Phylum Porifera

The “Pore Bearers”

What type of symmetry does the sponge in the figure have?
What does this tell you about its complexity?

Phylum Porifera : The Sponges

A few examples

Stovepipe Sponges

Red Volcano Sponge

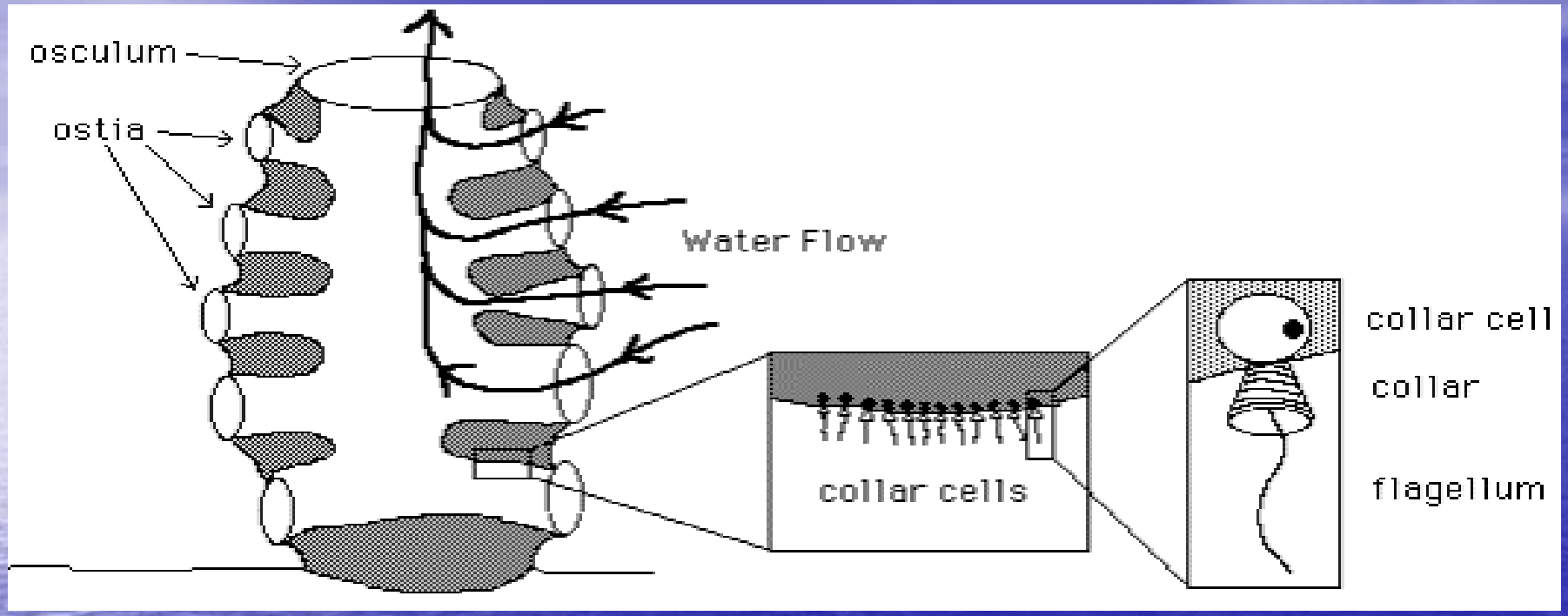
Yellow Tube Sponge

Look at these sponges and their variety.
Can anyone tell me what kind of symmetry each one has?
How can you tell?

Identifying Characteristics of the members of Phylum Porifera

- **Non-coelomates (**therefore do not possess any true body systems although they do have highly specialized cells that perform many functions**)**
- **Mostly asymmetric (**some exhibit radial symmetry**)**
- **Possess a GASTROVASCULAR CAVITY (GVC)**
- **Filter Feeders : through pores and special cells that line the GVC (Does anyone here like spaghetti?)**
- **Posses a skeleton made up SPICULES composed of either calcium carbonate or silica (surrounded by spongin)**
- **Hermaphroditic : can reproduce sexually (**do not self fertilize**) or asexually by regeneration or budding**
- **Sessile (**anchored to the ocean floor as an adult**)**
- **Found mainly in marine habitats**

