

SMITHSONIAN MARINE ECOSYSTEMS
EXHIBIT

OCEAN DISCOVERY AT-HOME

Ages 6-8



Smithsonian
Marine Station Fort Pierce



WHAT'S INSIDE?

Ocean Discovery At-Home is a series of modules designed to be experienced one per day as little morsels of the summer camp experience for a course of five days.

This series will be complemented by Career Dives: Conversations in Marine Science, a live stream summer series with Smithsonian professionals in the marine sciences.

Enjoy!

- INDIAN RIVER LAGOON TRIVIA-**
- INTRODUCING OUR WATERY WORLD-**
- INTRODUCTION TO VERTEBRATES
AND INVERTEBRATES-**
- WHAT'S A FISH?-**
- CAMOUFLAGE CRAZE-**
- ADDITIONAL GAMES-**
- SCHEDULE-**
- CAREER DIVES: CONVERSATIONS IN
MARINE SCIENCE***

Indian River Lagoon Trivia

Florida's coast have a great diversity of dynamic **habitats** (the natural homes of living organism) and **ecosystems** (the combination of interactions that happen between living and non living things in a habitat). At the Smithsonian Marine Ecosystems Exhibit (SMEE) we LOVE highlighting some of them and one of the most important missions of our facility is sharing information about the Indian River Lagoon, an estuary that covers about 40% of the state's eastern coast.

Learn some facts about the Lagoon before jumping into a trivia session!

THE IRL IS AN ESTUARY, NOT A RIVER.

ESTUARIES ARE BODIES OF WATER WHERE SALTWATER FROM THE OCEAN AND FRESHWATER FROM RIVERS AND TRIBUTARIES MIX, CREATING **BRACKISH** WATER.

LAGOONS ARE A TYPE OF ESTUARY SEPARATED FROM THE OCEAN BY BARRIER ISLANDS OR REEFS.

DID YOU KNOW?

THE INDIAN RIVER LAGOON (IRL) IS PART OF THE LONGEST BARRIER ISLAND COMPLEX IN THE UNITED STATES. STARTING AT THE PONCE DE LEON INLET, IT EXTENDS FOR A TOTAL OF 156 MILES AND ENDS AT THE JUPITER INLET.



THE IRL IS THE MOST **BIODIVERSE** ESTUARY IN NORTH AMERICA, HOME TO 2,200 ANIMALS, 2,100 PLANTS AND SO MUCH MORE!

THE FOLLOWING IRL ECOSYSTEMS ARE ESSENTIAL FOR THE HEALTHY DEVELOPMENT OF MANY SPECIES OF AQUATIC ANIMALS:

SEAGRASS BEDS



SEAGRASSES PROVIDE SHELTER AND FOOD FOR SMALL ANIMALS, MAKING THEM GREAT NURSERY HABITATS FOR FISH AND INVERTEBRATES.

MANGROVE FORESTS



MANGROVE FORESTS ARE NOT ONLY NURSERIES, BUT ALSO STABILIZE THE COASTLINE, REDUCING EROSION FROM STORMS, CURRENTS, WAVES, AND TIDES.

HARDBOTTOM ECOSYSTEMS



HARD-BOTTOMS PROVIDE HIDING NOOKS AND PREY FOR ORGANISMS TRANSITIONING OUT OF THEIR NURSERIES AND ON THEIR WAY TO THE OCEAN. MANY OF WHICH ARE OF COMMERCIAL RELEVANCE, INCLUDING SPINY LOBSTER, SHRIMP AND FISHES.

IRL TRIVIA TIME!

PREPARE TO PLAY

You will need access to at least two different screens to play this game of trivia.

A computer screen can be used to display the quiz questions. A phone, tablet or another computer can be used as a controller to submit answers.

Others will be able to join you for the game as long as they also have their own phone!

1) If using a tablet or phone as a controller, download the free Kahoot app from your app store.

2) Copy this link and paste it into your computer's browser to access the trivia quiz:

<https://create.kahoot.it/share/indian-river-lagoon-trivia/bb861580-75c2-4ebd-9454-5f248ef80257>

3) A screen including a preview to the quiz will open. Press "Play as guest" if you do not wish to sign up for an account.

4) Select the green "Classic" game button for single player games or the blue "Team mode" button so various individuals can share one phone as a controller to battle another team using another phone.

5) Submit the pin that will appear on the screen on the Kahoot app. The same pin can be used for all of the players that wish to join the game.

6) Start playing!



Some other resources in case you need to sharpen your Indian River Lagoon facts before trivia time:

- Indian River Lagoon Inventory <https://naturalhistory2.si.edu/smsfp/irlspec/09index.htm>
- One Lagoon Program(biodiversity facts) <https://onelagoon.org/living-resources/>
- Look us up on Youtube for quick and informative aquarium videos!
<https://www.youtube.com/user/SmithsonianSMS>



OVERVIEW

This activity introduces children to the importance of water as a necessary component for life on Planet Earth. Children will reflect on the ways that water is present in their lives. In addition, they will learn about the states of water naturally found on Earth and about the water cycle.

BACKGROUND KNOWLEDGE NEEDED

None.

LEARNING OBJECTIVES

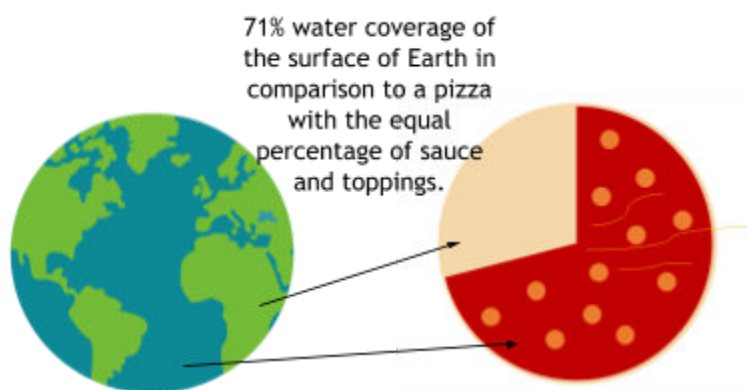
Children will:

- Understand that water is all around and inside us.
- identify the three states of water naturally found on Earth.
- understand the steps of the water cycle and the importance of it for life on Earth.

INTRODUCTION

We are part of a watery world!

Our planet is called Earth because it is mainly made of rock but when we look at it from space it looks mostly blue. Do you know why? That's because most of the rocky coating of Earth is covered by water! In fact, 71% of the surface (what we see) of Planet Earth is covered with water. Imagine planet Earth was a deep dish pizza and ocean water was the pizza sauce covering the majority of the pizza crust, but not all of it. It would look similar to this:



Water is up, down and all around

Water can be naturally found on Planet Earth in three states or forms: liquid, gas and solid. The liquid form of water falls from the sky as rain and can be found in the ocean, rivers, lakes, and under the ground. Those watery environments are home to many animals and plants. They are also places where humans find food, explore, and have fun. The solid form of water can be found on Earth as ice, snow, hail and glaciers. Glaciers are really important because they keep the planet cool enough for life to exist as we know it. The gas form of water, also known as vapor, is found around us, over the air and up in the sky.

