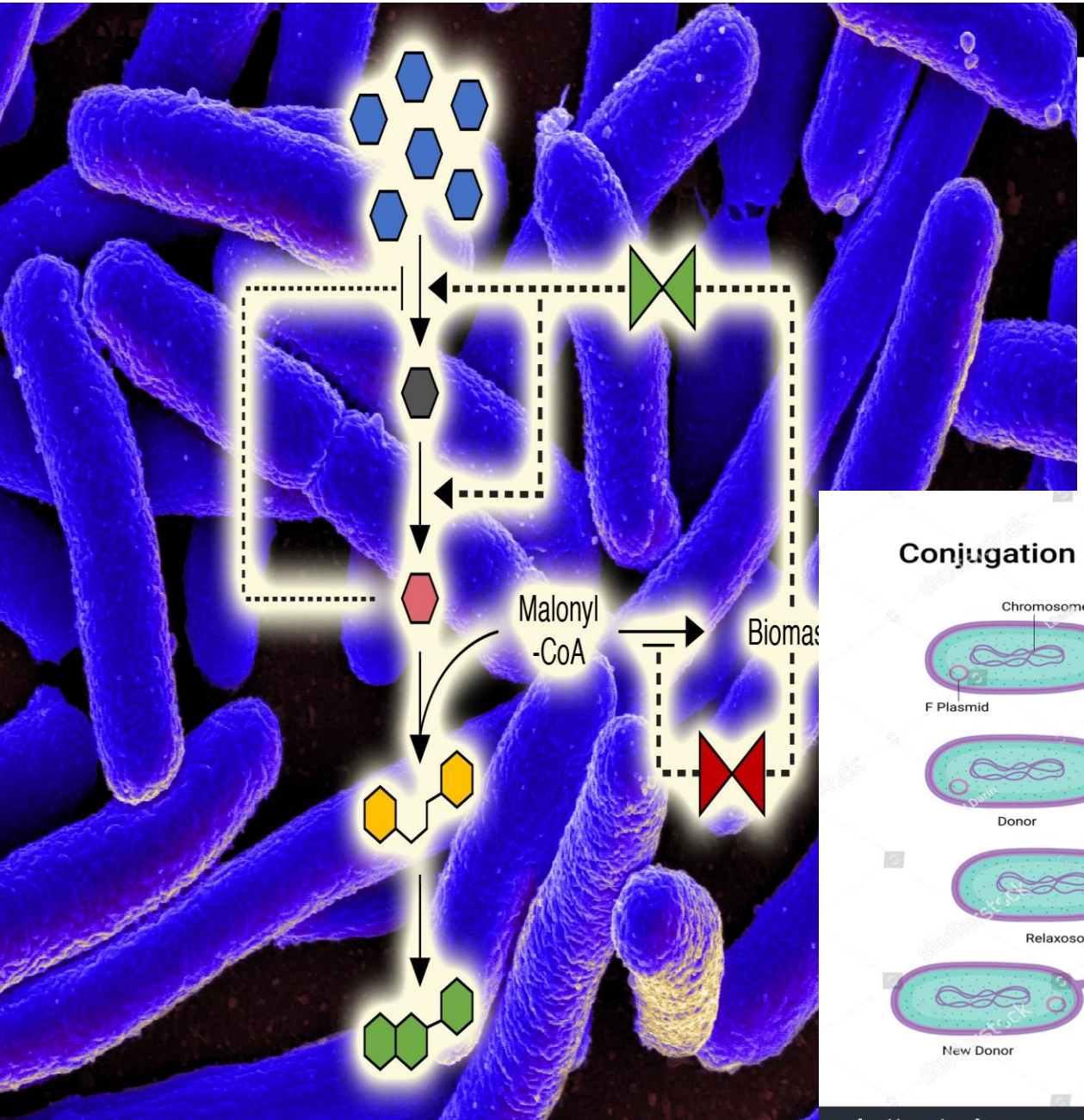
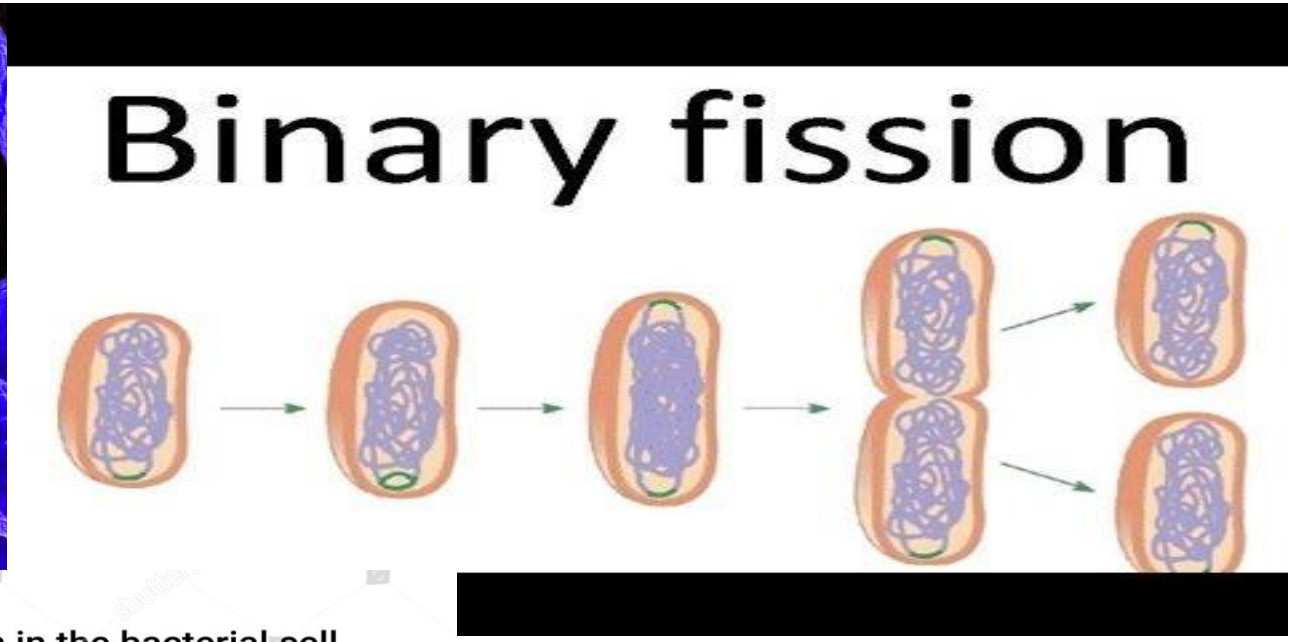
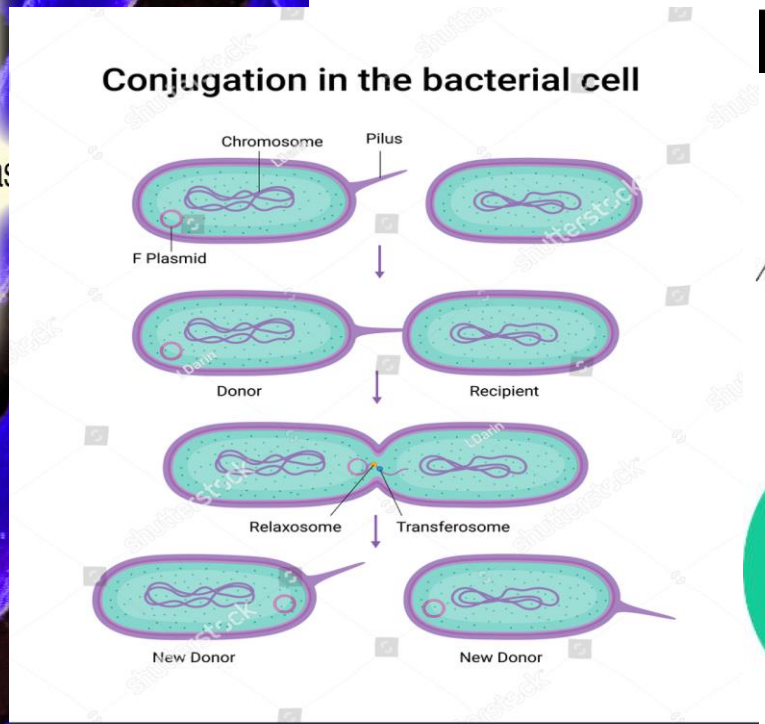
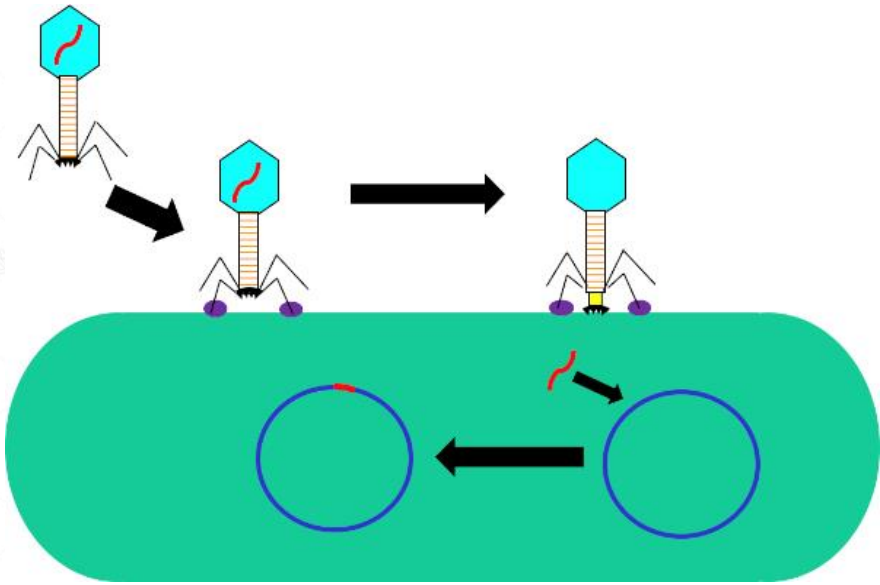
BACTERIAL MECHANISMS for survival









