Alkaliphiles just the basics

life in the extremes

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Colonies of blue-green bacteria called *Microcystis* flourish in alkaline environments like Mono Lake, California seen on the front of this card.

**EXTREME ABILITY** Alkaliphiles thrive in substances that are capable of neutralizing strong acids. These alkaline environments typically have pH values ranging from 9 to 11. To survive such harsh conditions, these organisms have evolved unique enzymes, specialized cytoplasm, and efficient cell membranes to protect their cells from damage.

**EXTREME ENVIRONMENTS** These microbes inhabit such places as soda lakes, caves, alkaline hot springs, deserts, and waste dumps from mines.

**EXTREME EXAMPLES** Alkaliphiles are used in making paper and recovering spilled oil. They are also common ingredients in dishwashing detergent and laundry soap.

Photo Credit: Mono Lake, California is 80 times more alkaline than the ocean - Mila Zinkova (front); *Microcystis* - David Patterson and micro*scope (back). For more information visit http://astrobiology.nasa.gov/