If you heat ice, it will become liquid water and if you heat liquid water, it will become gas or water vapor! It's almost like the three states play dress up as each other in a never ending cycle known as the water cycle. The water cycle controls the flow of water all over the planet and influences weather and climate.

Check out this video about the water cycle by SciShow kids to learn more:

<https://youtu.be/ROK7VKkksyc>



LIQUID WATER



WATER VAPOR



SOLID WATER



Water and life

Did you know that water is the main ingredient for life?

Think about it... if you go too many hours without drinking water or sweat a lot after running around you start getting really thirsty. If your parents go too many days without watering their plants they go droopy. Your pet most likely will ask for water if their bowl is empty. There is no way the bodies of people, animals or plants could keep them alive without water.

Check out this video from Peekaboo kidz to find out why we need to drink water:

<https://www.youtube.com/watch?v=31F0laJjyy8>

You most likely used water to brush your teeth this morning and your parents used water while cooking your meals or washing the dishes. Which other ways has water appeared in your life in the last week? These are only some of the reasons why water is important and necessary for life in our Planet. Look around and you will find the many ways that water makes life on Earth possible.



ACTIVITY I: AQUA CHARADES!

Through this activity children will explore the importance of water for people, animals and plants.
(Extracted and modified from the “[GROWING UP WILD](#)” MANUAL BY PROJECT WILD - Association of Fish and Wildlife Agencies)

MATERIALS

- Cups of water
- One sheet of paper per person (write “people”, “animals” and “plants” at the top of each one and illustrate with a drawing.)
- Writing materials

INSTRUCTIONS FOR PRELIMINARY THOUGHT EXERCISE

1. Get an adult to conduct this activity with you. Gather up your neighbourhood friends or family members that are similar ages to yours.
2. Start the activity by encouraging everyone to drink a cup of water.
3. Discuss the following questions as a group:
 - How do you feel when you drink water? How do you feel when you don't drink enough?
 - Have you ever seen a plant that someone forgot to water? What did it look like?
 - Do your pets at home or school need to be given water as part of your care routine?
 - What do you like about water and what makes it special?

WATER CHARADES INSTRUCTIONS

1. Choose a moderator (most of the time this will be an adult). The moderator will take care of asking questions and giving instructions. They will also be in charge of writing down all of the answers acted out to answer a specific question about the use of water.
2. Determine how people will be taking turns.(ex: youngest to oldest, clockwise, counterclockwise,etc.)
3. The moderator asks everyone to think of ways they and other people use water.
4. Players take turns acting out their ideas (ex:drinking, bathing,swimming, cooking) and the rest of the group has to figure out what they are trying to act out.
5. When an answer is discovered for each turn, the moderator will represent it with a drawing on the piece of paper labeled “people”.
6. When everyone runs out of ideas for this question, review the drawings/uses under “people” and put them into groups: Which uses are fun? Which uses are important to stay healthy? Which uses are important for our homes? Are there any uses you would be willing to give up?
7. Repeat steps 3 through 5 for animals and plants.
8. Look at all of the lists and discuss: Which uses are essential for all living things? How are the ways that people, plants and animals use water similar? How are they different?
9. Finish the game by reflecting on the question Why is water important?

Modifications

Easy level: Have three bowls, each one labeled “people”, “animals”, “plants”. Into each bowl, put multiple pieces of paper describing ways people, animals and plants use water. Instead of coming up with these uses, children will just act them out after randomly drawing the papers and the rest will guess. Reflection questions are still the same.



ACTIVITY II: THE WATER CYCLE IN A BAG

Through this activity children will explore the different steps of the water cycle. At the end of the activity, they will be able to identify the driving forces for the water cycle and name the three steps that occur in it.

MATERIALS

- 2 Cups of water
- Blue food coloring
- 1 Marker (use dry erase if you wish to reuse bags afterwards)
- 2 Ziplock bags or reusable silicone bags (1 quart) *please reuse or recycle
- Duct tape
- Ice (5-6 cubes - enough to make a layer of “[sea ice](#)”)
- Watch
- Access to a window, door, wall or stair railing that has good exposure to sunlight
- Pencil to write
- Printed copy of the observation sheet. Find it here: <https://bit.ly/2ZqwcCU>.

INSTRUCTIONS

Today, you will conduct a small experiment. You will follow a set of steps to create the water cycle in two plastic bags, one with lukewarm (the temperature of the environment around you) water and one with water and ice. After setting up the experiment under a sunny area, you will take observations over time to see how the cycle plays out. Once all the steps of the water cycle are completed in each bag, you will compare both bags and think about what happened, how it happened and how the process was similar or different between both bags.

Prep your bags

- 1 - On the front side of your first bag, write: “B1: Water + Sunlight”
- 2 - On the front side of your second bag, write: “B2: Water + Ice + Sunlight”
- 3 - Flip both bags around to show the back side. Decorate your bags by drawing waves on the bottom (where the water will cover), clouds on the top and any other little animals you may want to show in your water cycle bags.
- 4 - Put 5-6 drops of blue dye into the container with the two cups of water. Mix well.
- 5 - Add one cup of blue water to each one of the bags, making sure it doesn’t spill and doing your best to keep splashing to a minimum. If any splashing occurs and drops of water end up sticking to the sides of the bag, just remove them gently with a towel.
- 6 - Add ice into bag number 2
- 7 - Close your bags.





INSTRUCTIONS

Take it outside

8 - Tape your bags to a door, wall, staircase railing or window that gets a lot of sunlight. Write down the time, describe the bags or draw them and describe the temperature of the water (hot or cold) in each bag using the observation sheet.

Observe

9 - You will make observations of your bags every 15 minutes until the ice melts completely in bag 2.

Draw the bags to show any changes happening every time you notice something different. Write down the time every time you notice a change.

