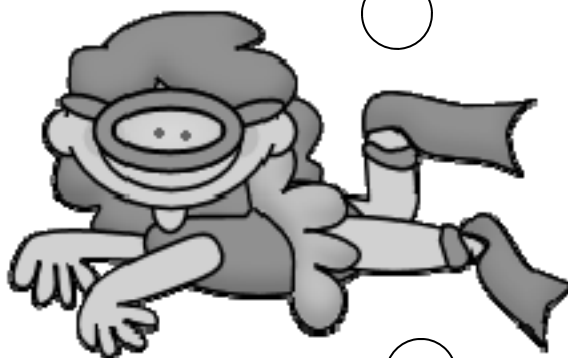


Under the Sea



Name _____

Homeroom Teacher _____

Discovery Lab
Science Notebook

Key Vocabulary Words

Food chain– the set of steps in which organisms get the food they need to survive
Food web– the pattern that shows how food chains are related
Consumer– any organism that eats the food producers make or eats other consumers
Producer– an organism, such as a plant, that makes food
Carnivores– a consumer that eats only other animals
Herbivores– a consumer that eats only plants
Omnivores– a consumer that eats both plants and animals
Decomposers– are organisms that consume dead or decaying organisms

Diversity of Living Things

Classification - Introduction

Scientists use classification systems to help understand the world we live in. Classification is a part of the science of taxonomy. Taxonomy is the science of grouping or organizing things. Whether you realize it or not, you also use classification systems in your daily lives. Generally, classification is the placing of similar things into similar groups or organizing things based on their characteristics or on specific criteria. When objects are classified they are put into groups with other objects that have the same characteristics.

There are over 1.7 million species of living things in our world. As mentioned previously, scientists have arranged all living things into a classification system based on their physical characteristics. All living things are divided into 5 *Kingdoms* which in turn are divided into phylum, then class, order, family, genus, and finally species. Below you will find a *general* explanation of "The Taxonomy of Living Things."

KINGDOM > PHYLUM .> CLASS > ORDER > FAMILY > GENUS > SPECIES

(King Philip Came Over For Good Spaghetti)

Now, the next category is called Phyla. Each of the 5 kingdoms is then divided into several phyla. The phyla category begins to break-up the animals, plants, bacteria etc. into smaller groups. A few examples of phyla in the animal kingdom are: Arthropoda (spiders, insects, crustaceans); Mollusca (clams, snails, squid); and the most common phylum, Chordata - animals with backbones (mammals, reptiles, fish, amphibians, birds).

After phyla, is Class which breaks up animals into more groups that you would find familiar. The phylum Chordata is broken down into several classes. Here are four examples of the classes found in the phylum called Chordata: Reptilia (reptiles), Mammalia (mammals), Aves (birds), and Amphibia (amphibians).