Basic Structure of a Sponge



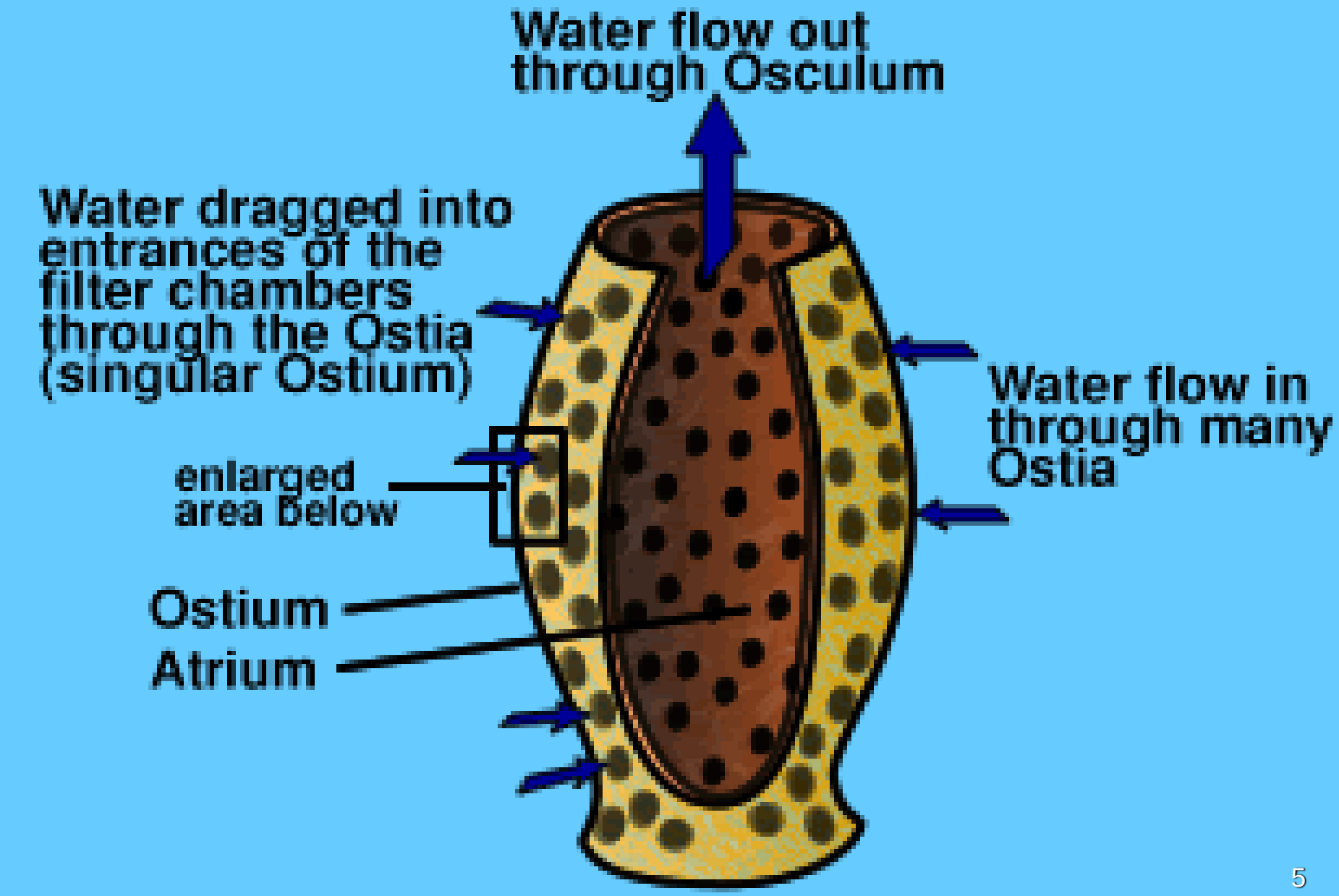
The Gastrovascular Cavity

- Has only one opening
- Serves two primary functions

1. "Gastro"
   digests and absorbs food and nutrients
2. "vascular"
   serves as a primitive circulatory system as it moves nutrients around to other parts of the body

