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What Causes Sharks to Attack and How Do You Prevent Attacks?

What I already know (and don't know) about my topic.

I never should have seen the movie Jaws. Every summer, when I reach the top of the last dune and look out over the blue of the Atlantic Ocean, my first thought is of the great white shark that is patrolling just off the beach waiting for me. Being attacked by a shark is one of my biggest fears when I hit the beach at the Jersey shore each summer. Over the years, I have loosely collected a short list about how to handle sharks called "Safely Swimming with Scary Sharks Strategies"

First, I *know*, or at least I think I know, that sharks are attracted to blood in the water. I have heard even a drop of blood can attract a shark from a mile away. I base the validity of this theory on the Disney movie *Finding Nemo*. In the movie, Nemo's father Marlin and a friend Dory come across a nice bunch of sharks, who have given up eating fish. Unfortunately for the pair Dory gets a bloody nose. Bruce, a great white shark, smells the blood and goes on a rampage wanting to devour the source of the blood (Dory).

Second, I *know* sharks are attracted to surfers and people on boogie boards. When surfers are lying on their boards with their arms and legs hanging off the sides, they look like a sea turtle from under the water. I have seen interviews with surfers who have been attacked by sharks based on the shark's mistaken identity. Several years ago a teenage girl who was surfing in Hawaii was attacked by a

shark and lost one of her arms. Today, a successful surfer, she shares her shark attack story with the world.

Third, I have heard that sharks are supposedly more afraid of humans than we are of them. While this theory seems unlikely to me, I realize there is a difference in the ways humans and animals react when they feel threatened. When we feel threatened in an environment, we usually leave the area. When an animal feels endangered, it can use a variety of techniques, like playing dead or becoming aggressive, to protect itself. I am not quite sure of the shark's exact technique.

Next, I heard that at night swimmers can shine a flashlight in the direction of the shark to scare it away. I personally have never been brave enough to attempt to prove this theory, so I am not sure of its accuracy.

Finally, if attacked by a shark a person should punch the shark in the nose or poke its eye. This will cause the shark temporary pain, and give the person time to swim away. As you can see, there are not many things that I know for sure about shark attacks. By doing this project, I hope to find out the reliability of these theories and learn more strategies.

Why I Want to Answer this Question.

Each summer my family and I take a two week vacation to the Jersey Shore to visit family and soak in the rays. We spend a lot of time at the beach. Between laying out sessions, I enjoy taking a dip in the Atlantic. My cousins and I do enjoy various water activities like swimming, snorkeling, boogie boarding, or just floating on the waves. When I swim, I can't help but wonder what sea creatures could be near. I have always thought sharks didn't swim that far north until a few years ago when my family told me of several awful shark attacks in 1916. A tiger or bull shark swam up the Matawan Creek just north of where we swim and killed several swimmers. Beaches closed down while area fishermen killed all the sharks they came in contact with. Though my initial reaction after hearing the story was to never

swim again, but after a few hours of baking under the sun, I changed my mind and have been swimming in salt water ever since.

Last summer a dead shark washed up on shore several beaches down from us. Stories about this shark were all over the local news. It was at this point in my life I found out that the New Jersey coastline was a common breeding spot for great white sharks. With the knowledge I have gained about sharks that reside near my summer get away, I have become extremely interested in precautions to avoid being on the shark's menu.

Story of the Search

When I started this assignment, I had no idea what topic to do. I bounced back and forth many ideas until I decided to research the mysterious death of Marilyn Monroe. Unfortunately, this topic wasn't really anything I could further investigate myself. After spending an hour or so brainstorming ideas with my mom, I came up with the idea of shark attacks. As far as researching goes, I realized I was not going to be diving into a pool of hungry sharks to find out the answers to my questions, instead I started by doing a *Google* search.

Immediately, thousands of websites came up about sharks and attacks with gruesome videos of live attacks (I quickly closed out of these). I decided to take my newly found knowledge about special *Google* searches and went under the book category of *Google*. Here I found tons of books related to sharks. I clicked on a few and read through them using the preview book tab. One book mentioned the *International Shark Attack File*; I quickly turned my attention to this and "*Googled*" it.

