Name: _____Unit 4: Single-Celled Organisms NOTES: 4.01

FOCUS: Single-Celled Organisms

ESSENTIAL QUESTION: Can you explain the difference between a prokaryote and a eukaryote? Can you explain the difference between bacteria and protists?

Prokaryotes & Eukaryotes

- Every living thing on the Earth can be classified into two groups: prokaryotes & eukaryotes.
- Let's break those words down:

PRO-
- Greek meaning = "before"
- Ex: prologue, proceed

EU-
- Greek meaning = "good" "well", or "true"
- Ex: eulogy, euphonic

-KARY-
- Greek meaning = "nut" or "kernel"
- Scientific meaning = "nucleus"

-KARY-
- Greek meaning – "NUT or KERNEL"
- Scientific meaning = "NUCLEUS"

-OTE
- Greek meaning of *otic* = "related to" or "characterized" by
- Ex: biotic, symbiotic, chaotic, antibiotic

-OTE
- Greek meaning of *otic* = "RELATED TO" or "CHARACTERIZED BY"
- Ex: *biotic, symbiotic, chaotic, antibiotic*

- **Prokaryote:** literally – an organism characterized by existing BEFORE the nucleus
  actually – an organism made of a single cell without a nucleus
- **Eukaryote:** literally – an organism characterized by having a good or true nucleus.
  actually – an organism made up of a cell or cells, each with a nucleus.

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Prokaryotes

- Lack a nucleus
- Lack membrane-bound organelles
- DNA in a single, free-floating loop
- Ex: bacteria (most primitive organism)

Eukaryotes

- Have a nucleus to hold the DNA
- Many specialized membrane-bound organelles
- DNA organized into several chromosomes
- Ex: Everything else (fungi, plants, animals, protists)

Two types of single-celled organisms: Bacteria & Protists

Bacteria

- Single-celled prokaryotes
- Simple structure: no nucleus, single loop of DNA, enzymes, no organelles (tiny organs)
- Can be photoautotrophs, chemoautotrophs or heterotrophs

Protists

- Single-celled eukaryotes
- Complex structure: nucleus, DNA organized in chromosomes, several specialized organelles (tiny organs)
- Can be photoautotrophs, heterotrophs, or both

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What in the world do all those words mean?

- **Photoautotrophs:**

PHOTO "light" AUTO "self" TROPH "feed"

  - Use light to produce their own food
  - Ex: plants, algae, some bacteria, some protists

- **Chemoautotrophs:**

CHEMO "chemicals" AUTO "self" TROPH "feed"

  - Use chemicals, such as sulfur, iron, or ammonia, to produce their own food
  - Ex: bacteria around hydrothermal vents on the ocean floor

- **Heterotrophs:**

HETERO "different" "other" TROPH "feed"

  - