

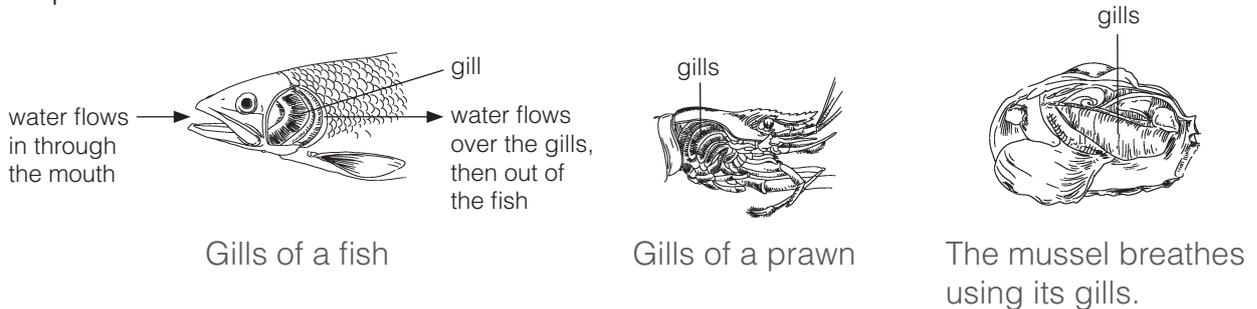
Adaptations of Aquatic Animals

All organisms need oxygen to survive. Without oxygen, organisms will die. Aquatic organisms have adapted themselves to a life in the water by various means. They take in dissolved oxygen that is in the water or come up to the surface of the water to take in air.

Adaptations For Breathing In The Water

- **Gills**

Fish and other aquatic creatures like prawns, crabs, mussel and tadpoles have gills to help them breathe under water.



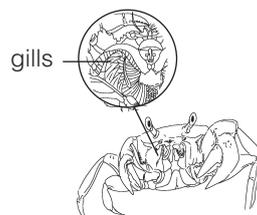
Insects like the damselfly nymphs, stonefly nymphs and mayfly nymphs have gills which enable them to live at the bottom of streams and ponds. Stonefly nymphs have gills on their thorax and mayfly nymphs have gills on their abdomen.



- **Gill chambers**

Some aquatic organisms do not stay in the water all the time. They come out of the water and move around on land but only for short periods of time. In addition to gills for them to breathe under water, they also have gill chambers.

A crab is one aquatic organism that has a gill chamber. A gill chamber is a special space in its body that allows it to store water. The filaments of its gills dangle down into the base of the chamber into the pool of water. Therefore, as long as the crab keeps its gill filaments moist, it is able to extract oxygen from the surrounding air in the gill chamber.



A mudskipper also has a gill chamber because it does not stay underwater indefinitely. It comes out of the water to move around on land. In the same way as the crab, it does

not move far away from a water source. This is because it needs to regularly keep its gill chamber with water.

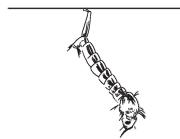


A mudskipper on land

- **Breathing tubes**

Some aquatic insects take in oxygen using a breathing tube (also called a siphon) found at the end of their abdomens. They live just below the water surface. They stick their breathing tubes out through the surface of the water to take in oxygen from the surroundings.

Examples of such insects are the young of the mosquito (the larva / wriggler and the pupa), the water stick insect and the water scorpion.



A wriggler comes to the surface of the water and pushes its breathing tube out to get air.



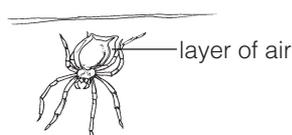
A water stick insect



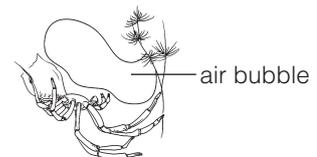
A water scorpion

- **Air bubbles**

The great diving beetle and the water spider carry an air bubble on their body. This 'mini-oxygen tank' helps them to breathe even while under water.



A water spider getting air from the surface so that it can live underwater.



A water spider uses its legs to scrape off the air bubble on its back.

- **Special nostrils**

Some mammals that live in the water have special nostrils that allow them to breathe in air. They have to come up to the surface of the water to take a breath.



Example

When manatees come up to the surface of the water, they exhale very hard. This allows them to breathe in, changing up to 90% of the air in their lungs. They are then able to stay underwater for longer periods of time between breaths.

A manatee can only breathe through its nostrils so it has a special structural adaptation in the form of a flap that covers tightly over its nostrils when it is underwater.



A manatee under water



Example

When seals and sea lions are underwater, their nostrils are shut automatically.



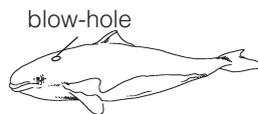
A seal swims underwater.



A sea lion dives underwater after taking in air.

- **Blowholes**

Dolphins, whales and porpoises have blow-holes at the top of the heads. When they need to breathe, they come up to the surface of the water, expel the carbon dioxide and take in a breath of fresh air.



The blow-holes are found at the top of the heads of the porpoise and the dolphin.

- **Skin**

Some aquatic animals breathe using their skin.



Example

Some salamanders have no lungs or gills. Instead, they breathe through their moist skins.

A frog can live on land and in water. An extensive number of blood vessels can be found throughout the frog's skin. Dissolved oxygen passes through its membranous skin and directly enters into the bloodstream when the frog is in the water.