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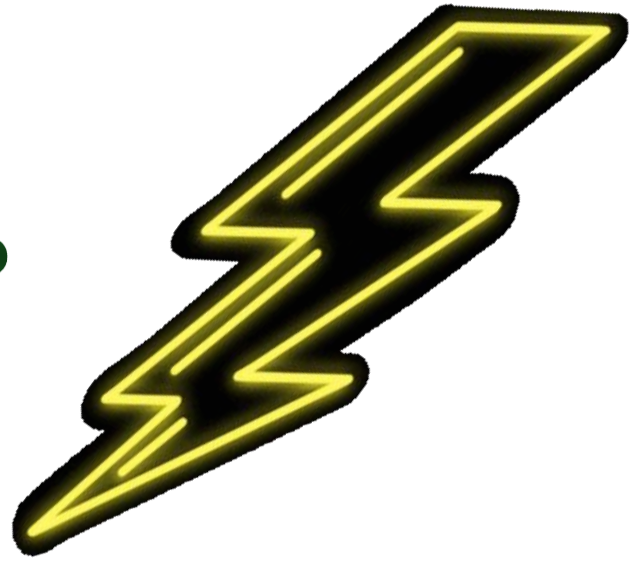
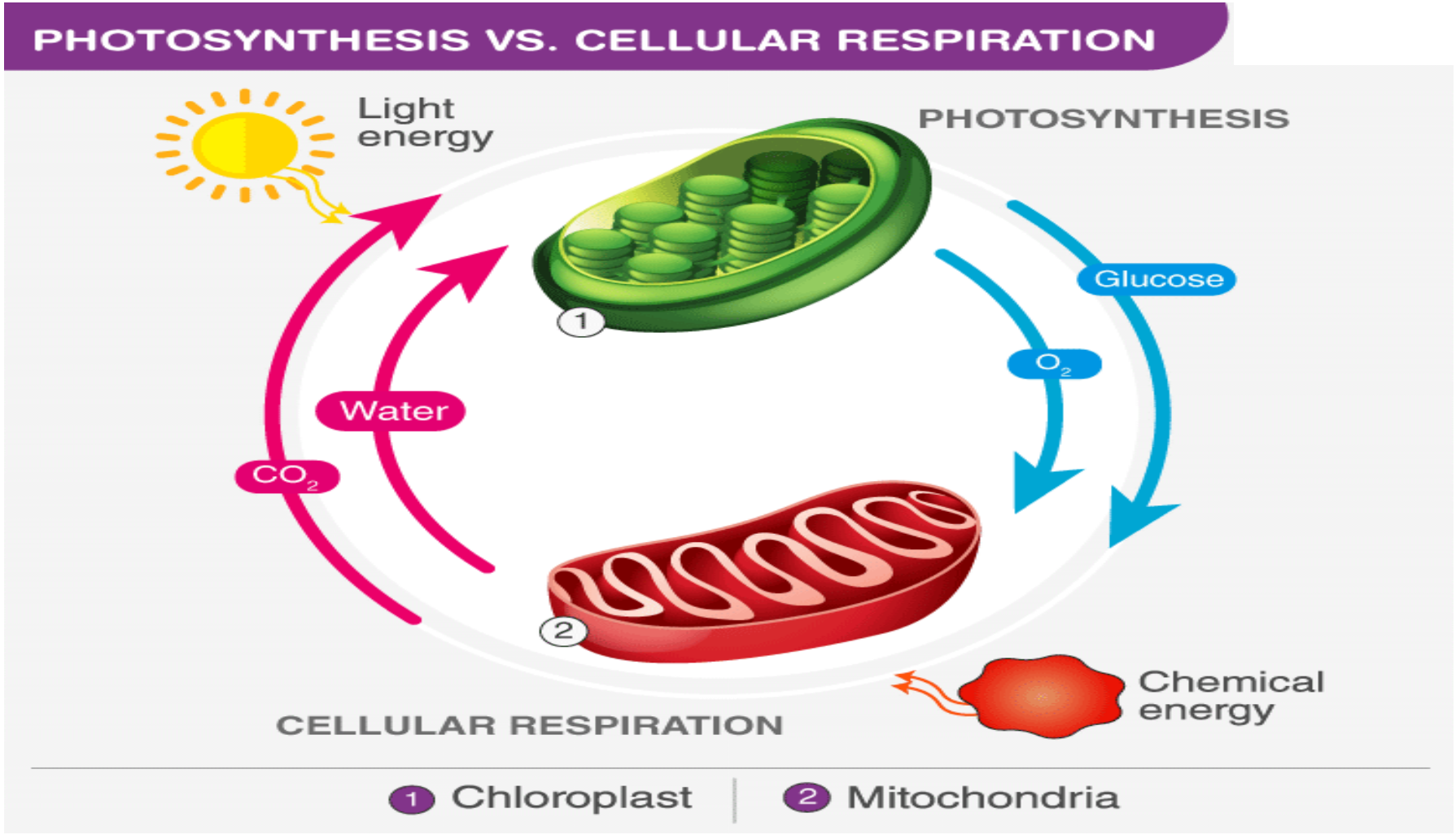


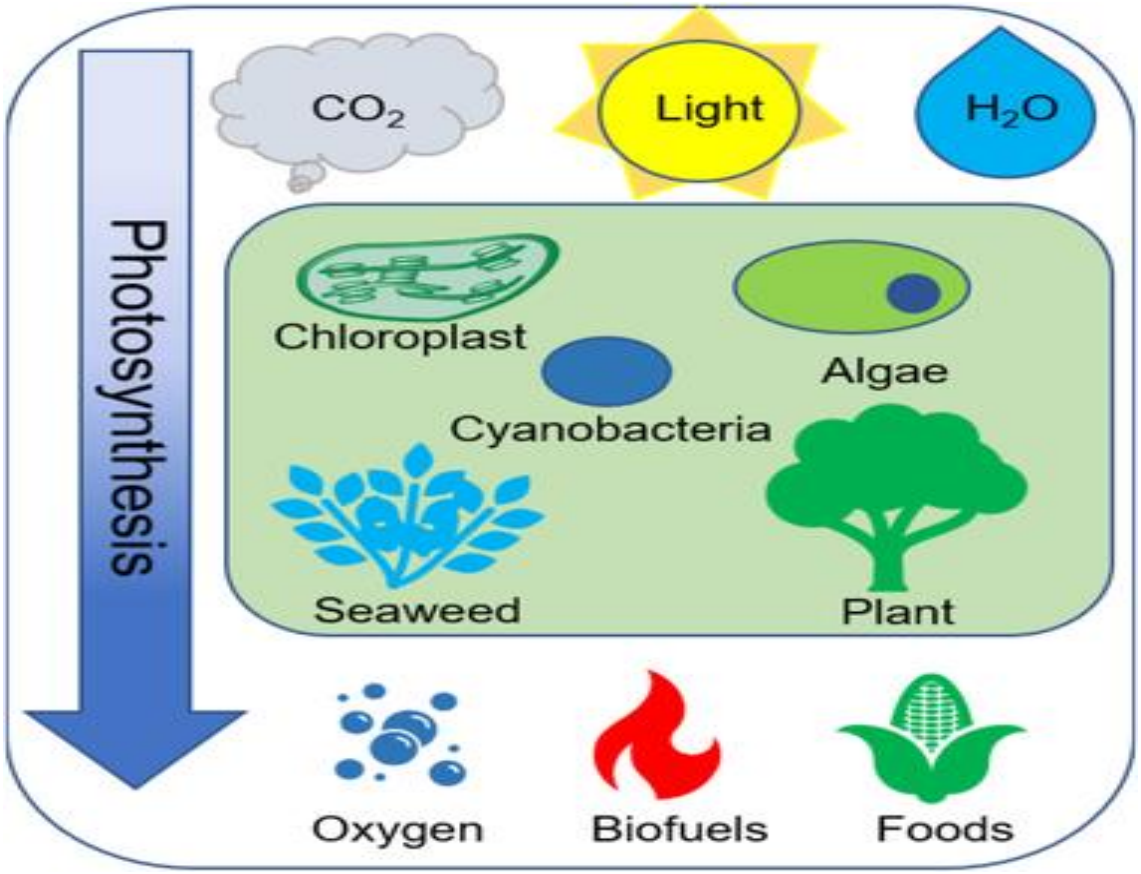
How do Bacteria obtain ENERGY ?



