Sponges

Ancient, colourful and full of holes!

Not only for use in the bath

In the past, people used the softer skeleton of one particular group of sponges to scrub their bodies – hence their name. Sponges belong to the Phylum Porifera, meaning "pore-bearer." They are characterised by a body that is punctured with microscopic holes or pores, as well as one or more larger round openings or vents.

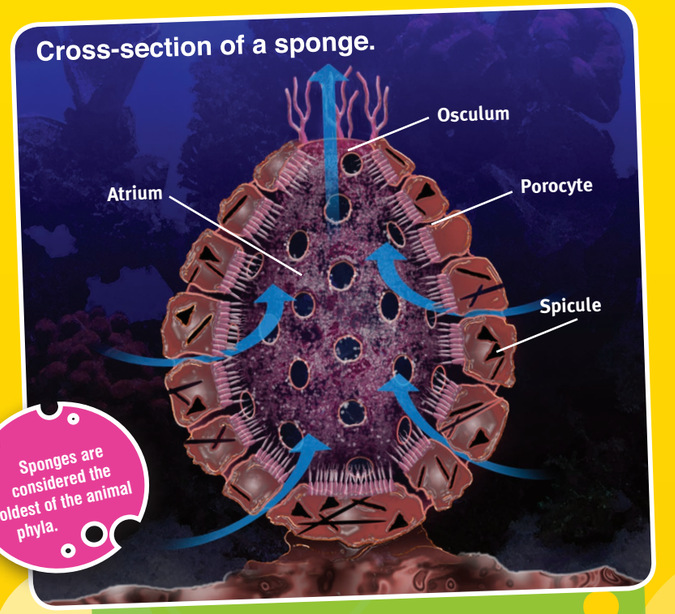
Incredible diversity

Sponges come in a wide variety of colours, including red, pink, purple, orange, blue, yellow and white; and their textures range from soft and readily compressible to rubbery or as hard as stone.

The shape of a sponge is not a reliable guide to identification. Sponges take on a range of shapes and forms, depending partly on the conditions of their habitat. Fans, cups and crusts; spherical, tubular, bushy or tree-like; and branching, round and honeycomb structures all exist.

The finger or chimney shape of some sponges maximises the water flow around their columns. In very strong currents sponges may take on an encrusting form – a thin layer of cells that grows on underwater surfaces, like rocks and jetty pylons, or over the top of other creatures such as corals.

The smallest sponges are microscopic. The largest sponges, found in the Antarctic and the deep sea, are two metres tall, one and a half metres across and shaped like a volcano!



Sponges are considered the oldest of the animal phyla.

Animal, vegetable or mineral?

Because they are sedentary (fixed in one place), colourful and simple in structure, sponges are often mistaken for plants. They are in fact the simplest form of multicellular animal. Sponges have no mouth, internal organs or nerves. Their outer layer of cells is covered with microscopic pores that lead to an inner network of canals and chambers.

Worldwide there are about 7,000 described species of sponges, although at least twice this number are thought to exist. In Australia there are around 1,500 described species, with an enormous number of species still waiting to be described.

Soft, stony or made of glass

Sponges are divided into three classes: **Demospongiae** (including the bath sponges), **Calcarea** (calcareous sponges) and **Hexactinellidea** (glass sponges).

Embedded in the bodies of some sponges are microscopic structures called "spicules" that provide a support or "skeleton" for the animal.

These hard spicules are made of either calcium carbonate (limestone) or glassy silica that vary in size and shape. Many are needle-like rods with pointed ends that can severely irritate the tissues of other animals, so they can be used to deter predators.

Some demosponge bodies also contain a fibrous protein called "spongin".

Soft natural bath sponges are the skeleton of one particular group of sponges that contain only spongin and lack spicules.

Sponges produce chemicals that make them toxic to predators.

Filter feeders

A sponge's body is largely a system of water-filled chambers lined with living cells, called "choanocytes" or "collar" cells.

The collar cells have microscopic whip-like tails called "cilia" that move about and stir the water. This creates a current that draws water into the sponge through tiny holes or pores called "ostia".

These collar cells also filter the water as it passes through the sponge. Plankton (tiny plants and animals), bacteria and oxygen are strained out of the water before it is pumped out of the sponge.

The filtered water and wastes are finally carried out through large vents called "oscules".

Sponges pump water through their bodies at a surprising rate to acquire the food they need. Many sponges can filter their body's volume in less than one minute, so even a small sponge can filter hundreds of litres of water a day.

A carnivorous exception

One family of sponges is quite unusual in that they feed by catching small crustaceans. Their spicules "stick" to the crustacean when they come in contact. Cells then migrate around the captured prey and the crustacean is digested.

Sponge communities

All sponges are aquatic with the vast majority being marine species. Sponges have adapted to all marine environments, from near shore to the ocean depths. They grow anywhere where they can gain a firm hold and are abundant in areas exposed to strong currents, where the circulating water brings them plenty of food.

Sponges form an important part of the marine ecosystem. They provide food and shelter for many animals such as fish, crustaceans, echinoderms, marine worms and molluscs. They can produce large quantities of mucus, which forms the main diet of many marine microorganisms. Sponges also play a vital role in filtering bacteria and organic particles from the water.

Some nudibranchs (a slug-like mollusc) consume large amounts of sponges, leaving only small traces of tissue behind.

Beachcombing

Sponges are commonly found by beachcombers because their "skeletons" are strong enough to survive the waves that wash them onto the shore. These washed up sponges have lost their bright colours but generally retain the shape they had when alive.

Reproduction – sponge sex

Sponges may be male, female or hermaphroditic (producing both sperm and eggs – usually at different times to avoid self-fertilisation).

Sperm are shed into the water to fertilise the eggs of another sponge. Sometimes the eggs remain inside the sponge waiting for the sperm to float in and fertilise them, or the eggs are released into the water column and fertilised in the seawater. The sponge releases a cloud of fertilised eggs by pumping water through its body cavity and out the oscules.

The fertilised eggs develop into tiny larvae, which may survive for several days. When they reach a suitable place the larvae settle and grow into adult sponges.

Some sponges can brood. With these sponges, the fertilised eggs are incubated internally and the larvae are released into the water.

Occasionally, a small ball-shaped "bud" can break off a sponge and grow into a new sponge demonstrating the ability of sponges to also reproduce asexually. If a sponge is cut into pieces, each piece may produce a new sponge.

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