



Fish Morphology (3rd-5th Grade)

Time: 45 minutes

Supplies: Small plates, clay or play dough, computer or screen device, worksheet

Standards:

SC.3.N.1.1 Raise questions about the natural world, investigate them individually and in teams through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.

SC.3.N.1.3 Keep records as appropriate, such as pictorial, written, or simple charts and graphs, of investigations conducted.

SC.3.N.1.6 Infer based on observation.

SC.3.N.1.7 Explain that empirical evidence is information, such as observations or measurements, that is used to help validate explanations of natural phenomena.

SC.3.N.3.2 Recognize that scientists use models to help understand and explain how things work.

SC.3.N.3.3 Recognize that all models are approximations of natural phenomena; as such, they do not perfectly account for all observations.

SC.3.L.15.1 Classify animals into major groups (mammals, birds, reptiles, amphibians, fish, arthropods, crustaceans, according to their physical characteristics and behaviors.

SC.4.L.16.2 Explain that although characteristics of plants and animals are inherited, some characteristics can be affected by the environment.

SC.4.L.16.3 Recognize that animal behaviors may be shaped by heredity and learning.

SC.4.N.1.4 Attempt reasonable answers to scientific questions and cite evidence in support.

SC.5.L.14.2 Compare and contrast the functions of organs and other physical structures of plants and animals, including humans, for example: some animals have skeletons for support-- some with internal skeletons others with exoskeletons-- while some plants have stems for support.

SC.5.L.17.1 Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycles variations, animal behaviors, and physical characteristics.

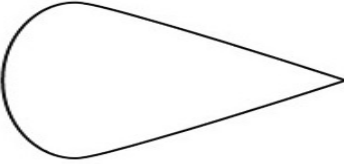
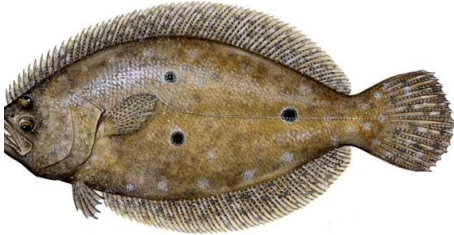
I. Learning Objectives - Students will be able to:

- Compare and contrast adaptations found in different species of fish.
- Relate certain adaptations to fish behavior, movement, habitat needs, etc.
- Design their own anatomically correct fish.
- Explain the adaptations of their fish, and tell us where they may live and what food source they may have by looking at those adaptations.

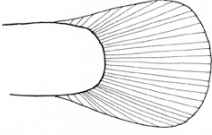
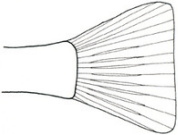
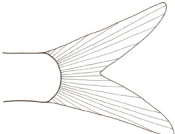
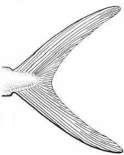
II. Procedures:

- Instructors will go over demo videos and fish body adaptations with campers.
- Groups will spend **10-15 minutes** at their tables working on designing their own fish.
- The groups will present their designs to the rest of the class and discuss:
 - How and why they choose certain adaptations.
 - Explain their fish's movement, habitat needs, and how it behaves.
 - Discuss how these adaptations allow us to understand behaviors, habitats, and food sources of different species of fish.

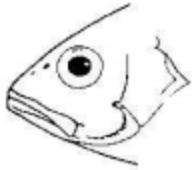
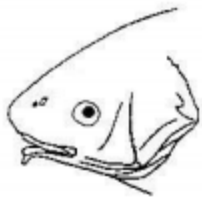
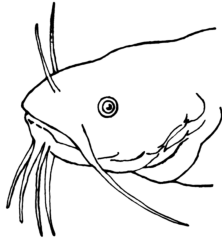
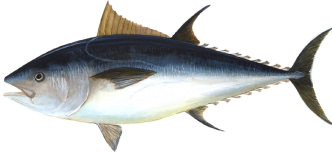
Fish Body Types