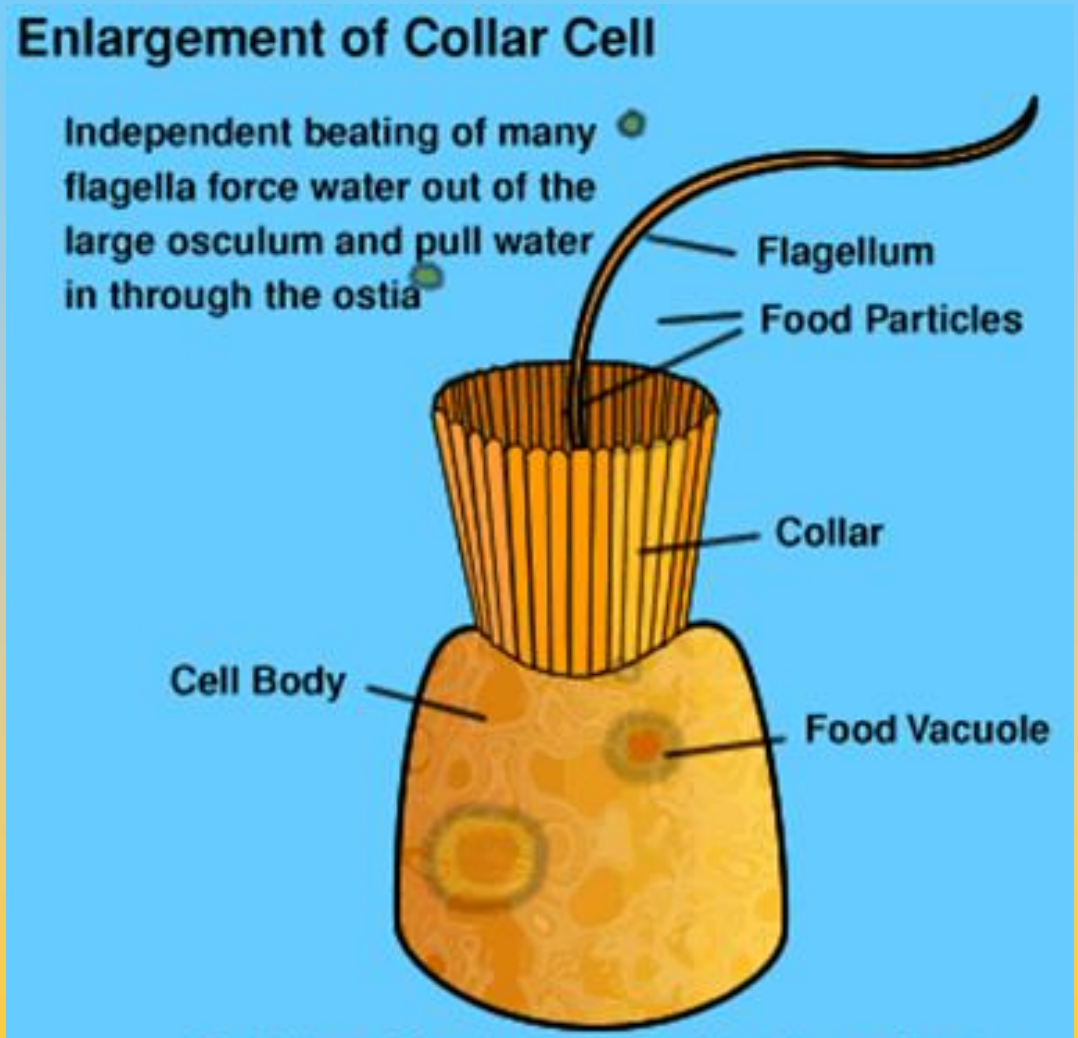
As sponges have this sac-like digestive system what does this tell you about their complexity in terms of evolution?

