

Sharks!

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Name _____

In this month's Internet Challenge™, we will take some time to explore the world of sharks. What comes to your mind when you think of a shark? Perhaps you have read about them in publications or seen sharks in videos or even in aquariums. However, our assessment of sharks might not be completely correct since there are nearly 400 different varieties!

As a group, sharks live in a wide range of aquatic habitats. Some species live in shallow coastal waters or in the open ocean, while others live on the deep-water ocean floor.

Did you know that this amazing fish does not have a bone in its body? The skeleton of a shark is made of the same material as your nose and ears: cartilage!

During its lifetime, some species of sharks can have up to 30,000 teeth. A shark's teeth are not attached to its jaws and are continually replaced.

Get ready to discover more fascinating details about sharks in our online activity. Since sharks are an important part of our marine ecosystem, we will also learn about shark education and conservation. Are you ready to begin?

Our first Web site is [Sharks and Rays](http://www.seaworld.org/animal-info/info-books/sharks-&-rays/index.htm) from Busch Gardens/Sea World. The site is found at <http://www.seaworld.org/animal-info/info-books/sharks-&-rays/index.htm>

Look at the index page to see a listing of topics. We will explore a few of these topics together.

Click the "Scientific Classification" button through the "Anatomy and Physiology" button and read the information in these four topics as well as examine the photographs. Then, answer the first set of questions.

1. Are sharks able to be preserved as fossils? Explain your answer.
2. Give the name of the ancient shark whose long, thick spine grew from the back of the skull.
3. Explain the difference between the habitats of the bull shark and the sleeper shark
4. Compare the sizes of the largest shark to that of the smallest shark
5. What is the advantage of a shark's "fusiform" body shape?

6. Countershading is a type of camouflage in which the dorsal side of a shark is lighter than its ventral side.
 - a. True
 - b. False
7. Since sharks have a low blood pressure, what do they do in order to circulate blood throughout their bodies?
9. How do sharks locate sick or wounded prey under water?
10. Give some details about the skin of a shark.

Very good!

Our next Web site is [The Shark Foundation](http://www.shark.ch/) at <http://www.shark.ch/>

Click “Information,” and then click each of the six tabs inside of it, from “Habitat” to “Reproduction.”

Read the material. and then complete the next set of questions.

8. If the Megalodon shark was living today, give details about its history of evolution and describe what it would look like.

Terrific answers!

The next Web site that we will visit contains an article from part of the handbook [Sharks – by Jay R. Calkins, University of Georgia Marine Extension Service](#). Find it online at <http://graysreef.noaa.gov/tw/sharks.html>.

Read the information, and then answer the next questions.

11. Explain the roles of a shark in a marine environment and compare it to that of a great cat (lions, tigers or cougars) in a terrestrial setting.

12. Evaluate any two of the sharks listed on this Web page and discuss their similarities and differences.

15. (A) List the countries that have finning restrictions.
(B) Should more countries have these same types of restrictions? Why or why not?

Great work!

We will return to [The Shark Foundation](http://www.shark.ch/Information/Accidents/index.html) site to learn about shark accidents. This resource is located at <http://www.shark.ch/Information/Accidents/index.html>

Read the page and look at the chart denoting the ten most dangerous sharks and their number of shark accidents.

13. According to the statistics from this Web site, what is the probability of being struck by lightning compared to being bitten by a shark?

16. What is a shark nursery and what dangers are they encountering? Explain your answer.

Now, scroll up the page and click "Preservation." Click each of the five photographs (near their headings) to learn why sharks should be protected.

17. How successful is shark cartilage in the treatment of cancer?

14. Not only are sharks actively fished for their meat, fins, or cartilage, but millions of them die needlessly as they are caught in nets and in long lines of swimming fish factories.

a. True

b. False

Good answers!

Let's go to the [NOAA Fisheries Shark](http://www.nmfs.noaa.gov/sfa/hms/sharks.html) site at <http://www.nmfs.noaa.gov/sfa/hms/sharks.html>

Click "It's the Ocean, not the Swimming Pool" and read its contents. Answer the following questions.

18. Explain how a shark attack could be considered a “hit-and-run” incident.

Shark Research Institute
http://sharks.org/education_kids.htm

Save Our Seas
<http://www.saveourseas.com/minisites/kids/21.0.html>

SharkWater.com
<http://www.sharkwater.com/education.htm>

19. NOAA Fisheries encourages all beachgoers to “swim smart.” Give an explanation as to what swim smart means.

Shark.org-Kids Making a Difference
http://sharks.org/education_kids.htm

Saving Sharks.com
<http://www.savingsharks.com/>

Find information regarding protection and conservation of sharks. After you have previewed these sites, create your own mini-video or poster about sharks and their value in our marine ecosystem. How can sharks be protected for future generations?

If you were to create a five-minute video, what information would you want to include in it? Alternatively, if you could design a shark safety poster, what would it look like? What would you say in your advertisement? Who would be your audience – young children or adults? How would you get your message across to your viewers?