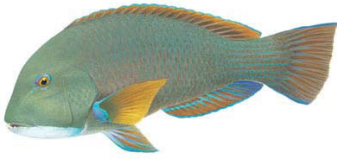
Shape	Name	Example	Movement	Habitat
	<u>Fusiform</u> Fish shape is streamlined or torpedo like		Fast moving- tail moves from side to side	open water
	<u>Depressed</u> Flattened top to bottom (like a pancake)		Slow moving- flaps fins up and down (like a bird)	Bottom dwelling
	<u>Compressed</u> Flattened side to side		Fast moving for short distances and can make quick turns	Ponds, lakes, coral reefs, and places that provide hiding spots
	<u>Filiform</u> (Attenuated) Elongated, tube/snake-like shape		Slow moving- slithers like snake-	Soft mud/sand, or under rocks

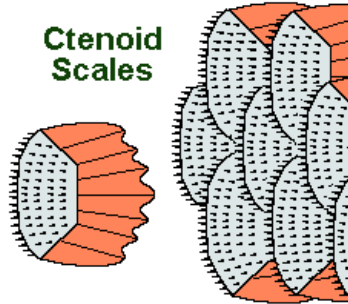
Caudal Fin Types

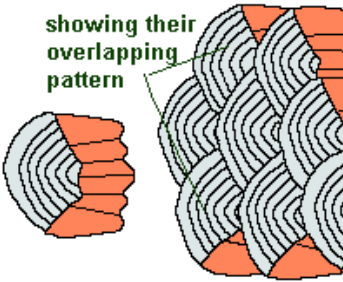
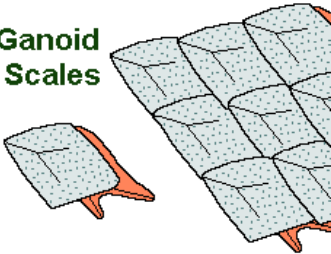
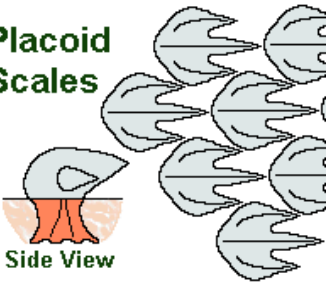
Shape	Function
Rounded 	Large surface area that helps with acceleration and maneuvering. Drag from the shape of fin causes fish to tire easily (can not swim fast for very long).
Truncate 	Moderate acceleration and maneuvering. Less drag than rounded.
Forked 	Good acceleration and maneuvering. Less surface area means less drag.
Lunate 	Rigid fins with even less surface area create low drag and very fast acceleration. Rigidness of fin means less maneuverability

Other Adaptations

Jaws/Mouth	Superior		Mouth positioned near top of head. Fish feed on what is above them.
	Terminal		Mouth positioned in middle of head. Fish feed on what is in front of them or chase prey.
	Inferior (bottom-feeder)		Mouth angled upwards allows fish to quickly attack and bite prey above it
	Barbels		Fish uses these structures to feel and sense prey in the sand
Coloration	Camouflaged		Lives in areas similar to its coloration (rocks/seaweeds ... etc.)
	Countershading (ie. darker on the top side and lighter on the bottom)		Fish swims in blue water (open ocean) and is less visible to predators from both above and below

Eyes	Both on the same side of their head		Fish lies flat on the ocean bottom and has a depressed or flat body type
	Small		Fish lives in the nearshore (shallow) environments
	Large		Fish lives offshore in deeper habitats

Scales	Ctenoid Scale	Ctenoid Scales 	Also have rings and grow with the fish similar to cycloid scales, but have small comb-like protrusions called ctenii on the posterior of scale.
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	Cycloid Scale	Cycloid Scales showing their overlapping pattern 	Scales are thin, circular, and covered in a thin layer of mucus and epidermis, making the fish feel slimy. Scales grow with fish and rings on the scales show growth.
	Ganoid Scale	Ganoid Scales 	Thick, hard, and plate-like scales that are diamond shaped. They grow as the fish ages.
	Placoid Scale	Placoid Scales Side View 	Tooth-like scales covered in enamel. They resemble rows of microscopic teeth and feel like sandpaper. Scales do not grow with the fish (more are added). Sharks and rays have these types of scales.

Build a Fish!

Group Name:

Drawing/Fish Name:

Adaptation	What does this mean about my fish? (habitat, behavior, etc.)
Jaw type:	
Body type:	
Caudal fin type:	
Eye type:	
Coloration:	