10 - After ice melts in bag 2, go outside every 60 minutes (1 Hr) to look at your bags.*

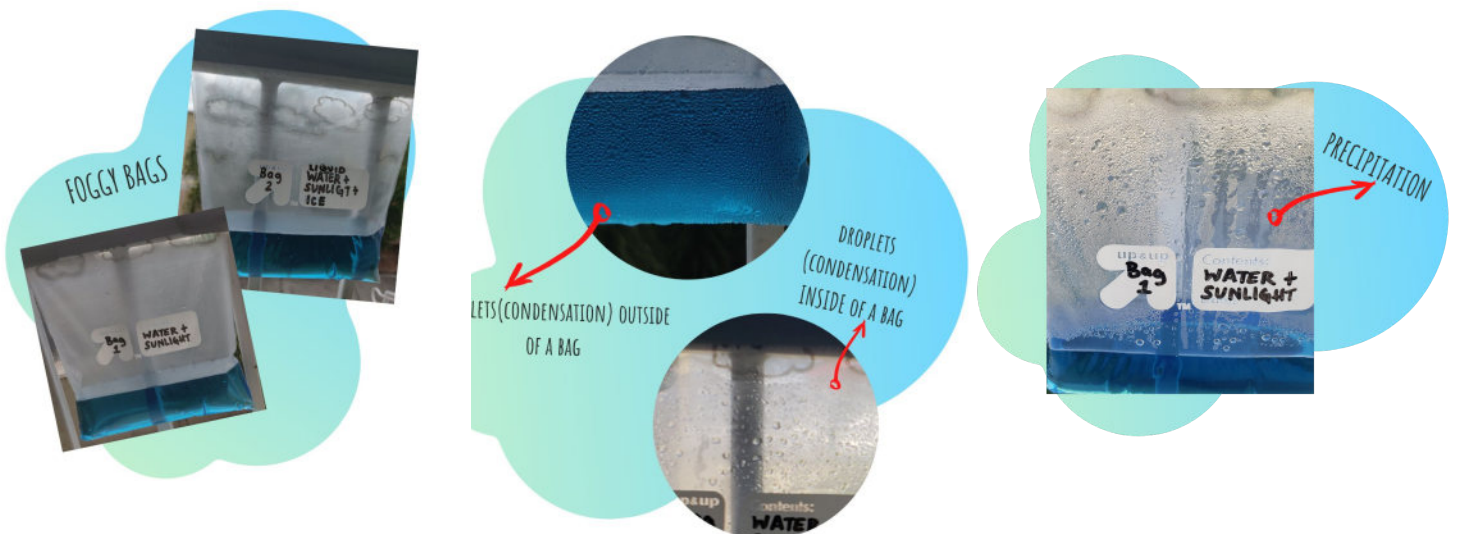
Write down your observations.

*Please be patient! Depending on the water (sunny or rainy) this experiment may take up to one day.



What to look out for during the period of observation?

- 💧 *Fog in bags means there is evaporation happening! The liquid water is turning into vapor.*
- 💧 *Bags that have little droplets of water stuck to the sides (inside or outside) are showing condensation! Remember, condensation happens when warm water vapor all of a sudden touches air or a thing that is cooler and turns into drops.*
- 💧 *If you are able to tap your bag, and the water droplets start falling down the sides of the bag and into the water, you are seeing precipitation. You are making it rain in the bag!*





LET'S REFLECT ABOUT THE WATER CYCLE IN OUR BAGS:

WHY WAS IT IMPORTANT TO PUT THE BAGS UNDER THE SUN FOR THE WATER CYCLE TO HAPPEN INSIDE EACH BAG?

WHICH BAG WENT THROUGH THE COMPLETE CYCLE FIRST? HOW LONG DID IT TAKE (IN HOURS)?

DO YOU THINK THE ICE AFFECTED THE EVAPORATION PROCESS IN BAG TWO? HOW?

HOW DO YOU THINK SEA ICE CAN BE HELPFUL FOR THE ANIMALS AND PLANTS THAT LIVE IN COLD PLACES LIKE THE NORTH AND SOUTH POLE?

DID YOU NOTICE ANYTHING ABOUT THE COLOR OF THE CONDENSATION DROPLETS? WERE THEY BLUE? WHAT DID YOU NOTICE AND WHAT DO YOU THINK HAPPENED?

WHAT DO YOU THINK WOULD HAPPEN IF YOU LEAVE THE BAG OUTSIDE OVER MANY DAYS? WOULD THE CYCLE STOP OR KEEP ON HAPPENING?

CONGRATULATIONS! YOU FINISHED YOUR EXPERIMENT.



OVERVIEW

This module introduces campers to two of the major taxonomic groups in the animal kingdom: vertebrates and invertebrates. Campers will venture out on a nature walk (around the neighbourhood, on a trail or at the beach) to observe how many vertebrates and invertebrates they can identify close to home. The nature walk experience will serve as inspiration as campers reinforce their observational skills matching vertebrates to their skeletons and inventing an invertebrate. By the end of this module campers will be able to identify all of the main groups of vertebrates and some of the most commonly known groups of invertebrates in the planet by recognizing characteristics shared within each classification.

BACKGROUND KNOWLEDGE NEEDED

None.

LEARNING OBJECTIVES

Campers will:

- understand that living organisms are grouped according to their physical characteristics and behavior.
- learn what it means to be a vertebrate or invertebrate animal.
- get to know major groups of vertebrates and invertebrates.

INTRODUCTION

Do you know how to count up to 8 million? Can you imagine what it would look like to have 8 million pieces of your favorite snack available to you? Would they fit in a house or would you need a huge field to fit them? The world may never know...but we can agree that 8 million is an extremely BIG amount, and according to the [Census of Marine Life](#), there are about **8.7 million species** or kinds of living organisms on Planet Earth, many of which are yet to be discovered and studied!

All of the organisms on Earth are very diverse and can be hard to study and understand. More than 200 years ago there existed a man known as **Carl Linnaeus** who dedicated his life to studying living beings. Linnaeus came up with a system that helps scientists organize all of life into groups, making it a little easier to keep track of species, where they come from and how they relate to one another. He is now known as the father of taxonomy, the science that names, describes and classifies organisms into groups. Although this science keeps on growing and changing with the evolution of technology, the focus remains in grouping biodiversity (the diversity of life) based on common characteristics.

This module will teach you about the two major groups into which **animals** (organisms that eat other living things to stay alive) are divided: vertebrates and invertebrates.

Check out these videos from Peekaboo Kidz to get a short introduction for each:

What are vertebrates? <https://youtu.be/R50Xc1EUHwg>

What are invertebrates? https://youtu.be/Sr_T4skBYNo (Please note that “arthropods” is a grammatical error. The right word is “arthropods”.)



These infographics offer a general overview for each group:

VERTEBRATES

Have backbones

KEY: = AQUATIC HABITAT = LAND HABITAT

FISH

Habitat:

Characteristics:

- Most are cold blooded.
- Have gills, fins, and scales.

AMPHIBIANS

Habitat:

Characteristics

- Most have four legs or appendages.
- Slimy, moist skin.

BIRDS

Habitat:

Characteristics

- Have beaks and their bodies are covered in feathers.
- Lay eggs to reproduce.