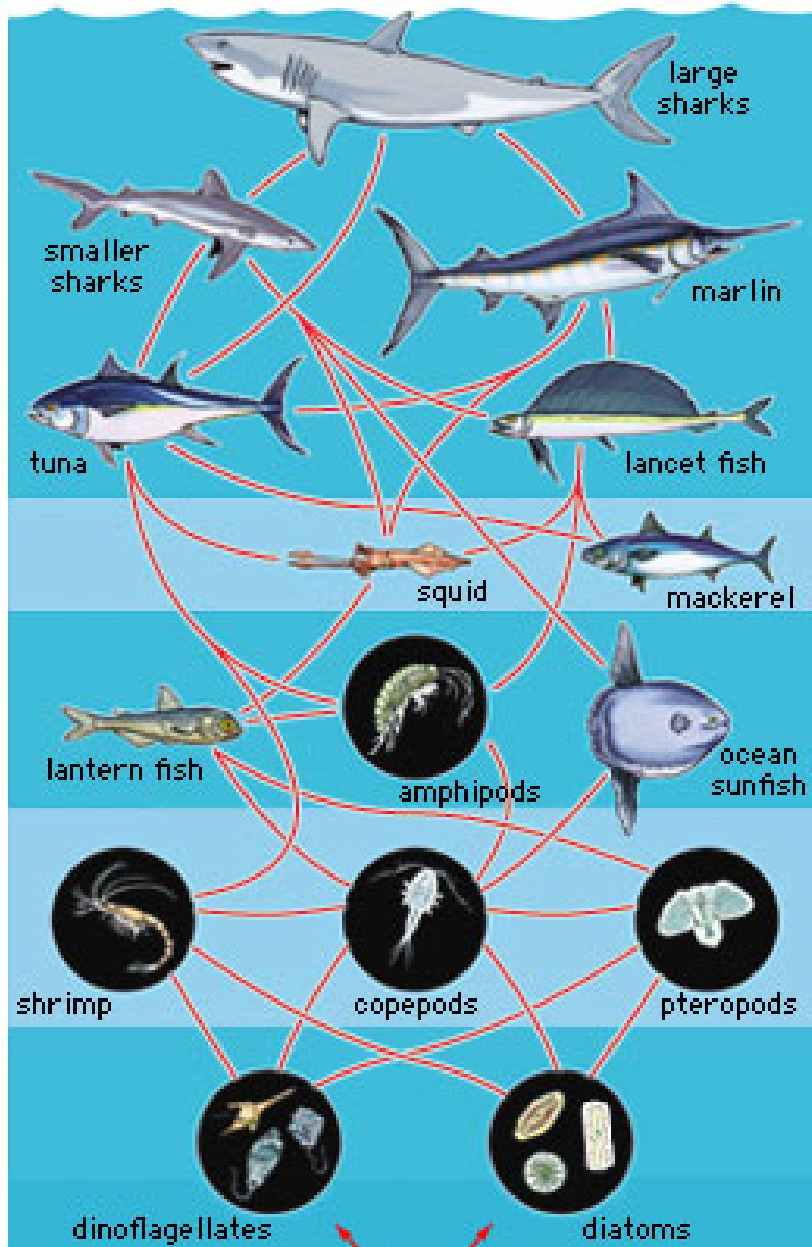
The next category is the Order. Each class is made up of orders. The Mammalia class can be broken down into Primates (monkeys), Perissodactyla (horses, zebras) Rodentia (rats, mice), Chiroptera (bats), Insectivora (moles), Carnivora (dogs, cats, weasels), Artiodactyla (cows), Proboscidea (elephants) and several more.

After Order is Families. The order Carnivora can be broken down into several families such as Ursidae (bears), Mustelidae (weasels, wolverines), Canidae (dogs), Felidae (cats), Hyaenidae (hyaenas, wolves) to name a few.

The next category is the Genus. The family Felidae (cats), for example, can be broken down into Acinonyx (cheetah), Panthera (lion, tiger), Felis (domestic cats) etc.

After genus is the final category of Species. The genus Panthera (lion, tiger) is broken down into Panthera leo (lion) and Panthera tigris (tiger).

