

Fish Match Game

Adapted from: An original Creek Connections activity.
Creek Connections, Allegheny College, Meadville, PA 16335.

Grade Level: all

Duration: 15-30 minutes

Setting: Classroom

Summary: Students match fish illustrations with their correct names on a game board.

Objectives: Students will be able to identify many common fish.

Vocabulary: Fish, ichthyologist, taxon, binomial name

Related Module Resources:

- Books and Identification Guides

Materials (Included in Module):

- 4 Matching Game boards
- 4 envelopes with illustration game pieces
- Fish have families too Fact Sheet
- Various identification tools to fishes.

Additional Materials (NOT Included in Module):

- None

ACADEMIC STANDARDS (ENVIRONMENT AND ECOLOGY)

7th Grade

4.3.7.C. Explain biological diversity.

- Explain the complex, interactive relationships among members of an ecosystem.
- Explain how diversity affects ecological integrity of the natural resources.

4.7.7.A. Describe diversity of plants and animals in ecosystems.

- Select an ecosystem and describe different plants and animals that live there.

10th Grade

4.1.10.C Describe the physical characteristics of a stream and determine the types of organisms found in aquatic environments.

- Identify terrestrial and aquatic organisms that live in a watershed.

4.3.10.C Explain biological diversity as an indicator of a healthy environment.

- Explain species diversity.
- Analyze the effects of species extinction on the health of an ecosystem

12th Grade

4.6.12. A. Analyze the interdependence of an ecosystem.

- Understand how biological diversity impacts the stability of an ecosystem.

4.7.12. A. Analyze biological diversity as it relates to the stability of an ecosystem.

- Examine and explain what happens to an ecosystem as biological diversity changes.
- Explain the relationship between species' loss and bio- diversity.

ACADEMIC STANDARDS (SCIENCE AND TECHNOLOGY)

7th Grade

3.3.7.A. Describe the similarities and differences that characterize diverse living things.

- Explain how to use a dichotomous key to identify plants and animals.

10th Grade

3.3.10.A Explain the structural and functional similarities and differences found among living things.

- Identify and characterize major life forms according to their placement in existing classification groups.
- Describe organizing schemes of classification keys.
- Identify and characterize major life forms by kingdom, phyla, class and order.

BACKGROUND:

Fish are one of the most obvious animals found in a stream. A person who studies fish is called an **ichthyologist**. Different fish can be found in different aquatic environments based on their size. A small stream is more likely to contain smaller fish such as minnows, darters, and suckers while larger fish such as trout, bass, and bluegill can be found in large environments such as rivers. Fish are obviously dependent on a water-based environment for their entire lives and can be found living in many different types of aquatic environments.

Fish are organisms with backbones, and therefore belong to the vertebrates (Phylum Chordata). There are many families of fish present within aquatic environments. Some of the most common include the minnow family (Crypinidae), the sculpin family (Cottidae), the sucker family (Catostomidae), and the trout/salmon family (Salmonide). Examples of species that are common to streams would include creek chub, longnose dace, common shiners, slimy sculpins, rainbow darters, yellow perch, and brook trout.

In order to better understand the relationships between different animals on Earth, scientists have devised a classification system in which all organisms are placed into categories. These categories, or taxonomic ranks, form a hierarchy of classification. The major taxonomic ranks are as follows, proceeding from the higher, more inclusive ranks to the lower, less inclusive ones: kingdom, phylum, class, order, suborder, family, subfamily, genus, and species. A **taxon**, or taxonomic name, is a name used for a group of naturally related organisms. A taxon may be used for a group at any taxonomic rank. For example, the brook trout, or Salmoniformes, represent a taxon recognized as an order. The name "brook trout" is a common name that varies among languages and in regional usage. Salmoniformes is an internationally accepted scientific name based on rules of nomenclature. Scientific names most often have Latin or Greek derivatives. Basing the scientific naming process on a neutral language enables scientists around the world to have a common understanding of a single organism.

A **binomial name** (or two-name name) is used for the scientific name of a species. It is composed of the name of the genus to which the organism belongs, followed by its species name. The genus name is capitalized, while the species name is not; both names are italicized. For example, *Semotilus atromaculatus* is the scientific name for the creek chub. The binomial species name is especially important since most organisms in a species are similar and can produce viable offspring in nature.

