

FishOn! Lesson Plan



Fish Adaptation

Overview:

Students will learn about how structural and behavioral adaptations help fish survive in their aquatic environments and demonstrate their knowledge by selecting a habitat and designing a fish well adapted to survival there.

Students will be able to:

- Define and differentiate between structural and behavioral adaptations.
- Identify specific examples of structural and behavioral adaptations across fish species.
- Explain how these adaptations help fish survive in their habitats.

Next Generation Science Standards

Practices

- Constructing Explanations

Core Ideas

- LS2: Ecosystems: Interactions, Energy, and Dynamics
- ESS2: Earth's Systems

Crosscutting Concepts

- Energy and Matter: Flows, Cycles, and Conservation

Procedure:

Step 1: Begin by defining what an **adaptation** is. **Adapt** is another word for **change**. Students have likely needed to **adapt** at some point in their lives, whether by moving to a new school, adding another sibling to their family, or another life event.

Think-Pair-Share: Have students think of a time they needed to adapt and share their example with a friend.

When we talk about adaptation in our own lives, we are talking about changes that we have made in our lifetime, from birth until now. When scientists talk about animal adaptations, they are talking about physical or behavioral changes in a species made over thousands or millions of years. These changes, or **adaptations**, allow animals to survive better in certain habitats.



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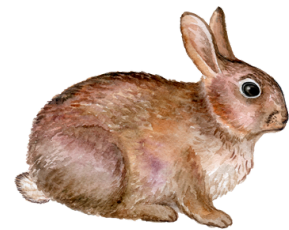


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Step 2: Inform the class that you will first focus on **structural adaptations**, meaning how an animal looks. As a class, review two or three examples of animals that have structural adaptations that help them survive.



Ex. Giraffes have long necks to help them reach leaves on tall trees.



Ex. Cottontail rabbits have brown fur that help them camouflage, or blend in to the ground.

Ask students to come up with their own examples. They can focus on the animal's body parts, or their colors and patterns. Choose a few students to share their examples with the class.

Step 3: Next, ask students to think about **behavioral adaptations**, meaning the way an animal acts. Review two or three examples of behavioral adaptations as a class.



Ex. Brown bears hibernate through the winter to conserve energy.



Ex. Monarch butterflies migrate to warmer temperatures in the fall.

Have students come up with their own examples of behavioral adaptations. Choose a few students to share with the class.



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Fish Adaptation

Step 4: Now that students understand the different types of adaptations, pass out the **Fish Adaptations** card sheet. Students can be broken into small groups and assigned certain adaptations to research, or the key below can be reviewed as a class. Students can use the **Fish Adaptations Notes** sheet to keep track of their findings.

Key:

The **mouth shape** of a fish gives clues as to what the fish eats and how.

Terminal	Terminal mouths are the most common among fish. They typically feed in midwater. Many have teeth and prey on other fish or aquatic creatures.
Superior	Superior mouths are pointed upwards and designed for feeding at the surface. Some of these fish are ambush predators, and lay waiting for prey to pass by. Others eat algae and insects on top of the water.
Inferior	Inferior mouths are pointed downward. Fish with this mouth tend to feed on the bottom surface of their habitat. Some of these fish scavenge for dead fish or invertebrates, while others eat plant material.
Protrusible	A protrusible mouth allows fish to extend their mouth out quickly - this is often used to catch fast moving prey or as a territorial defense mechanism.

The **body shape** of a fish gives clues as to where the fish lives and how it swims.

Fusiform	Fusiform bodied fish are streamlined for fast, continuous swimming in open water.
Compressiform	Compressiform bodied fish are capable of short bursts of speed, but are not suited to long distance swimming.
Depressiform	Depressiform bodied fish tend to be bottom dwellers, and propel themselves forward by moving their fins up and down, similar to a bird.
Elongate	Elongate fish are slender and eel-like. This body shape is ideal for moving in and out of narrow spaces.





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The **tail shape** of a fish gives clues as to how it swims.

