Festival Activity: Outdoor Aquarium

Subject: Science

Concepts: Fish habitat and observation

Key Vocabulary
- Habitat
- Aquatic

Skills
- Observation
- Identification

Materials
- □ All materials will be provided by activity leader

Immerse yourself in the **aquatic** world (living in water). Watch shimmering silver and graceful fish glide past underwater windows.

The aquarium provides an opportunity to observe and identify a variety of fish from our Washington inland streams and lakes.

Grade Level Expectations (GLEs) or Evidence of Learning

Science

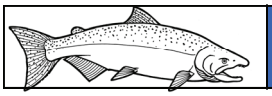
1.1.6 Understand how to distinguish living from nonliving and how to use characteristics to sort common organisms into plant and animal groups.
1.3.10 Understand that an organism's ability to survive is influenced by the organism's behavior and the ecosystem in which it lives.

Objective

Students will identify and observe fish in an outdoor aquarium.

Suggested Procedure

Students will make observations of fish characteristics and their **habitat** (the arrangement of food, water, shelter, and space suitable to an animal's needs) in an outdoor aquarium. Each student will receive their own fish flashcard and will be asked to find and observe their fish in the aquarium. They will identify their fish using fish identification posters.



Pre-Work: Blueprint of a Fish

Subject: Science

Concept: Fish biology and habitat

Key Vocabulary
- Adaptations
- Habitat

Skills
- Questioning
- Investigation
- Inference

Materials
- □ "Something's Fishy" from Gyotaku Pre-Work activity
- □ Teacher Reference, "External Fish Anatomy" from Gyotaku Pre-Work activity
- □ Student Worksheet, "Fish Flashcards" - one per group
- □ Teacher Reference, "Fish Flashcards"

Fish and other animals are the product of countless adaptations over long periods of time. These **adaptations**, for the most part, are features that increase the likelihood of surviving in their **habitat**.

Grade Level Expectations (GLEs) or Evidence of Learning

Science

2.1.1 Understand how to ask a question about objects, organisms, and events in the environment.

1.3.10 Understand that an organism's ability to survive is influenced by the organism's behavior and the ecosystem in which it lives.

Objectives

Students will: 1) learn the general features of a fish, 2) describe adaptations of fish, and 3) identify how these adaptations help fish to survive in their habitat.

Suggest Procedure

1. Refer to the Gyotaku Pre-Work, "Something's Fishy" for fish characteristics (what makes a fish) and the Teacher Reference, "External Fish Anatomy" diagram. Students should know the general features of a fish and the names of the fins and fin functions before looking at the flashcard activity.

2. Emphasize to the students that all fish have a head, a body and a tail, but they also have modifications to this basic design—adaptations to meet the specific needs and challenges of a particular lifestyle or habitat. ***These adaptations are clues as to how fish make their living, as well as keys to identification.***

3. Divide your students into 5 or 6 groups. Make copies of the Student Worksheet, "Fish Flashcards" for each group.

The flashcards illustrate four species of fish that can be found in central Washington streams and lakes: salmon, bluegill, bass, and suckers. Each fish has a slightly different body shape, fin arrangement, and mouth design. Characteristics for each fish are listed on the back of each Teacher Reference, "Fish Flashcards."

4. Have your students look at the four shapes and describe the differences they see between the four fish.

5. Ask the following questions:

- Which fish is long and narrow, like a torpedo?
- Which fish is disc-shaped, like a frisbee or a pancake?
- Which fish looks like it might be a fast swimming fish or slow swimming fish?
- Which fish looks like it is shaped to live near the bottom?

Note: The shape of a fish's body can tell you a lot about its lifestyle. In general, fish that are streamlined or torpedo-shaped with a pointed head are the fastest swimmers. Usually these fish are predators. They are capable of swimming at high speeds for much of the time to catch their food. Examples include salmon, trout, and bass.

Disc-shaped or deep-bodied fish are flattened from side to side like a frisbee. Fish with this shape are not very streamlined nor do they swim fast to catch food. They are very agile swimmers capable of maneuvering in tight quarters such as rocky areas or dense beds of aquatic plants. Many deep-bodied fishes have spiny rays in their fins for protection from predators. Examples include bluegill and pumpkinseed.

