SPONGES

SCIENTIFIC CLASSIFICATION

COMMON NAME:	sponges
KINGDOM:	Animalia
PHYLUM:	Porifera
CLASS:	• Calcarea – calcareous sponges • Hexactinellida – glass sponges • Demospongiae – contains 90% of sponge species
ORDER:	
FAMILY:	
GENUS SPECIES:	Approximately 5,500 species

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FAST FACTS

DESCRIPTION:

Sponges are the most primitive multi-cellular animals. They lack organs, however they have very well-developed connective tissue in which cells perform a variety of functions. They also lack muscles and nerves.

A sponge's structure is maintained by spicules (needle-shaped, skeletal fibers of calcium carbonate or silica) or a kind of collagen protein called spongin. Sponges are classified based on the presence and kind of spicules. Sponges are organized around a system of water canals. Water enters canals through tiny pores on the body surface (ostia) and moves along passageways (spongocoals) lined with cells bearing single, long flagella (choanocytes or collar cells). The water will pass through more corridors and eventually emerge at the surface (osculum). The flow is mainly driven by the movement of the flagella of the choanocytes or by surrounding external currents. The currents bring in dissolved oxygen, small food particles, and organic matter and carry away body wastes. Some sponges can pump as much as 20,000 times their volume through their tissues within 24 hours.

Sponges can be radially symmetrical, but most are asymmetrical

	and have massive, erect, encrusting or branching growth patterns. Sponges exhibit almost every color; from bright blues and lavenders to yellow, orange, red, and white.
SIZE:	Some calcareous sponges are only about the size of a grain of rice. Larger sponges can reach up to 2 m (6.56 ft.) in height on Caribbean reefs. Some grow even larger in Antarctica.
LOCOMOTION:	Sponges are sessile.
DIET:	Minute particles in the water
FEEDING:	Sponges are filter feeders that depend on water flow through the body.
REPRODUCTION:	Most sponges are hermaphrodites; sperm leaves one sponge and enters another in the currents flowing through the water canals. Eggs are fertilized within the sponge and may be released by the water canals or brooded until they reach the larval stage.
RESPIRATION:	Gas exchange depends on the flow of water through the body.
LIFE SPAN:	Estimates range from 20 to 100 years.
RANGE:	Oceans worldwide; more diverse in tropical reef habitats
HABITAT:	Intertidal to deep sea; found on rocks, shells, coral, and even muddy or sandy bottoms.

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FUN FACTS

1. Many sponges, especially coral reef species, have a mutualistic symbiosis with bacteria and cyanobacteria. The sponge provides a home for the bacteria and algae. The cyanobacteria provide the sponge with nutrients from photosynthesis, which increases sponge growth rate and competitive ability. Sponges can also gain nutrition from bacteria.

2. In Antarctica, sponges comprise 75% of the benthic biomass at 100–200 m (328–656 ft.) depths.

3. The tropical encrusting sponge, *Terpios*, grows on living and nonliving substrates including corals, hydrocorals, molluscs, and algae. It grows an average of 23 mm (0.91 in.) a month. Experiments have shown that it is toxic to living corals.

4. Commensalism is common among all sponges due to their porous nature, which makes them an ideal habitat. A single sponge in Florida was found to have over 16,000 alphaeid shrimps living in it. A study from the Gulf of California found approximately 100 species of plants and animals in a 15 x 15 cm (5.9 x 5.9 in.) section of sponge.

5. There are about 150 species of freshwater sponges.

6. Some sponges are able to regenerate damaged or missing parts.

7. For more information, please visit the Tide Pool Infobook.

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ECOLOGY AND CONSERVATION

Sponges are a food source for many marine animals including nudibranchs, chitons, sea stars, sea turtles, and many fishes.

The use of sponge skeletons dates back to at least the Bronze Age. Ancient Greek paintings depict bathers using sponges. Greek writings reveal that sponges were used for scrubbing tables and floors. Romans used sponges as painting tools, mops, and often as a substitute for drinking cups. Today, synthetic sponges are commonly used. However some still prefer the qualities of natural sponges.

One of the primary defense mechanisms of sponges is biochemicals. Sponges manufacture a broad spectrum of biotoxins, some of which can be quite potent. Many of these biochemicals are being studied by natural product chemists and biologists interested in their potential as pharmaceutical agents. Compounds with respiratory, cardiovascular, gastrointestinal, anti-inflammatory, antitumor, and antibiotic activities have already been identified by marine sponges.

Beachcombers, tidepoolers, and divers must remember not to disturb or collect any specimens that they may encounter. The removal of animals from an ecosystem may disrupt ecological processes and decrease the diversity in areas that are frequently visited. Because of their specific nutritional and physiological needs, certain animals, such as sponges have a much better chance for survival in their natural environment than in an unregulated home aquarium.

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BIBLIOGRAPHY

Buchsbaum, M. R. a. P., Vicki & John. (1987). Living Invertebrates. Pacific Grove, CA, The Boxwood Press.

Morris, R. H., D. p. Abbott, et al. (1980). Intertidal Invertebrates of California. Stanford, Stanford University Press.

Myers, P., R. Espinosa, C. S. Parr, T. Jones, G. S. Hammond, and T. A. Dewey. 2006. The Animal Diversity Web (online) <http://animaldiversity.org>

Ruppert, E. E. and R. D. Barnes (1994). Invertebrate Zoology. San Diego, Harcourt Brace College Publishers.

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