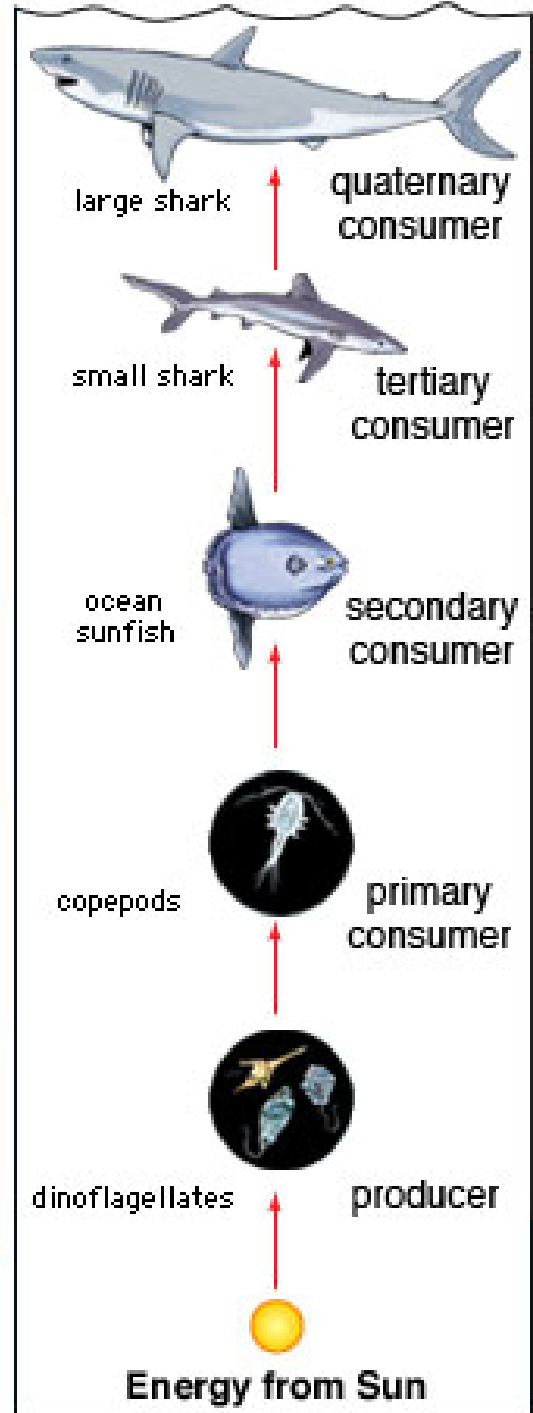
Food Web



Energy from Sun

© 2006 Encyclopædia Britannica, Inc.

Food Chain



Energy from Sun

Name: _____

Date: _____

KWL

Use the graphic organizer below to organize your information.

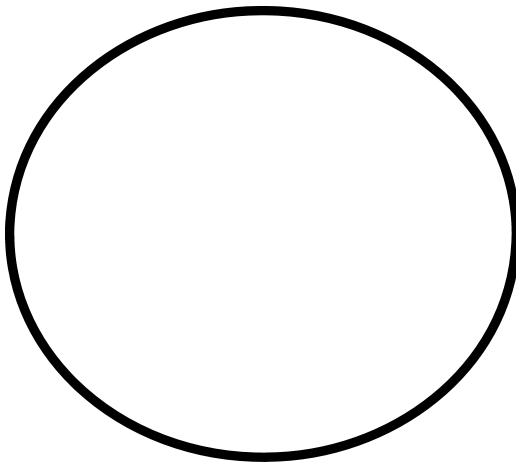
Topic: _____

<p>K</p> <p><i>What I <u>Know</u></i></p>	<p>W</p> <p><i>What I <u>Want To Learn</u></i></p>	<p>L</p> <p><i>What I <u>Learned</u></i></p>