Scientists often identify organisms in a taxonomic group by the prominent feature or features that the individuals share. Frequently, scientists appropriately name these organisms using these features. When identifying an organism, specifically a fish, it may be helpful to note characteristics such as the number of ray filaments on a fin, distinct physical features or patterns, and the size of the fish. For example, some types of minnows look very similar; therefore, a useful identifying tip is to count the number of dorsal fin rays. Different species of minnows have different numbers of rays on their dorsal fin. It is extremely difficult to count the number of dorsal rays on a small fish such as a minnow and caution should be taken so as not to harm the fish.

There are many kinds of fish found in freshwater environments and some are more common than others. Often the presence or absence of certain fish can indicate the quality of a stream. Some fish are capable of living in water that is polluted, while others are very pollution-sensitive. Note that certain species of fish will not be found in some environments since they are not able to live there due to habitat requirements. This means that a low variety of fish species found in a specific area is not necessarily a bad thing. If

any fish life is found in an aquatic environment, it is a good indicator that the waterway is healthy.

OVERVIEW:

Students will match the illustrations of the fish with the correct name on a game board. This activity can be used as a review of identifying fish after a real stream study has been conducted, or used as a preview to what students will find in a stream. This activity can also incorporate the skill of using a dichotomous key.

PROCEDURE:

Student Activity:

1. Divide the students into four groups and distribute Match Game Set to each group, making sure the Color of Fish Illustrations matches the game board.
2. Instruct the students to remove the fish illustrations from the baggie.
3. Have the students try to match the pictures of the freshwater fish species with the correct names by sticking them on the board. **DO NOT LOOK UNDER THE FLAP!!!!** Students may use a dichotomous key to identify the fish if they do not already know them. You may want to have the students keep a mental or written list of the most striking characteristics of some of the fish species they learn.
4. Once all the fish pictures have been attached to the board, the students may lift the flap to check their answers.
5. After checking their answers and noting key characteristics, students should remove the illustrations from the game board and return them to their corresponding envelope.
6. If enough time remains, Game Sets can be exchanged and steps 2-5 repeated.

DISCUSSION:

Which physical features did the students use to identify the fish? *They may have looked at number of ray filaments on the dorsal fin or distinct physical features or patterns on the fish.*

What kinds of features could they observe if these were living fish and in their natural environment? *Behavior and habitat.*

Why do the fish have a common name and a scientific name? *Refer to background section.*

What are some of the most striking characteristics of the different types of fish? *Refer to the "Fish Have Families Too" fact sheet for information on the key physical characteristics of fish from the different families found in Pennsylvania.*

Explain to students that most of the scientific names shown on the game board are in the taxonomic rank "order" (some are in "class"). Unlike species, these are larger groups that students may not be used to. Remind them that these animals can be keyed down to species.

EVALUATION:

- Have students correctly identify the most common fish.
- Distinguish key identification characteristics.
- Understand that fish have a common name and a scientific name.

EXTENSIONS AND MODIFICATIONS:

- Use this activity as a quiz.
- Time students to see who is the fastest.

NOTES (PLEASE WRITE ANY SUGGESTIONS YOU HAVE FOR TEACHERS USING THIS ACTIVITY IN THE FUTURE):

FISH HAVE FAMILIES TOO!

Pennsylvania's waterways are home to more than 153 species of fish from 21 families. Much like people from the same family often bear a striking resemblance to one another, fish belonging to the same family frequently look a lot alike. Likewise, just as people from different families have subtly or strikingly different features, fish from different families have characteristics that distinguish them from other fish families. Here are some of the key characteristics typical of fish from the 21 families found in Pennsylvania.

