Title: **Is It a Trout?**		
Overview:	At the conclusion of this lesson students will be able to • Use a dichotomous key to identify game fish found in the Potomac River (or other cold water habitats). • Use their knowledge of external fish anatomy to construct their own dichotomous key.	
Grade:	Upper elementary	
Standards	NGSS	4-LS1-1 – Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction
	Core Idea	From Molecules to Organisms: Structure and Processes
	Practices	• Constructing explanations • Obtaining, evaluating, and communicating information
	Cross-Cutting Concept	• Structure and function
	Reading, Writing and Social Studies	• CCSS.ELA/Lit. RI.4-5.4 – Determine the meaning of general or domain specific words or phrases in a text relevant to a grade appropriate topic or subject area. • CCSS.ELA/Lit.SL.4-5.1 - Engage effectively in a range of collaborative texts, discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade appropriate topics and building on others' ideas and expressing their own clearly.
	Environmental Literacy	

	Description	Resources

Engage	Before beginning this activity, it is a good idea if the students have studied or reviewed the external anatomy of fish, especially the names and locations of the various fins.
	• Ask students whether any of them have been fishing. Did they try to identify what they caught? How did they identify it?
	  • Tell students that one way scientists identify something is to use a dichotomous ("divided into two parts") key.
	  ○ The key always offers them a choice between two statements at each step, based on an observable characteristic.
	  ○ Their choice will determine the next step.
	• As an example, ask them how they would divide the class into	

	two groups, based on an observable characteristic. ○ If it is a coed school, the obvious answer would be males and females. ○ Then taking one of the groups, how would they further divide them into two groups (For example, students who have brown hair and those that don't) and so on. ○ Have them try this to develop a dichotomous key of their classmates	
Explore	Once they understand how a dichotomous key works, tell them that they are going to pretend that they are going to go fishing in the upper Potomac River which is a cold water river. • They are going to have to be able to identify any fish they catch in order to comply with the fishing regulations • They will have to use their knowledge of fish anatomy and a dichotomous key to identify several species of fish found in the Potomac River. • Hand out the "Name that Fish" worksheet and have students work independently to identify the fish. Have them write the answers on their worksheet.	"Name That Fish" worksheet External anatomy of a fish
Explain	• Once everyone has finished, go over the steps that they used to identify each fish (This is because some students may recognize several species and not use the key to identify them!). • Were there any places where they had trouble deciding where to go next? Have them brainstorm how they would improve the key to make it work better.	
Extend	• Have students create a dichotomous key for species of fish found in different habitats. Students will have to do some research at the library or on the Internet to find pictures and descriptions. Some suggestions might be: ○ Chesapeake Bay – striped bass, killifish, pipefish, menhaden, silversides, lined seahorse, etc. ○ Atlantic Coast – croaker, black and red drum, sea bass, bluefish, spot, Spanish and king mackerel, etc. • If possible, take a field trip to a cold water stream or lake and have the students use their dichotomous keys to identify fish.	
Evaluate	Evaluation based on accuracy of identification	

Teacher Background:

A dichotomous key is a tool that is usually used to identify living things. The key is called dichotomous ("divided into two parts") because at each step the user must make a choice between two alternatives, based on some characteristic of the organism to be identified. Some keys are fairly simple, using easily observed external characteristics, and covering only a limited number of easily identifiable species. Other keys are quite complex and often require extensive

knowledge of both internal and external anatomy. Sometimes only an expert can identify an organism down to the species level.

Given the same group of organisms to be identified, the key can be constructed in a number of ways, based on different characteristics, but resulting in the correct identification.