REPTILES

Habitat:

Characteristics

- Skin covered in scales.
- Cold blooded. Use behavior to get warm.

MAMMALS

Habitat:

Characteristics

- Have hair. Some have modified hairs.
- Give life birth and nurse their babies.

INVERTEBRATES

LACK A BACKBONE

30 MAJOR GROUPS OR PHYLLUMS

MOST DON'T GROW A SKELETON

SOME GROW PROTECTIVE EXOSKELETONS (EXTERNAL)

EXAMPLES:

KEY: = AQUATIC HABITAT = LAND HABITAT

SPONGES

Habitat:

Characteristics

- No tissues or organs.
- Filter water.

CORALS & JELLIES

Habitat:

Characteristics

- Gelatinous bodies.
- Have stinging cells.

MOLLUSKS

Habitat:

Characteristics

- Mostly soft bodied.
- Some have shells.
- Some have a muscle called muscular foot for movement.

ECHINODERMS

Habitat:

Characteristics

- "Spiny skin"
- Water-based vascular system.
- Skeletons made of calcium carbonate.

ARTHROPODS

Habitat:

Characteristics

- Jointed appendages
- Exoskeleton



Activity I: Take a Nature Walk

Practice your observation skills by looking for vertebrate and invertebrate animals around your neighbourhood.

MATERIALS

- Nature journal (could be any notebook) or a copy of the observation sheet:
<https://bit.ly/3dlCge1>
- Pencil or pen
- Optional: Camera to take pictures of the animals and coloring pencils/crayons
- Note: Bring the infographics along to help you tell if an animal is a vertebrate or invertebrate and the major groups it belongs to.

ACTIVITY INSTRUCTIONS

- Talk to your parents or guardian about going out for a walk around the neighbourhood, the beach or a trail so you can put your vertebrate and invertebrate knowledge to practice. The walk can be as short or as long as you want. This nature walk is just an opportunity for learning and enjoyment.
- Print out a copy of the nature walk observation sheet or write down the categories of the sheet into a notebook and bring it with you.
- Go explore your surroundings. Do your best to spot all of the animals around you! You might be surprised to find out there is a great amount of animals even in your backyard.
- Look up at the sky, around trees, shrubs, grassy areas and even in and around puddles.
- Write down observations about the animals you are seeing:
 - Do you know what type of animal it is already?
 - If not, can you describe how it looks? Use the characteristics learned from the videos and infographics to help identify important characteristics.
 - How many are there?
 - How is it acting?
 - Sketch the animals you are observing.
 - Can you tell what major animal group it belongs to?
 - Can you call it by its common name?

ENJOY YOUR NATURE WALK AND BE RESPECTFUL OF THE ANIMALS AND THE PLACE YOU ARE VISITING.
Happy exploring!

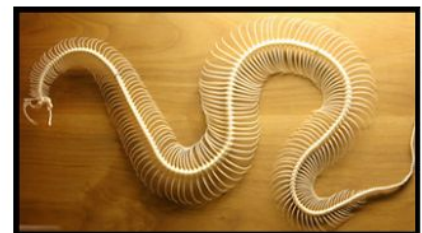
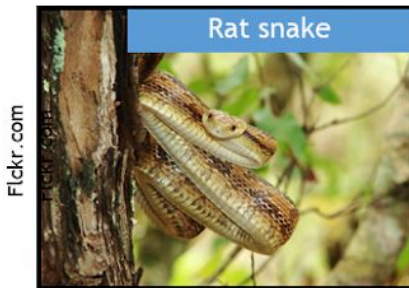
Suggested Modification

- **Learners ages 9-11 and advanced learners ages 6-8**
Download the FREE iNaturalist app on your phone, register and share your observations with the rest of the community! Once you spot your vertebrate or invertebrate, take a clear picture and upload it as an observation. iNaturalist has a really cool feature where it suggests species identification for your observations. Bring any species identification books available at home in case iNaturalist isn't able to accurately identify your animal. Here is a list of video tutorials for the app:
<https://www.inaturalist.org/pages/video+tutorials>



Activity II: Vertebrate Match

Draw a line to match each vertebrate animal to their skeleton.



Advanced activity for kids ages 9-11:

Print out an enlarged version of a fish skeleton (here: <https://bit.ly/3fLQAnR>). Use modeling clay to build a 3D version of the skeleton by laying each piece of clay bone structure on top of the flat sheet of paper. Once you are done, identify: the vertebral column, caudal fin, dorsal fin, anal fin, pectoral fin, operculum (hint: protects the gills), and lower jaw.

(Answer sheet here:)

Answer for matching game: <https://bit.ly/2LsRZlw>



Activity IV: Invent an Invertebrate

In this activity you will create an invertebrate of your own. As you create your invertebrate, read through the worksheet and think about how your creature would survive and where it would live. There is no wrong way to make your invertebrate! As you are working on your invertebrate or after you have finished making it, answer the questions on the worksheet.

MATERIALS

- Invent an invertebrate worksheet here:
<https://www.stlucieco.gov/home/showdocument?id=7642>
- A variety of random craft supplies (paper cups, paper plates, pipe cleaners, toothpicks, pom-poms, googly eyes, markers, crayons, string, etc.)
- Glue and/or tape

ACTIVITY INSTRUCTIONS

- Watch this video for instructions and an example: <https://youtu.be/-Buw65sTRE>



Activity V: I'm a Little Vertebrate Song

Extracted from the "GROWING UP WILD" MANUAL BY PROJECT WILD - Association of Fish and Wildlife Agencies

(To the tune of "I'm a little teapot")

*I'm a little vertebrate
With fins and tail
I breathe underwater
And I have lots of scales
What am I? (Fish!)*

*I'm a little vertebrate
With hollow bones
A beak and feathers
And a nest called home.
Who am I? (Bird!)*

*I'm a little vertebrate
With smooth, wet skin,
I'm born in the water
But then live on land
Who am I? (Amphibians!)*

*I'm a little vertebrate
With fur and hair,
My mother gave me milk
And raised me with care
Who am I? (Mammal!)*

*I'm a little vertebrate
With scaly skin.
You can find my eggs
Buried in the sand.
Who am I? (Reptile!)*



OVERVIEW

This module will introduce you to the basic characteristics used by scientists to identify specific aquatic animals as fish. You will learn introductory terms about the fish anatomy through an interactive activity that will set the stage for creating your very own species of fish using [OET's Any Fin is Possible Module!](#)

BACKGROUND KNOWLEDGE NEEDED

Basic knowledge of marine environments and habitats.







LEARNING OBJECTIVES

- Understand not all animals that live in the water are fish;
- Learn the list of characteristics that scientists use to designate an aquatic animal as a fish;
- Learn and recognize the basic body parts that most fish share and the function of these body parts;
- Identify different physical adaptations of fish to help them survive in a specific environment.