Rounded	Rounded tails usually mean the fish is a fairly slow swimmer, but can swim far and for a long period of time.
Truncate	Truncate tails also indicate a slower fish, but the large surface area allows the fish to turn and move about easily.
Forked	Forked tails are typically found on fish that are active, continual swimmers.
Lunate	Lunate tails lend speed to the fish - these are some of the fastest swimmers. They cannot turn easily or swim backwards, but can travel long distances and have bursts of explosive speed.

The **reproductive behavior** of a fish gives clues as to how it ensures the survival of its young.

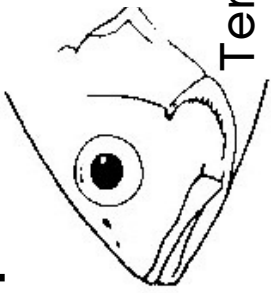
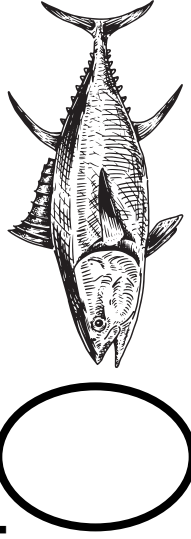
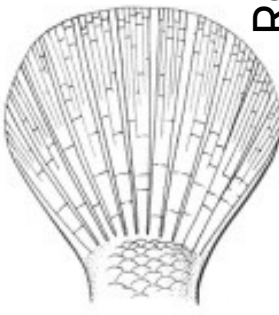
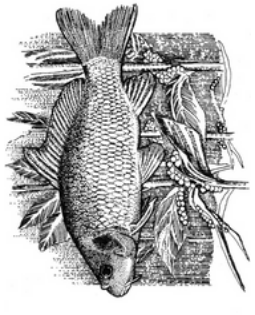
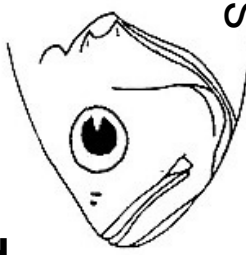
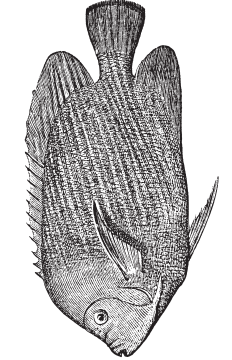
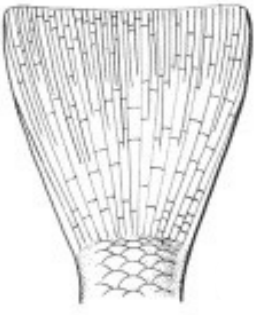
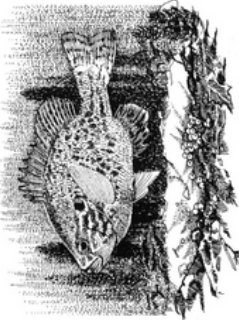
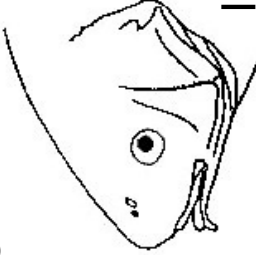
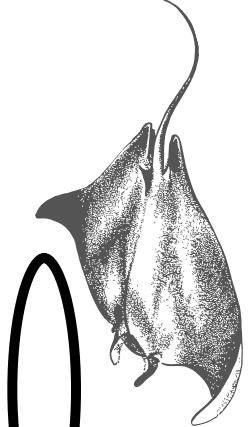
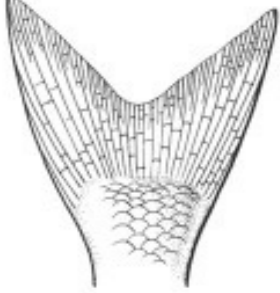
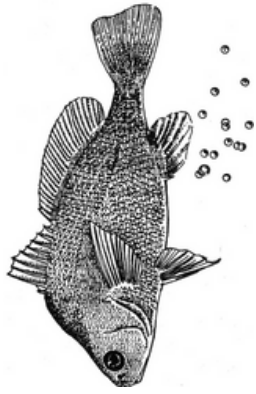
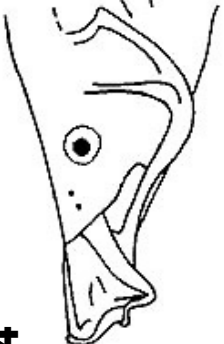
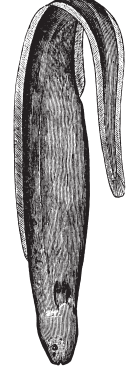

