

S12282: The Extremes of Life
Lesson 2: Thermophiles, Psychrophiles, and Piezophiles

Learning Objectives:

- Summarize the major classes of biopolymers and their components, including DNA, protein, and the membrane
- Predict the possible adaptations of organisms living in “extreme” environments

Write down some examples of “extreme” environments:

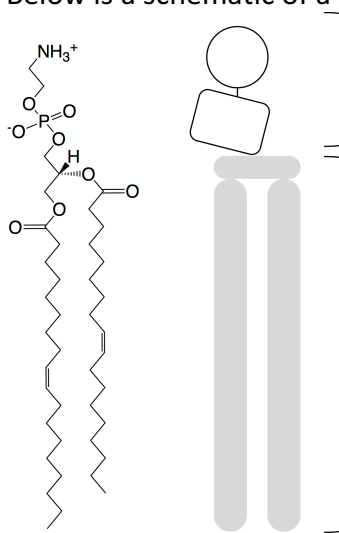
What physical parameters make these environments extreme?

What are the three domains of life?

Classify organisms by their optimum growth temperature:

Growth temperature (°C)	Classification
37 (98.6 °F)	
45-60 (113-140 °F)	
60-80 (113-176 °F)	
> 80 (> 176 °F)	

Below is a schematic of a lipid molecule. Label the parts of the molecule.



What is the hydrophobic effect? What are some examples of processes caused by the hydrophobic effect?

What is the function of the cell membrane?

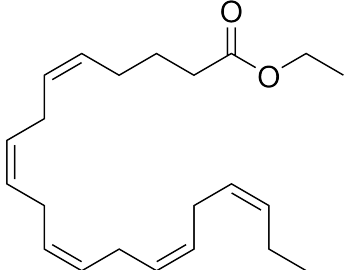
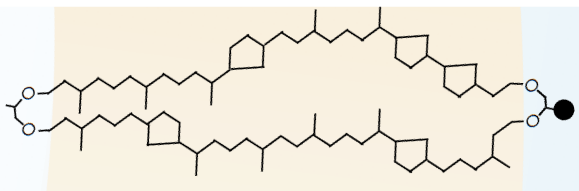
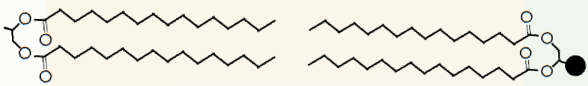
What are some adaptations of hyperthermophile plasma membranes?

What is the difference between saturated and unsaturated fatty acids?

What are some adaptations of hyperthermophile plasma membranes?

Match the lipid with the type of organism it most likely came from.

Options: bacterium, hyperthermophile, psychrophile

Lipid	Type of organism
	
	
	

What are the four monomers (subunits) of DNA? Which pair is more stable?

What is the central dogma of molecular biology?

What are enzymes?

What types of noncovalent interactions help proteins fold?

What are some adaptations of hyperthermophile proteins?

What are some adaptations of psychrophile proteins?

Below is a figure of an *E. coli* cell. Label the parts of the cell.