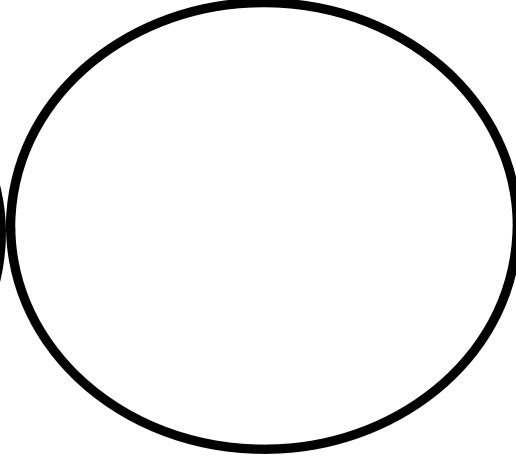
Life in The Sea



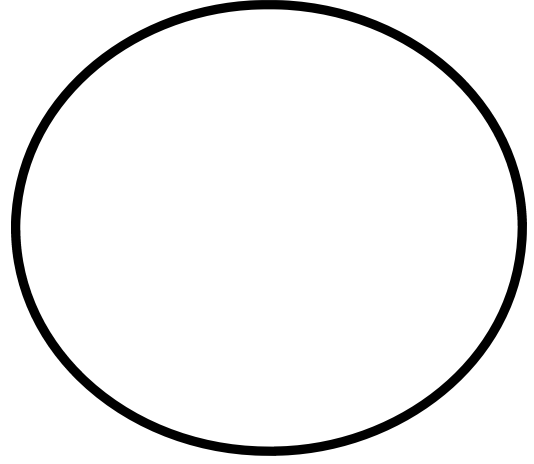
Use the circles provided below to draw and label what you preview in each slide. You may use colored pencils after all slides have been drawn to add details.



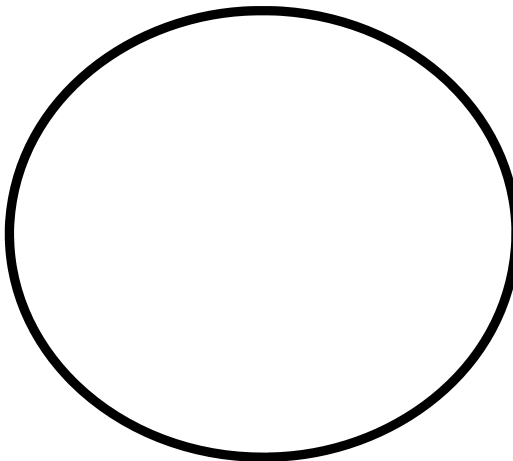
SLIDE 1 _____



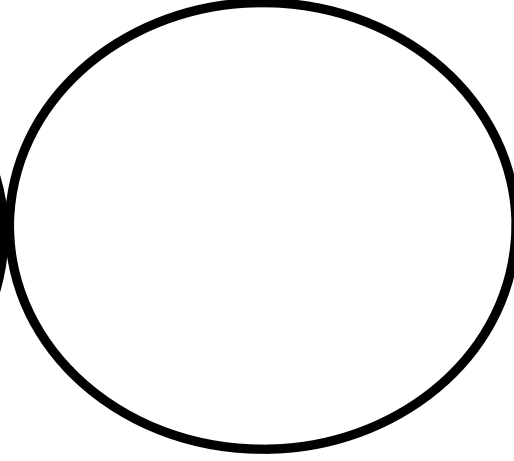
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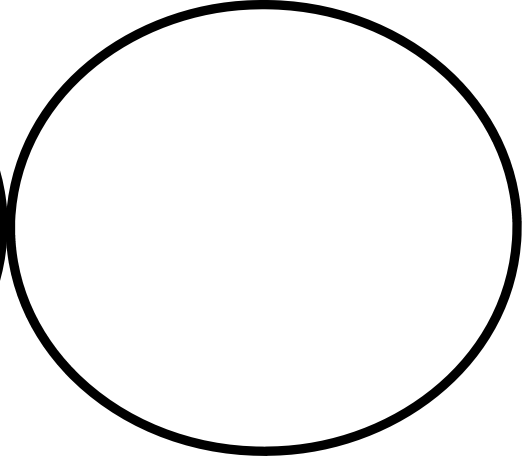
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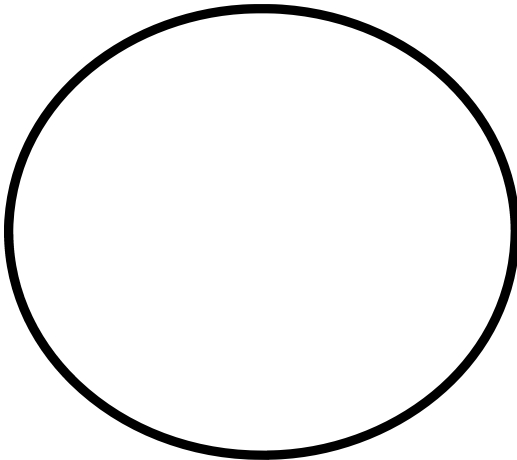
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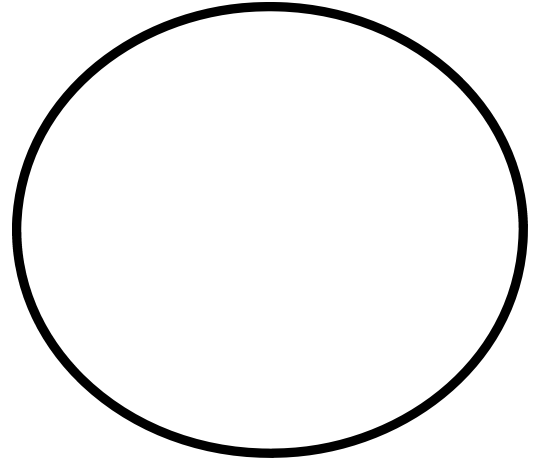
SLIDE 5 _____