1. HOW TO GET FOOD ?

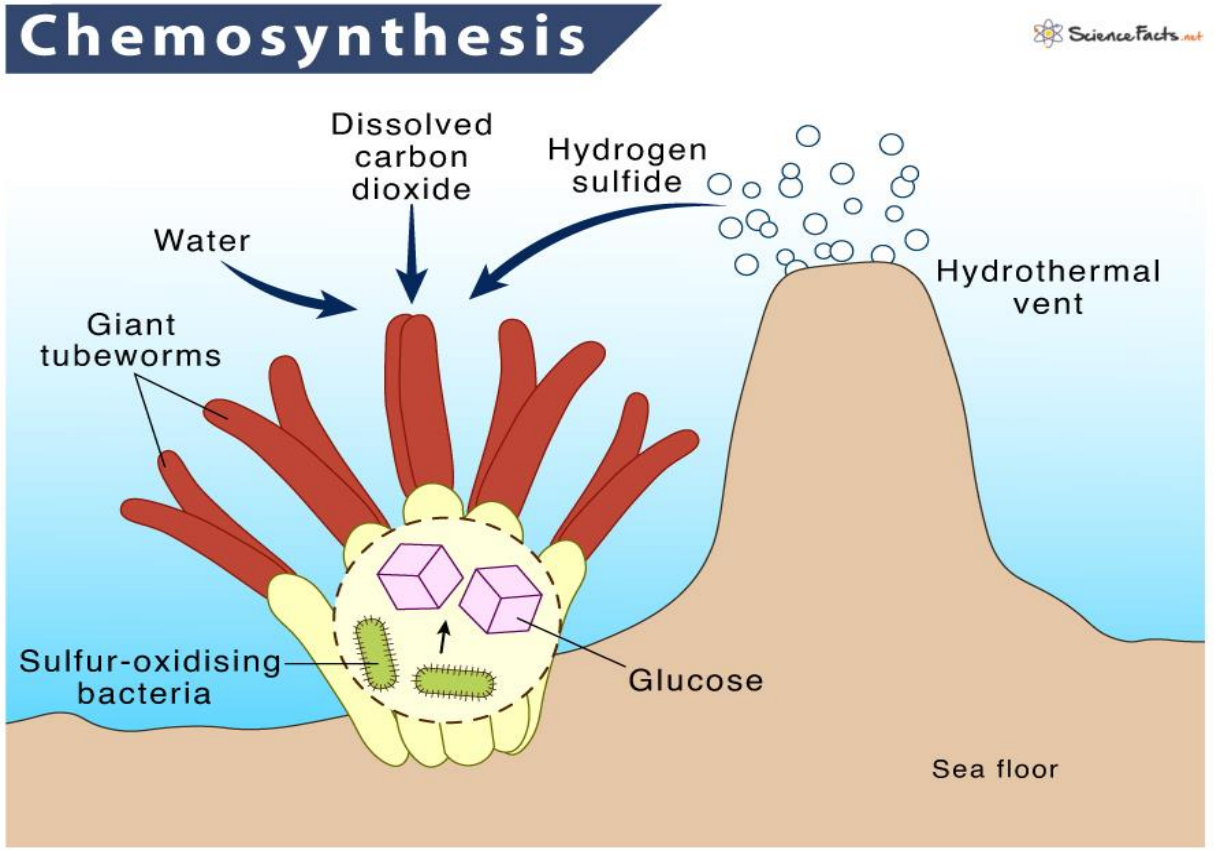
A) AUTOTROPHIC BACTERIA

SELF **NOURISHER**



Can take low energy CO_2, H_2O and harness Light Energy to run reactions to make high energy Sugar and Oxygen

Either way: Once you make your own food then you burn it to release energy for your own cellular processes.