I found an entire website dedicated to the research of sharks and their attacks. According to the *International Shark Attack File*, of the 375 species of sharks only 30 are reported to have attacked humans. I thought this was a very interesting fact. When I think shark, I think human killing bully. In reality, the majority of shark species have never harmed a human. Being attacked by other wild animals

or getting hit by lightning is far more likely than being attacked by a shark. In fact, dog attack fatalities are far more likely; in 2001 there were 23 dog attack fatalities in America and only 3 shark attack fatalities (International).

After reading this information, I felt a little more at ease concerning shark attacks. I did further investigation on this website and found there are four different types of shark attacks. First is the provoked attack. This occurs when someone is bothering a shark like divers trying to release sharks from nets. Second is "the Hit-and-Run" attack which usually results in minor injuries and rarely death. This is when a shark in shallow water mistakes the movement of a human for that of a fish. The shark bites a leg or an arm, realizes it isn't a fish, releases it, and quickly swims away. Third is the sneak attack. Now, I imagine this attack to be like the attacks in the movie *Jaws*. This attack takes place in deep water, and the victim doesn't see the shark coming (do-do do-do). This attack often results in serious injury, even death. The final kind of attack is called "the Bump-and-Bite". The shark bumps into the victim with its head or body before biting; this attack can sometimes result in serious injury or even death (International).

Why doesn't our country do something at the beaches to keep sharks away, you might ask? Marine Biologists have designed a "Shark Exclusion Net". This is a net that can be placed in *calm* water that will separate the sharks from the humans' swimming area. It is designed to cause no physical injury to a shark if they get entangled. As of now, this net is rarely used because of the cost and the strict water conditions that are required for it to be effective (International).

I really found this website useful, and I wanted to talk to the researchers behind the scenes of this website. I visited the contact information page where I found Joana Fernandez de Carvalho, a marine researcher for this organization. I organized a list of questions and emailed them to her.

Next, I visited the *LexisNexis* online newspaper article source. Here I found an interesting article called “More Hype and Bite”. This was a newspaper article published in Florida in the summer of 2008. After reading the article, I discovered some interesting facts.

First, shark attacks most often occur in September during hurricane season. Hurricane season is the time of the year that has the best waves so many surfers hit the beach. The fact that surfers hit the beach at such a dangerous time could be the reason why most shark attacks are related to surfing.

Second, it is recommended that swimmers avoid swimming at dawn or twilight because this is when the sharks are most actively feeding. Referring to one of the many *Jaws* movies, a girl is eaten by a shark while swimming late one night. Sharks are on the prowl for their meal at these times. By avoiding swimming at dawn and twilight, you could avoid being a tasty snack.

The article summed things up by comparing the likelihood of shark attacks to other dangerous events. Since 1996, 43,687 people have been injured in toilet related accident. How, you might ask? I have no idea, but I do know that since 1996, only 13 people have been seriously injured due to shark attacks. Yes, shark attacks are pretty rare, but I still wanted to find out what to do if I happen to be one of the 13 people attacked. I continued my search.

I knew there would be many programs about sharks on the *Discovery* Channel because every summer they dedicate an entire week to shark shows. I started my research by going to Discovery.com. I looked through *Man vs. Wild, Survivor man*, and *Planet Earth* episodes, but I could not find anything useful. I went out on a limb and looked through the *Mythbuster* episode index. As luck would have it, I found what I was looking for. Unfortunately, this particular episode was not viewable through Discovery.com so back to Google I went. I eventually found a reliable website on which I could watch the Shark Week Special of *Mythbusters*.

The *Mythbusters* crew tested a variety of shark theories the first being, can a person find and jab a shark in the eyes during an attack? They started by creating a giant, Jaws-like, shark replica named

Bruce. They gave the shark rows and rows of foam teeth and two stopwatches for eyes. The shark was wired so that when an "eye" was poked correctly the shark would stop thrashing.

The team tried this experiment with the shark's victim in several different positions in the shark's mouth. When the victim was lying on his stomach, it was nearly impossible for victim to find and poke the stopwatch eyes. When the victim was lying on his back, it was pretty easy to find the stopwatch eyes. Next, the team added more voltage to the strength of the robotic shark and retried the positions. The increased strength of the shark made it much harder for the victim to find the eye stopwatches. The team decided the theory was plausible depending on the size and strength of the shark and the position, fear, and injuries of the victim.

