MARINE INVERTEBRATE

Matching game

Grade Level: Pre-K – Grade 12

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Ocean Literacy Standards:

#5: *The ocean supports a great diversity of life and ecosystems.*
#6: *The ocean and humans are inextricably interconnected.*

Through this invertebrate matching game, you will learn to identify and name different benthic marine invertebrates found in the Skidaway River, and if you're up to challenge, learn a fun fact about each one.

KEY CONCEPTS

- Benthic marine invertebrate identification
- Gathering factual information about an organism

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BACKGROUND:

Invertebrates are organisms without a backbone, such as jellyfish, crabs, and insects. In fact, approximately 95% of all named animal species are invertebrates, with a majority of them being insects. In marine (saltwater) environments, organisms are identified as pelagic or benthic. **Pelagic** organisms live in the water column, whereas **benthic** organisms live along or in the bottom substrate of a water body. Some benthic organisms are **sessile**, which means they are attached to a substrate. These sessile organisms obtain their food through a process called **suspension** or **filter feeding** where they pump water and catch food at it passes by.

A group of interacting species that live within a certain area and use the same resources is called a **community**. Some species of benthic marine invertebrates form a special type of community called a **fouling** community. If you have ever seen a buoy or dock with a lot of growth on it, then you have witnessed a fouling community at work. Usually, when we head the word "foul" we don't think of something very pleasant, and that's how this community got its name. This community colonizes on the underwater surfaces of ships, boats and docks. Because they slow boats down, fishermen came up with the term "fouling," meaning they disrupt or interfere with natural functions of objects, such as buoys, boats and docks. This community may be considered a nuisance by some; however, there is a lot of **biodiversity**, or variety of organisms, in fouling communities. Species can range from sessile organisms, such as barnacles or tunicates, to freely-moving organisms like crabs, sea spiders and annelids.

Fouling community on a floating dock

Barnacles, bryozoans, and sea grape tunicates on a PVC pipe

Scientists study fouling communities because these invertebrates play an important role in marine environments. Sessile organisms like barnacles create a habitat for smaller organisms. Oyster **spat**, or larva attached to a hard substrate, are an important food source for mud crabs. Fouling communities also provide **ecosystem services**, which arecontributions from ecosystems for the benefit of other organisms. Oysters provide an important ecosystem service by filtering water. One oyster can filter 50 gallons of water per day! Coastal waters would not be as healthy without this ecosystem service. Scientists are also interested in learning more about **invasive species** that are not native and cause harm to ecosystems. Numerous invasive species come to the U.S. through ship ballast water or catching rides on existing fouling communities on international boats and ships.

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MATCHING GAME DIRECTIONS:

Beginner *(grades pre-k to 5):*

This set of cards includes a picture of the invertebrate and its name.

1. Print out two copies of the beginner matching game sheet.
2. Cut out the cards along the lines and arrange the cards face down in any order.
3. Flip over two different cards to see if they are a match.
   - The goal is to match two of the same invertebrates.
4. The person with the most matches at the end of the game wins.

Advanced *(grades 6 to 12):*

This set of cards includes a picture of the invertebrate and a fun fact about it.

1. Print out two copies of the advanced matching game sheet (there should be four pages total).
2. Cut out the cards along the lines and arrange the cards face down in any order.
3. Flip over two different cards to see if you can match the invertebrate with its name and fun fact.
   - An answer key with new vocabulary definitions has also been included for your reference.
4. The person with the most matches at the end of the game wins.

FAN WORM

This sedentary worm uses long ciliated radioles to collect food.

+

=

MATCH!

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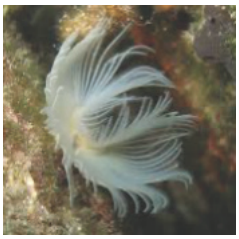
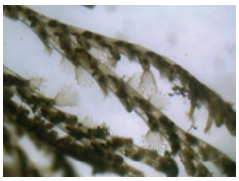
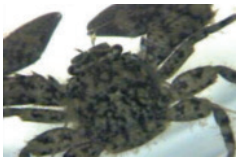
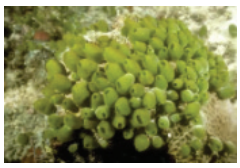
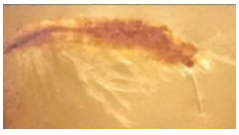
BEGINNER: PRE-K - 5

 FAN WORM	 SEA SPIDER	 BRYOZOAN COLONY	 SEA WHIP
 POLYCHAETE WORM	 IVORY BARNACLE	 HYDROID	 ANEMONE
 SKELETON SHRIMP	 TITAN-ACORN BARNACLE	 SEA GRAPE TUNICATE	 ROUGH SEA SQUIRT
 GRASS SHRIMP	 MUD CRAB	 PORCELAIN CRAB	 GREEN COLONIAL SEA SQUIRT
 AMPHIPOD	 NUDIBRANCH		