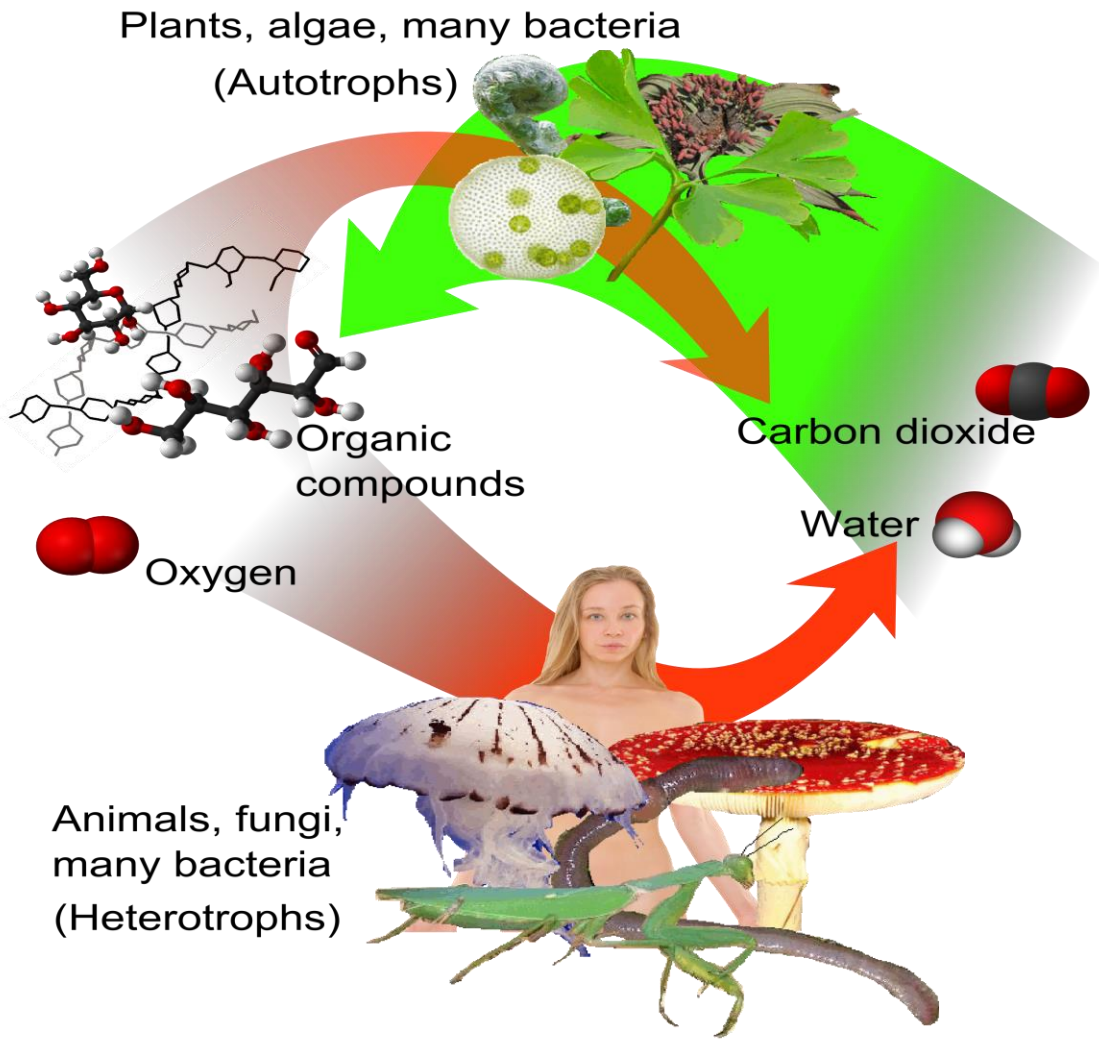


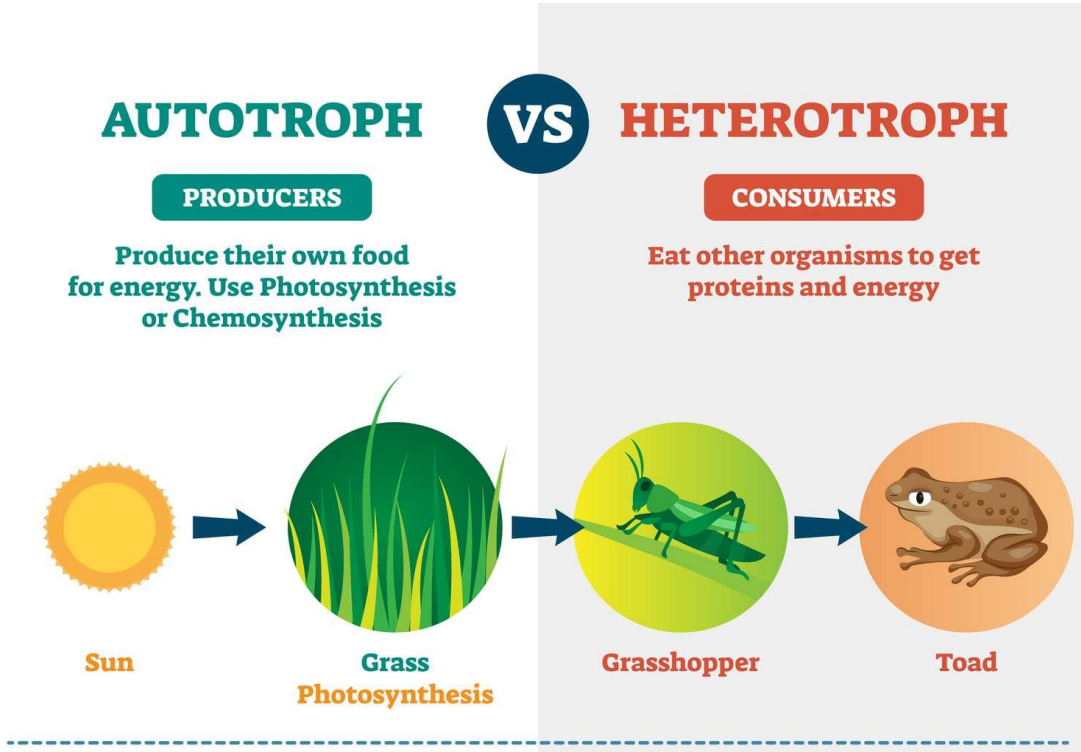
The process of harnessing chemical energy from inorganic compounds to produce high energy organic compounds like Sugar.

B)HETEROTROPHIC BACTERIA

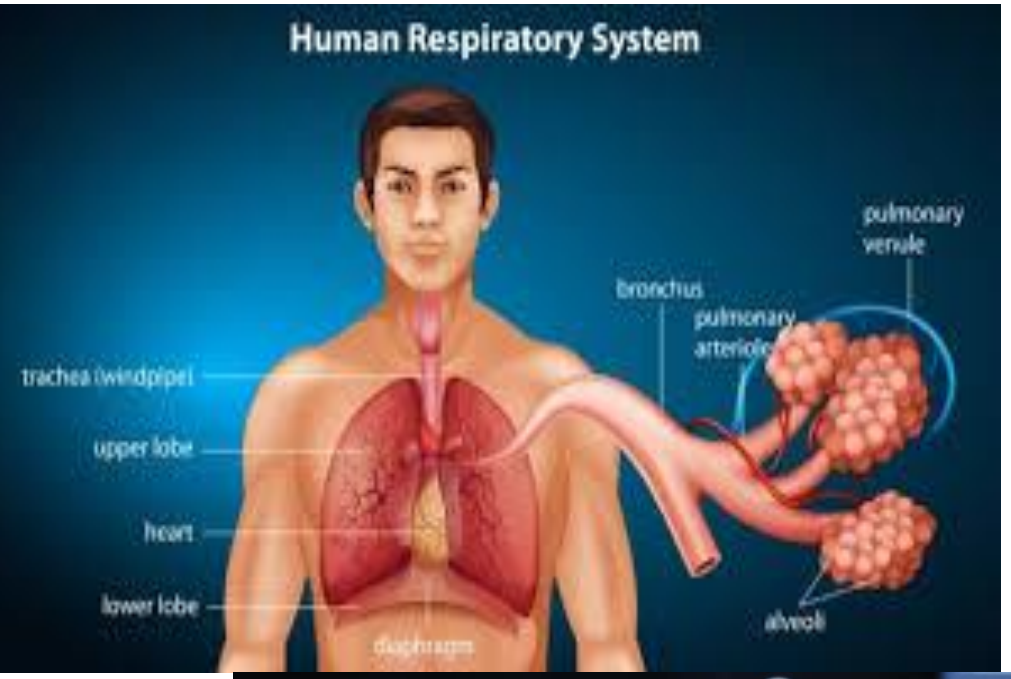
DIFFERENT NOURISHER

Organisms that have to take in ORGANIC compounds (food) from a different source

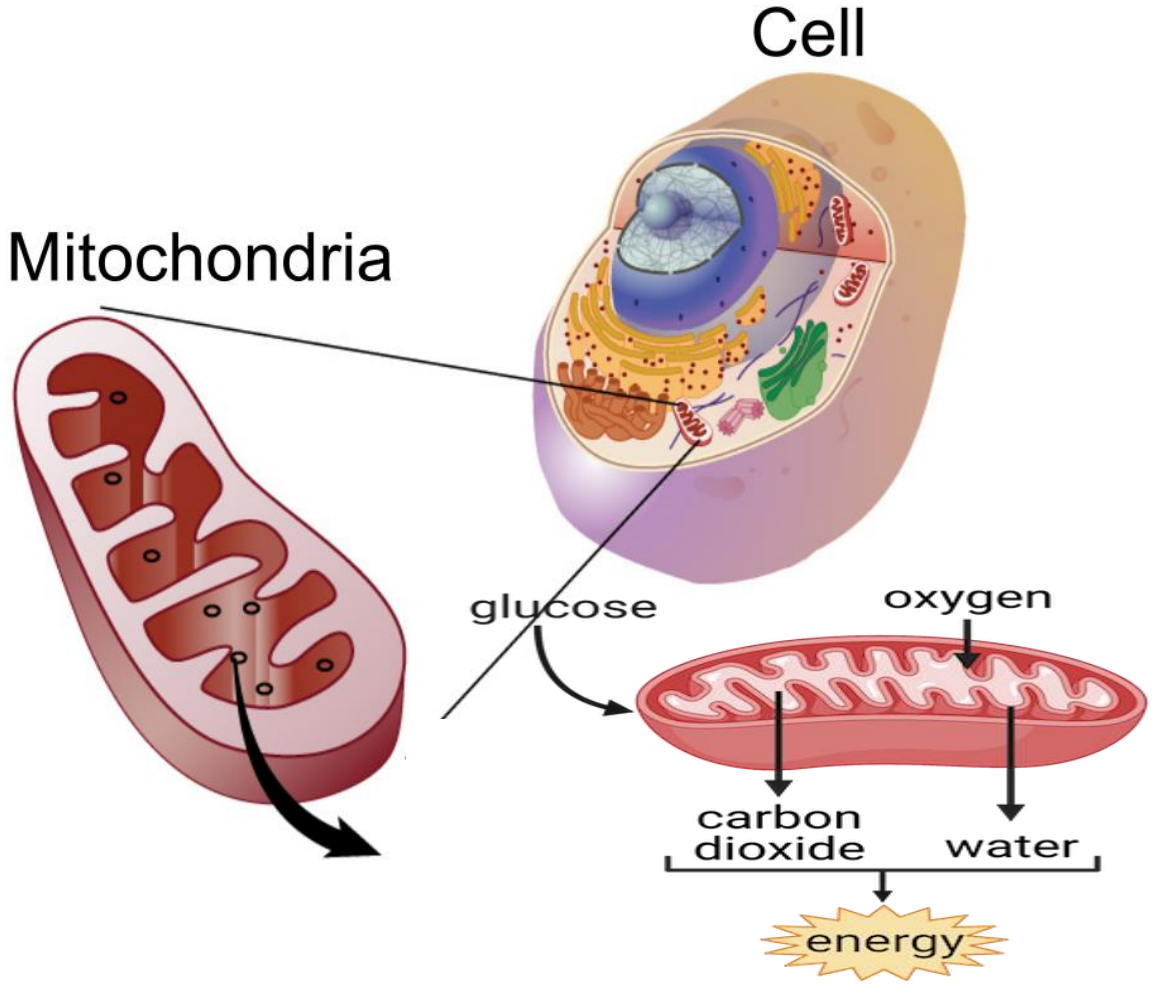




2.HOW TO GET GASSES ? - RESPIRATION



To run most energy releasing cellular reactions some organisms also need to take in Oxygen