Structure of a Sponge

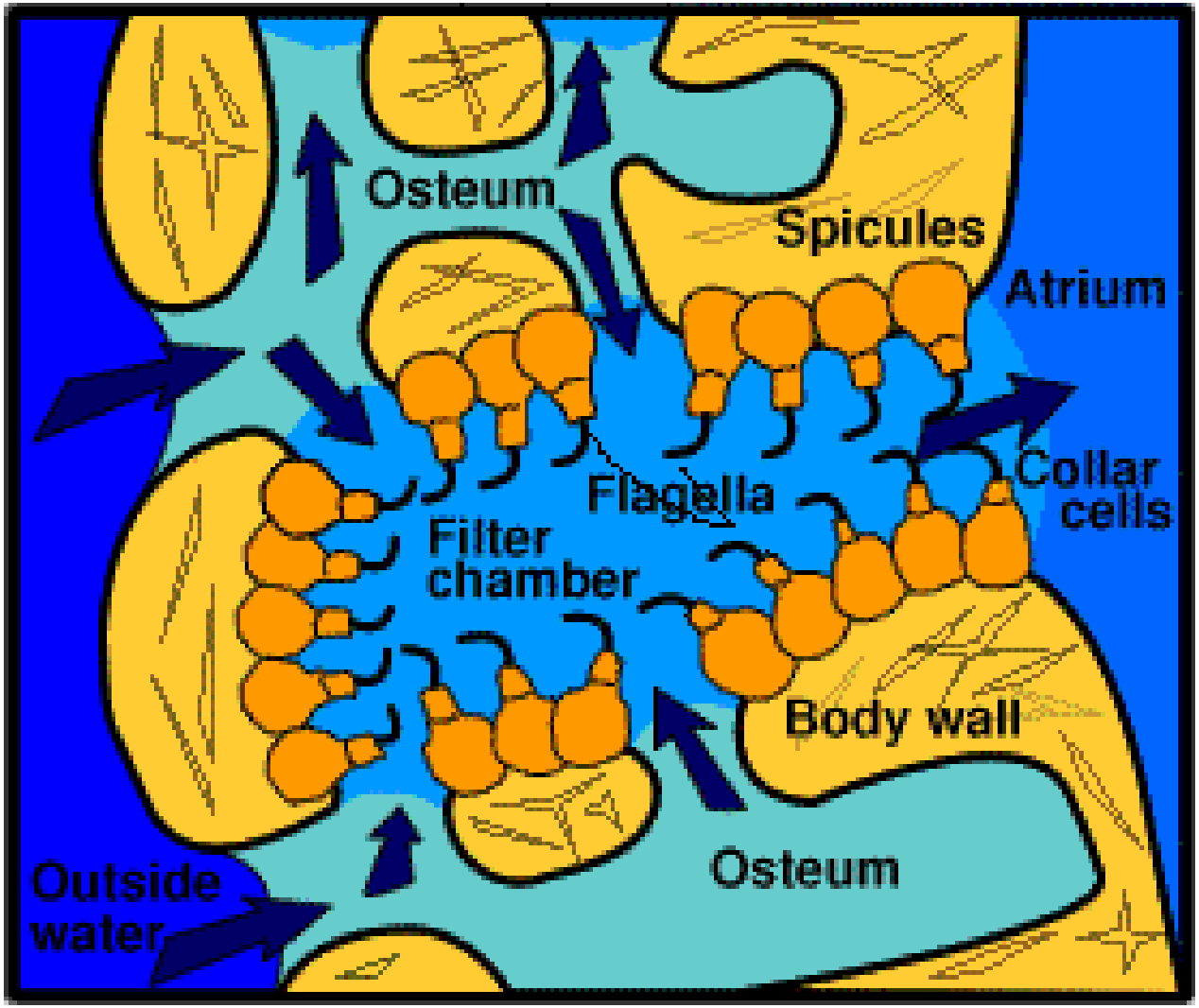


Basic Functions of the Internal Cavity

1. To filter water as it passes through the sponge for food and oxygen (see collar cell enlargement)
2. To extract particles of food from passing water and digest food either in collar cell food vacuoles, or by roaming amoeboid cells.
3. To get rid of metabolic waste products through the osculum

