

## Lesson 4. – Fangs, Fins, Mouths, and Eyes

Lesson objectives:

- Students will learn what the appearance of fangs, fins, mouth and eyes can tell a researcher.
- Students will see examples of each.

Vocabulary words: canine, krill, plankton, subterminal, terminal, nictitating, caudal, dorsal and ventral

### How do Fish Teeth Differ?

Many fish have teeth on several head and face bones. Some fish do not have 'teeth' at all, they are merely extensions of the bones in their heads that are used for feeding. Other fish have teeth on the tongue and between the gills. Some fish have plate-like teeth that are used for grinding corals, and crushing shells to get to the softer prey beneath. Other fish have strong **canine** teeth (fang-like teeth seen in dogs), in the front of their mouths for grasping prey. Each species of fish may have teeth located on different bones, or locations in their mouths because of their specialized location in the ocean.

Pikes and many sharks have large mouths and many sharp teeth. Their appearance labels

them as **predators** that can take large bites and swallow prey whole. Sharks have rows of teeth that allow them to take bites out of prey that are too big to swallow. Barracudas and piranhas also have the same dental arrangement. Deep-sea fish have dagger-like teeth that help them to grasp prey of large size and hold it until it can be swallowed.

Other large-mouthed fishes have weak teeth or none at all! Their mouths have other structures that can hold prey, or strain out **plankton**. Some whales, the largest sea creature known to man, have **baleen**. A baleen is a plate-like structure that is used to strain tons of **krill** and plankton from the ocean water.

Fish have specialized mouths for the way they feed, and what they eat. **Wolf eels** feed upon shelled animals, and have strong teeth in the front and back for crushing its prey. The two front teeth in parrotfishes are fused. This is so they can

bite off chunks of coral. A slipmouth is capable of extending their mouths to **siphon** prey. The thin snout-like mouth of a butterflyfish is useful for removing food items from small cracks and **crevices**.

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## What are the Differences in Fish Fins?

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The shape of fishes fins is probably the most noticed feature on the fish body. Fins are composed of two groups, unpaired and paired. The

unpaired fins are the **dorsal**, **caudal**, and **anal**; the paired fins are called **pectorals** and **pelvics**, or **ventrals**.

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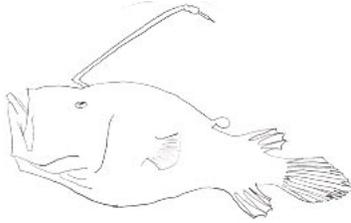
### Paired Fins

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**Pectoral fins** are present in almost every fish. They are found behind the gill cavity, and are prominent. In primitive fishes, the pectoral fins are found lower on the body, nearer the ventral side. In some cases, these fins look like an arm-like extension. In other cases, the pectoral fins have evolved to look like wings for the South American flying fish and a pad for resting on the bottom in some catfish. Other fish have developed specialization in their fins for certain habits like protection, tactile organs, taste, and crawling.

The **pelvic fins** are generally smaller than the pectorals, and more restricted in function. The pelvic fins are located behind the pectorals. Pelvic fins function in stabilizing and braking, they are of little use for locomotion. Some have spines and rays on them. Other fish have modified pelvic fins in the form of a sucker, or use them as an appendage to create friction between themselves and the substrate to help them stay in place. Some fish have even lost their pelvic fins completely, especially those that spend their lives scouring along the ocean floor!

## Unpaired Fins



The **dorsal fin**, the **caudal** or the tail fin, and the **anal**

**fin** are all unpaired fins. The dorsal fin extends along the length of the back, the anal fin is located on the ventral side of the fish, and behind the anal opening, and the caudal fin is the tail.

The dorsal fin may extend the entire length of the back, may be a fleshy ray, or quite large and supported by spines. Some fish do have 2 dorsal fins, but they are not symmetrical and not considered paired fins. The dorsal fin is useful in stabilizing the fish as it swims, helping to change direction quickly, or used with the other fins for braking. The

dorsal fins have been modified in the remoras into a sucking disc that allows them to cling to sharks or other large fishes. In the anglerfish, the dorsal fin has been modified into a fishing rod and lure. Other fish have small finlets that have evolved from the dorsal ray.

The anal fin is usually short, but some fish have anals that stretch from near the chin, to the caudal fin. Very few fish have more than one anal fin (i.e., the cods), and some do not have one at all (i.e., skates and rays). In some species, the anal fin has modified into an organ used in copulation called a **gonopodium**.

The caudal fin, or tail fin, appears in a variety of shapes, sizes, and kinds. The shape of the caudal fin might deduce swimming habits. See the table below.

