

Welcome to the Tennessee Aquarium! As you search for answers to the following questions, carefully read the information found on signs throughout the galleries and look closely at the animals and their exhibits, and check your Aquaguide. You'll be surprised what you can learn from observation – you might learn where an animal lives, how it eats or how it protects itself. Good luck, and have fun exploring the Tennessee Aquarium!

Ocean Journey

Tropical Cove

Tropical rainforests are areas of high humidity, rainfall and temperature located along the equator between the Tropic of Cancer and Tropic of Capricorn. The Tropical Cove recreates this spectacular habitat in a 30-foot tall sunlit space filled with lush tropical plants and 20-foot tall palms.

1. The freshwater rays in the Tropical Cove do not have a salt gland to process saltwater like their ocean relatives. If they are exposed to saltwater for a long period of time, they would die. What are two defenses these freshwater rays have to protect themselves? _____

2. Hyacinth macaws nest in what type of tree? _____

How many pounds of pressure can a hyacinth macaw beak exert when opening a nut? _____

3. Touching the sharks and rays at Shark Island is a memorable experience. Many people misunderstand sharks, thinking they are fierce and menacing. Because of this, shark populations have declined around the world. Can you think of at least two threats that are facing them? _____

Fun Fact

Sharks and stingrays are related, both having a skeleton made of flexible cartilage rather than bone.



Butterfly Garden

Butterflies make use of the color, shape, pattern and motion of their wings to create some of the most effective and dazzling visual displays in nature.

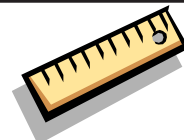
4. When butterflies find nectar to eat, what do they use to eat it? _____

5. What are three ways that a butterfly can protect itself? _____

6. What could the bright colors of a butterfly mean? _____

Fun Fact

Butterfly wings are covered in tiny scales, so small that nearly 250 of them laid in a line would only be one inch long!



Penguins' Rock

Penguins are unique birds of the Antarctic and Subantarctic regions in the southern hemisphere. Despite the fact that they have more feathers than most birds, penguins can't fly. Instead their heavy bodies, modified wings and webbed feet make them wonderfully adapted to "fly" underwater.

7. Name three threats to penguin survival. _____

8. Explain how a penguin's "tuxedo" helps it to survive. _____

9. Name two ways that penguins are able to stay warm and survive in their frigid habitats.



Fun Fact

While adapted to swim underwater at speeds of 23 miles per hour, Gentoo penguins are quick on land also - able to outrun a human over a short distance!

Boneless Beauties

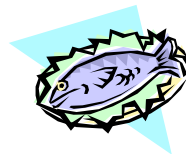
Drastically different in appearance, the creatures found in Boneless Beauties all have one thing in common, the lack of a backbone. Scientists estimate that more than 95% of all known species on earth are invertebrates. From the microscopic rotifers at .000004 inches to the giant squid growing to more than 60 feet in length, these animals represent a vast array of shapes, sizes and colors.

10. How many cuttlefish can you find in the exhibit? What do they blend in with? How does their ability to quickly change color help them survive? _____

11. The giant spider crab is the largest known shellfish. How long can their legs grow and what happens if they lose one? _____

Fun Fact

The octopus uses its suckers to help it detect prey such as crabs, snails and fish. Once captured, the octopus injects a toxin through its beak to help dissolve the prey, making it easier to eat.



Secret Reef

Deep in the waters of the Gulf of Mexico about 115 miles south of Texas lies a coral reef teeming with life. The Tennessee Aquarium's Secret Reef exhibit contains over 600,000 gallons of artificially created saltwater. Over 3,500 fish make their home among the corals and sponges in the exhibit.

12. Find three fish with different mouths. What do you think they might feed on and where in the water column might they feed?

13. Fish protect themselves in a variety of ways. Look closely and describe at least two methods of defense.

14. Fish swim in groups called schools. Watch the fish in the Secret Reef. What types of fish do you observe swimming in a school? Can you name an advantage to schooling?

15. What two species of sharks can be seen swimming around the Secret Reef exhibit?

Observe both species, then compare and contrast their appearance and behavior.

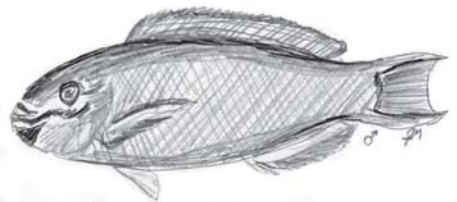
16. Are coral plants, animals or neither?