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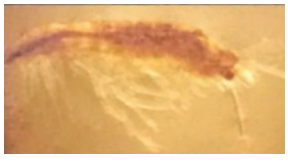
ADVANCED: GRADES 5-12

FAN WORM This sedentary worm uses long ciliated radioles to collect food.		**SEA SPIDER** Sea spiders breathe through their legs via pores in the exoskeleton.	
POLYCHAETE WORM This segmented worm has setae covered parapodia for movement.		**IVORY BARNACLE** Ivory barnacles are hermaphroditic.	
SKELETON SHRIMP Skeleton shrimp move like an inchworm moves on land.		**TITAN-ACORN BARNACLE** They are an invasive species that grow over 5 cm in height and width.	
GRASS SHRIMP They are important indicators of human impacts on estuaries, with populations declining in areas of higher runoff.		**MUD CRAB** Mud crabs prefer living among oyster shells and preying on newly settled oysters.	
AMPHIPOD Amphipods are scavengers that eat decaying algae and plants.		**PORCELAIN CRAB** This invasive species has a flat body and claws.	

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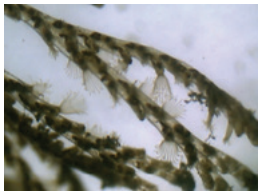
ADVANCED (CONTINUED)

SEA WHIP Nematocysts will appear from the polyps when they are feeding on prey		**NUDIBRANCH** Nudibranchs are shell-less mollusks that are also known as sea slugs.	
ANEMONE Anemones contain stinging tentacles that surround the oral disc.		**BRYOZOAN COLONY** These colonial animals collect food from water with lophophores lined with cilia.	
ROUGH SEA SQUIRT Adults can survive in both salt and brackish water.		**HYDROID** Hydroids are branching colonies of polyps.	
GREEN COLONIAL SEA SQUIRT These tunicates collect food by filtering water through two openings called siphons.		**SEA GRAPE TUNICATE** Sand grains and shell fragments will adhere to them as a form of camouflage.	

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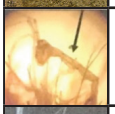
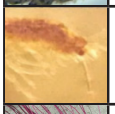
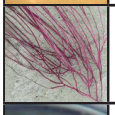
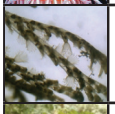
ADVANCED ANSWER KEY

	**FAN WORM** – This sedentary worm uses long **ciliated radioles** to collect food.
	**SEA SPIDER** – Sea spiders breathe through their legs via pores in the **exoskeleton.**
	**POLYCHAETE WORM** – This segmented worm has **setae** covered **parapodia** for movement.
	**SKELETON SHRIMP** – Skeleton shrimp move like an inchworm moves on land.
	**GRASS SHRIMP** – They are important indicators of human impacts on estuaries, with populations declining in areas of higher runoff.
	**IVORY BARNACLE** – Ivory barnacles are **hermaphroditic**.
	**TITAN-ACORN BARNACLE** – They are an **invasive species** that grow over 5 cm in height and width.
	**MUD CRAB** – Mud crabs prefer living among oyster shells and preying on newly settled oysters.
	**PORCELAIN CRAB** – This invasive species has a very flat body and claws.
	**AMPHIPOD** – Amphipods are **scavengers** that eat decaying algae and plants.
	**SEA WHIP** – **Nematocysts** will appear from the **polyps** when they feed on prey.
	**NUDIBRANCH** – Nudibranchs are shell-less **mollusks** also known as sea slugs.
	**ANEMONE** – Anemones contain stinging tentacles that surround the **oral disc**.
	**BRYOZOAN COLONY** – These colonial animals collect food from water with **lophophores** lined with **cilia**.
	**GREEN COLONIAL SEA SQUIRT** – These **tunicates** collect food by filtering water through two openings called siphons.
	**HYDROID** – Hydroids are branching colonies of polyps.
	**ROUGH SEA SQUIRT** – Adults can survive in both salt and **brackish** water.
	**SEA GRAPE TUNICATE** – It will attach sand grains and shell fragments to its body as a form of camouflage.

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VOCABULARY:

Ciliated radioles – feather-like tentacles covered in tiny, hair-like projections (cilia) that are used for feeding

Exoskeleton – hard, external skeleton that protects and supports an arthropod's body

Setae – bristle or hair-like structures

Parapodia – foot-like appendages used for feeding, movement, and respiration

Hermaphroditic – possessing both male and female organs

Invasive species – a species that is non-native and causes harm to the ecosystem

Scavengers – feed on dead/decaying matter

Nematocysts – stinging cells utilized for feeding and protection

Polyp - a type of body form common in animals belonging to the phylum Cnidaria

Mollusks – a soft-bodied invertebrate from the phylum Mollusca

Oral disc – the flat, open end of the body containing the mouth surrounded by tentacles

Lophophores – fan of ciliated tentacles surrounding the mouth that aid in feeding

Cilia – tiny, hair-like projections

Tunicates – marine invertebrates surrounded by a tough, flexible "tunic" made of cellulose

Brackish – a mix of fresh and salt water