Diagram 4-1. Fish Tail Shapes

| Shape   | Name                             | How they swim                                    | Where they live   |
|---|----------------------------------|--|-------------------|
|    | Lunate<br>(crescent)             | Fast, rapid                                      | Pelagic           |
|    | Forked                           | Constantly moving                                | Pelagic           |
|    | Truncate                         | Strong swimmer, slower                           | Pelagic           |
|    | Rounded                          | Strong swimmer, slower                           | Pelagic           |
|   | Leptocercal<br>(long, whip-like) | Wriggling  | Usually bottom    |
|  | Leptocephalii                    | weak swimmer, ribbon-like body, wriggling motion | Plankton, pelagic |
|  | Small or continuous with body    | Weak swimmer, or wriggling on bottom             | Pelagic or bottom |

## How Big is a Fish Mouth?

The mouth tells much about the habits of a fish by its position, shape, and size. The typical fish has a mouth at, or very near, the front end of the head. Fish mouths have developed to adjust to specialized lifestyles. The size of fish mouths can give a clue to its feeding habits, especially when considered with the type and placement of teeth.

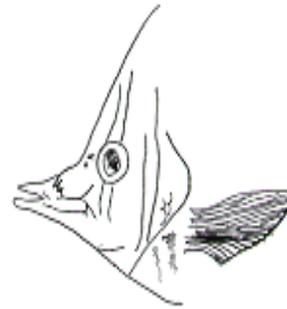
Bottom-feeding fishes have downward-pointing (**subterminal**) mouths, while



surface oriented fish have upward-pointing mouths (**superior**). Other fishes that catch their food directly in front of them as they are swimming through the water have a **terminal** mouth. Fish that are flat, like the ray and feed directly off the ocean floor have a mouth on their belly, or ventral side. This kind of a mouth is called an **inferior**

mouth, and makes it easy to scoop fish and invertebrates from the ocean floor.

Some fish have a mouth that is **sword-shaped**. The top jaw of the mouth has evolved into the shape of a long sword that protrudes from the front of the fish. Other fish have beak-shaped mouths. The triggerfish has a **beak-like** mouth. Having a



mouth this shape makes it easy for the fish to break off small pieces of coral.

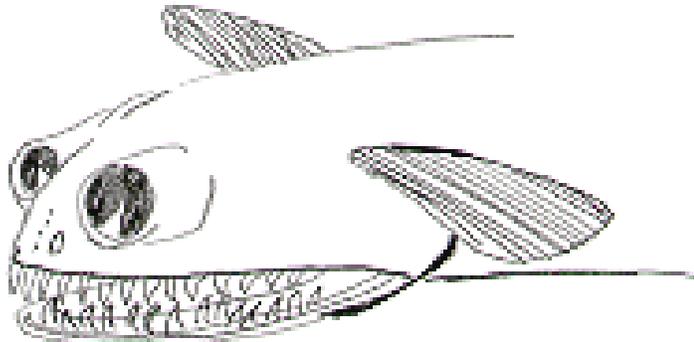
The size of the mouth is usually directly related to the size of the prey, as is its shape. Therefore, a fish that feeds on small invertebrates by suction have a small mouth surrounded by protractile "lips" that when **protruded** form an O-shaped opening.

## What do Fish Eyes Look Like?

What do you think it is like to live, and see underwater? Remember that calm water can reflect up to 80% of the sunlight coming in, and seeing through water is completely different than seeing in air. Various species of fish can cope with life only at the bright surface, in brilliant coral reefs, dimly lit caves, dim bogs, or sheltered forest streams. Some even peer above the waters surface! As you can see, all fish eyes are not the same. Read on, and we will discuss a few differences.

The eyes of most fish are placed on the sides of the head. Fish do not have eyelids, with the exception of a few which have a **nictitating** eyelid. Most fish need to have a maximum field of view, so their eyes are spherical, with a bulging shape. Saltwater fishes have the ability to move their eyes better than fresh water fishes. Most fish have the ability to move their eyes so

that they can see forward or backward, and up and down. (Wouldn't it be great if humans could see behind them, without turning around?!) The size of the eyes, relative to the size of the fish, varies both according to the methods used to capture food and according



to the light levels under which the food is taken. Well-developed eyes are found in most fishes that are **diurnal** predators, although the largest eyes are found in fish that feed at dawn and dusk.

The night-active, or deep-water fishes that depend on other senses to find food, have relatively small eyes, or none at all. Other fish have barrel-like or tubular eyes; while others have fixed, four eyes, or **aerial vision** as well as underwater vision.

Finally, some fish that have poor eyesight, or are blind, have other organs that are

sensitive to light. These vary in fish, and help the fish to adapt to its environment.