INTRODUCTION

What are fish?

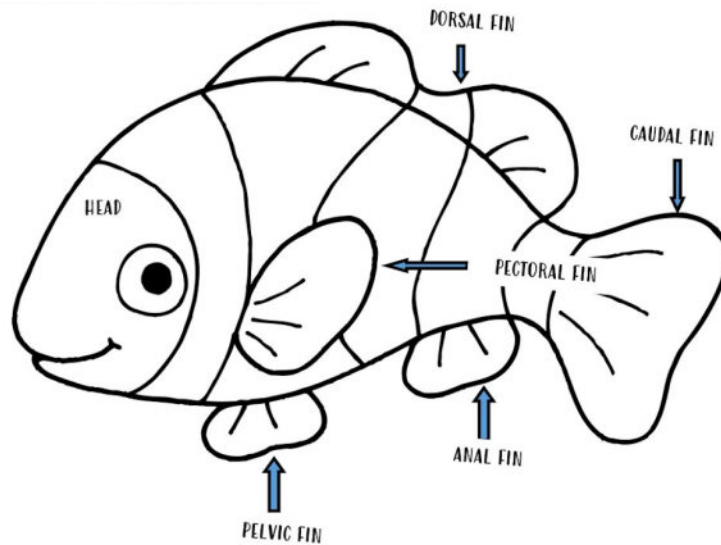
These are the five characteristics scientists use to tell fish apart from other aquatic (water based) animals:

-  Fish live in **aquatic** (water-based) environments such as rivers, streams, lakes, ponds, estuaries, and oceans. Marine fish can be found all over the world from the shallowest parts of the sea, to the deepest, darkest, and coldest corners of the deep ocean.
-  Fish are **vertebrates**, animals with backbones that provide the basic structure for swimming.
-  Fish are **cold blooded** (also known as *ectotherms*). Contrary to us humans, their body temperature is affected by the temperature of the environment.
-  Fish have **gills**, structures located close to their faces used for breathing. Water enters the mouth and passes through the gills, oxygen is extracted and water exits through the gill opening.
-  All fish have appendages known as **fins**.
-  The skin of many fish is covered in protective **scales** which can vary in shapes and sizes.

Check out the introductory video for "WHAT'S A FISH" HERE: <https://youtu.be/Ozz3X-P3HhQ>



Fish anatomy



For an introduction to fish anatomy, check out this video: <https://youtu.be/BE9QlaP7sIU>

- 🐟 **Eyes:** Fish eyes are sensitive to light and help them navigate the environment to find food. Very often, eyes are specialized for specific conditions, like perceiving minimally available light in the deep sea.
- 🐟 **Mouth:** Mouths help fish eat and pump water towards their gills for breathing. They are shaped according to what fish eat. Some fish open their mouths wide to show power over a territory. There are species, like the [banggai cardinalfish](#), who practice mouthbrooding to protect their eggs and larvae (babies) until they are ready to face the ocean on their own.
- 🐟 **Dorsal fins:** Located along the top of the body, dorsal fins keep fish from rolling on their sides. Elongated fish like Eels use them as their main form of propulsion.
- 🐟 **Pectoral fins:** Pectoral fins come in pairs and are located on either side of most fish, helping them maneuver from side to side and gain forward propulsion. [Flying fish](#) use their pectorals for gliding!
- 🐟 **Pelvic Fins:** These paired fins can be located in various positions along the ventral(bottom) part of fish. They provide stability for fish and serve as the brakes for some, helping them stop whenever necessary.
- 🐟 **Anal fins:** Located on the ventral and back area of the body, these keep fish from rolling on their sides.
- 🐟 **Caudal fin (the tail of the fish):** Helps push fish forward and turn or steer from side to side.



Activity I: The Fish Anatomy Song and Dance

MATERIALS:

- ❑ Computer or phone with access to the internet
- ❑ Video with the tune of “Head, shoulders, knees and toes” song:
<https://www.youtube.com/watch?v=lpBFYRatzzc>

INSTRUCTIONS

- Sing the “Fish Anatomy Song” to the tune of “Head-shoulders-knees and toes” and do the fish anatomy dance as instructed below. The tune of the song will get faster with each of the four repetitions. It is your job to try to keep up with it by trying to sing and dance to the rhythm! Here is an audio demonstrating how the lyrics would sound:
<https://drive.google.com/file/d/1BeKHaPiwpmnmWT8mrhcJMLMWiYnMWtci/view?usp=sharing>
- Make sure that the adult in charge sets a finish line so everyone can race towards it at the end of the song. At the end of the song, the adult shouts: “Now swim, swim, swim, swim!” and campers must race to the finish line!

Fish Anatomy Song

Lyrics and dance instructions:

*Ventral, Dorsal, **point to your belly and your back**
Head and Tail **point to your head and your feet**
Head and Tail **point to your head and your feet***

*Pelvic Fin, **wiggle fingers on the sides of your belly while forming a fin with hands**
Dorsal Fin, **shark fin over the back of your head**
Caudal Fin **wiggle feet***

*Now watch me swim **freestyle!**
With Pectoral Fins, **extend hands and wiggle fingers**
And my gills **wiggle fingers on both sides of neck**
They help me breathe and swim!*

(Repeat 3 more times while staying on track with the rhythm!)



Activity II: Fish Anatomy Coloring

MATERIALS:

- ❑ One copy of the fish anatomy coloring sheet per camper. Answer key found as second page of this pdf document.: <https://bit.ly/3clstdN>
- ❑ Crayons or coloring pencils (yellow, red, orange, pink, green, blue)

INSTRUCTIONS

- Color each of the body parts on the seahorse and clownfish drawings as indicated on the fish anatomy coloring sheet.
- Check the answer sheet to see if you were right after finishing.

FISH ANATOMY

COLOR EACH OF THESE FISHES' S BODY PARTS ACCORDING TO THE FOLLOWING INSTRUCTIONS. MAKE SURE TO ASK YOUR INSTRUCTOR IF YOU HAVE QUESTIONS.

- HEAD: YELLOW
- DORSAL FIN: RED
- PECTORAL FINS: ORANGE
- CAUDAL FIN: PINK
- PELVIC FIN: GREEN
- ANAL FIN: BLUE
- PAINT THE REST OF THE FISHES HOWEVER YOU LIKE.