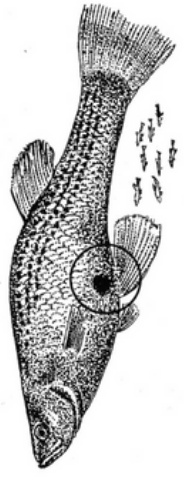
On Vegetation	Eggs attached to aquatic vegetation are hidden from predators and protected from forces like water current, keeping the eggs stable until hatching.
In Nests	Adult fish who create nests to deposit eggs often stay nearby to guard the nest until hatching.
Free Floating	Free floating eggs are dispersed in high numbers, with the hope that a percentage of them will survive.
Live Birth	Live bearers retain eggs in their body and give birth to live young. This allows for a higher survival rate.

Step 5: Pass out the **Build-a-Fish** work sheet. Instruct students to use dice or an number generator and the **Fish Adaptations** card sheet to build their own fish and answer the questions on the worksheet.

To wrap up, invite students to share the fish they built and the habitat it would likely live in.



Fish Adaptations

Mouth Shape	Body Shape	Tail Shape	Reproductive Behavior
<p>1</p>  <p>Terminal</p>	<p>1</p>  <p>Fusiform</p>	<p>1</p>  <p>Rounded</p>	<p>1</p>  <p>On Vegetation</p>
<p>2</p>  <p>Superior</p>	<p>2</p>  <p>Compressiform</p>	<p>2</p>  <p>Truncate</p>	<p>2</p>  <p>In Nests</p>
<p>3</p>  <p>Inferior</p>	<p>3</p>  <p>Depressiform</p>	<p>3</p>  <p>Forked</p>	<p>3</p>  <p>Free Floating</p>
<p>4</p>  <p>Protrusible</p>	<p>4</p>  <p>Elongate</p>	<p>4</p>  <p>Lunate</p>	<p>4</p>  <p>Live Birth</p>



Student Worksheet

Fish Adaptation Notes

Name: _____

Mouth Shapes

Describe how fish with each mouth adaptation eat:

Terminal: _____

Inferior: _____

Superior: _____

Protrusible: _____

Body Shape

Describe how fish with each body shape adaptation move through the water:

Fusiform: _____

Compressiform: _____

Depressiform: _____

Elongate: _____

Tail Shape

Describe how fish with each tail shape adaptation move through the water:

Rounded: _____

Truncate: _____

Forked: _____

Lunate: _____

Reproductive Behavior

Describe how fish with each reproductive behavior adaptation ensure their young survive:

On vegetation: _____

In a nest: _____

Free floating: _____

Live birth: _____



Student Worksheet

Build-A-Fish

Name: _____

Getting Started

You will need a dice or number generator and the **Fish Adaptations** card sheet. Roll the dice to determine which adaptation from each category your fish will have. If you roll a 5 or 6, continue to roll until you have a number 1-4. As you roll for each category, record your fish's adaptations below.

Mouth Shape:	Body Shape:
Tail Shape:	Reproductive Behavior:

Build Your Fish

Using the adaptations recorded above, draw your fish below. Use your drawing and what you learned in class to answer the questions on the next page.

Build-A-Fish

Reflection Questions

Based on the mouth shape of your fish, what would they be likely to eat and how would they eat it?

Based on the body shape and tail shape of your fish, how would they swim?

Return to your drawing and add habitat details to your fish. Think about what kind of water they would live in and what would surround them. Jot down the details that you added.

How will your fish ensure its offspring survive? What are the pros and cons of its reproductive behavior?

BONUS: Considering the habitat and adaptations of your fish, what color and pattern would it have? Would your fish want to stand out or blend in? Why?