<u>FAMILY (Common Name)</u>	<u>P.A. EXAMPLES</u>	<u>KEY PHYSICAL CHARACTERISTICS</u>
Acipenseridae (Sturgeons)	shortnose, lake, and Atlantic sturgeons	- long body, flat head and snout, five rows of bony plates, four soft barbels, upper lobe of tail fin longer than lower lobe, dorsal fin back toward tail, fins have white outline
Amiidae (Bowfin)	bowfin	-robust, heavy scales cover body, bony plates cover head, one long, low dorsal fin, vertical stripes, one pair of short barbels
Anguillidae (American Eel)	American eel	-long, slender body, tiny scales, long dorsal almost connected to caudal and anal fins, no pelvic fins, defined pectoral fins, long head with small eyes and protruding jaw
Catostomidae (Suckers)	white, black, and	-medium-sized, robust, cycloid scales, spineless fins, single soft-northern hog suckers, rayed dorsal fin, anal fin near back of underside, redhorses and quillbacks
Centrarchidae (Sunfishes)	redeer, redbreast, and	-spectacular colors and patterns, small species "pan-shaped," green sunfishes, bluegill, large eyes, two dorsal fin sections—front is spiny, back is soft-pumpkinseed, small- and rayed, pectoral fins high on body, pelvic fins have one spine largemouth bass, spotted five rays, ctenoid scales bass, crappie species
Clupeidae (Herrings)	blueback herring,	-juveniles long and slim, adults wide-bodied and robust, American, gizzard, and compressed and flat when viewed head-on, large, silver, cycloid hickory shads, alewife scales, one dorsal fin centered on back, large eyes, head scaleless

FAMILY (Common Name)	P.A. EXAMPLES	KEY PHYSICAL CHARACTERISTICS
Cottidae (Sculpins)	mottled, slimy, Potomac,	- <i>small fish, blend well with surroundings, wide head with large, spoonhead, deepwater, upward looking eyes, two dorsal fin—front spiny and rear soft, and Blue Ridge sculpins body scaleless except for small patches</i>
Cyprinidae (Minnows)	bluntnose, fathead, and	- <i>one short dorsal fin with nine or less rays, cycloid scales, cutlips minnows, emerald, spineless fins golden and common shiners, river and creek chubs, blacknose and longnose dace, grass carp, and fallfish</i>
Cyprinodontidae (Killfish)	banded killfish	- <i>elongated body with flat sides, large, round scales, dark vertical lines on sides, square tail</i>
Esocidae (Pikes)	redfin, chain, and grass pickerel, northern pike, tiger and common muskellunge	- <i>coloration blends with environment, variable markings, slender and cylindrical, duck-like mouth, forked tail, dorsal and anal fins back near tail</i>
Gadidae (Burbot)	burbot	- <i>hind dorsal fin and anal fin long and equally long, rounded tail, pair of pelvic fins near throat, large pectoral fins, one barbel</i>
Gasterosteidae (Threespine Stickleback)	brook, four- and three-spine stickleback	- <i>bony-plated sides, scaleless, dorsal spines</i>
Ictaluridae (Catfishes)	white, channel, and flat-catfishes, yellow and brown bullheads, stonecat, margined madtom	- <i>scaleless, tough, smooth skin, eight head barbels, pectoral and dorsal fins have poisonous spines, adipose fin</i>
Lepisosteidae (Gars)	spotted and longnose gars	- <i>long, thin, cylindrical body, large, thick, diamond-shaped scales, beak-like snout, single dorsal and anal fins near tail</i>
Moronidae (Temperate Basses)	white perch, white and striped bass, striped bass hybrid	- <i>deep bodied when viewed from side, narrow and compressed when viewed from front, dark horizontal stripes, large, rough scales, two dorsal fins—front spiny, rear rayed, large mouth forked tail</i>
Osmeridae (Rainbow Smelt)	rainbow smelt	- <i>small, slender, silvery, large mouth, cycloid scales, deeply forked tail, adipose fin</i>
Percidae (Perches)	greenside, banded, johnny, and tessellated darters, yellow and log-perch, sauger, saugeye, and walleye	- <i>long, narrow bodies, 2 dorsal fins—first spiny, second rayed, ctenoid scales</i>

<u>FAMILY (Common Name)</u>	<u>P.A. EXAMPLES</u>	<u>KEY PHYSICAL CHARACTERISTICS</u>
Petromyzontidae (Lampreys)	Ohio, northern brook, mountain brook, least brook, American brook, and sea lampreys	- <i>jawless, no pectoral or pelvic fins, thin, cylindrical, snakelike body, notched dorsal fin connects to tail</i>
Salmonidae (Trout and Salmon)	Coho, chinook, pink salmon, rainbow, golden rainbow, brown, brook, and lake trout, steelhead	- <i>adipose fin, tail forked or square, spine- less fins</i>
Sciaenidae (Freshwater Drum)	freshwater drum	- <i>anal fin has two spines, sharply arched body</i>

Resource: The Pennsylvania Fish & Boat Commission. Pennsylvania Fishes. Harrisburg: Bureau of Boating & Education, 2000.