17. Corals maintain a symbiotic relationship with algae called zooxanthellae. How do you think this relationship benefits the algae?

the coral?

Fun Fact

Some parrotfish sleep in style or rather in slime. At night, they settle down and secrete a bubble of mucus from their mouths. It is thought that the mucus tent masks their scent from night predators.



River Journey

Seahorses Gallery

Seahorses, pipefish and seadragons are all fish but they sure do look different! Look for some of their unique characteristics as you go through this exhibit: tube-like mouths, rigid bodies, eyes that rotate independently and the ability to change colors to match their surroundings.

18. Look at a species of seahorse. Describe three adaptations that help them survive.

19. What are three threats that seahorse species face?



Fun Fact

In seahorses, the males carry their young in a pouch on their stomachs. Male seadragons carry their young under their tails.



Cove Forest

The Cove Forest exhibit recreates a small, remote, ancient forest found high in the Appalachians. It is an immersion exhibit, making visitors feel as if they are actually in a forest.

20. The Cove Forest is home to several different species of snakes. The corn snake (located on the overlook) is a nonvenomous snake that very closely resembles the venomous copperhead (located in the first exhibit on right). How might resembling the copperhead give the corn snake an advantage? _____



21. How might it be a disadvantage? _____

Fun Fact

To furnish the high amount of energy required for flight, birds have a high metabolic rate. Their normal body temperature is 110 degrees F and blood races through their bodies at tremendous speeds to furnish oxygen to their muscles efficiently. The average bird has an incredibly high heart rate of nearly 600 beats per minute! Compare that to the average human heart rate of 75 beats per minute.

Discovery Hall

Explore wetlands, estuaries and other watery habitats in Discovery Hall. You'll encounter many small creatures that are often overlooked.

22. The hellbender lurks beneath the rocks and crevices of streams eating any other aquatic animal it can swallow. List two ways its body is designed for bottom dwelling.

23. What threats do sturgeon face? _____

24. Name an immediate threat to amphibians. _____

Fun Fact

Brackish water is a mixture of salt and fresh water usually found in areas called estuaries. Only certain animals that have special adaptations to help survive that type of environment can live in those areas.

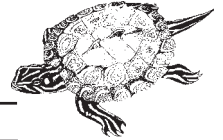
Delta Swamp

The Delta Swamp immerses visitors in a cypress swamp habitat. A swamp is an area that experiences flooding during the rainy season and may become dry during periods of drought. Swamps are important because they act as nature's sponges. By absorbing excess water and then slowly releasing it into a river, swamps help prevent flooding.

25. Swamps are an important ecosystem because they act as natural water filters. Name another reason swamps are important. _____

26. The Delta Swamp is a replica of a true southern swamp right down to the types of trees. Why would the broad, spreading bases of the large bald cypress and water tupelo trees be useful?

27. Describe how an alligator snapping turtle catches its prey.



Fun Fact

The bald cypress trees in the Delta Swamp have varied origins. Some are living trees; others are dead trees that were airlifted from Hurricane Hugo wreckage in South Carolina in 1988. The rest are fabricated trees made of fiberglass, wire mesh and rubber.

Gulf of Mexico

The Gulf of Mexico is the ultimate destination of water from the Tennessee, Ohio and Mississippi Rivers. Notice the transition from the mangrove trees representing the shoreline to the open ocean in this exhibit. The coastline of the Gulf is an area where salt and freshwater flow together to create an exceptionally nutrient rich and fertile ecosystem. This area is home to a tremendous diversity of native and migratory wildlife.

28. Observe the barracuda and the porkfish. Compare their physical characteristics and their behavior. Where do you think they live in the water column?

BARRACUDA _____

PORKFISH _____

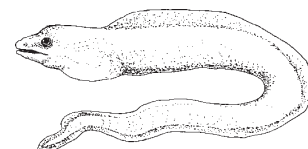
29. On the right side of the tank you see mangrove roots. Name one fish that you see hanging out in the roots. _____

Why do you think it prefers this habitat? _____

30. Observe the green sea turtle in the exhibit. The number of sea turtles is declining due to beach development, which destroys nesting areas, and accidental deaths in shrimp trawling nets. Can you think of things that would help turtle populations? _____

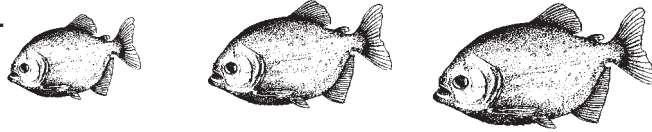
Fun Fact

Moray eels vary in color from green to brown. The color is produced from the combination of the yellowish slime coat covering the eel's blue body.