Second, will "playing dead" keep sharks from attacking you? In 1945, a top secret ship, the USS Indianapolis, was sunk by a Japanese submarine, and 900 crewmen fell into the water. Only 317 people survived the shark feeding frenzy to be rescued a few days later. One man claimed the reason he survived was because he played dead in the water.

In this experiment, *Mythbuster* researchers started by churning the water to attract sharks. Next, two men on the crew jumped into the shark infested water. One played dead and the other thrashed around in the water. After 10 minutes of this, the sharks were clearly more interested in the thrashing man. Then the two men switched roles and the "dead" man thrashed around, while the "thrashing man" played dead. The sharks immediately switched their attention to the thrashing man. This proves that sharks are more interested in the thrashing movement of a victim rather than a silent and still victim possibly because they look like injured fish, a shark's prey (Shark Week Special)

The next experiments were done with shark repellents. The team took a trip to the Bahamas in an area where a shark attack had killed a person less than two weeks earlier. Scientists know that sharks can sense electric magnetic fields (Shark Week Special). They started by testing some magnets on small sharks. When the magnet got close to one of the sharks, it quickly moved away. When the magnet got

close to another shark, its reaction was to bite at the magnet. They moved out into the open waters with adult lemon sharks. They filled two milk crates with raw fish and watched as the sharks went after the meat. They then filled the milk crates with raw fish and attached powerful magnets around the edges of the crate. The sharks did not seem to notice the magnets and continued to go after the meat. The scientists concluded "If something is going to be a shark repellent, it must work across a bunch of species. This experiment is a bust" (Shark Week Special).

Next, the team tested whether or not an ancient Indian method of shark repellents actually worked. Ancient Indians put hot chilies on and around their boats to fend off sharks. The control was a balloon filled with water which the shark bit, demonstrating that he was not afraid of the balloon. The team tested this by filling balloons with processed hot chilies and attached the balloons to the milk crates. The team replaced the water filled balloon with the chili filled balloon, and the shark bit that too. The experiment had several trials, and each trial provide that sharks are not phased of the hot chilies.

Can a shark see potential food outside of the water and jump out of the water to attack it? They based this experiment on the movie *Deep Blue* Sea. When a shark sees a parrot sitting on a ledge, it jumps out of the water to eat it. To test this experiment, the crew put raw meat on a stick and held it above the water's surface. The sharks jumped out of the water to retrieve the food. This experiment confirmed the idea that shark will jump out of the water to devour their prey.

Does a flashlight attract sharks? Earlier, I explained how I believe a flashlight would scare a shark away. Oh my, was I wrong. When divers swim at night, they use a flashlight to see where they are going. "Theories suggest that sharks can mistake the electric magnetic field of the flashlight for fish food. Coupled with the fact that most sharks hunt at night, and all sharks are intensely curious, you got yourself a myth" (Shark Week Special). The team dove into the water at night and position themselves at various locations. They count the number of sharks they see circling during a twenty minute time period. The only lights the divers have are a few low beam lights simulating moonlight in the water. They

saw six sharks total. The next night at the same location and time with flashlights they had a dramatic change. “More sharks came in a less amount of time and were more aggressive” (Shark Week Special). One crew member even had to hit the shark in the nose to scare it away. They are not sure what it is about flashlights that attract the sharks so they deemed this theory to be plausible.

Do dogs attract sharks in the water? The team designed a life-like robot dog that looked, sounded, moved, and smelled (urine, anal secretions, and blood scents) like a dog. The team went to a remote location in the ocean and counted the number of sharks that showed up in a twenty minute period – 15 sharks. The next day the team put the “robodog” and all its lifelike features into the water. Still, only about 15 sharks came, and they were not interested in the dog whatsoever. This experiment proved that swimming with dogs does not attract sharks. The *Mythbusters’* two- hour special proved to be very informative. They gave tips about shark attacks and tested many theories, proving some to be true and others to be untrue.

