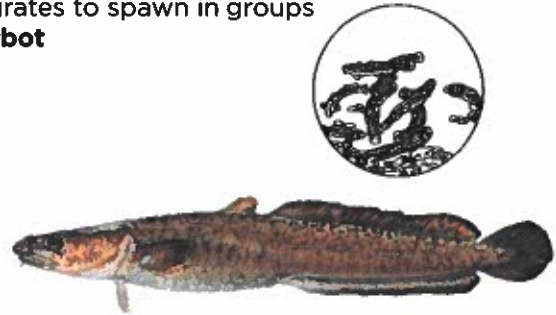
Reproduction:
cavity spawner
Bullhead catfish



Reproduction:
eggs deposited on vegetation
Northern pike



Reproduction:
migrates to spawn in groups
Burbot



Tackling Your Tackle Box

Summary

Students go “shopping” for fishing tackle for a particular species of fish. Without any information on their species, students choose tackle from a price list, figure their total spent and change from \$20. After receiving information about their species, students then go “shopping” for tackle again. Shopping lists are compared to see if knowledge about the species helped them make better shopping choices.

Objectives

Students will:

- select tackle appropriate for catching a particular type of fish
- describe how knowledge of fish characteristics leads to economical and effective choices of tackle box items
- use addition, subtraction and multiplication while working with decimals (money)
- work cooperatively in small groups

Materials

- tackle box full of various items (hooks, lines, bobbers, split shot sinkers, bait, jigs, etc.)
- *Tackling Your Tackle Box Price List*, two for each group of three or four students
- *Fish Information Cards*, one card for each group of students
- *Tackle Information Cards*, one card for each group of students to go with the appropriate fish card

Background

Anglers have a huge assortment of tackle options available at sporting goods stores. There are as many choices in tackle as there are types and sizes of fish. Making smart purchases can save an angler money and frustration when out enjoying a day fishing. It is helpful to learn a few things about the fish that you are hoping to catch - mouth size, food preferences, where it may be located in its habitat, and its typical size. Knowing these things will help in selecting the proper gear. No one item can guarantee that you will catch a fish, but proper gear can make a fishing trip more pleasant and successful. Here is some information on the tackle students will “shop” for in this activity.

Hooks: Hooks come in a variety of sizes and styles. Hooks need to be large enough to hold the bait, but small enough to fit in the fish’s mouth. Hook size 10, 8 and 6 work well for smaller-mouthed fish, such as

Grade Level

4-12

Subject Areas

Math, Science

Time

40-50 minutes

Vocabulary

bait, crankbait, fishing line, hook, jig, lure, spinner, spinnerbait, tackle

bluegill and trout. Larger hooks such as 2, 1, and 1/0, are required for larger fish such as walleye, northern pike and largemouth bass.

Fishing line: Fishing line comes in different sizes or “tests,” measured in pounds. The higher the pound-test the heavier or stronger the line. For example, 4-pound test line is appropriate for catching bluegill, trout and perch. The line won’t break unless there is four pounds or more of pull on the line. Fishing for northern pike calls for 12-pound test or higher. The line is stronger and more durable than lower test line that could break if tugged by larger fish.

Artificial Lures: Selecting fishing lures can be overwhelming with many different types. Each lure style comes in a dazzling variety of shapes, sizes and colors. Some of the more popular lures are listed below.

- **Jigs and jig heads** have a weighed head and a hook. A jigtail, made of feathers, hair or soft plastic, can be purchased separately and slid over the hook to make a tail. Jigs resemble natural fish food such as insects and small fish. They are lifted and lowered near the bottom. Feather jigs are used to catch smaller fish, like panfish. Twistertail jigs are used to catch all species.
- **Plastic worms** are commonly used to catch bass but other fish will also bite them. They are made of soft plastic and come in many shapes and sizes. Some contain scents attractive to fish. They don’t have hooks, so they are threaded onto a basic hook or another lure attached to a line. An easy way to use a plastic worm is to hook it to a plain jig head.
- **Spinners** have one or more blades that spin around a metal shaft. Fish are attracted to the flash and vibration of the revolving blades. Most have tails made of soft plastic or animal hair that resemble natural fish food such as insects. Common types are straight-line spinners and spinnerbaits. Spinnerbaits look like an open safety pin with a spinning blade on one end and a jig on the other. Spinners can be used to catch all species.