## Activity 4-1. Fish Ecology Word Art

Objective: Students will draw on the information and vocabulary that they have learned to be illustrative and create an environmental or fish drawing. They will have an understanding of the vocabulary and concepts that are drawn from fish ecology, while at the same time, working on their spelling abilities.

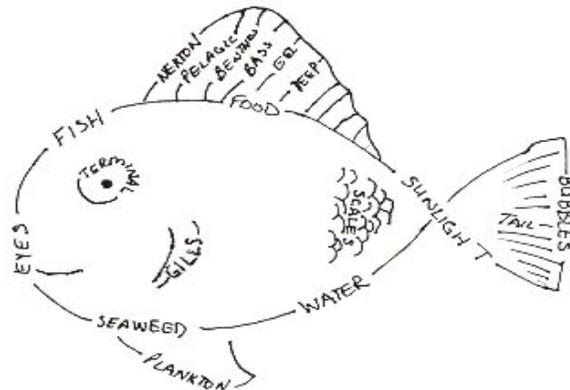
### Materials:

Drawing utensils  
Paper

### Procedure:

1. As a class list as many words as possible that will describe fish, the environment in which they live or recreation that surrounds fish ecology.
  - Use adverbs, adjectives, nouns, and verbs. Try to conjure up all possible words that describe how a fish survives, the environment(s) in which they survive, when a fish might swim upstream, etc.
2. While the students are coming up with these words, take the time to discuss the definitions of each word so that each student gains comprehension of the vocabulary.
3. Have each student copy down the list of words.
4. Finally, have the students use the words to 'draw' a fish or environment. They can mix words with lines, and other shapes.

See Example:



## Activity 4-2. Mathematical Fish Find

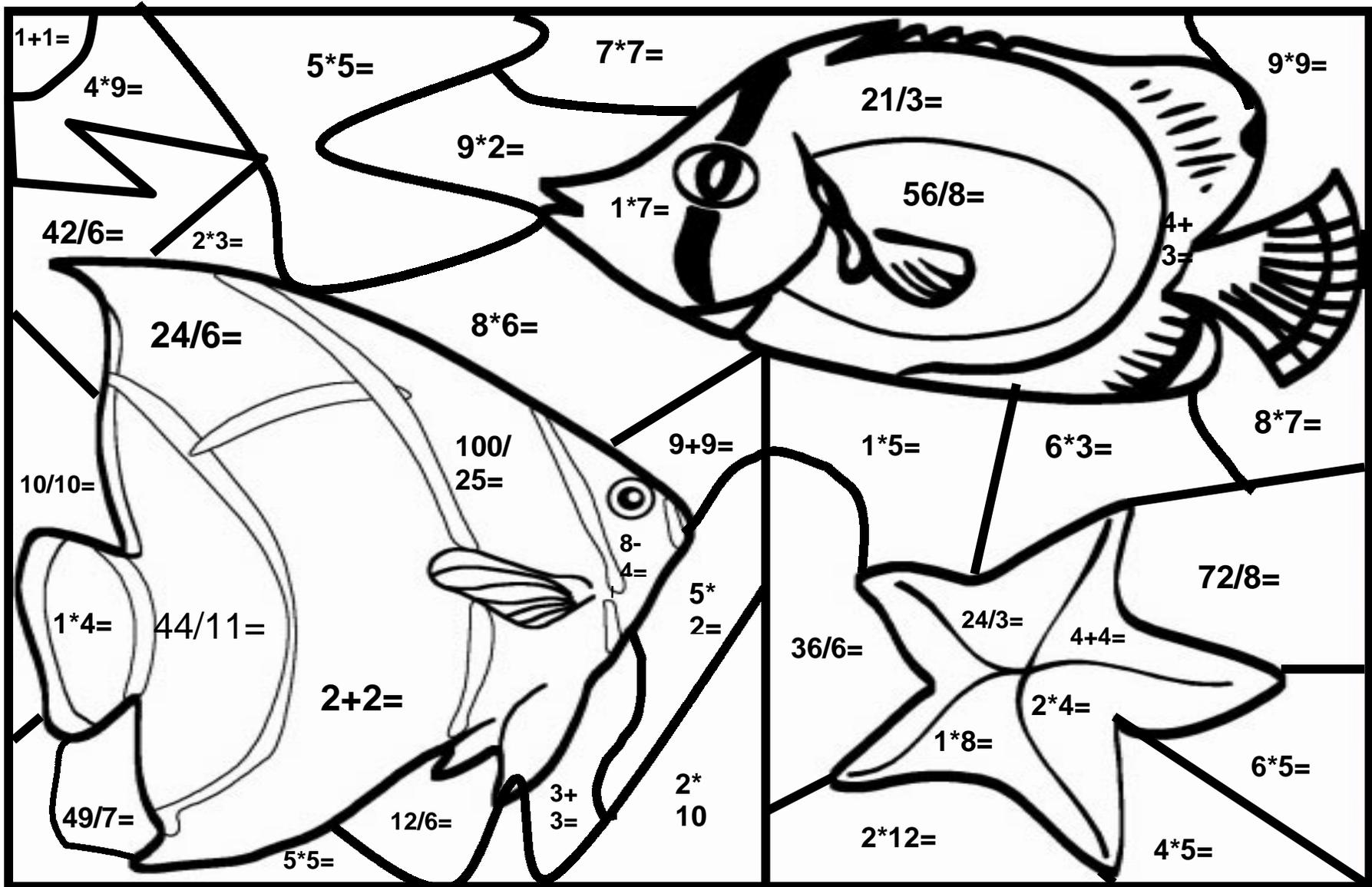
Objective: Polish students' basic mathematical skills through solving simple mathematical equations. After the equations are solved, the students will color by number to 'find' the hidden fish.