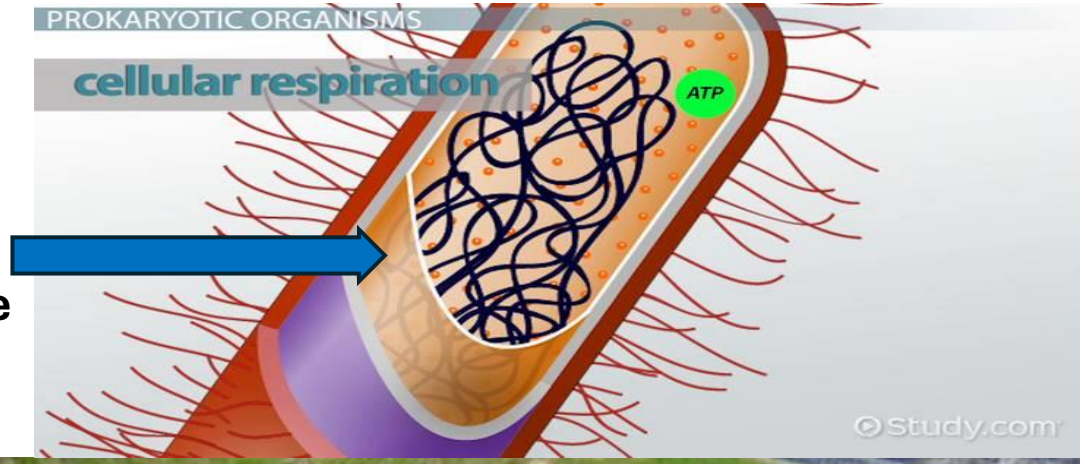


THREE CATEGORIES

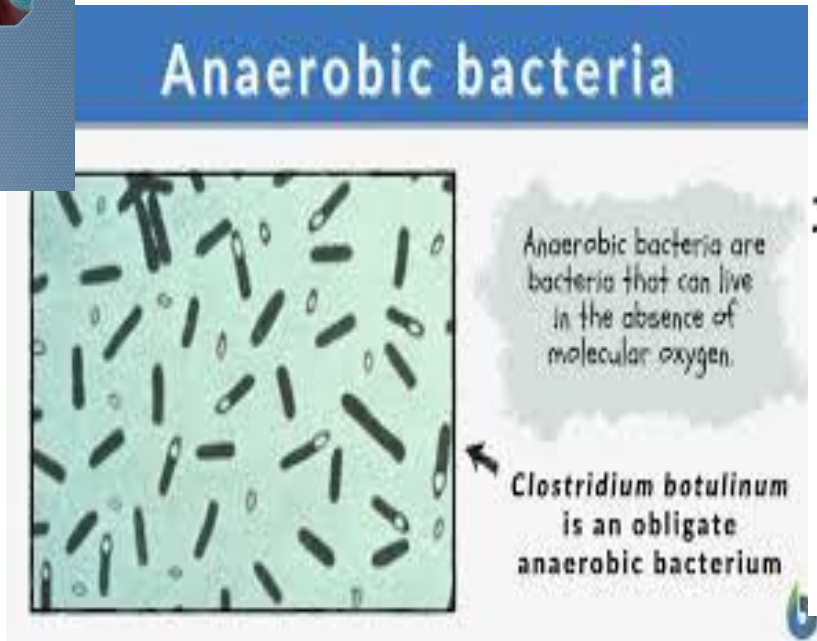
A)Like us some Bacteria are <u>OBLIGATE AEROBES</u>

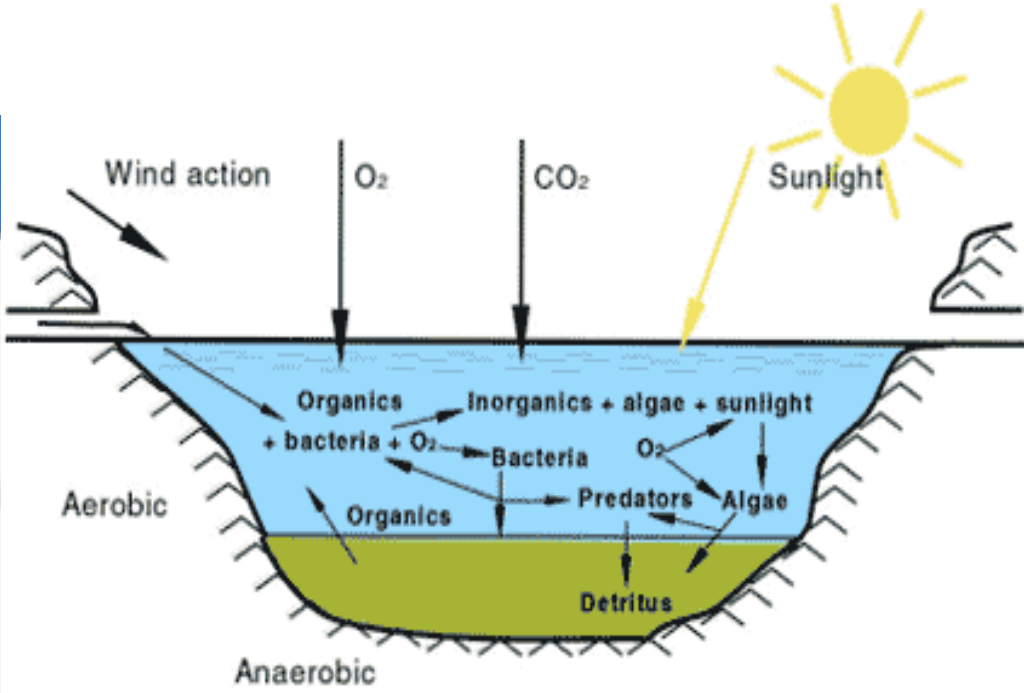
They require a supply of oxygen to stay alive and run their metabolic (cellular) reactions

These bacteria will use enzymes in their cell membrane to burn the food with Oxygen



