

Examples of Earthly Extremophiles

Cold – The McMurdo Dry Valleys in Antarctica are some of the coldest, driest deserts on Earth, with average annual temperatures of -4°F and less than 4 in of precipitation a year! Scientists have found bacteria in liquid water pockets deep in “solid” lake ice. Some of these bacteria use chemical nutrients from particles of dirt in the ice and use energy from sunlight for photosynthesis.



McMurdo Dry Valleys in Antarctica

Hot – Large concentrations of microbes thrive in Yellowstone National Park’s Grand Prismatic Spring, a hot spring with water temperatures up to 188°F ! Other hot springs in Yellowstone are extremely acidic, yet are home to many different kinds of bacteria and microbes. Many of these microbes use chemical nutrients in the waters and energy from sunlight for photosynthesis.



Grand Prismatic Spring in Yellowstone NP



Floor borehole, Lupin gold mine,
Nunavut Territories, Canada

Deep Underground – Scientists have discovered bacteria living in groundwater 5 km (3 mi) below the surface in deep gold mines in South Africa. These microbes thrive in cavities and cracks in rocks, living at temperatures that approach 176°F ! Scientists are also investigating life within and below permafrost in northern Canada.

Bottom of the Sea – Scientists have found abundant life clustered around hydrothermal vents on the ocean floor, including bacteria, mussels, clams, shrimp, and giant tubeworms that can reach ten feet in length. Water pouring out of the vents in the complete darkness thousands of feet under the surface of the sea can reach temperatures of 248°F ! Bacteria use chemicals in the vent’s water as their energy source. Other creatures survive by eating the bacteria or each other.



Hydrothermal Vent "Black Smoker"



Rio Tinto in Spain

High Acidity – The water in the Rio Tinto in southwestern Spain is very acidic. The river has a deep red color, like wine, because of iron dissolved in the water. Microbes living in the water use chemical reactions with iron and sulfur minerals to generate the energy they need. Many algae and fungi also live in the acidic waters.