A few days into my revising process, I received an email from Robert A. Buch, a Marine Scientist from the Florida Program for Shark Research – *International Shark Attack File* website. He answered all my email questions.

First, I asked, “I have heard that a drop of blood can attract a shark from a mile away does this hold any truth?” He responded:

> This is commonly said, but wrong (in a way). There are so many factors that can affect this. Depending on the species and the environment, sharks could smell blood from a long distance. Also, an important factor is the amount of blood – how big a drop? Is there a current leading right the shark (some sharks do hunt using currents to their advantage)? What is the quality of the water? And on, and on—there are just too many factors to be able to make a generalization like this. Some shark species do have a very good sense of smell indeed, but this is tough to say in general (Buch).

I found this response to be very interesting. I did not realize that there were some many variables that affected the validity of this theory. He also explained that sharks can be attracted to loud

noises, uneven tanning marks, and even contrasting colors on a swimsuit. I found this interesting because evidently sharks can notice even slight color changes like uneven tans.

After having a few of my questions answered through these sources, I looked for another website. After searching through various websites, I found a great website entitled “How Stuff Works”. At this website, I found a great deal of useful information about sharks.

First, in many movies like *Jaws* and *Deep Blue Sea*, sharks appear to get a taste for human blood and only want human flesh. This, however, has not been proven to be true. Often when there is a shark attack in a particular area, the culprit is usually long gone in a few hours. Unfortunately, if there is another attack in that area, people naturally assume it is the same shark. Fishermen have killed hundreds of the sharks in an area in hopes of killing the “monster”, when in reality, that shark could be long gone.

Second, when attacked by a shark the most common cause of death is a loss of blood. If someone on shore can stop the bleeding quickly enough, it can be the difference between life and death for the victim.

Finally, the three deadliest sharks are the great white shark, bull shark, and tiger shark. This is true for four reasons. First, they can be found in almost all parts of the oceans around the world. Second, “they are so powerful that their initial bite can cause fatal damage” (Grabianowski). Next, their gigantic size can make humans look like the size of their normal prey. Finally, they are at the top of the ocean food chain so they are not afraid of very many things.

What I learned or failed to learn?

Wow, that is a lot of information to process. I can’t decided if I am more comforted because of the rarity of attacks, or more concerned because of all the scary shark encounters I have read about. As I mentioned early from research I gathered from the “More Hype than Bite” article I read, shark attacks

are very, very rare. According to the "How Stuff Works: Shark Attacks", Americans' have a 1 in 9 million chance of being attacked by a shark. Now, when I looked at that stat, a wave of relief swept over me, but then I read on. If you vacation at a Florida beach, your chance of being attacked by a shark increases to 1 in 430,000. I realize these still pretty good odds in my favor, but it's a *huge* increase in likely hood from the original 1 in 9 million statistic.

Shark attacks are rare, but how do you make your chances of being attacked even smaller? I have improved my "Safely Swimming with Scary Sharks Strategies" list with even more tips to share.

1. Never swim alone. Sharks tend to attack the lone swimmers (International).
2. Avoid swimming at dawn or dusk. This is when sharks are the most active (Grabianowski).
3. Avoid swimming near sandbars, steep drop offs, and near the natural prey of the sharks. This is where the sharks tend to gather (Buch).
4. Don't swim with open cuts. Even a small amount of blood can attract sharks (Grabianowski).
5. Try not to thrash around and make loud noises. Sharks are curious about the source of the ruckus (Shark Week Special).
6. Don't wear shiny jewelry in the water. From a distance this can look like fish scales in the water (International).
7. If sharks have been spotted in the area, don't swim there (Grabianowski).
8. Be careful in murky water. Sharks can see you, but you probably can't see them (Grabianowski).
9. Don't think you are safe in shallow water. Shark attacks have occurred in 3 feet of water (Grabianowski).
10. Always be aware of your surroundings (Buch).

After completing this research, I have an appreciation for sharks. Yes, I am still petrified of them, but I know they are not out on a hunt to get me. They are just doing what they can to survive in their environment. It's important to remember that as swimmers we are entering their environment at our

own risk. This summer I will go back to the Jersey shore and swim in the ocean, but I will always remember what could be lurking near my feet.