Close

READING TOOLBOX

Comparisons Have students work in small groups to make a table that compares each type of fish that they have studied in this section. They should write *Jawless fish, Cartilaginous fish,* and *Bony fish* across the top of their table. The titles of the rows down the side of the table will vary from group to group. Have groups fill in the table with information that they have learned. Each group can then present its table to the class. Have individual students copy their group's table and place it in their portfolios.

LS Logical

Formative Assessment

What adaptive advantage is provided by the operculum?

A. It increases the fish's ability to capture prey. (Incorrect. The operculum is a gill cover.)

B. It increases the buoyancy of bony fishes. (Incorrect. Buoyancy is controlled by the swim bladder.)

C. It increases the sensitivity of the lateral line. (Incorrect. The operculum is not a sense organ.)

D. It allows stationary bony fishes to move water over their gills. (Correct! The operculum and its nearby muscles move water over the gills even when a bony fish is not actively swimming.)



Figure 8 Scientists thought coelacanths had been extinct for millions of years, until one was caught in 1938 off the coast of Africa. **How does a coelacanth differ from a ray-finned fish?**

teleost (TEL ee ahst) a member of a group of ray-finned fishes that have a caudal fin, scales, and a swim bladder

READING TOOLBOX

Concept Map After reading this section, finish filling in the concept map that you made at the beginning of the chapter.

Ray-finned Fishes Most bony fishes are ray-finned fishes. Their fins are supported by bony structures called *rays.* **Teleosts,** such as the yellow perch shown in the feature Up Close, are the most advanced type of ray-finned fish. Teleosts have very mobile fins, thin scales, and completely symmetrical tails. About 95% of all living fish species are teleosts. One reason for the success of teleosts is their ability to suck food toward their mouth. The fish can protrude its upper jaw forward in order to grasp food.

Lobe-Finned Fishes Only seven species of lobe-finned fishes exist today. One species is the coelacanth, shown in **Figure 8.** The other six species are lungfishes. The paired fins of lobe-finned fishes are very different from the fins of ray-finned fishes. The fins of many lobe-finned fishes are fleshy, muscular structures supported by bones. These bones are connected by joints, like the joints between the bones in your hand. Bony rays are found only at the tips of each lobed fin. Muscles within each fin can move the bony rays independently of one another. A lobe-finned fish was the direct ancestor of amphibians and all other land vertebrates.

Reading Check ***How does the fin of a teleost compare with the fin of a lobe-finned fish?***

Section 2 Review

KEY IDEAS

1. **Compare** jawless fishes with other fishes.
2. **List** the materials that make up the endoskeleton of bony fishes and sharks.
3. **Summarize** how the swim bladder can be viewed as an energy-saving mechanism.

CRITICAL THINKING

4. **Evaluating Conclusions** A fish specimen has rough skin, several rows of teeth, and no opercula. A student infers, based on these traits, that the fish has a swim bladder. Explain why you agree or disagree with this conclusion.
5. **Making Inferences** Propose an explanation for the reason why cartilaginous skeletons are not a characteristic of land-living vertebrates.

METHODS OF SCIENCE

6. **Forming a Hypothesis** Hagfishes do not have swim bladders. Write a hypothesis that could explain why the lack of a swim bladder is an adaptive advantage for hagfishes.

Answers to Section Review

1. Jawless fish, unlike other fishes, have no jaws, scales, paired fins, or vertebral columns. Like other fishes, jawless fish have endoskeletons and gills.
2. The endoskeleton of bony fishes is made of bone and the endoskeleton of sharks is made of cartilage.
3. A fish can maintain a particular depth in the water by adjusting the amount of gas in the swim bladder rather than by using muscular force.
4. Disagree; these are the characteristics of cartilaginous fishes, which do not have a swim bladder.
5. Cartilage is a light yet strong fibrous connective tissue. Its flexibility makes it unsuitable as the supporting framework for a land-living vertebrate skeleton. The buoyant force of water reduces the gravitational force exerted on the cartilaginous skeleton of fish thus making it more suited to water-living vertebrates.
6. Sample answer: Hagfish are bottom-dwelling fish that do not need to be buoyant. Therefore, the lack of a swim bladder allows hagfishes to remain at the ocean bottom without much effort.