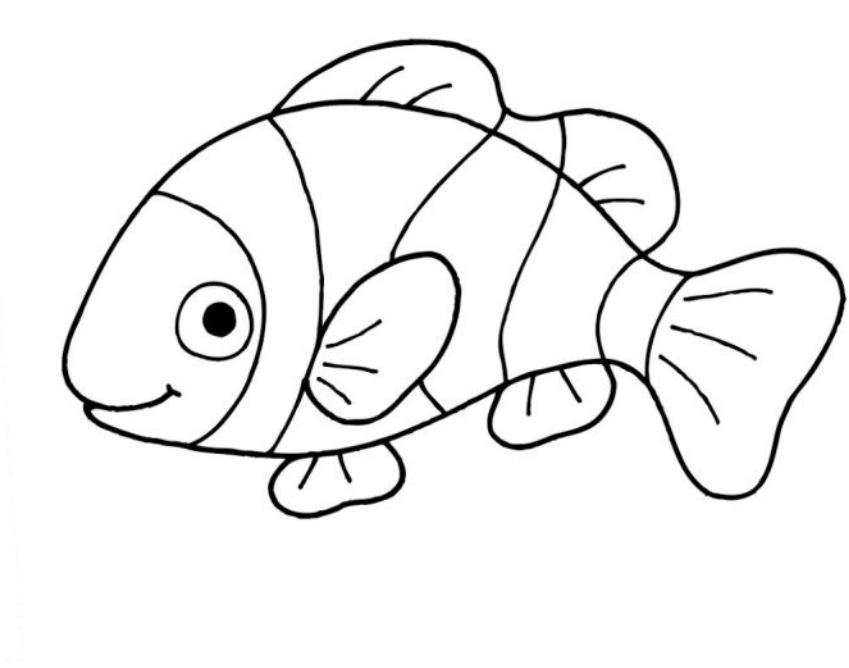
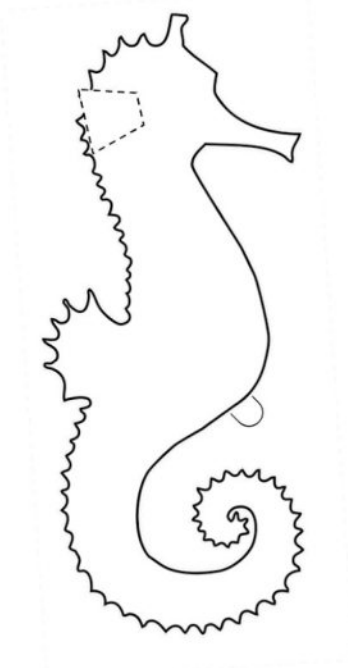


Image: This is how the fish anatomy coloring sheet looks.



Activity III: Any Fin is Possible

MATERIALS

- Introductory Level: Any Fin is Possible Printable Body Parts and Overview of adaptations. Found here: <https://bit.ly/2YttbkV>
- 4 containers (box/large envelope/bags) containing:
 - Body Shapes Descriptions + Cutouts
 - Fin Design Descriptions + Cutouts
 - Mouths Descriptions + Cutouts
 - Sensory structures/additional features + cutouts
 - 1 pair of kid-safe scissors per child
 - 1 set of crayons and coloring pencils
 - Glue sticks, glue dots or clear tape
 - New Species worksheet found [here](https://bit.ly/2yPyQH2): <https://bit.ly/2yPyQH2>

SET-UP INSTRUCTIONS FOR PARENT OR GUARDIAN:

1. Set-up 1 container for each of the cards included in the Any Fin is Possible activity pack.
2. Cut each body part including their number and place them inside the respective container: body shape, fin design, mouths, and sensory structures.

INSTRUCTIONS: *Time to make your own fish!*

- Now that you know the basics of fish anatomy, visit the following links with the supervision of an adult to observe four species of fish that live in different habitats. Think about how their bodies have adapted to survive within those specific conditions:
 - Flounders: <https://www.youtube.com/watch?v=EIMRSt40OMk>
 - Humphead Parrotfish: <https://youtu.be/o-blz2ghKOU>
 - Gulper Eel: https://www.youtube.com/watch?v=iT_EMK12A3Y
 - Sargassum fish: <https://youtu.be/Wb-j6-rzmc0>
- Explore the four different containers of body parts and the adaptations cut-outs inside. Try to match each shape with their description to learn why each adaptation is helpful to fish.
- Grab your [New Species Worksheet](#) and read the sentences on the top. Ask for help from an adult if you are learning to read. Use those sentences as inspiration while you use the body parts inside each container to create a new species of fish. Cut, color and assemble!
- Fill in the blanks of the New Species Worksheet and draw a habitat for your fish.
- Place your new species of fish on top of the habitat drawing.
- Share on social media by tagging us on Facebook, Instagram and Twitter at @SMSEducation.



WHAT'S A FISH? (Ages 6-11)

Here is an example of a new species of fish:

This fish is commonly known as a shiny-nose tripod fish.

This species lives in the deep water coral environment. They move slowly.
(photic, aphotic, water column, seafloor, etc.) (slowly, quickly, explosively, etc)

thanks to their long, slender body and continous fins. Their mouth is located bellow their shiny nose.
(body shape, color) (fin shape) (mouth shape or description)

allowing them to eat small fish & shrimp attracted by the bioluminescence coming from their nose.
(favorite prey item)

SEE MY FISH IN ITS ENVIRONMENT: THE DEEP WATER CORAL ECOSYSTEM



OVERVIEW

This module will introduce you to the concept of camouflage. You will learn why camouflage can be a winning adaptation for survival in the sea by playing a series of three fun games where you will either be a predator or prey.

BACKGROUND KNOWLEDGE NEEDED

Having a general idea of the definition of the word adaptation.

LEARNING OBJECTIVES

After this activity you will be able to explain what camouflage is using your own words, give examples of camouflage in the sea and explain its importance for animal survival.

INTRODUCTION

Surviving in the wild can be a pretty difficult mission. There are open spaces all around, light shines for at least the first 200 meters of depth (a little less than the length 2 football fields) and the movement of life never really stops. Out in the sea it is eating-o'clock for someone at all times, so animals need to have some pretty good strategies to outsmart those who could eat them (predators) or those whom they want to eat (prey).

Have you ever watched an octopus changing colors to match the seafloor as it walks along the sand? How about being stung by a jellie while swimming at the beach without ever being able to find the culprit? That, my friend, is the power of CAMOUFLAGE! Camouflage is an adaptation that allows some animals to blend in with their environment, making them really hard to spot.

Can you think why camouflage might be helpful for animals?

It's all about predation. Predation is the scientific word that describes what happens when a predator eats prey. An animal could take the role of the predator, the prey, or both. When a predator like the Sargassum fish on the next page blends in with their habitat, they tend to sneak up on their prey before opening their mouths wide and eating them. We call these ambush predators.

Today you will test your predatory and camouflaging skills while playing three games as part of a camouflage craze!

But before jumping into the activities, check out some examples of experts in the art of camouflage that have been collected from the coastal waters of Florida and displayed at some point at the Smithsonian Marine Ecosystems Exhibit.