SLIDE 6 _____



SLIDE 7 _____



SLIDE 8 _____

Starfish

Echinoderms are invertebrates which are characterized by an external skeleton covered with sharp spines, radial symmetry, and tube feet. The phylum Echinodermata includes starfishes or sea stars, brittle stars, sea urchins, sea lilies, and sea cucumbers. All but the last have a limy internal skeleton and hard external spines or plates. They are fixed or slow-moving inhabitants of the sea, from the high-tide zone to considerable depths. Often they are abundant but none form colonies. Species of shallow water are easily collected by hand at low tide and deeper ones are captured by dredging.

Starfish may well be the most unusual well-known creature. They have no front or back and they can move in any direction without turning. Their mouth is on the bottom side called the oral surface. The top side is called the aboral surface. Starfish walk using their **tube feet** to move themselves along a surface. Their tube feet have suckers on the ends, which they use to attach themselves to rocks and to trap prey items.

Rather than using muscles to move their hundreds of tube feet, starfish use a complex hydraulic system to move around or cling to rocks. The intake valve for this system, **Madreporite**, is generally located on the top of the Starfish, just off center.

Starfish can regrow their **arms** if they are damaged or eaten by predators. In fact, in some cases an entire sea star can be regenerated from just a single arm!

Sea stars are carnivores (meat-eaters). They eat clams, oysters, coral, fish, and other animals. They surround the shell and use the suckers on their feet to pull the two shells (or valves) apart. The sea star has enough force in its arms to actually bend the shell! This creates an opening between the two shells that is only .01 inches wide. Using this tiny gap, the sea star puts its stomach out through their **mouth** and into the clam's shell. The stomach secretes digestive juices that dissolve the oyster or clam, turning it into liquid. Since starfish have no teeth or jaws, they draw up the liquid through a tube. When it is done, nothing is left but an empty shell.

Most species of starfish expel enormous numbers of eggs and sperm into the ocean; fertilization is external. After fertilization, the tiny, transparent, bilaterally symmetrical larvae (baby sea stars) travel many miles as they are swept along by ocean currents for about two months. As they develop, the tiny larvae swim in the sea, eat phytoplankton, and are a component of zooplankton.

Common species of starfishes used for class work are *Asterias forbesi* and *A. vulgaris* of the Atlantic coast and *Pisaster ochraceus* of the Pacific coast.

CLASSIFICATION:

Kingdom - Animalia

Phylum - Echinodermata

Class - Asteroidea

Parts to identify and label:

Arms or rays - projecting from disc

Central disc - the center of the animal

Oral surface - where the mouth is

Aboral surface - the top of the starfish

Madreporite - small white circular area, off-center on aboral surface of disc

Spines - many short, rough, limy, in patterns over aboral surface

Eyespot - small, pigmented on one end of each arm

Ambulacral grooves - one along oral surface of each ray

Oral Spines - surround the mouth

Tube feet - soft, slender, with expanded tips; 2 or 4 rows in each groove

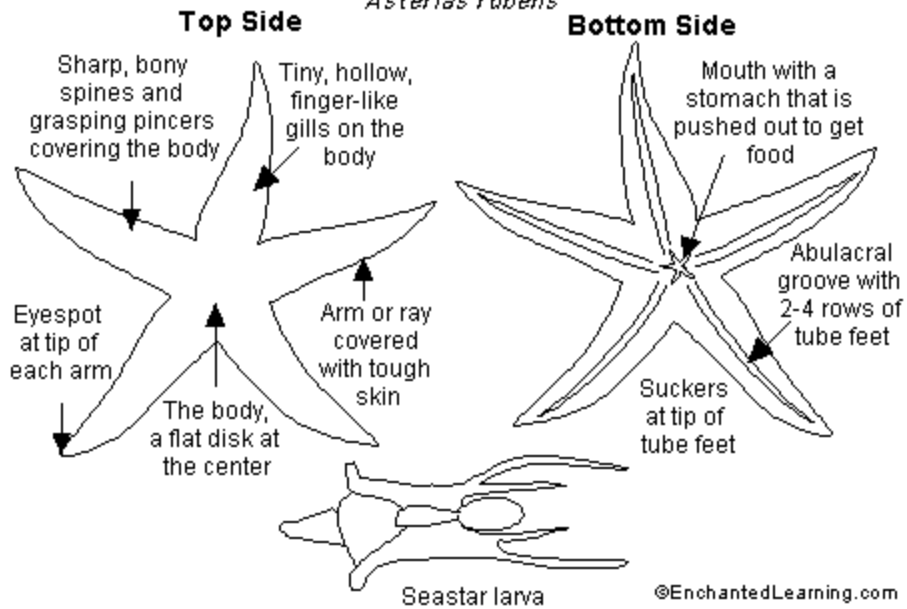
Mouth - on oral surface in center



Starfish

Common Sea Star

Asterias rubens



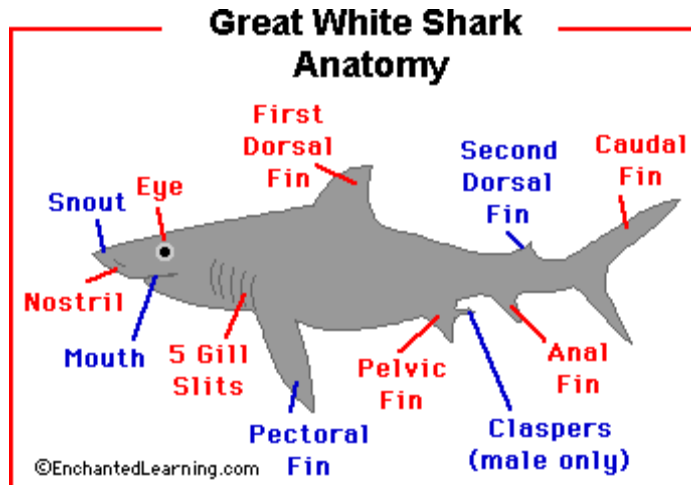
1. How do sea stars move?
2. How do they 'see'?
3. How does a sea star eat?
4. What do they eat?
5. What animals are predators of the sea star?
6. How do these animals reproduce?
7. How many arms does it have?
8. What happens when a sea star loses an arm?
9. Describe the environment that sea stars like to live in.
10. What kingdom do starfish belong to?

GREAT WHITE SHARK

Carcharodon carcharias

GENERAL DESCRIPTION

The great white shark is a streamlined swimmer and a ferocious predator with 3,000 teeth at any one time. This much-feared fish has a torpedo-shaped body, a pointed snout, a crescent shaped tail, 5 gill slits, no fin spines, an anal fin, and 3 main fins: the dorsal fin (on its back) and 2 pectoral fins (on its sides). When the shark is near the surface, the dorsal fin and part of the tail are visible above the water.



COLORATION

Only the underbelly of the great white shark is actually white; its top surface is gray to blue gray. This is useful in hunting its prey. The great white usually strikes from below and its grayish top coloration blends in with the dark water, enabling it to approach the prey unobserved.

