

- a. After a great white shark bites its victim, it swims a short distance away, waiting for its victim to bleed to death. If rescuers are nearby, many human victims survive the attack.
  - b. Great white shark populations may be increasing along the coasts of California and Oregon due to increasing populations of seals and sea lions. Marine mammal populations are increasing as a result of federal protection. Populations of predators naturally increase as food becomes more readily available.
  - c. To reduce the chance of an attack by a great white shark, swimmers and divers should stay clear of seal and sea lion rookeries, or other known areas frequented by the sharks.
  - d. Swimmers and skindivers at the surface are more prone to attack than SCUBA divers beneath the water. At the surface, a swimmer's or diver's silhouette resembles that of a seal. Great white sharks may not be able to make the distinction.
  - e. California has one of the highest great white shark attack rates in the world. Yet fatalities average only one every eight years.
7. There is no known effective shark deterrent.



Great white sharks (*Carcharodon carcharias*) rely on stealth and surprise to prey on seals, sea lions, and other marine mammals.

## **VI. Diet and Eating Habits.**

### **A. Food preferences and resources.**

1. As a group, sharks and batoids eat almost anything: fishes, crustaceans, molluscs, marine mammals, and other sharks.
2. While some sharks are probably not very selective feeders, certain sharks eat some foods more than others. For example, hammerhead sharks (*Sphyrna* spp.) are known for eating stingrays; bull sharks (*Carcharhinus leucas*) eat other sharks; and smooth dogfish (*Mustelus* spp.) eat crabs and lobsters.
3. Tiger sharks have been called "garbage cans of the sea" because they feed opportunistically on both live food and carrion. Prey includes bony fishes, other sharks, marine mammals, seabirds, and invertebrates. Tiger sharks are ecologically important predators of sea turtles and sea snakes.
4. Many sharks prey most often on the weak, inferior members of a population. They select weak, ill, injured, or dying prey because it is easier to catch.

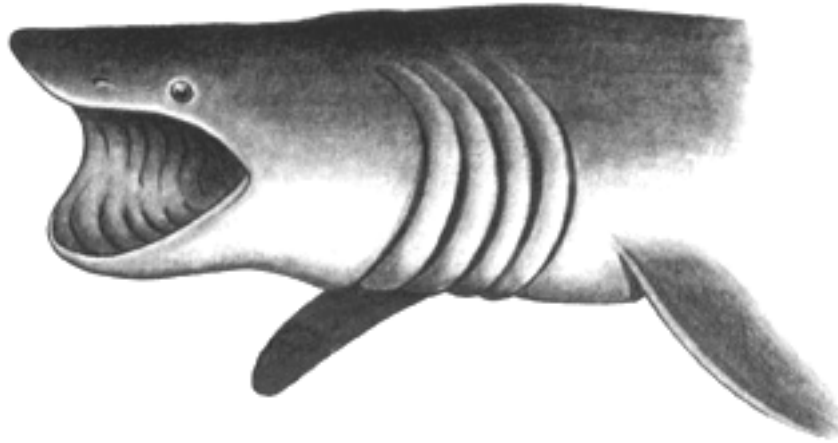
### **B. Food intake.**

In a zoological environment, a shark eats about 1% to 10% of its total body weight per week. Studies on sharks in the wild show similar food intake.