Bottom dwelling fish can have a variety of body shapes. A flounder and a catfish are both bottom dwelling fishes, but look very different. The bottom fish represented here is somewhat torpedo-shaped, but is also flattened along its belly so it can comfortably spend most of its life in continuous contact with the bottom. This style of fish also tends to have a flattened head. Examples include carp, catfishes, and suckers.

6. Ask the students to look at the mouth of each fish. The mouth of a fish can tell you a lot about its feeding habits.

7. Ask the following questions:

- Are the jaws large or small?
- Is the mouth located at the end of the snout (called terminal) or pointed upward or downward?
- Does the mouth have a unique shape?

Note: In general, the size of the mouth is directly related to the size of the preferred food item. Fish that feed on large prey typically have a rigid rim surrounding the mouth, lined with sharp teeth, like walleye or bass.

The location of the mouth can tell you where a fish finds its food. Bottom feeding fish, like carp and suckers, have downward-pointing mouths. Fish that capture food near the surface or on the surface have upward-pointing mouths.

Also, the mouth can give important clues about what it eats. Predators usually have sharp, pointed teeth for catching and holding food. Suckers have very fleshy, flexible lips which enable them to suck plant and animal matter off the bottom like a vacuum cleaner. Carp and catfish have special whiskers, called barbels equipped with taste buds around their mouth to help find prey in murky water or after dark. Carp have molars, very similar to our back teeth, for crushing and grinding up plant materials.

8. Ask the students to count the number of fins and then look at fin shape, size and arrangement.

9. Ask the following questions:

- Do they all have the same number of fins?
- How are fins similar, yet different, between each of the four fishes?
- Describe the shape of the tail or caudal fin.

Note: In general, most fish have 7 fins: 2 pectoral fins, 2 pelvic fins, 1 dorsal fin, 1 anal fin, and 1 caudal fin. All trout and salmon have 8 fins. The small, fleshy fin located between the dorsal and caudal fin is the adipose fin. It's also called, the "mystery fin" since its function remains unknown. Salmon hatcheries often remove this fin from young fish so they can be identified as hatchery fish later in their lives.

Pelvic fins are the most variable in arrangement. The pelvic fins are located directly below the dorsal fin, along the belly of the fish on salmon and suckers. These fins act as stabilizers. On bluegill and bass, the pelvic fins are more forward in position and located below the pectoral fins. This arrangement increases maneuverability. Bluegill and bass also have spiny rays in their dorsal fin, which provide a lightweight and effective means of protection against predators.

In general, the shape of the tail usually reveals the normal swimming speed of a fish. A forked caudal fin produces less drag and is found on fish that need and require frequent sustained swimming speeds to capture prey. Fish with crescent-shaped tails, like tuna, are very fast swimmers and are constantly on the move. Fish that don 't need to swim fast have more rounded tails like those found on sculpin and sticklebacks. They are generally slow moving but are capable of short bursts of speed.

10. Ask the students if they can name other fish adaptations. For example: color, markings or patterns on the body, or whether they live in salt water or freshwater.