Rivers of the World

Rivers are very important to the people, plants and animals that live around them. However, rivers and streams only carry .001% of all the water on the planet. Take a look around this gallery and explore the diversity of river life from around the world.



31. Describe piranha behavior as it relates to the different seasons. _____

32. China's wildlife face tremendous threats. Name three of those threats in the space below.

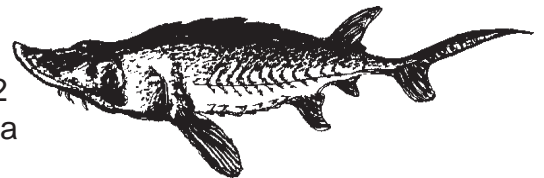
- 1) _____
- 2) _____
- 3) _____

33. Although the Tropical Asian exhibit has a fish with 'shark' in its name, they are not related to the true sharks of the ocean. Why might they be called sharks? _____

34. In the Nishikigoi exhibit, what is the formal Japanese word for koi? _____ When were koi first exported to the United States? _____

Fun Fact

The Beluga sturgeon can reach weights up to 1 1/2 tons and a length of 28 feet. The eggs of the Beluga are also the highest priced of all caviar.



Turtles: Nature's Living Sculptures

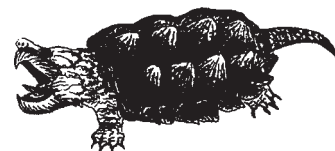
Turtles are beautiful and interesting creatures that are found all over the world. The shape of a turtle shell often can tell us where it lives. Species with high domed shells usually live on land, while flatter shells help aquatic turtles swim more easily. Of course, there are always exceptions and you're bound to find some in the exhibit so look carefully.

35. How do sideneck turtles hide their heads? Is this an advantage or a disadvantage? _____

36. Name three threats to turtles as a result of fragmented habitats. _____

Fun Fact

A snap of the jaws of an alligator snapping turtle is powerful enough to injure a hand or foot.



Tennessee River

The Tennessee River has undergone many changes. Before dams were built, the river was dangerous and hard to navigate in many areas. When the dams were built, the current was slowed and controlled, allowing the river to be used as a main source of transportation

37. Find the graphic called "Lakes People Make". Nickajack Lake is a section of the Tennessee River held behind a dam. What habitat changes might occur suddenly due to water collection or release? Why is this a potential problem for fish species in the lake? _____

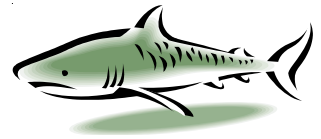
Lake Nicaragua

What was once a saltwater bay of the Pacific Ocean is now the largest lake in Central America. Lake Nicaragua was formed over thousands of years as the volcanic land along the Pacific coast of the country rose and cut off this body of water from the ocean.

38. Observe the fish in this exhibit. What behaviors do you notice?

Fun Fact

Saltwater species like tuna, swordfish, tarpon and even one species of shark have adapted over time to live in this now freshwater lake along with other freshwater species.



Flooded Amazon Rainforest

Here in the temperate United States we experience four seasons. Tropical areas experience only two seasons, rainy and dry. During the rainy season in the Amazon, between 80-120 inches of rain can fall. This causes rivers to flood out of their banks and into the forests. Some fish species in this area are adapted to eat the seeds and fruits from the trees when water is high.

39. The *Arapaima gigas* can grow to 14 feet in length. What is its common name? Does it seem to prefer to stay at the top or bottom of the tank? Why? _____

40. Catfish get their name from the whisker-like barbels that are used for finding food. They also are known to have sharp spines. How many types of catfish can you find in this tank? _____

Which has spines that are sharp enough to cut wood? _____

Fun Fact

The arapaima's tongue is extremely hard and is dried out and used as a file or grater by native people of the Amazon.



Note: A question may have more than one correct answer. Answers are available on our website at :<http://www.tnaqua.org/KidsTeachers/KidsTeachers.asp>.