

The image features a solid blue background. At the top, there are several wavy, overlapping lines in various shades of blue, creating a dynamic, fluid effect. The word "NEKTON" is positioned in the upper right quadrant of the image.

**NEKTON**

# INTRODUCTION

- Nekton comprises all the fast and free swimming animals of the pelagic waters.
- The term "nekton" was coined by Ernst Haeckel (1890) and it is derived from the Greek word nekton, which means "swimming".
- They are provided with efficient locomotory organ and hence they are not at the mercy of currents.
- Most nekton are carnivores (meat eaters) and predators (organisms that kill and eat other animals) and some are scavengers (meat eaters that don't kill what they eat).
- A few nekton are carnivorous filter feeders (animals that filter large volumes of water to obtain their food, which is usually zooplankton) e.g. baleen whales.

# TYPES

**There are three types of nekton viz.**

- chordates
- molluscs
- Arthropods

## CHORDATES

- Nekton belonging to the chordates are the largest groups, which have bones or cartilage.
- This group includes bony fish, sharks, whales, porpoises, dolphins, seals, turtles, snakes, and sea birds.
- There are almost 25,000 species of fishes, more than any other group of vertebrates.

# I. FISHES

- Among the nektonic vertebrates, fishes represent the major constituent of the nekton.
- Based on the habitat they inhabit, these are grouped into holoepipelagic and meroepipelagic.
- **Holoepipelagic fishes** are those that spend their entire lives in the epipelagic region. These fishes include most of the tropical and subtropical fishes and often lay floating eggs and have epipelagic larval life.
- **meroepipelagic fishes** spend only part of their life in the epipelagic region and visit this region to find their prey. They may spawn in inshore or fresh water regions.

## II. REPTILES

- The nektonic marine reptiles include sea snakes and turtles. These are cold blooded animals.
- Though the turtles are the true pelagic animals they often visit the shores for breeding .
- The leathery turtle (*Dermochelys*) and the hawk-billed turtles (*Chelonia imbricata*) are carnivores
- The green turtle (*Chelonia mydas*) feeds largely on seaweeds and eel-grass.
- The sea-snakes are represented by more than sixty species distributed abundantly in the Indo-Pacific region.
- Important genera include *Enhydrina*, *Pelamis*, *Microcephalophis* and *Laticauda*.

### III. SEABIRDS (AVES)

- Seabirds, which are warm blooded nektonic animals, play a significant role in the investigation of marine ecosystems and food chain dynamics.
- Especially their interaction with marine fishes and the fishery are regarded of growing economic importance.
- They typically breed on offshore or coastal areas like cliffs, dunes, skerries or remote islands.
- Some 274 species belong to seabirds, comprising mainly penguins, albatrosses, fulmars, petrels, shearwaters, pelicans, cormorants, skuas, ducks, terns and auks.

## IV. MAMMALS

- The mammals include the seals, dugongs, manatees, dolphins, porpoises and whales, of which the whales are the most important.
- These are the largest members of the nekton. The blue sulphur-bottom whale, a plankton feeder, attains a length of 25 metres and a weight of 60-80 tons.
- The toothed whales (sperm whale, *Physeter catodon*, and killer whale, *Orcinus orca*) are predators feeding on squids and large fish.
- The whalebone whales (baleen whales) on the other hand feed on plankton, mainly sieving euphausiids and others from surface waters.

# INVERTEBRATES

## I) MOLLUSCS

- Nektonic molluscs include octopus and squid. Unlike clams and oysters, squids have no shells on the outside of their bodies.
- There are about 375 species of squid. Squids are very fast swimmers and they use a kind of jet propulsion to move.
- Squids have some unique adaptations. Some can change colour, some use bioluminescence to create light, and some shoot ink to cloud the water and escape from predators.

- There are two large groups of octopus.
- The cirrata or finned octopuses live in the deep sea at depths of between 1000 and 24,000 feet.
- About 85% of octopuses are in the incirrata group.
- They have eight tentacles. The tentacles have suction cups on them and are used to hold onto prey.
- The tentacles also have taste sensors that let the octopus know if what it grabbed is worth eating.
- Some species may also inject prey with a toxic substance.

## II) ARTHROPODS

- Among arthropods, shrimps are the major nektonic organisms.

# ADAPTATIONS

## 1. Fishes

### **Buoyancy**

- Most fish have a gas-filled swim bladder. Most fish can regulate the amount of gas in the bladder and thus control their buoyancy.
- Gas filled cavities (lungs) help float all air-breathing nektonic animals.
- Marine mammals to increase buoyancy are bone reduction and the presence of a layer of lipids (fats or oils).
- Large amounts of lipids are also present in nektonic fish that do not have swim bladders (sharks, mackerels, bonito).

## ii. Musculature

- The fishes those living in the deep sea areas have suitable adaptations to withstand the prevailing high pressures and to the dark conditions. These fishes are fragile and weak with soft and loose muscle.

## iii. Colour

- They develop black or dark brown colourations to minimise the problem of predation.

## iv. Eyes

- Many deep sea nekton have reduced eyes or no eyes.

## v. Bioluminescence

- Some fishes have bioluminescence organs in their body to attract their prey as well as to find their mates (e.g. angler fish)

## 2. REPTILES

- Turtles possess a special adaptation to marine life by having buccal respiration in which a highly vascularised mucous epithelium takes up oxygen from water in the mouth.
- The mucous epithelium of the buccal cavity of sea-snakes is known to be supplied with numerous capillaries which enable these snakes to take oxygen from the water.
- This would explain the records of sea snakes seen resting in the bottom and remaining submerged for several hours.

### 3. SEABIRDS

- Seabirds swim at the sea surface and under water; they use their webbed feet, their wings, or a combination of wings and feet.
- They float by using fat deposits in combination with light bones and air sacs developed for flight.
- Their feathers are waterproofed by an oily secretion called preen, and the air trapped under their feathers helps keep the birds afloat, insulates their bodies, and prevents heat loss.
- When diving, the birds reduce their buoyancy by exhaling the air from their lungs and air sacs and pulling in their feathers close to their bodies to squeeze out the trapped air.

## 4. MARINE MAMMALS

### **i. Temperature Maintenance**

- Large size - less loss of body heat (reduces surface to volume ratio)
- Insulating layers of blubber or fat
- Adaptations of the circulatory system for reducing heat loss

### **ii. Respiratory modifications for diving**

- Have the ability to hold their breath for extended periods of time making deep dives possible.
- They are able to dive with their lungs empty avoiding problems of buoyancy and bends (nitrogen bubbles in the blood)

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- Their blood is rich in haemoglobin and other respiratory pigments, and the muscles are rich in myoglobin (another respiratory pigment in the muscles).
  - During deep dives, sphincters in arteries shut off blood to parts of the body so it only goes where it is needed.
  - The heart slows, and the muscles can tolerate a greater oxygen debt than terrestrial animals.
  - When the animal surfaces and breathes, a very rapid O<sub>2</sub>-CO<sub>2</sub> exchange occurs.

### iii. Osmotic Adaptations

- The kidneys reabsorb water and they excrete a very concentrated urine
- Fatty insulating layers may also play a role in water storage.
- Most water intake comes from the fish they eat.