

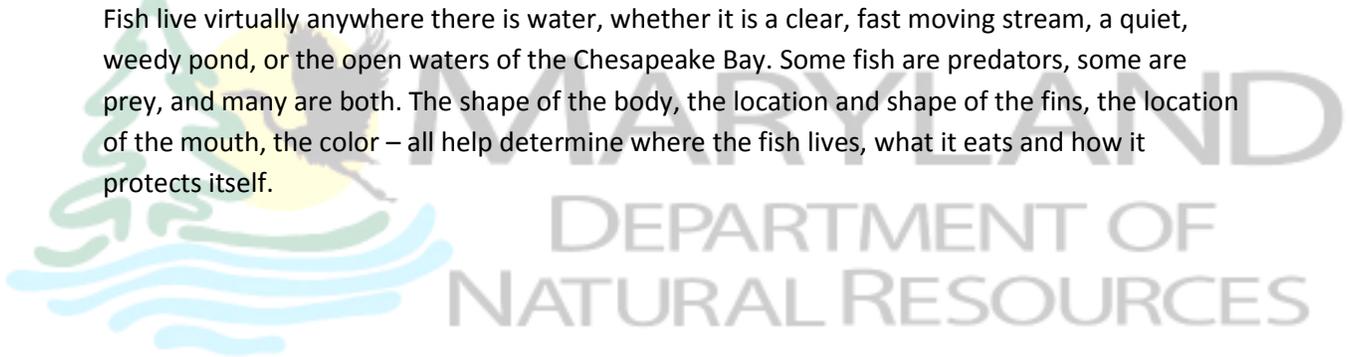
Title: <b>Fish Clues</b>		
Overview:	<p>At the conclusion of this lesson students will be able to</p> <ul style="list-style-type: none"> <li>• Explain that the anatomical shape of a fish's body, fins, mouth, and so on, is related to the function of that part.</li> <li>• Make deductions concerning the habitat, diet and possible predator/prey relationships of a fish based on external characteristics</li> <li>• Describe basic information about several species of trout.</li> </ul>	
Grade:	Elementary	
Standards	NGSS	<ul style="list-style-type: none"> <li>• 2-LS4-1 – Make observations of plants and animals to compare the diversity of life in different habitats.</li> <li>• 3-LS3-2 – Use evidence to support the explanation that traits can be influenced by the environment.</li> <li>• 3-LS4-3 – Construct an argument with evidence that in any particular environment some organisms can survive well, some survive less well and some cannot survive at all.</li> <li>• 4-LS1-1 – Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior and reproduction.</li> </ul>
	Core Idea	From Molecules to Organisms: Structure and Processes
	Practices	<ul style="list-style-type: none"> <li>• Constructing explanations</li> <li>• Engaging in arguments from evidence</li> <li>• Obtaining, evaluating, and communicating information</li> </ul>
	Cross-Cutting Concepts	<ul style="list-style-type: none"> <li>• Structure and function</li> </ul>
	Reading, Writing and Social Studies	<ul style="list-style-type: none"> <li>• CCSS.ELA/Lit.WI.3-5.1 - Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.</li> <li>• CCSS.ELA/Lit.RI.3-5.1 - Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.</li> <li>• 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.</li> </ul>
	Environmental Literacy	