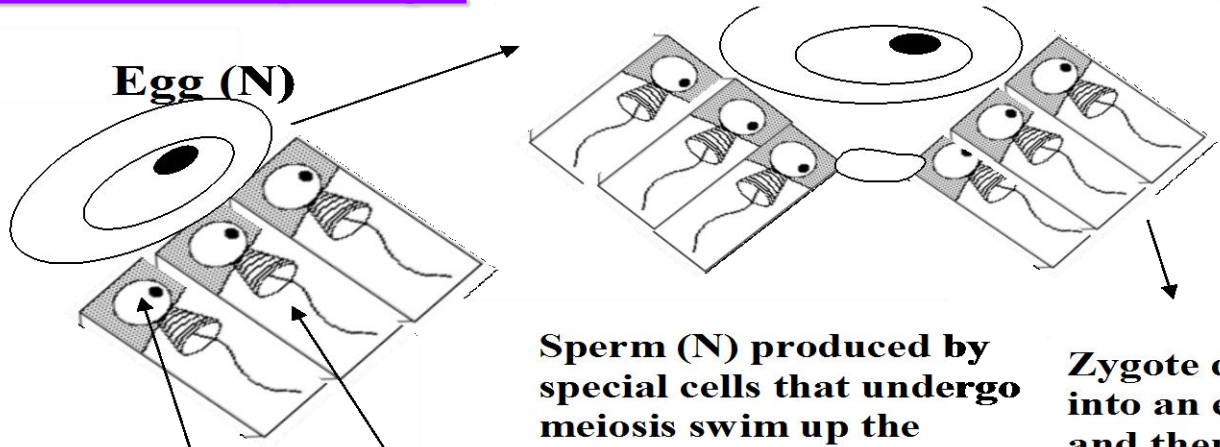


Collar Cells at work bringing in water and retrieving oxygen and food for the sponge



Life Cycle of the Sponge

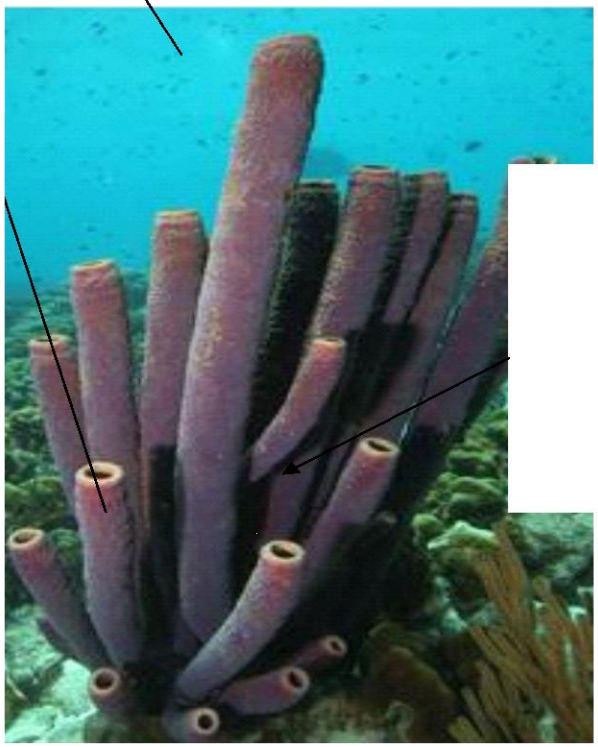
Fertilization occurs and produces a zygote (2N)



Sperm (N) produced by special cells that undergo meiosis swim up the collar cells to the egg

Zygote develops into an embryo and then free swimming larva

Egg producing cells undergo Meiosis and produce an egg



Free swimming larvae attaches to a rock or hard surface and undergoes metamorphosis into an adult sponge

Ecological Importance of Sponges

Sea Crab living inside a Fluorescent sponge

What are the 4 types of symbiotic relationships?

Name an organism other than sponges that shows a symbiotic relationship.

- **Sponges provide shelter and food for other ocean creatures**
- **Sponges can release chemicals that help to break up old shells**
- **Sponges form symbiotic relationships with bacteria and plant-like protists**
- **Because sponges are filter feeders, they are very sensitive to water pollution as it will quickly clog their pores and destroy the sponge. Therefore a lack of sponges in a certain area is a good indication that there is pollution in the area and more of the ocean life is potentially at risk**

Economical Importance of Sponges

Sea sponge Skeleton to be used in the bathroom for washing

- At one time there was a market for sponges to be used in the bathroom and the kitchen because of their ability to absorb water, however synthetic sponges have replaced this industry

Super Cool Sponge Facts

- Each species of sponge somehow knows exactly which day of the year the other members of its species will release their gametes into the water. This is how sponges are able to cross fertilize.

- The Loofah "Sponge" sold in many stores is not actually a sponge at all…. It's the inside of a plant known as a gourd!

Purple Vase Sponge and a sea fan