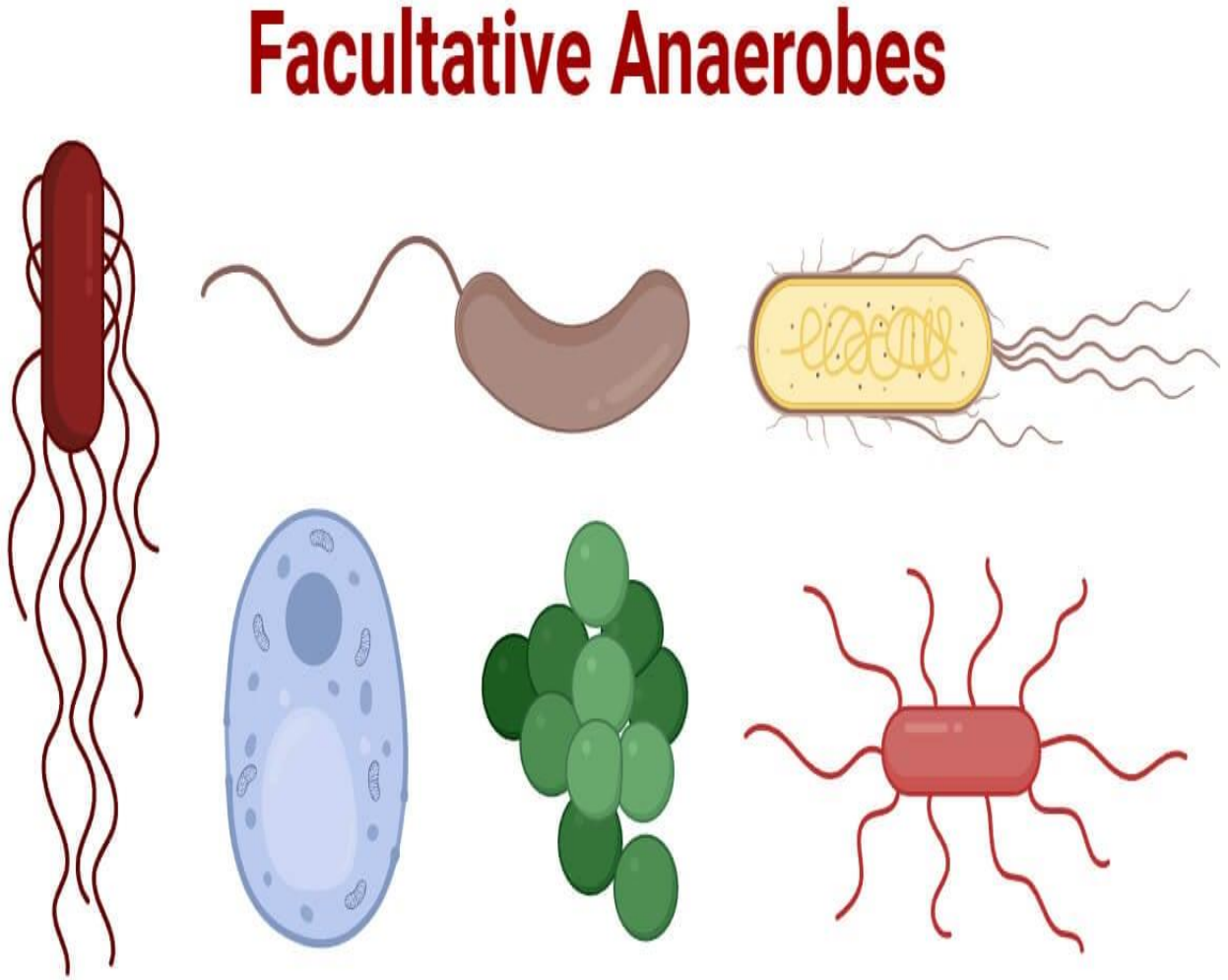
B) Some bacteria are the opposite, they can survive and grow without Oxygen. Some of these species, are actually, poisoned by Oxygen. All of these are classified as **OBLIGATE ANAEROBES**





C) The third group are the **FACULTATIVE ANAEROBES**

They have the best of both worlds they can run their cellular reactions with Oxygen or without Oxygen.

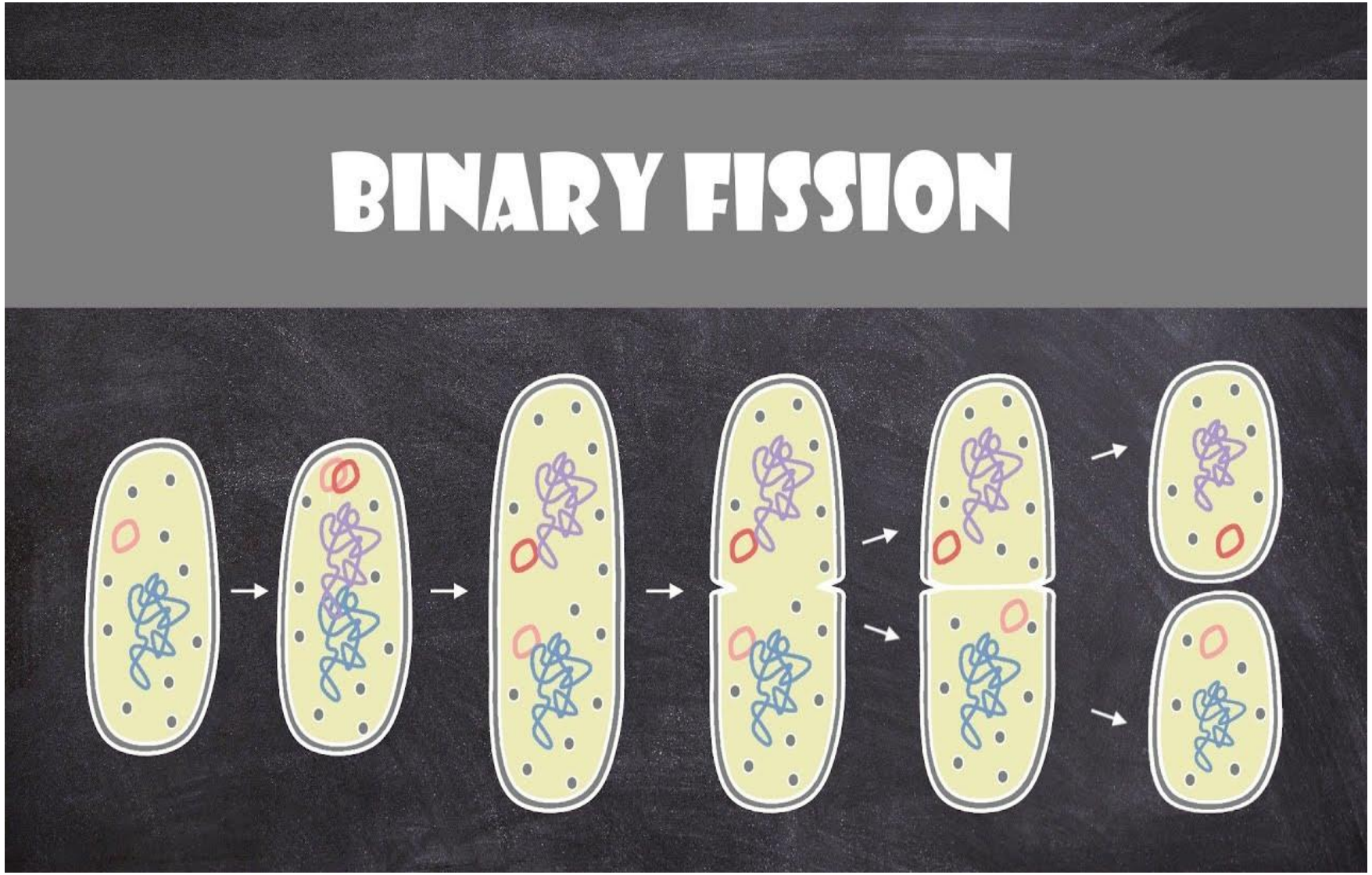


These bacteria can virtually live in almost every environment on the surface of Planet Earth.

C.H.A.R.G.E.R.