	Description	Resources
Engage	<p>This would be a great introduction to “Trout in the Classroom” and should be done before the students have studied or know anything about trout.</p> <p>Write the words “Form follows function” on the board and ask the students if they know what it means. Have them try to come up with a working definition.</p> <ul style="list-style-type: none"> <li>• If they are having trouble, try using the example of birds’ feet. Why do ducks and hawks have different shaped feet? What do the feet tell them about the bird?</li> </ul>	
Explore	<ul style="list-style-type: none"> <li>• Tell them that they are going to use their powers of observation and deductive reasoning to come to similar conclusions about fish.</li> <li>• Hand out one fish card and a copy of Fish Adaptations to each student. <ul style="list-style-type: none"> <li>○ Tell them that they know nothing about the fish – not even the name. Remind them that the fish are not to scale, so there is no way to know how large it is.</li> <li>○ They are to study their fish and using the Fish Adaptations, they are to make notes describing where they think the fish lives, how it feeds and what it might feed on, how it might protect itself and anything else they can deduce.</li> </ul> </li> </ul>	<p>Fish cards</p> <ul style="list-style-type: none"> <li>• Make enough copies for each student to have one</li> <li>• Cut the cards apart; you might want to laminate them so they can be used again</li> </ul> <p>Fish Adaptations – one copy per student</p> <p>Fish External Anatomy diagram (if students haven’t previously studied fish anatomy) – to save paper you might want to scan the page and bring it up using an LCD projector or Smart Board.</p>
Explain	<p>Once they have finished, divide the class into 3 groups – one group for Fish #1, one for Fish #2, and one for Fish #3</p> <ul style="list-style-type: none"> <li>• Have the students work as a group to summarize their notes into one document. Remind them that they are to report on where they think the fish lives, how it feeds and what it might feed on, how it might protect itself and anything else they can deduce.</li> <li>• Remind them that it is all right if they do not all agree. Be sure to include any disagreements in the document (i.e., “Three of us thought..., but two of us thought...”)</li> </ul> <p>Have the groups select a spokesperson to report their results to the class</p>	
Extend	<ul style="list-style-type: none"> <li>• Now it is time to find out how good their powers of observation and deductive reasoning are!</li> <li>• Tell the students the name of each numbered fish so they can</li> </ul>	Computers with Internet connection

	<p>identify the fish they were assigned.</p> <ul style="list-style-type: none"> <li>○ Fish #1 – brown trout</li> <li>○ Fish #2 – brook trout</li> <li>○ Fish #3 – rainbow trout</li> </ul> <ul style="list-style-type: none"> <li>● Using the Internet, they are to research their fish and write a paragraph comparing their deductions with their research.  <a href="http://www.dnr.state.md.us/fisheries/fishfacts/index.asp">www.dnr.state.md.us/fisheries/fishfacts/index.asp</a> <ul style="list-style-type: none"> <li>○ They are to indicate how accurate their deductions were.</li> <li>○ Be sure to tell them that it is all right not to be entirely correct.</li> </ul> </li> </ul>	
Evaluate	Evaluation based on reasoning	

**Teacher Background:**

A basic principle of biology is that “form follows function”; in other words, the anatomy of an animal, both internal and external, is related to its behavior. Nowhere is this better illustrated than in fish. Fish come in all sizes, shapes and colors, but this variety is not random. Fish live virtually anywhere there is water, whether it is a clear, fast moving stream, a quiet, weedy pond, or the open waters of the Chesapeake Bay. Some fish are predators, some are prey, and many are both. The shape of the body, the location and shape of the fins, the location of the mouth, the color – all help determine where the fish lives, what it eats and how it protects itself.



# Fish Cards



Fish #1



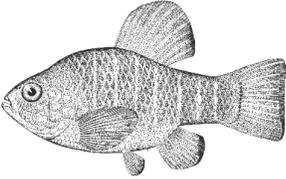
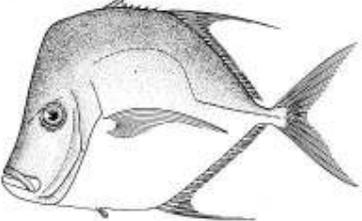
Fish #2

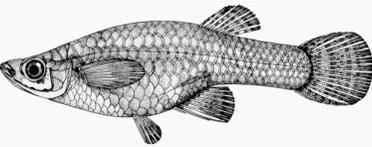
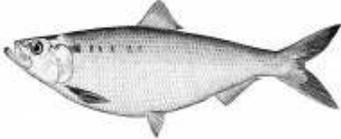