Name that Fish – Student Worksheet

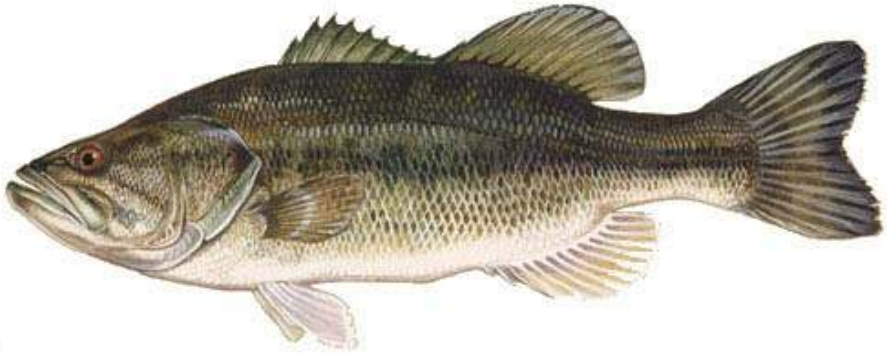
You and your classmates have been learning about the fish found in cold water streams in Maryland, especially trout. You are hoping to take a field trip and you have all been wondering how you could identify the fish. You really want to know how to tell the various species of trout apart. When you ask your teacher, she replies that she is not sure either – that you will have to use a "dichotomous key" to find out.

She explains that a dichotomous key is a way of identifying living things by looking at different characteristics. "Dichotomous" simply means "divided into two parts". At each step you will have two choices; you will have to decide which choice best describes the fish you are trying to identify. Your decision will determine your next step.

How to use the dichotomous key:

- Before beginning, you will need to review external fish anatomy, especially the names of the fins.
- Start with the first fish. Using the key, read the first pair of statements. You will have to decide whether you think the fish has one dorsal fin or two. Once you have decided, follow the dotted line to the right to find a new number.
- Go back to the left side until you find the correct number. Again, you will have to make a decision and then follow the dotted line to the right until you find a new number or name of a fish.
    - If you see another number, go to the pair of steps with that number and continue making choices until you have identified the fish.
    - If you find the name of a fish, you have identified the fish.
- Repeat the process until you have identified all nine fish.