CAMOUFLAGE EXPERTS FOUND IN FLORIDA WATERS



DECORATOR URCHIN



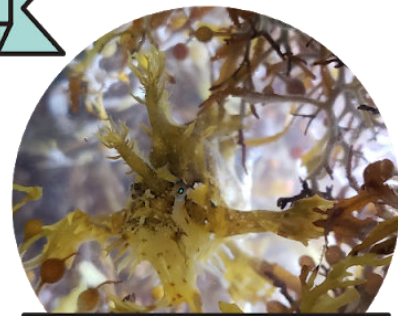
SCORPION FISH



FLOUNDER



PIPEFISH



SARGASSUM FISH



Activity: Hunting M&M Candies

Test your predator skills by trying to fish as many camouflaged M&M candies as possible in a sea of Skittles candies.

Activity from [Scientific American's Science Buddies](#)

MATERIALS

- Five medium sized containers to hold candy
- Plain M&Ms, at least 10 of each color (At least two 1.69-ounce packages may be needed)
- Skittles, at least 60 of four of the colors- there are 5 colors in each bag (At least one 16-ounce package may be needed)
- Metal pie tin or sturdy plate (please reuse after game to decrease waste)
- Timer or stopwatch
- One to four "predators" who are up for devouring some M&Ms

SET-UP INSTRUCTIONS

- Count and place 10 M&Ms of each color into one of the containers. This means you should have 10 yellow, 10 blue, 10 green, 10 brown, 10 red and 10 orange M&Ms candies in that one container (making a total of 60 candies in the bag).
- Count and place 60 Skittles of your favorite four colors into their own container (four separate bags each containing a separate color). This means you should have one container per 60 Skittles. Orange, yellow, green, and red candies are great because they will make it for a more challenging game.

ACTIVITY INSTRUCTIONS

1. Choose a person to run the timer and keep track of the time for each round. They will also make sure no one cheats. This game allows for a maximum of four players.
2. During this game you will pretend to be hungry M&Ms-feasting birds! Make a "beak" using your pointer finger and thumb for collecting M&Ms. You will have 20 seconds to use your beaks to quickly pick up M&Ms and put them in your other hand. Once you are done with the activity, you will be able to eat the same number of candies as you picked up. DO NOT EAT the candies until you are done with the activity.
3. Avoid picking up any Skittles candies, because Skittles make the M&Ms birds sick. The M&Ms are your **prey**, and the Skittles represent the **habitat** in which the M&Ms live—and try to use as camouflage.
Time Keeper asks: How do you think the Skittles habitat will work to camouflage the different colored M&Ms prey?
4. Pour one prepared container of Skittles into a metal pie tin or sturdy plate(one color only). Mix in the prepared container of M&Ms. Put the pie tin in the middle of your group of M&Ms birds or in front of the one predator. Make sure everyone can reach the pie tin.
Time Keeper asks: Which M&Ms are the best camouflaged in your pie tin?

**ACTIVITY INSTRUCTIONS (CONTINUED)**

5. Set the timer for 20 seconds.
6. The time keeper will say "Go!" and start the timer. When the timer beeps, make sure everyone stops picking up M&Ms.
7. Count the number of each M&Ms color that each person collected. Also count any Skittles that were picked up. Make sure to keep track of the amount of M&Ms being picked up by each person.
Time Keeper asks: Which M&M color was the least-picked one? What do you think this has to do with camouflage?
8. Put all of the M&Ms back in the container you prepared them in (including M&Ms that people picked). Remove the Skittles you used for the habitat (by pouring them off the pie tin).
9. Repeat the 20-second M&M hunt with the other prepared containers of Skittles until you have tested each Skittles habitat (separately) with the M&Ms.
Time Keeper asks: For each Skittles habitat, which M&M color was the least-picked one? Can you explain what this has to do with camouflage?

THE PREDATOR THAT PICKED UP THE MOST AMOUNT OF M&Ms WINS!
Everyone gets to eat Skittles and M&Ms!



Game: Hiding in Plain Sight

Camouflaging is a great strategy used by animals for hiding from predators by using the colors of their own bodies to blend in with the environment. In this game of hide (in plain sight) and seek, players will test their camouflaging skills by trying to hide as many animal toys in plain sight as possible and preventing predators from finding them in a specific period of time. Predators will test their observation skills by trying to find as many animals as possible per round.

Activity adapted from "[GROWING UP WILD](#)" by the Association of Fish and Wildlife Agencies

MATERIALS

- 10-15 animal toys (Mega sized plushies will not work for this activity. Keep them small to medium sized.)
- Timer

SET-UP INSTRUCTIONS

- This activity can be played inside or outside.
- Two or more players necessary.
- As many rounds as desired can be played. Changing the location each round (ex: one round in the yard, one in a room of the house, one in the garage) helps extend the game and explore different camouflaging techniques.
- Select 10-15 animal toys to use for the game.
- Select a field, yard or a room in your house to serve as the first "habitat" for your animals to camouflage. Make sure to set up boundaries for the game if playing outside.
- Have the timer ready. Hiders will have 3 minutes to hide animals in plain sight. Predators will have 1 minute to look for prey.

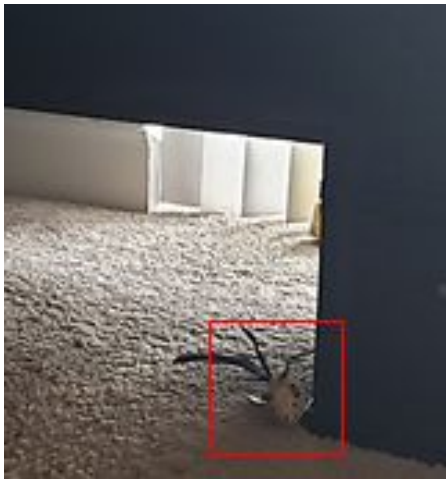
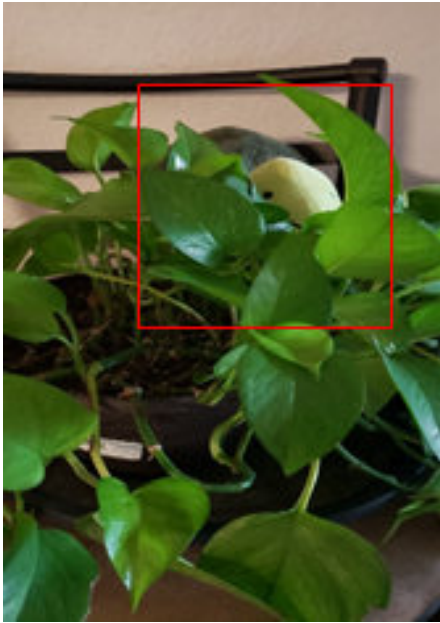
ACTIVITY INSTRUCTIONS

