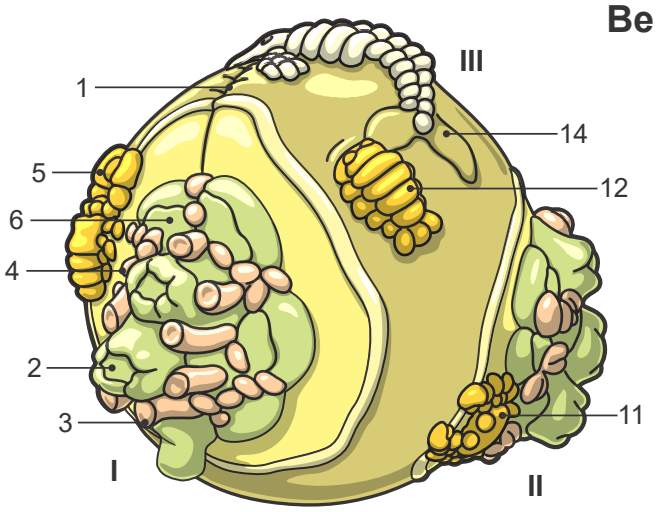
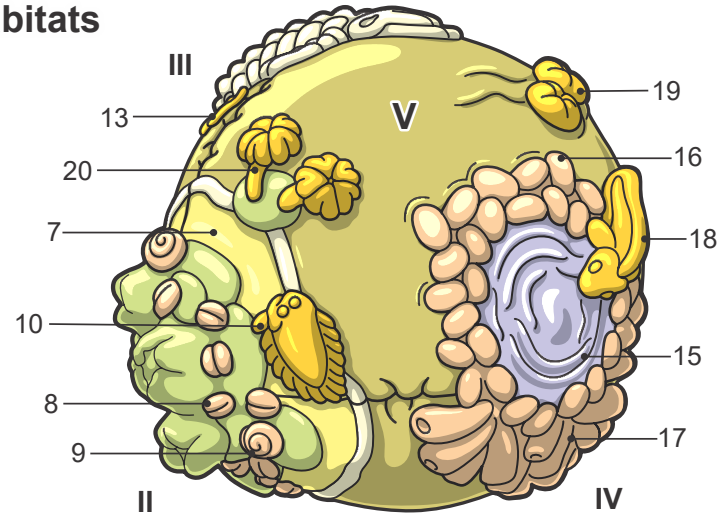
Benthic Habitats





I) Black Smoker Hydrothermal Vent: At mid-ocean ridges (1) and other tectonically active sites, molten magma rises close to the surface. Water that percolates down through the sediment and shattered stone is prevented from boiling by the tremendous pressure, and becomes "superheated". Chemical compounds become dissolved in this superheated water, which then rises, billowing out into the cold sea.

At this hydrothermal vent, sulfides in the water give it a dark coloration, as they precipitate out of the cooling plume, and so such places are known as "black smokers". Minerals accrete here to form "precipitation chimneys" (2). Around these chimneys lives a diverse community of organisms adapted to handle extremes of temperature, pressure, and salinity.

Among the creatures here are tube worms (3), mussels (4), and a squat lobster (5). At the base of this fascinating community are bacteria and archeans, which live in mats (6), as well as in symbiotic association with the animals. These microbes have the ability extract energy from minerals dissolved in the superheated water.

II) White Smoker Hydrothermal Vent: This hydrothermal vent spews water of a different chemical composition, giving the plume a lighter color, and so such places are called "white smokers". Compared to black smokers, the waters at these vents are generally not as hot, and their precipitation chimneys are not as large. As with the other vent, the surrounding terrain is covered in sediment (7) which is enriched with metals that have settled out of the plume.

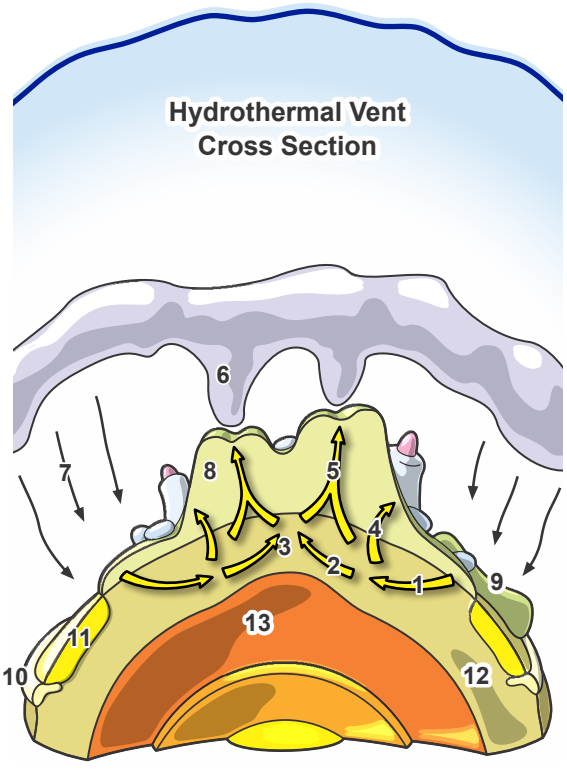
Because they are isolated from one another, different vents often host entirely different communities of organisms. In this location, you can see giant clams (8), snails (9), a flatfish (10), and a crab (11).

III) Whale Fall: After a long and fruitful life, a whale has died, and sunk to the abyssal plain. Such "whale falls" become habitats for complex biological communities which can persist for years. This whale is mostly gone, but you can still see a giant marine isopod (12) and some hagfish (13) feeding. Microbial mats (14) trace the outline of the whale's tail fluke.

IV) Cold Seep / Brine Pool: Also associated with tectonic activity, but at much lower temperatures than hydrothermal vents, are locations known as "cold seeps". These places also host living communities which are anchored by microbes capable of extracting energy from minerals dissolved in the water. In association with cold seeps are sometimes found strange pools (15) of super-dense brine.

This pool is ringed by mussels (16) and tube worms (17) different than those found at the hydrothermal vent. Swimming above the brine pool is a rattail (18), a type of fish often found in the deep sea.

V) Abyssal Plain: The Abyssal plain is a sparsely populated desert. The animals found here are detritovores such as these sea urchins (19), which feed on "marine snow"; organic particles which drift down from the sunlit waters above. Also present are filter feeders such as these crinoids (20), which have anchored themselves to a patch of bare rock left over from an extinct hydrothermal vent.



1·Inflow of Seawater
2·Mineral Enriched Seawater
3·High Temperature Reaction Zone
4·Diffuse Flow
5·Focused Flow (Hottest Water)
6·Plume of Mineral Enriched Water
7·Precipitating Particles
8·Precipitation Chimney
9·Toppled Chimney
10·Crust
11·Metalliferous Sediment
12·Basaltic Seafloor Rock
13·Magma