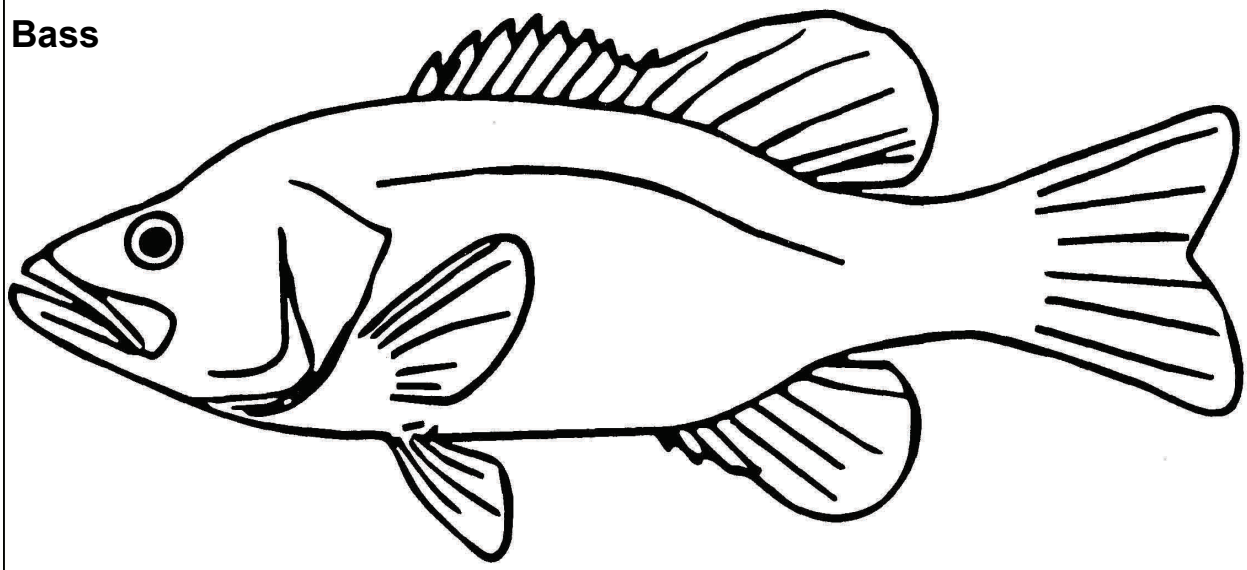
Vocabulary Words

Adaptations - the process of making adjustments to the environment.

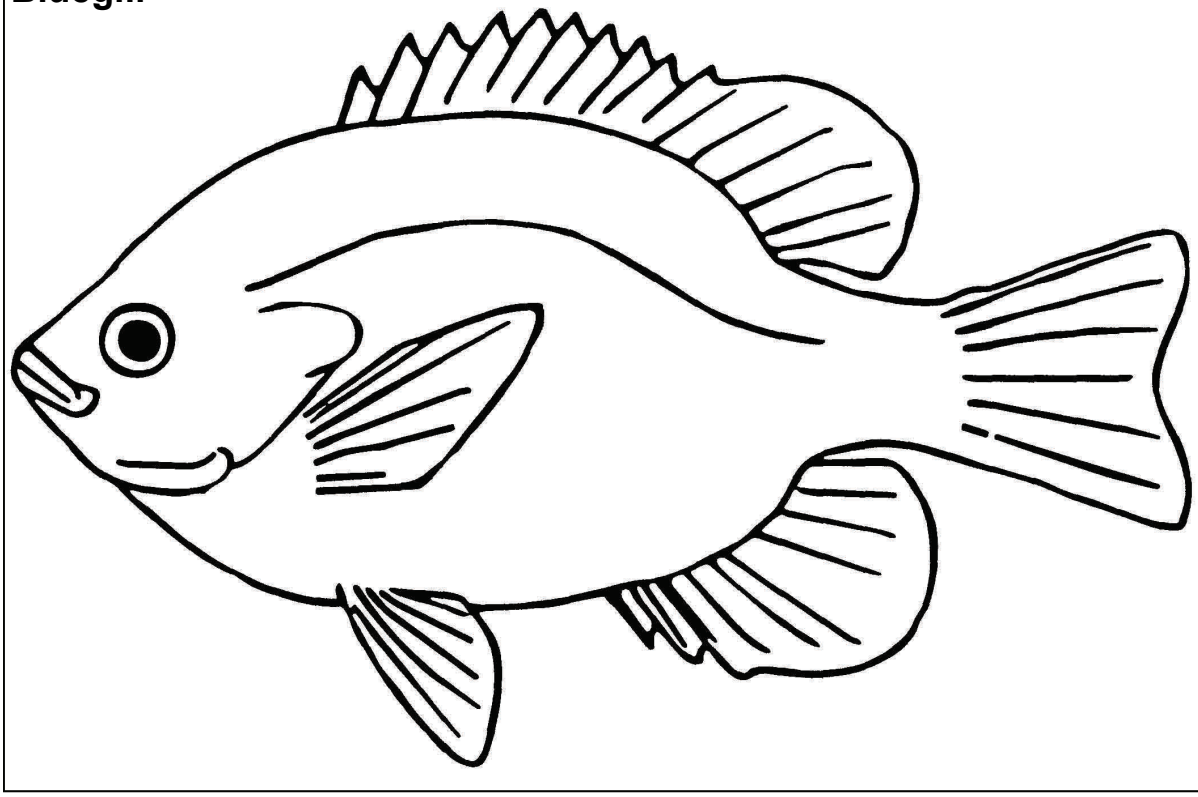
Habitat - the arrangement of food, water, shelter or cover, and space suitable to animal's needs.