SIZE

Great whites average 12-16 feet long (3.7-4.9 m) long. The biggest great white shark on record was 23 feet (7 m) long, weighing about 7,000 pounds (3200 kg). Females are larger than males, as with most sharks. Shark pups can be over 5 feet (1.5 m) long at birth.

DIET AND FEEDING HABITS

Young great white sharks eat fish, rays, and other sharks. Adults eat larger prey, including pinnipeds (sea lions and seals), small toothed whales (like belugas), otters, and sea turtles. They also eat carrion (dead animals that they have found floating dead in the water). Great whites do not chew their food. Their teeth rip prey into mouth-sized pieces which are swallowed whole. A big meal can satisfy a great white for up to 2 months.

TEETH

The great white shark has 3,000 teeth at any one time. They are triangular, serrated (saw-edged), razor-sharp, and up to 3 inches (7.5 cm) long. The teeth are located in rows which rotate into use as needed. The first two rows are used in obtaining prey, the other rows rotate into place as they are needed. As teeth are lost, broken, or worn down, they are replaced by new teeth that rotate into place.



SENSES

Shark's primarily use their sense of smell followed by their sensing of electric charges. The shark's other senses, like sensing changes in water pressure, eyesight, and hearing, are less important. The great white's nostrils can smell one drop of blood in 25 gallons (100 liters) of water. (Shark nostrils are only used for smell and not for breathing, like our nostrils. They breathe using gills, not nostrils.) The sensing of minute electrical discharges in the water is accomplished by a series of jelly filled canals in the head called the ampullae of Lorenzini. This allows the shark to sense the tiny electrical fields generated by all animals, for example, from muscle contractions. It may also serve to detect magnetic fields which some sharks may use in navigation. The great white is the only type of shark that will go to the surface and poke its head up out of the water. No one knows exactly why it does this; perhaps it is to see potential prey such as surface-dwelling sea lions.

GREAT WHITE SHARK ATTACKS

Most great white attacks are not fatal. Great whites account for about 1/2 to 1/3 of all 100 annual reported shark attacks. Of these 30-50 great white attacks, only 10-15 people die.

SOCIAL GROUPS

Great whites are usually solitary animals but are occasionally spotted travelling in pairs.

HABITAT

Great white sharks are found near shore along most of the temperate (not very hot and not very cold) coastlines around the world.

DISTRIBUTION

Great white sharks have been observed along the coastlines of California to Alaska, the east coast of the USA and most of the Gulf coast, Hawaii, most of South America, South Africa, Australia (except the north coast), New Zealand, the Mediterranean Sea, West Africa to Scandinavia, Japan, and the eastern coastline of China and southern Russia.

MIGRATION

In the fall, some females migrate to warmer waters (for example, southern California) to give birth.

SWIMMING

Great whites are propelled through the water by their powerful tails. The fins are only used for balance. Their movement is more like an aircraft's flight than other fishes swimming. They average about 2 mph (3.2 kph) but can swim 15 miles per hour (24 kph) in short bursts.

They swim constantly or they will sink since, like other sharks, they have no gas filled swim bladder to keep them afloat like bony fish do. Like other sharks, their large, oily liver provides some buoyancy (floating ability). but they are still heavier than water and will sink unless they are propelling themselves through the water. Also like other sharks, they cannot swim backwards or even come to an abrupt stop, because their fins are not flexible like other fish. In order to go backwards, they must stop swimming and fall backwards, using gravity to propel themselves backwards. It has been recently discovered that great white sharks can jump out of the water. They jump into the air from deep water in order to catch fast-swimming seals.

LIFE SPAN

No one knows the life span of the great white shark. Some people estimate it to be about 100 years, but this has not been proven.

POPULATION COUNT

Great whites are decreasing in numbers and are rare due to years of being hunted by man. They are a protected species along the coasts of California, USA, Australia, and South Africa.