- **Diving lures and crankbaits** imitate baitfish with “lips” that cause them to dive and wiggle. The size and angle of the lip and the weight of the lure determine how deep the lure will travel. Crankbaits are great for attracting larger predatory fish that swim in deeper areas, such as northern pike, walleye and bass.
- **Surface lures** float on the surface of the water. They resemble insects or frogs and can be used for all species, especially sunfish, bass and northern pike. Some, called poppers, have flat or scooped-out fronts that splash as they are jerked across the water.
- **Live bait** can be worms purchased at the store or grasshoppers caught along the edge of a stream. Some live bait listed in this activity may be illegal or have restrictions in Idaho. Please check regulations before using live baits.

Procedure

1. Ask students what they think they would need if they wanted to go fishing. Brainstorm a list of items with your students. Write the list on the board. The list might include worms, fish eggs, fishing line, fishing rod, hooks, fishing lures, fish stringer, tackle box, etc.
2. Show the students a tackle box full of items. Display and describe what some of the items are called and their uses. A helpful hint—the larger the number size of a fish hook, the smaller the hook size. A size 1 hook is actually much larger than a size 10 hook.
3. Divide students into groups of three or four. Tell the students that they will be “shopping” for items to fill a tackle box. In particular, they will be shopping for hooks, line, live bait and fishing lures.
4. Give each group of students a *Tackling Your Tackle Box Price List* sheet. Tell the students that they have \$20.00 to spend on their tackle items. Each group needs to decide which items on the list to purchase to help them catch their target fish.
5. Assign each group a fish (bluegill, yellow perch, black crappie, rainbow trout, bullhead, walleye, smallmouth bass, largemouth bass, catfish, or northern pike). Have the students write down the fish species on the *Tackling Your Tackle Box Price List* sheet.
6. Have the students multiply the number of individual items selected by the price of each item and write the total in the cost line across from the item. They need to write the reason for the purchase in the space provided.
7. Remind students to add up the total cost of their purchases from each page and figure the change left over from their \$20.00.
8. Ask a spokesperson from each group to present what they purchased, what it cost and how much money they had left over. How did the group decide on which items to purchase? How were they sure of their decisions? Have the students set aside the worksheets to refer to them later.
9. Ask the students what fish species they were targeting for their fishing trip. Would knowing some information about their fish have been helpful in purchasing the correct tackle items? Hand out the appropriate *Fish Information Card* to each group of students. Have them read the information within their group.
10. Hand out a second *Tackling Your Tackle Box Price List* to each group. Have the students repeat the shopping exercise with the information on their fish species in mind, again with \$20.00 to spend.
11. Have each group compare the second price list to their first price list. How do the shopping lists differ? Was it easier to decide what to buy with information on the fish species?
12. Tell the students that you have information on the tackle recommended for catching each species. Hand out the appropriate *Tackle Information Card* to each group.
13. Ask the students to compare what they purchased with the items on the *Fish Tackle Card*. How did they do? Did they spend their money more wisely on the first shopping trip or the second shopping trip? Have each group report to the class about their experiences.

Evaluation

1. Evaluate each group’s presentation after the second shopping trip. Presentations should include:
 - Name of fish species they were buying tackle for
 - Differences in what was purchased after receiving more information about their species
 - List any items purchased and money spent on tackle not suited to their species
2. Collect price list forms and check for correct computations.







Adapted from: MinnAqua, Minnesota DNR © 2010






Names: _____

Fish Species: _____

Tackling Your Tackle Box Price List

Item	Price	Number	Total Cost	Why did you choose this item?
Hooks 				
10 Hooks, size 10	\$1.50			
10 Hooks, size 8	\$1.50			
10 Hooks, size 6	\$1.50			
10 Hooks, size 2	\$1.50			
10 Hooks, size 1	\$1.50			
10 Hooks, size 1/0	\$1.50			
Line 				
4-pound Test Line	\$5.00			
6-pound Test Line	\$5.00			
10-pound Test Line	\$6.00			
12-pound Test Line	\$6.00			
20-pound Test Line	\$7.00			
Jigs and Plastic Baits 				
Jig Head, 1/16 oz.	\$0.25			
Jig Head, 3/8 oz.	\$0.25			
Jig Head, 1 oz.	\$0.25			
				