Teacher Reference: Fish Flashcards

Bass



Bluegill



Bass

- Streamlined body shape, but not to the degree found in trout
- Pointed head
- Large mouth at end of snout
- Fins evenly located about body for stability and maneuverability. Notice the location of the pelvic fins, they are directly below the pectoral fins—which makes this fish an agile swimmer.
- Dorsal fin has spiny and soft rays
- Adipose fin absent

This fish is an example of a rover-predator-—a fish constantly on the move searching for prey which it captures through pursuit. Prey items include fish, frogs, crayfish, and aquatic insects.

Other streamlined fishes include trout, salmon, and many members of the minnow family.

Bluegill

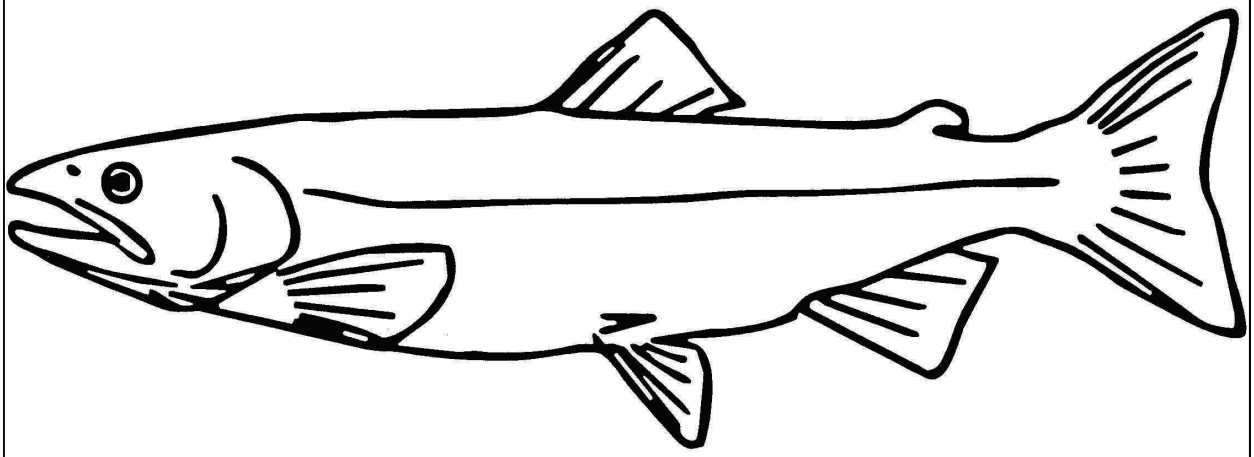
- Disc-shaped or deep-bodied, like a frisbee
- Long dorsal and anal fins
- Pectoral fins large and pointed
- Eyes large, snout short, small mouth at end of snout
- Dorsal fin has spiny and soft rays
- Large and pointed pectoral fins
- Adipose fin absent

This fish is an example of a deep-bodied fish. This body style is agile and not built for speed. These fish feed by picking small items off the bottom or from the water column. Their large and pointed pectoral fins allow for very precise movements as well as for maneuvering in tight places. They can be found in warm shallow lakes with rooted vegetation. They feed by sight during daylight hours on aquatic insects, small fish, and crayfish.

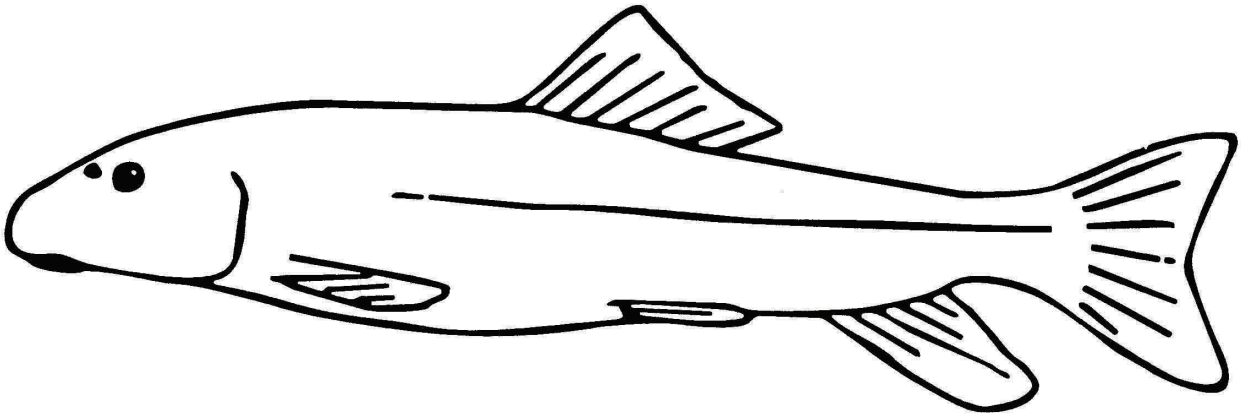
Other deep-bodied fish include pumpkinseed and crappie.