3. HOW DO THEY REPRODUCE?

A) Main method is **BINARY FISSION**

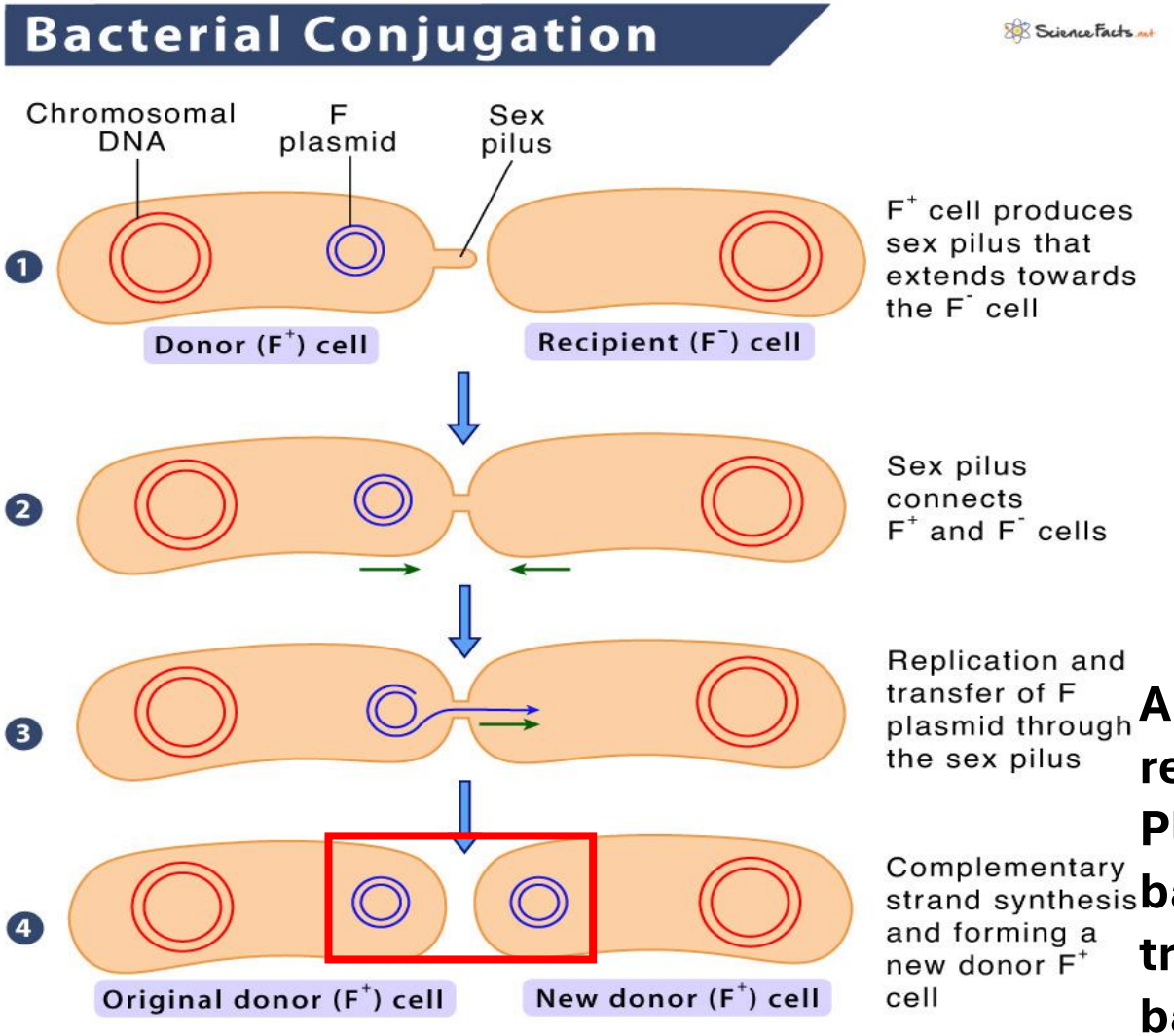


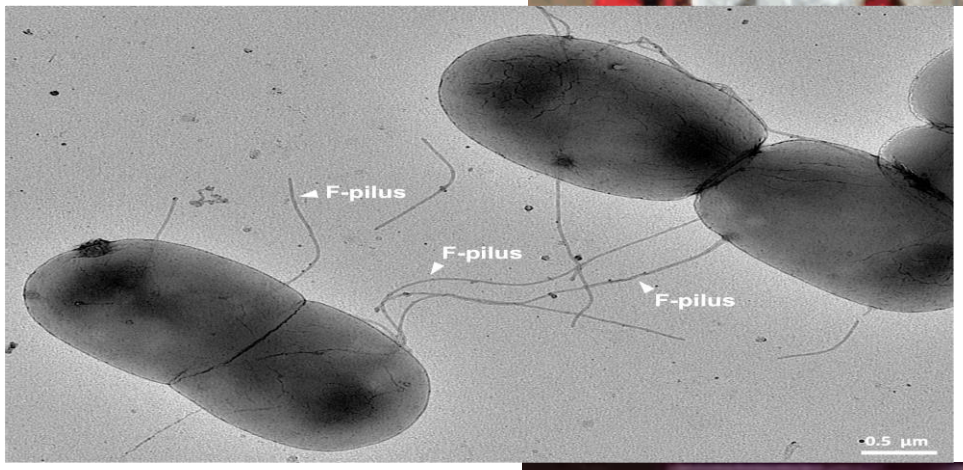
This is a very simple and FAST method of reproduction. It requires that the DNA and Plasmid DNA be copied and then the cell divides into TWO daughter cells that are clones of each other.

If a small colony of bacteria containing 4 bacteria undergo binary fission every 20 minutes how many bacteria will there be after 2 hours, if space, food etc is optimal to maintain this rate of division?

- What is the biggest disadvantage of this method of reproduction when it comes to SURVIVAL OF THE FITTEST ?

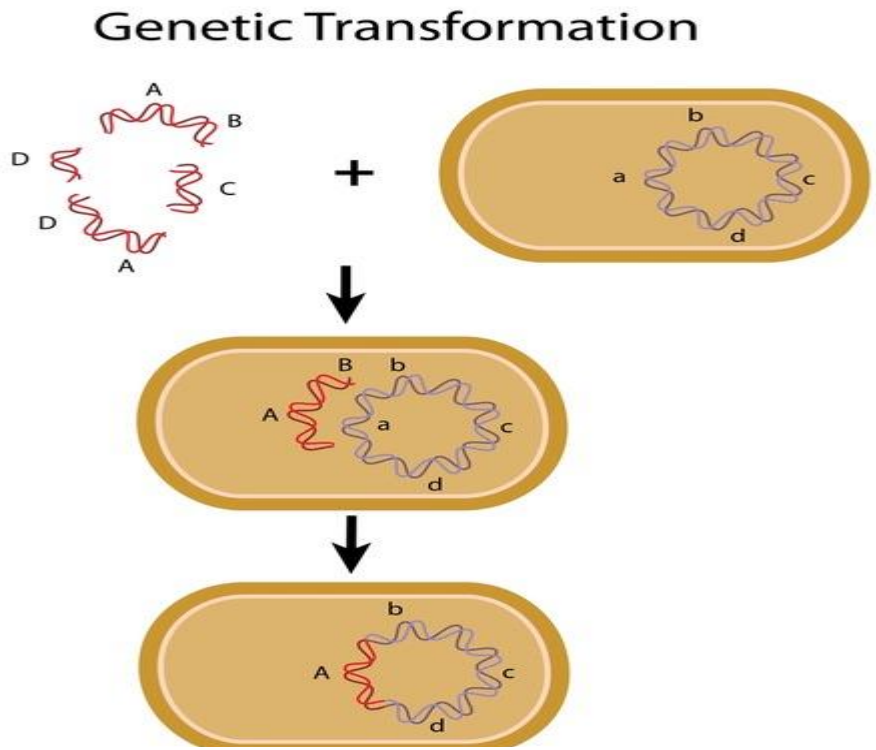
B) Some species of Bacteria spice it up with some CONJUGATION



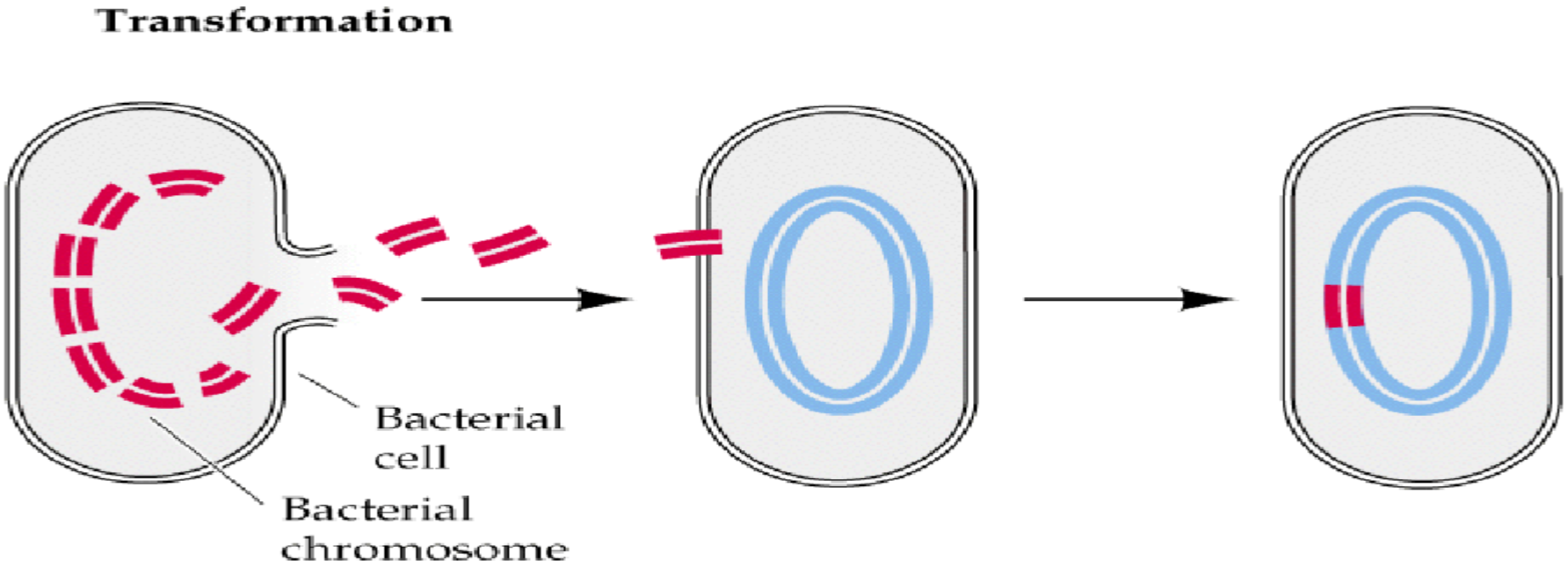


A form of sexual reproduction whereby the Plasmid DNA from one bacteria is replicated and transferred to the other bacterium