1. Determine who will be the person in charge of hiding the animal toys for the first round.
2. The rest of the members of the group will close their eyes as the hider gets 3 minutes to hide the animal in a specific area. If they are hiding the toys inside one room, for example, close the door and keep predators in another room as they wait with the timer. Predators can scream "Time!" when the three minutes are over.
3. The twist of this game is that the hider cannot cover the animal toys. They must do their best to hide the toys in plain sight. The toy must always be visible.
4. Once hiding time is over, set up the timer for 1 minute. Predators will go into the room and catch as many animal toys as they can without any help.
5. Once the minute is over, each predator will count how many toys they found. The person that gets the most toys wins the round and will be the hider for the next one.
6. Determine if all the toys were found or if any are still in hiding, get the hider to get them.
Discuss why it was harder to find some of the toys.
Was camouflage effective for all or only a few of the animals in this habitat (room)? Why is that?
Camouflage is not effective for all animals in all environments.
7. This is the point when the group must decide if they wish to change habitat (locations around the house or field).



8. Repeat the hiding and seeking cycle until everyone is ready to stop the game.
9. The person with the most victories per round, wins the game.

EXAMPLES:





Outdoor Game: Camouflage

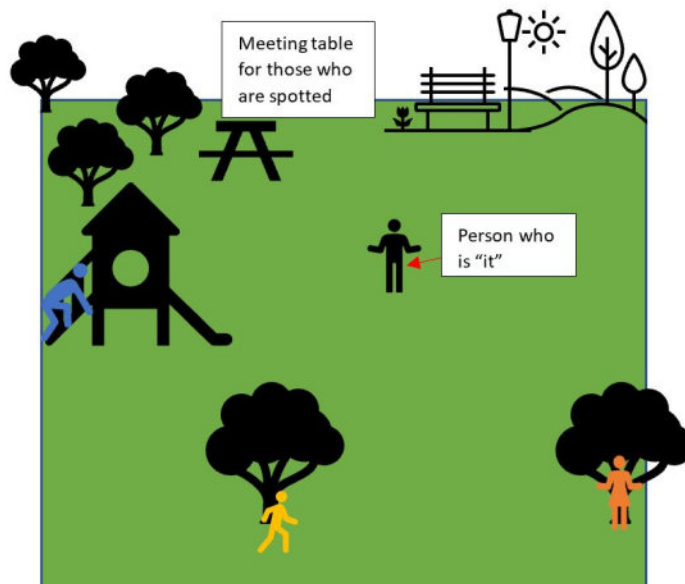
SET-UP INSTRUCTIONS

- This activity must be played outside. The center of the space must be cleared up so children don't stumble with obstacles. Trees, shrubs, or articles of multiple colors are good to have around for camouflaging/hiding.
- Three or more players.
- As many rounds as desired can be played.

INSTRUCTIONS

1. Select one person to be "it". They must stand around the center of the playing area, close their eyes and count to 30 while everyone else runs to hide!
2. Once the 30 seconds are up the person who is "it" may open their eyes and try to spot the people hiding. They can look all over, however they must keep one foot planted at all times. They must call out who they see, for example: "I see someone in an orange shirt hiding behind a tree." "I see someone in a blue ball cap hiding behind a trash can."
3. Once someone is spotted they must come out of hiding and return to a pre-designated area. The people that have been spotted must not give away the location of the others.
4. After the person who is "it" can no longer spot anyone, they will count to 3 and shout camouflage ("1, 2, 3, CAMOFLAUGE"). Everyone who is still hiding will run towards the person who is "it". The first person to high five them wins!

Variations: The person who is "it" closes their eyes multiple times, allowing the people hiding to change hiding places!





Park Ranger:

Task: The person who is “it” stands in the middle of a large area while all other players line up facing them. Each player must think of a type of sea animal and the instructor will call out different things that each of the organisms may or may not have (for example if you animal has fins, if your animal has teeth, if your animal is large, etc.). If the animal selected by the player has/does the thing called out by the instructor they must run to the other side without getting tagged! If they do get tagged they must get out of the game until the next round.

Red/ Black/White:

Task: This game is aimed at teaching kids about three of the different species of mangroves that grow in Florida. Each type of mangrove (red, black, and white) has their own gesture to best show that species. The group leader will call out the types of mangroves while doing the gesture, and the players must mimic the gestures. After everyone has the hang of the game, the leader will try and trick the campers by saying a type of mangrove but doing the gesture that does not match! Players must resist the urge to simply copy the gesture the leader is doing, but hold up the correct gesture for that species. Once everyone gets the hang of the game the leader can increase the speed for calling out the mangroves and start eliminating kids that do the wrong gesture.

A) red mangrove gesture: arms straight out making a “T”

B) black mangrove gesture: arms in front of your body with your elbows bent up (fingers facing the sky and spread out)

C) white mangrove gesture: arms flat by your side



A) red mangrove



B) black mangrove



C) white mangrove

CAREER DIVES: Live Conversations in Marine Science

Learn how Smithsonian marine science professionals earned their fins through this weekly summer series. Discussions will include how they found their paths into the marine sciences, interests and research. Bring your questions for live Q&A sessions!

JUNE SESSIONS Thursdays @ 10 AM



June 4
Valerie Paul (PhD),
Head Scientist and Director
Smithsonian Marine Station
Registration: <https://bit.ly/2X4Zdm6>



June 11
World Oceans Day Edition:
Marine Microplastics
Laura La Beur, Marine educator
Smithsonian Marine Ecosystems Exhibit
Registration: <https://bit.ly/3c7b7QR>



June 18
Katie Skura, Aquarist
Smithsonian Marine Ecosystems Exhibit
Registration: <https://bit.ly/3ccs0cF>



June 25
Bill Hoffman,
Aquarium manager and Head aquarist
Smithsonian Marine Ecosystems Exhibit
Registration: <https://bit.ly/3c5oXmF>



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JULY SESSIONS Thursdays @ 10 AM



July 2
Dean Janiak, Biologist
Smithsonian Marine Station & Marine Geo
Project
Registration: <https://bit.ly/3cuMM7O>



July 9
Kelly Pitts, Research technician
Coral Health and Marine Probiotics Lab,
Smithsonian Marine Ecosystems Exhibit
Registration: <https://bit.ly/2U9418q>



July 16
Michelle Donahue
Science writer and Communications
specialist, Smithsonian Marine Station
Registration: <https://bit.ly/2ACira8>



July 23
Holly Sweat (Ph.D.),
Marine community ecologist
Smithsonian Marine Station
Registration: <https://bit.ly/2U8eUas>



Smithsonian
Marine Station Fort Pierce