Teacher Reference: Fish Flashcards, continued

Salmon/Trout



Sucker



Salmon/Trout

- Streamlined body shape
- Forked tail
- Pointed head, mouth at end of snout (called terminal)
- Fins evenly distributed about body for stability and maneuverability
- Adipose fin present
- All fins have soft rays

Salmon are rover-predators, constantly on the move searching for food items that they capture through pursuit.

Other members of the salmon family include Chinook, sockeye, coho, steelhead, whitefish and trout.

Sucker

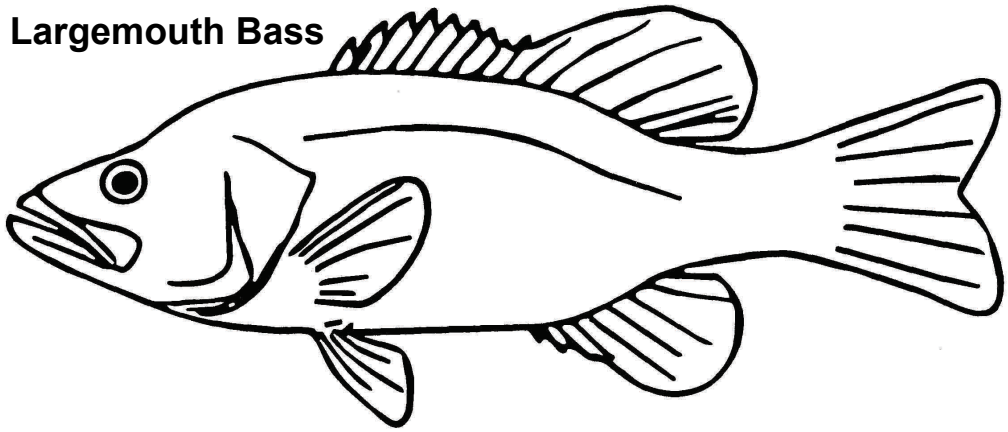
- Streamlined, but flattened on the bottom
- Sucker-like mouth; the mouth points downward
- Flattened head
- Eyes small
- All fins have soft rays
- Adipose fin absent

Suckers are examples of bottom rovers, similar in body shape to rover-predators except the head is flattened. Suckers are mainly bottom feeders, foraging by sucking up materials from the bottom. Suckers find food items by both touch and taste, as well as sight. They eat aquatic insects and their larvae, small mollusks, algae, and small crustaceans.

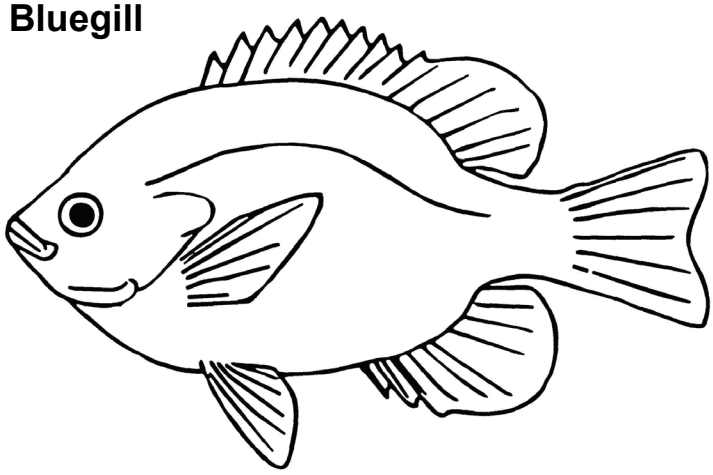
Other bottom feeders include sculpins, sturgeon, carp, and catfishes.