Jig Tail, 2 inches	\$0.20			
Jig Tail, 3 inches	\$0.20			
Jig Tail, 4 inches	\$0.20			
Plastic Worm, 5 inches 	\$0.35			
Spinners				
Straight-line Spinner, size 0	\$2.60			
Spinnerbait 				
Spinnerbait, 1/16 oz.	\$2.00			
Spinnerbait, 3/8 oz.	\$3.50			
Spinnerbait, 1 oz.	\$5.50			
Total Cost Page 1				

Item	Price	Number	Total Cost	Why did you choose this item?
Diving Lures				
Crankbait, 2 inches, shallow runner	\$2.50			
Crankbait, 3 inches, shallow runner	\$3.80			
Crankbait, 4 inches, shallow runner	\$4.80			
Crankbait, 3 inches, deep runner	\$3.80			
Crankbait, 4 inches, deep runner	\$4.80			
Crankbait, 5 inches, deep runner	\$6.00			
Crankbait, 7 inches, deep runner	\$7.00			
Surface Lures 				
Surface Lure, 2 1/2 inches, 3/8 oz.	\$3.50			
Surface Lure, 7 1/2 inches, 2 1/2 oz.	\$5.50			
Spoons 				
Spoon, 1 3/8 inches, 3/16 oz.	\$2.30			
Spoon, 2 7/8 inches, 3/4 oz.	\$4.80			
Spoon, 5 3/8 inches, 3 1/4 oz.	\$5.80			
Live Bait 				
Wax Worms or Grubs, 1 dozen	\$1.50			
Worms, 1 dozen	\$2.50			
Nightcrawlers, 1 dozen	\$2.50			
Leeches, 1 dozen	\$2.80			
Crickets, 1 dozen	\$2.80			
Crayfish, 5	\$2.75			
Crappie Minnows, small, 1 scoop	\$2.50			
Fathead Minnows, medium, 1 scoop	\$2.50			
Sucker or Shiner Minnows, large	\$6.80			
Total Cost Page 2				
Total Cost Page 2				
+ Total Cost Page 1				
= Total Cost Both Pages				
Amount of Change Left Over from \$20.00				