MORE DIVERSITY



Another method that bacteria use to create more diversity to ensure their survival is **BACTERIAL TRANSORMATION.** During this process, bacteria will take in stray DNA from dead bacteria and incorporate that DNA into their own DNA

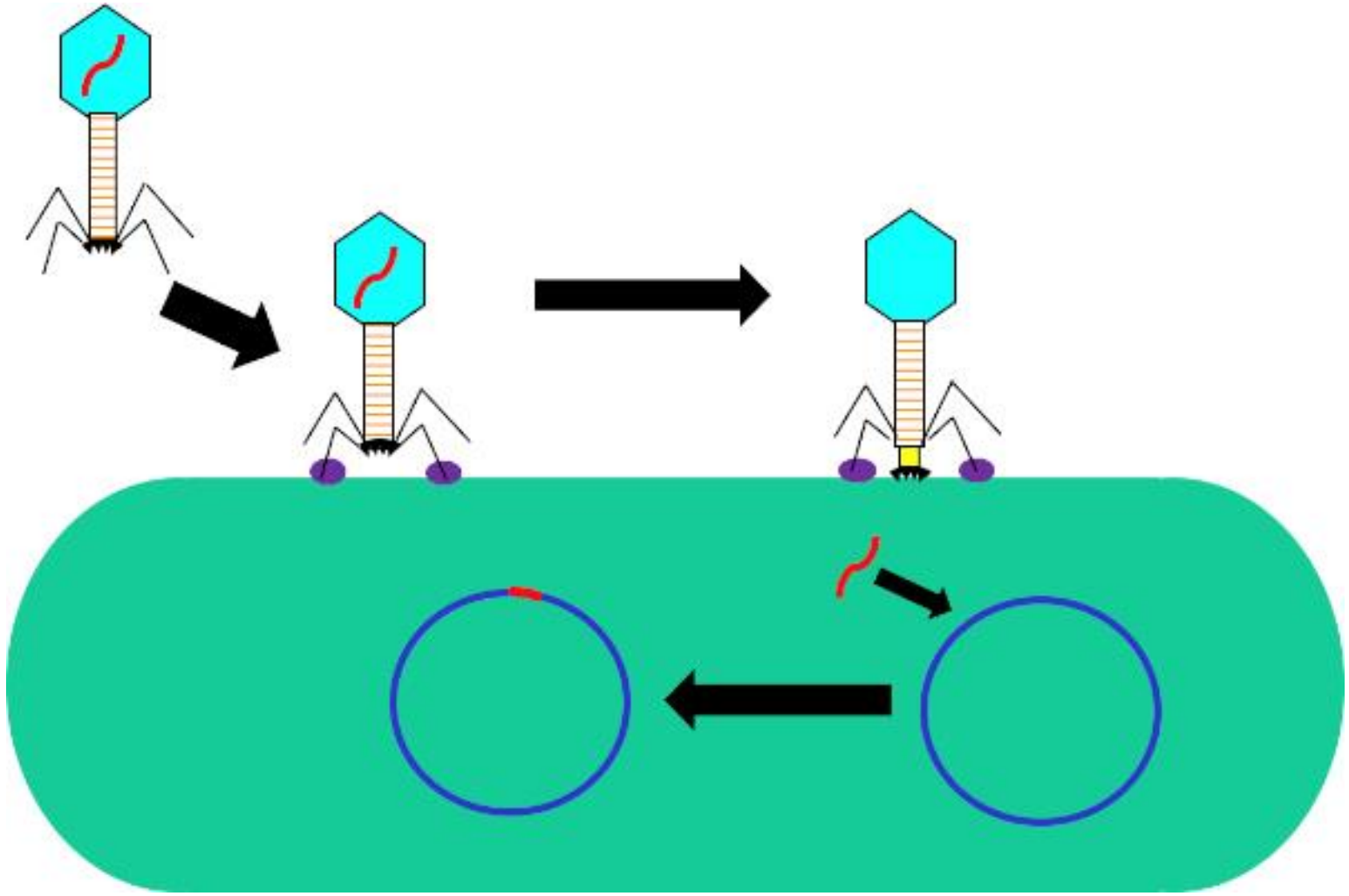


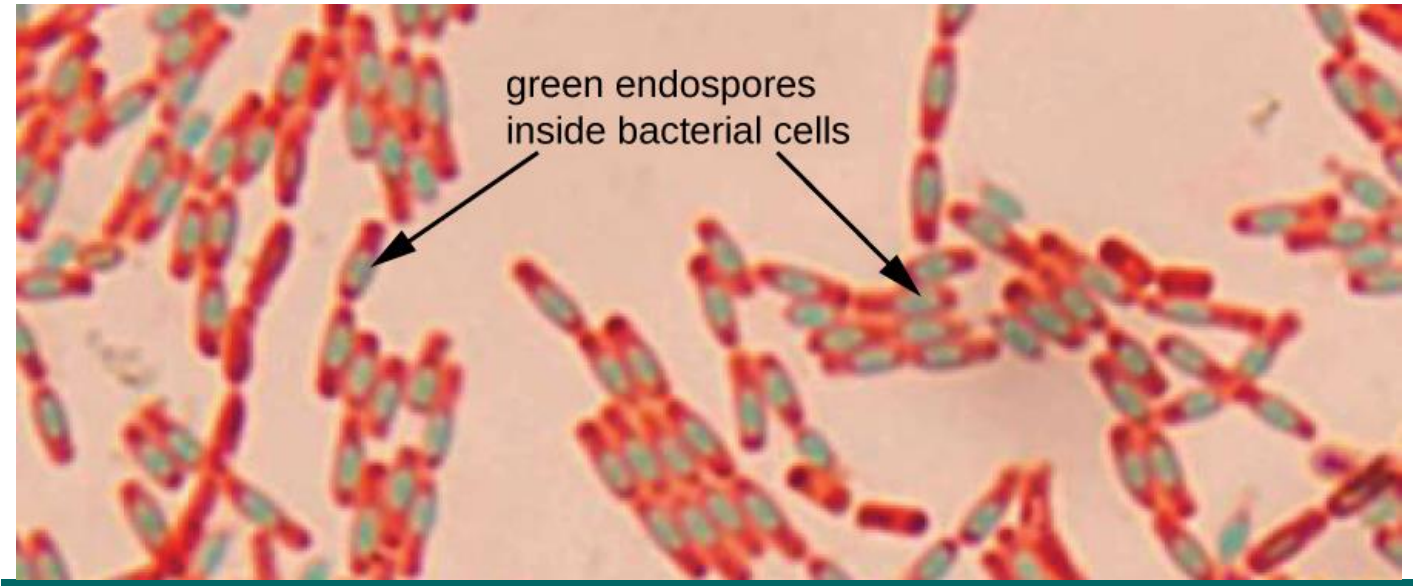
Even More Diversity

Another common process that alters bacteria and creates more diversity to increase their chances of survival is BACTERIAL TRANSDUCTION.

During Transduction a virus inserts foreign DNA into the host bacterium and the bacterium incorporates it into its own DNA.

Lysogenic to Lytic etc





4. HOW DO THEY SURVIVE ?

To survive harsh times, many bacteria will portion off their DNA and some of their Cytoplasm and encase with a thickened cell wall that can protect it against desication (drying out). This ENDOSPORE will remain dormant until favourable conditions return. Some endospores can remain viable for DECADES.