Student Worksheet: Fish Flashcards

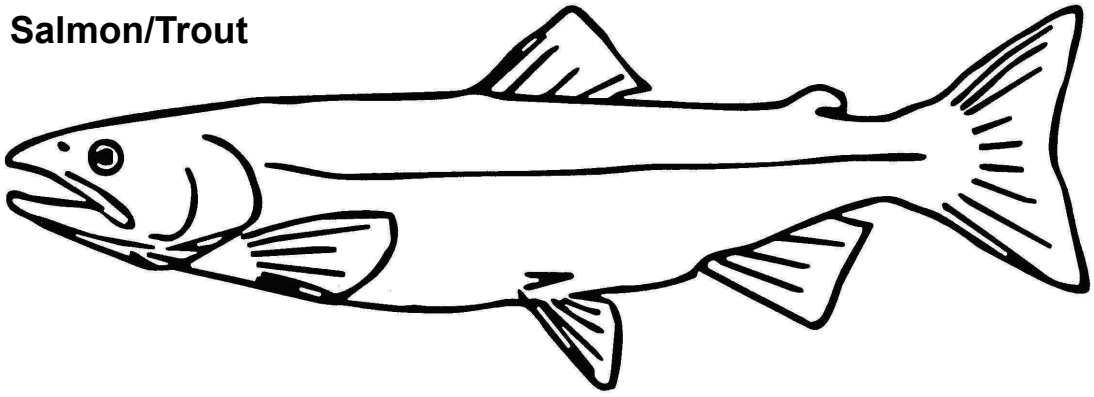
Largemouth Bass



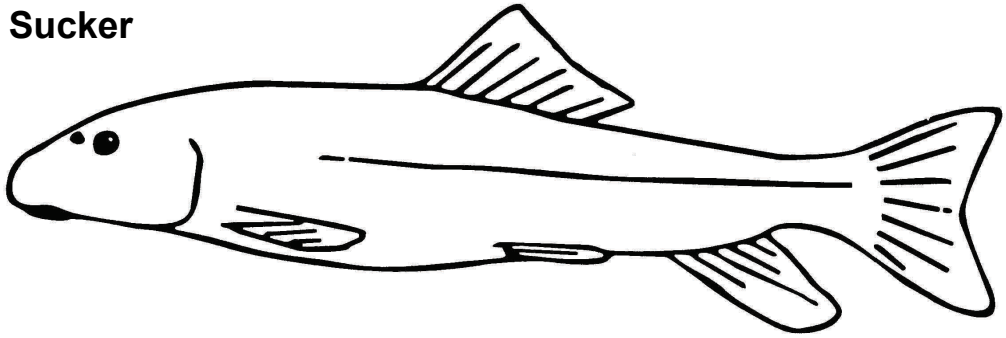
Bluegill

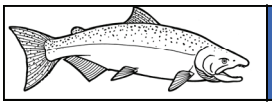


Salmon/Trout



Sucker





Post-Work: Classroom Aquarium

Subject: Science

Concepts: Fish habitat and adaptation

Key Vocabulary
- Habitat
- Adaptations

Skills
- Observation
- Identification
- Prediction

Materials
- □ Student Worksheet, "Fish Silhouettes"
- □ Student Worksheet, "Aquarium Guide"
- □ Crayons or color pencils
- □ Scissors
- □ Construction paper

Now that your students have had an opportunity to observe and identify a variety of fish from our own inland streams and lakes, let's make a classroom aquarium.

Grade Level Expectations (GLEs) or Evidence of Learning

Science

1.3.10 Understand that an organism's ability to survive is influenced by the organism's behavior and the ecosystem in which it lives.

Objective

Students will create a classroom aquarium using paper fish on a bulletin board.

Suggested Procedure

1. Make copies of the Student Worksheet, "Fish Silhouettes" to recreate the fish observed in the outdoor aquarium at the Salmon Festival. Optional: Fish can be enlarged depending on space availability on your bulletin board.

2. Have students color each fish the appropriate color using the Student Worksheet, "Aquarium Guide."

3. Using your bulletin board as the aquarium, have students place the fish in the aquarium according to their observations at the Salmon Festival. Where were they located in the body of water in the aquarium? Was the fish in the open, near the bottom, near cover, or at the top?

4. Have the students use construction paper to fashion plants, rocks and gravel, and woody materials like root wads and branches. Add these to create **habitat** within the aquarium.