Directions: On the following page is a picture of several fish encoded in mathematical equations. Solve and then color according to the following.

1. Color all number 4's orange.
2. Color all number 8's green.
3. Color all number 7's yellow.

Materials: Worksheet

Coloring materials  
Mathematic skills



## Student Information Sheet 4. Fangs, Fins, Mouths, and Eyes

By observing the features of a fish, a lot can be learned. Just by looking at the fangs, fins, mouths and eyes, information such as where the fish lives, how it eats and how it swims can be learned.

| Shape   | Name                          | How they swim                                    | Where they live   |
|---|-------------------------------|--|-------------------|
|    | Lunate (crescent)             | Fast, rapid                                      | Pelagic           |
|    | Forked                        | Constantly moving                                | Pelagic           |
|   | Truncate                      | Strong swimmer, slower                           | Pelagic           |
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The fins of a fish are also very interesting to look at. Most fish have a pair of fins on their **ventral** side (belly), called the pectoral fins.

These are often used for steering, quickly changing direction and braking. The fins that are observed on the **dorsal** side (top) of the fish are called the dorsal fins. The caudal and the anal fins are located on the ventral side. If each of these fins is present, they are NOT found in pairs. In some fish, the dorsal fin might extend the entire length of the back, or the dorsal fin might have

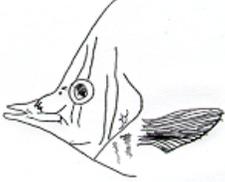
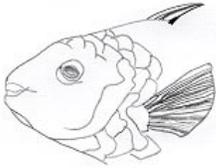


evolved into an apparatus much more useful to that particular fish. Look at the anglerfish, the dorsal fin has become a fishing line and lure used to catch prey. In the remora,



the dorsal fin has become a sucker-like apparatus so that the fish may attach to larger fish without harming it, and feed off its scraps. The tail fins of fish all look very different as well. It is easy to decide how a fish swims by merely looking at the shape of the tail.

| Fish Eyes: | How different they all are!!   |
|------------|--|
|            | <p>This fish looks forward, and swims through the water column. The food that it eats is caught in front of it. Since the fish is so flat, it also may have the ability to forage on the ocean bottom.</p>   |
|            | <p>This fish is called a stargazer because of its upward, tubular eyes. The fish is a bottom dweller, but feeds well on the fish that swim above it.</p>   |
|            | <p>This fish is a large mouth bass. The eyes on it are on the sides of the head, and can easily pick up on movement in the water. It feeds on fish as it swims through the water column, and can see all around its body; front, back, upward, and downward.</p> |

|   |  |  |   |
|---|--|--|---|
| <h2>Fish mouths and Functions</h2>  |  | <p>This is the jaw of the wolf eel. It has strong canine teeth used to bite shelled invertebrates.</p> |    |
|    | <p>This is a protruding mouth, good for reaching for small animals.</p>                                      | <p>The subterminal mouth. This is a fish called a dace.</p>  |    |
|   | <p>The thin mouth on the butterflyfish is good for getting small invertebrates from cracks and crevices.</p> | <p>This is a terminal mouth, in the trout. Usually full of sharp teeth.</p>                            |   |
|  | <p>This is a tang, which has two front teeth fused to form a beak-like mouth.</p>                            | <p>The superior mouth, in ladyfish, tarpon, and herring is used to capture food above it.</p>          |  |
|  | <p>A small terminal mouth in permit. Used for catching food in front of it, during swimming.</p>             | <p>The inferior mouth in sturgeons. Good for upsetting food lying in the benthos.</p>                  |  |