extract from

Insiders Series: Oceans

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Templar

Sea level
0 ft (0 m)

300 ft (100 m)

600 ft (150 m)

COASTAL SEAS: THE FACTS

LOCATION EXAMPLES: Around every continent

ANIMALS: Bony fish, such as herrings, anchovies, salmon, sardines, sea bass, drums, flounders, and sea robins; sharks; whales and dolphins; invertebrates, such as jellyfish, squid, octopus, cuttlefish, and zooplankton

PLANTS: Phytoplankton, such as diatoms

MAJOR THREATS: Overfishing and pollution

PHOTO: Dolphins jump off the coast of Roatán, Honduras

Abundance in the

Coastal Sea

Coastal seas are shallow compared to the open ocean, but they teem with life. This abundance starts close to the sunlit surface, where tiny floating plants and animals called plankton thrive. Shrimps and small fish that eat plankton become meals for larger predators, such as humpback whales, mackerels, and tunas. Topping the predator list are the ocean's premier hunters—sharks. The coastal realm also includes a variety of jellyfish and squid, and crustaceans, such as crabs and shrimps that scuttle across the seafloor. With so many species, coastal seas are popular for commercial fishing. They produce around 90 percent of the seafood eaten by people around the globe.

Manta ray *A manta ray swims using its large triangular fins. It eats plankton swept in by flaps in front of its mouth.*

Schooling fish *Schools, such as these jacks, provide plenty of food for sharks and other fish-eating predators.*

Jellyfish *Jellyfish have tentacles that fire harpoon-like threads into prey, injecting the victim with a paralyzing toxin.*

Humpback whales *Instead of teeth, humpbacks have stiff, comblike fibers called baleen that filter out plankton and small fish from seawater.*

Sharks rule

Most sharks live in coastal seas and pursue prey smaller than they are. A dangerous few, such as great whites, tiger sharks, and bull sharks, hunt large animals and are not afraid to attack people.

Sand tiger shark *The pointed teeth of a sand tiger shark curve backward into its mouth. This makes it more difficult for a struggling prey fish to escape.*

Squid *A squid can change the color and pattern of its skin to match its surroundings or evade a predator.*

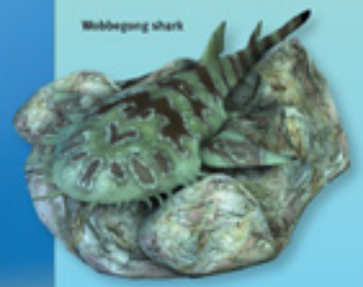
Cuttlefish *Relatives of octopus and squid, cuttlefish swim by squeezing jets of water out through a narrow tube.*

Sea stars *A sea star's mouth is under its body, so it must climb onto its prey, such as clams.*

Crab *Crabs use their large front pincers to grasp food, such as bits of seaweed or flesh from a fish—dead or alive.*

HOW DO SHARKS HUNT?

Most sharks have razor-sharp teeth, but different species use different methods to hunt and capture prey.



Wobbegongs rest quietly on the seafloor. Their flat body and blotchy skin help disguise them as they lie in wait for prey, such as small fish, crabs, and lobsters.

A thresher shark slaps through schools of fish with its long, curved tail. It then captures fish that have become disoriented by the stunning blow.

Great white sharks hunt marine mammals, such as dolphins and seals. They are stealth hunters that sneak up on prey from below and attack with a sudden lunge.

The Formation of Earth's

First Ocean

When Earth formed about 4.6 billion years ago, it was nothing like the planet we know today. Scientists believe the skinlike crust at Earth's surface was hot and rocky. Volcanoes erupted, lightning flashed, and dark clouds of gas and steam rose to the sky. Later, the first ocean began to form. According to theory, some of the water that filled this sea came from melting ice in comets and other material that bombarded the young planet from space. Much more fell as rain. By about 200 million years ago there was a single huge continent, which scientists now call Pangaea, surrounded by a vast ocean.

Earth's moving surface
Earth's crust is divided into sections called tectonic plates, outlined by red lines in the map below. Forces deep inside Earth move its plates. Earthquakes, tsunamis, and volcanic eruptions are triggered by these plate movements.

Direction of plate movement

Oceans through time
Over time, continents move and ocean basins enlarge or shrink. Fifty million years from now, the Atlantic Ocean will be much wider than it is today.

200 million years ago
The world ocean surrounds a single huge continent, Pangaea.

90 million years ago
Moving plates split Pangaea and the Atlantic Ocean basin starts to form.

50 million years from now
Ocean basins change shape as plate movements continue.

Earth's first atmosphere *Clouds of gas and water vapor formed Earth's first atmosphere. As the young planet cooled, the water vapor condensed into liquid water that fell as rain.*

Water cycle begins *Water evaporated from the ocean and other bodies of water, then fell back to Earth as rain. This was the start of Earth's water cycle.*

Salt for the ocean *Ash and other materials from early volcanoes contained chemicals, such as chloride and sulfide, that helped make the ocean salty.*

Land and sea form *Some of Earth's crust remained as dry land while other parts sank and became the seafloor.*

Magma *The deeper parts of Earth's crust are hot, mudlike magma. When a volcano erupts, this fiery magma may rise to the surface and burst out along with steam and ash.*

Soil and sediment *As rain fell over many millions of years, the land weathered and eroded. This created soil on land and sediments on the seafloor.*

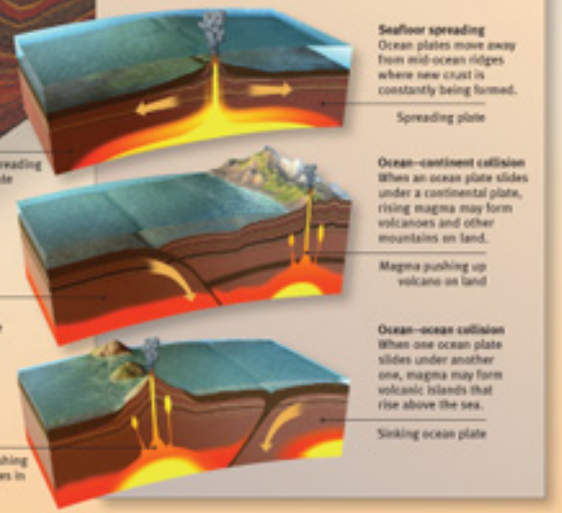
Birth of the ocean

When hot early Earth had cooled, steam from erupting volcanoes formed rain. The rainwater slowly filled low basins and washed minerals into them. After millions of years, seawater covered 70 percent of Earth's surface.

Islands are born *Movements of Earth's crustal plates pushed up new land areas. Like the water cycle, these processes go on today.*

THE DYNAMIC SEAFLOOR

Tectonic activity at mid-ocean ridges creates plates that form the seafloor. Earth's oceans are always on the move.



Seafloor spreading
Ocean plates move away from mid-ocean ridges where new crust is constantly being formed.

Spreading plate

Ocean–continent collision
When an ocean plate slides under a continental plate, rising magma may form volcanoes and other mountains on land.

Magma pushing up volcano on land

Ocean–ocean collision
When one ocean plate slides under another one, magma may form volcanic islands that rise above the sea.

Sinking ocean plate