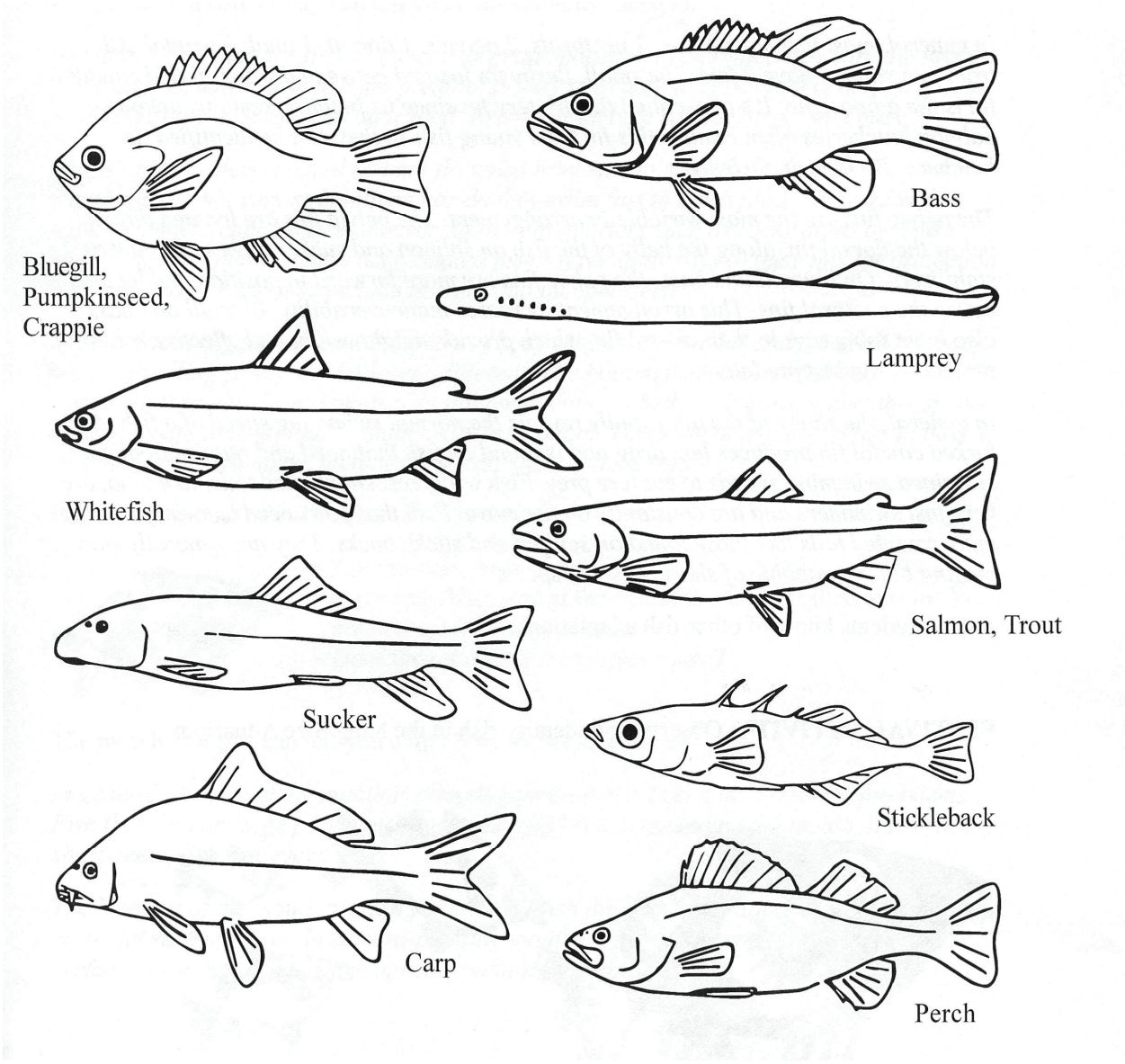
5. Continue the discussion about **adaptations**. Is color an adaptation? Can you predict where certain fish are found based on their coloration?

Vocabulary Words

Adaptations - the process of making adjustments to the environment.

Habitat - the arrangement of food, water, shelter or cover, and space suitable to animal's needs.

Student Worksheet: Fish Silhouettes



Student Worksheet: Aquarium Guide