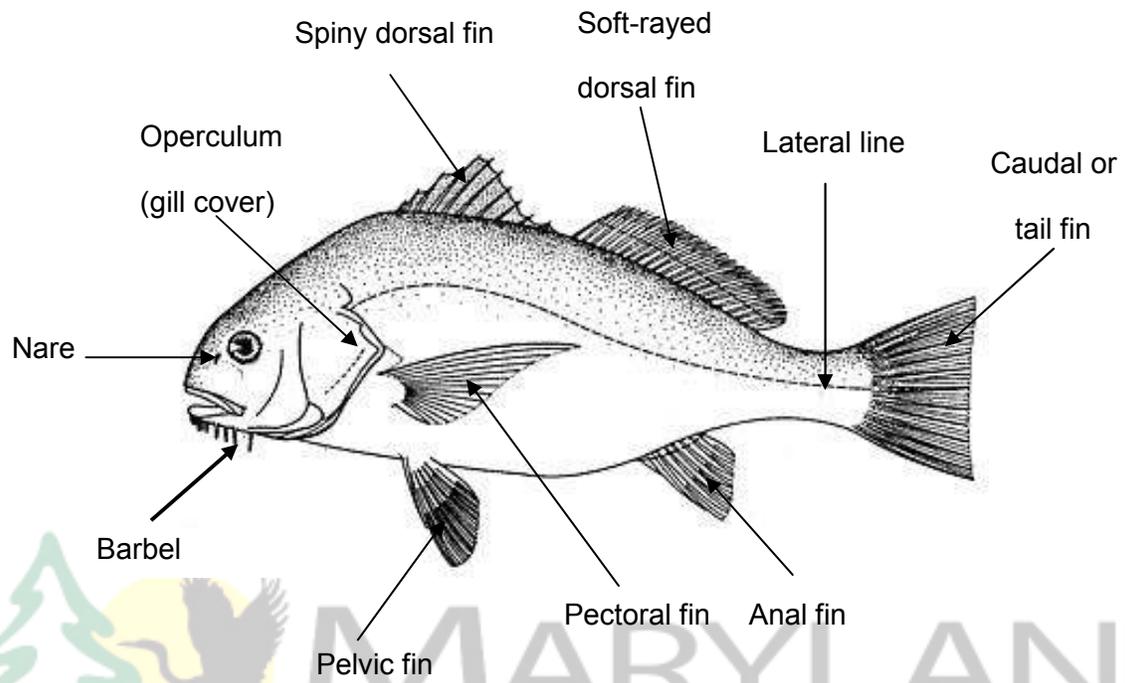
Fish #3



## Fish Adaptations (Note: fish are not to scale)

	Body Shape	Tells You That...
	Streamlined slender body	Steady swimmers, usually found in open water or in water that has a current
	Flattened from side to side	Short bursts of speed and able to change direction quickly; tend to live where there is cover to hide in
	Flattened from top to bottom	Short bursts of speed
	<b>Shape of Caudal (Tail) Fin</b>	<b>Tells You That...</b>
	Square caudal fin	Somewhat slow swimmers; able to increase speed and change direction quickly
	Forked caudal fin	Fairly fast swimmers; often found in fish that live in moving water
	Extremely forked caudal fin	Tend to be very fast swimmers but limited ability to change direction

	<b>Location and Size of Mouth</b>	<b>Tells You That...</b>
	Mouth located at front of snout; jaws are same size	Feeds anywhere in the water
	Mouth located underneath snout; upper jaw extended	Usually feeds on food found on bottom
	Mouth located above snout; lower jaw extended	Usually feeds on food floating on the surface of the water
	<b>Coloration</b>	<b>Tells You That...</b>
	Countershading – dark on back, light on belly	Usually found in a fish found in open water
	Stripes	Often found in a fish that hides in weed beds
	Spots	Often found in a fish that lives in clear water with sunlight and shadows



## External Anatomy of a Fish