Design your announcement by using appropriate computer software and technology equipment or paper, pencil, and art tools. Once you have completed it, share it with your teacher and classmates. Talk about it!

Excellent!

Go to these sites listed below and try some of these fun activities for extra credit:

- <http://sharks.org/teachers.htm>
- <http://graysreef.noaa.gov/tw/activities/actshark.html>

Congratulations! You have done an incredible job in completing this month’s Internet Challenge™.

Continue learning about precautions when swimming in the ocean. Go to <http://www.saveourseas.com/minisites/kids/sharks.html>. Click “Precautions” and read the six rules.

20. Wearing jewelry while swimming in the ocean waters is not a smart idea. Why?

Remarkable responses!

Extension Activity

Why should we protect sharks? How can you educate the public about shark protection and conservation?

Go to the Web sites listed below (and/or go back to those sites listed previously in this activity) and peruse the material through each one.

Answers to September's Internet Challenge™

1. Since cartilage rapidly disintegrates, sharks are seldom preserved as fossils. The fossil record of sharks consists mainly of teeth and spines from their fins.
2. The name of the shark is the Xenacanthus.
3. While Sleeper sharks can stay in chilly Arctic waters all year round, Bull sharks survive extremely well in fresh water.
4. The largest of the sharks is the whale shark (*Rhiniodon typus*). Although the whale shark averages 4 m to 12 m (13-39 ft.) in length, one specimen was found to be 18 m (59 ft.) long. The spined pygmy shark (*Squaliolus laticaudus*) is probably the smallest of all sharks. Females reach about 18 cm (7.1 in.) in length while mature males may only be 15 cm (5.9 in.) long.
5. Sharks typically have a fusiform body (rounded and tapered at both ends). This shape reduces drag and requires a minimum amount of energy to swim.
6. (b) False. Countershading is a type of camouflage in which the dorsal side of a shark is darker than its ventral side.
7. The walls of the pericardium (the membranous sacs that enclose the heart) are rigid, creating suction within the pericardium to maintain the flow of blood. To circulate blood throughout their bodies, many sharks must swim continuously.
8. Probably the largest predatory shark ever to swim the world's oceans was the Megalodon. It lived in the Miocene period (18 million years ago) and disappeared in the lower Pliocene period about 5 million years ago. Although the Megalodon is often termed the oldest known ancestor of the white shark due to its teeth form, current scientific knowledge has not yet confirmed this. Compared to the white shark, which reaches a length of six to seven meters (19-22 feet), the Megalodon was a real giant who must have reached a length of 18 meters (approximately 59 feet). Its worldwide range covered the temperate zones.
9. Sound travels under water about four times faster than on land, whereby low frequencies dissipate slower than high ones. The sense of hearing is thus important to sharks. They react especially to low frequency, pulsating oscillations around 100 Hz, as produced by sick or wounded animals. Several shark species can thus accurately locate their prey over a distance of several hundred meters.
10. Shark skin has highly sensitive pressure and temperature sensors, some of which are so sensitive that they can register skin vibrations/movements of only 0.02mm. With these sensors, sharks can feel contacts, water currents, and temperature changes.
11. The role of sharks in the marine environment is similar to the role of great cats (lions, tigers, and cougars) in terrestrial environments. Cats eliminate the weak or slow animals in a herd of wildebeests or deer in the same way as sharks eat the slower fish in a school of mackerel or herring.
12. Students' own answers.
13. In the United States, the probability is 16 times higher of being hit by lightning than being bitten by a shark.
14. (a) True
15. (a) Only a handful of countries have introduced finning restrictions: Canada (1994), Brazil (1998), the U.S. (2000), Spain (2002) and Costa Rica (2005). (b) Students' own responses.

16. In order to prevent their pups from becoming victims of larger sharks, most female sharks bear their young in protected shallow waters. These shark "nurseries" are not easily accessible to larger sharks and represent a safe haven for shark pups as well as other; smaller shark species. Shark nurseries are becoming rare due to environmental destruction. More than 80% of all shark species live in coastal areas and are directly exposed to the many harmful chemicals that are transported from our rivers directly into the ocean.
17. Currently, no serious scientific study is available in which treatment with shark cartilage has proven to have any effect on human cancer cells.
18. When a shark bites a human, it is usually mistaken identity -- the shark thinks the human is a fish and takes a bite expecting to have dinner. When the shark realizes that the person is not a tasty fish, it lets go and swims away. This is why most shark "attacks" are hit-and-run incidents and often only result in cuts and bruises,
19. When you are swimming in the ocean, be aware of your surroundings. You are a guest in a wild habitat and you should respect that habitat and its creatures.
20. Wearing shiny things is not a good idea while swimming in the ocean waters because when they shine, they confuse sharks. Sharks think that they are seeing fish scales shining so they are more prone to attack.

Extension Activities – students own answers.