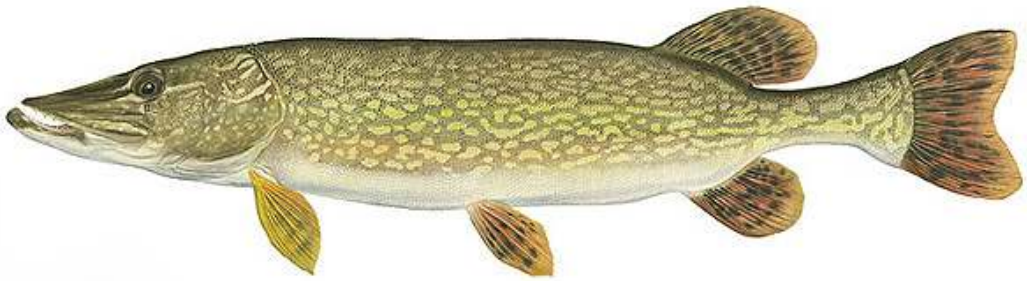
Fish Name:_____



Fish Name:_____

Fish Name:_____

Fish Name:_____



Fish Name:_____

Fish Name:_____

Fish Name:_____

Fish Name:_____

Fish Name:_____

Dichotomous Key for Cold Water Game Fish

1a. Fish has one dorsal fin……2

1b. Forked two dorsal fins……4

2a. Fish is spotted……..northern pike

2b. Fish is striped……3

3a. Fish has dark stripes……tiger muskie

3b. Fish has light stripes……muskellunge

4a. Fish does not have spots……5

4b. Fish has spots……6

5a. Fish has large first dorsal fin……..walleye

5b. Fish has large second dorsal fin……...largemouth bass

6a. Fish has light spots……brook trout

6b. Fish has dark spots……7

7a. Fish has more spots near or on tail……..cutthroat trout

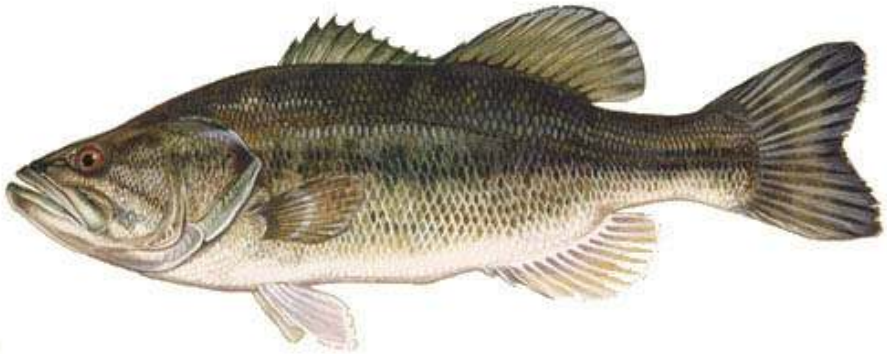
7b. Fish does not have more spots on or near tail……..8

8a. Fish has light area in middle……rainbow trout

8b. Fish does not have light area in middle……brown trout

Answers

Fish Name: *muskellunge*



Fish Name: *largemouth bass*

Fish Name: *rainbow trout*

Fish Name: *brook trout*

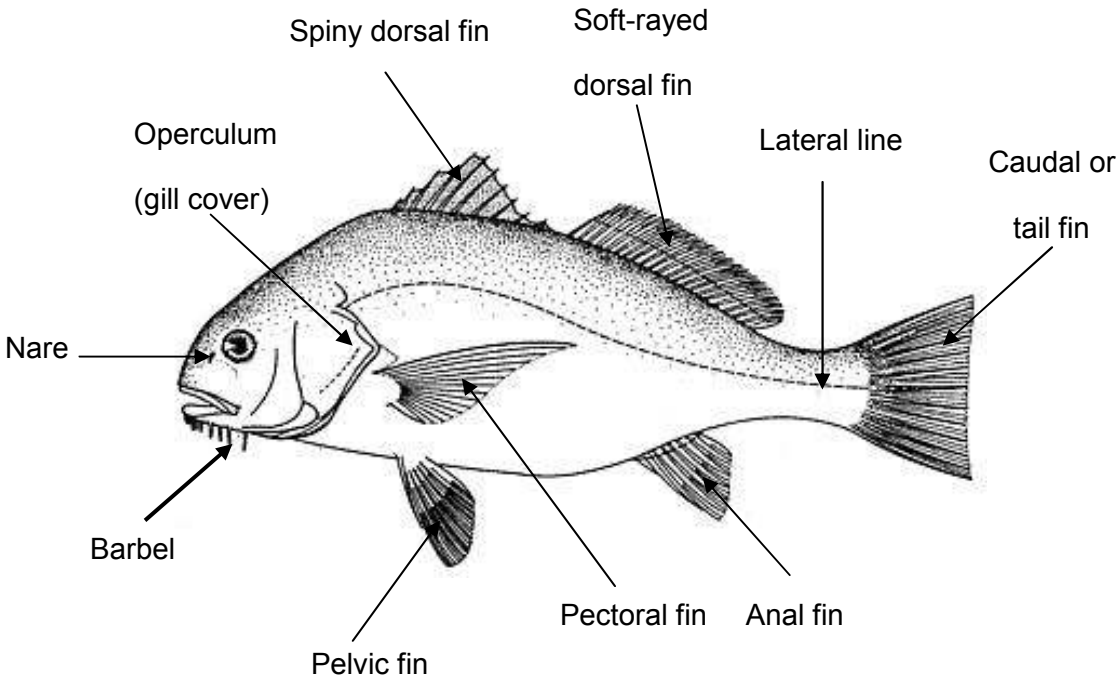
Fish Name: *northern pike*

Fish Name: *walleye*

Fish Name: *cutthroat trout*

Fish Name: *tiger muskie*

Fish Name: *brown trout*



External Anatomy of a Fish