### **C. Methods of collecting and eating food.**

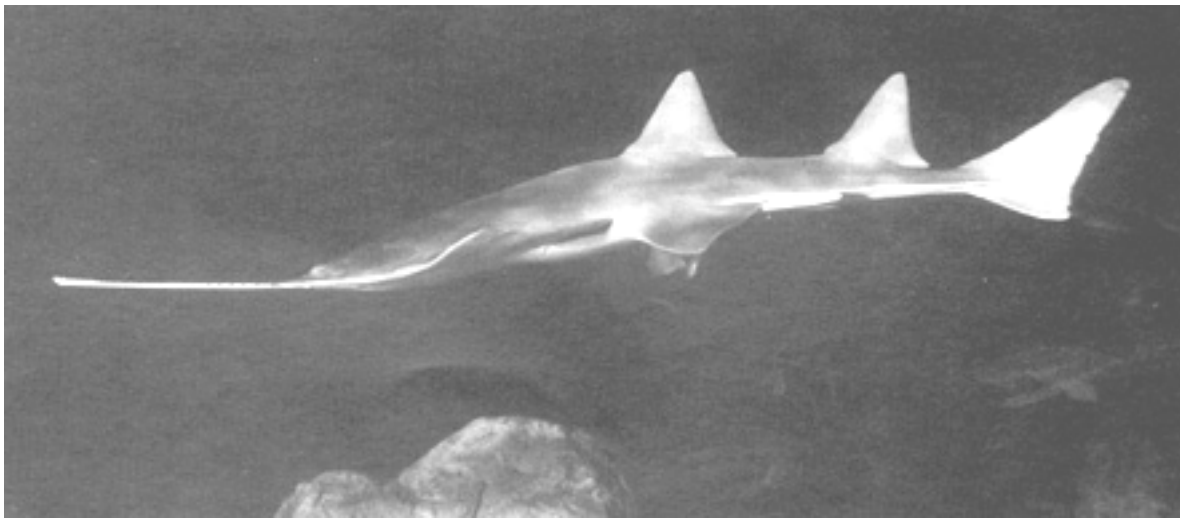
1. The characteristic teeth of each species are adapted to that particular species' diet. The teeth may be serrated or smooth. Most are used for seizing prey, cutting, or crushing. For sharks, plate-like triangular teeth are the most common shape.
2. Because of the biting force exerted by sharks, teeth often break off while sharks are feeding. They are replaced by teeth in reserve rows. The lemon shark (*Negaprion brevirostris*) can replace a tooth in about eight days.
3. Most predatory species of sharks seize, grasp, and tear food. A shark may circle its prospective prey and may even bump it with its snout or pectoral fins.
4. A shark's jaws are loosely connected to the rest of the skull at two points. As the upper jaw extends forward from the mouth, teeth of the lower jaw first encounter prey. The lower jaw teeth puncture and hold prey. The upper jaw teeth slice. A shark's short jaws make the bite powerful.
5. Many species of sharks and most rays are adapted for bottom feeding. Bottom feeders use the upper jaw to help pick up prey items. One example of a bottom feeder, the horn shark has two types of teeth. Front teeth are pointed for grasping and back teeth are flat and molar-like for crushing. Stingrays (family Dasyatidae) and eagle rays (family Myliobatidae) have teeth that are fused into plates.

6. Another mechanism some sharks and batoids use for collecting food is filter feeding. Rays in the family Mobulidae (*Manta* spp., for example), the basking shark (*Cetorhinus maximus*), and the megamouth shark strain enormous quantities of plankton from the water on gill rakers. Whale sharks also filter feed, but instead of using gill rakers, they strain plankton through a spongy tissue supported by cartilaginous rods between the gill arches. Filter feeders have reduced, nonfunctional teeth.



Basking sharks (*Cetorhinus maximus*) strain plankton from the water to feed.

7. Some elasmobranchs are quite specialized for feeding.
- A thresher shark (*Alopias* spp.) uses the long upper lobe of its tail to corral schools of fish.
  - A sawfish (*Pristis pectinata*) moves its head from side to side and strikes prey with its long rostrum.



A sawfish (*Pristis pectinata*) moves its head from side to side and strikes prey with its long rostrum.

- c. Nurse sharks (family Ginglymostomatidae) use their thick lips to create suction, effectively pulling their prey from holes and crevices.



A nurse shark's (family Ginglymostomatidae) thick lips create suction, helping this shark pull prey from holes and crevices.

- d. A cookiecutter shark (*Isistius spp.*) uses suction to attach itself to whales and large fishes; it carves out a core of flesh with its large triangular teeth.



This Cuvier's beaked whale shows scars and a fresh wound from a cookiecutter shark.