Fish Information Card

Rainbow Trout



Mouth Size: Small to medium

Fish Weight: Light

Fish Length: Short to medium

Primary Habitat: Shallow to mid-deep streams

Food Preferences: Insects, small fish

Fish Information Card

Black Crappie



Mouth Size: Small to medium

Fish Weight: Light

Fish Length: Short

Primary Habitat: Shallow to mid-deep streams

Food Preferences: Small fish, worms

Fish Information Card

Yellow Perch



Mouth Size: Small

Fish Weight: Light

Fish Length: Short

Primary Habitat: Shallow to mid-deep streams, lakes

Food Preferences: Small fish, worms, leeches, insects

Fish Information Card

Bluegill



Mouth Size: Small

Fish Weight: Light

Fish Length: Short

Primary Habitat: Shallow water

Food Preferences: Insects, worms, leeches

Fish Information Card

Bullhead



Mouth Size: Small to medium

Fish Weight: Light

Fish Length: Short to medium

Primary Habitat: Shallow to mid-deep water, likes bottoms

Food Preferences: Insects, worms, leeches, crayfish, snails

Fish Information Card

Catfish



Mouth Size: Large

Fish Weight: Heavy to very heavy

Fish Length: Long

Primary Habitat: Shallow to deep water, likes big rivers

Food Preferences: Frogs, crayfish, large fish, decaying matter

Fish Information Card

Smallmouth Bass



Mouth Size: Medium

Fish Weight: Medium

Fish Length: Medium

Primary Habitat: Medium to deep water

Food Preferences: Medium fish, insects, crayfish

Fish Information Card

Largemouth Bass



Mouth Size: Large

Fish Weight: Medium to heavy

Fish Length: Medium to long

Primary Habitat: Shallow to medium water

Food Preferences: Frogs, medium fish, crayfish

Fish Information Card

Walleye



Mouth Size: Medium to large, with teeth

Fish Weight: Medium to heavy

Fish Length: Medium to long

Primary Habitat: Deep water

Food Preferences: Medium to large fish

Fish Information Card

Northern Pike



Mouth Size: Large, with teeth

Fish Weight: Heavy to very heavy

Fish Length: Long

Primary Habitat: Shallow to deep water

Food Preferences: Large fish

Tackle Information Card

Walleye



Hook Size: 2

Line Size: 6-pound test

Lures: Jig, crankbait, spoon

Lure Size: $\frac{3}{8}$ oz. jig with 3-inch tail, 4-inch deep diver crankbait, $\frac{3}{4}$ oz. spoon

Live Bait: Nightcrawlers, leeches, 2-4 inch minnows

Tackle Information Card

Northern Pike



Hook Size: 1/0 or larger

Line Size: 12-pound test or higher

Lures: Jig, spinnerbait, crankbait, surface lure, spoon

Lure Size: 1 oz. jig with 4-inch tail, 1 oz. spinnerbait, 7-inch deep runner crankbait, $2\frac{1}{2}$ oz. surface lure, $3\frac{1}{4}$ oz. spoon

Live Bait: 6-12 inch minnows

Tackle Information Card

Rainbow Trout



Hook Size: 6

Line Size: 4-pound test

Lures: Jig, straight-line spinner, crankbait, spoon

Lure Size: $\frac{1}{16}$ oz. jig with 2-inch tail, size 0 spinner, 2-inch shallow runner crankbait, $\frac{3}{16}$ oz. spoon

Live Bait: Worms, hellgrammites

Tackle Information Card

Black Crappie



Hook Size: 6

Line Size: 4-pound test

Lures: Jig, spinnerbait

Lure Size: $\frac{1}{16}$ oz. jig with 2-inch tail, $\frac{1}{16}$ oz. spinnerbait

Live Bait: Small minnows, wax worms

Tackle Information Card

Yellow Perch



Hook Size: 8

Line Size: 4-pound test

Lures: Jig, spinnerbait

Lure Size: $\frac{1}{16}$ oz. jig with 2-inch tail, $\frac{1}{16}$ oz. spinnerbait

Live Bait: Small minnows, worms, wax worms, leeches, crickets

Tackle Information Card

Bluegill



Hook Size: 10

Line Size: 4-pound test

Lures: Jig, spinnerbait

Lure Size: $\frac{1}{16}$ oz. jig with 2-inch tail, $\frac{1}{16}$ oz. spinnerbait

Live Bait: Worms, wax worms, leeches, crickets, grasshoppers

Tackle Information Card Bullhead



Hook Size: 2

Line Size: 4-pound test

Lures: Not usually used

Live Bait: Worms, leeches, crayfish, snails, crickets

Tackle Information Card Catfish



Hook Size: 1/0

Line Size: 10-pound test or higher

Lures: Not usually used

Live Bait: Frogs, nightcrawlers, crayfish, live or dead minnows (small minnows for smaller fish, 6-12-inch minnows for big catfish)

Tackle Information Card Smallmouth Bass



Hook Size: 1

Line Size: 6-pound test

Lures: Jig, plastic worms, spinnerbait, crankbait, surface lure

Lure Size: $\frac{3}{8}$ oz. jig with 3-inch tail, hook with 4-inch plastic tail, $\frac{3}{8}$ oz. spinnerbait, 3-inch shallow or deep runner crankbait, $\frac{3}{8}$ oz. surface lure

Live Bait: Crayfish, 2-4-inch minnows, nightcrawlers, hellgrammites

Tackle Information Card Largemouth Bass



Hook Size: 1/0

Line Size: 10-pound test or higher

Lures: Jig, plastic worms, spinnerbait, crankbait, surface lure

Lure Size: $\frac{3}{8}$ oz. jig with 3-inch tail, hook with 4-inch plastic tail, $\frac{3}{8}$ oz. spinnerbait, 3-inch shallow or deep runner crankbait, $\frac{3}{8}$ oz. surface lure

Live Bait: Frogs, 3-6-inch minnows, crayfish, nightcrawlers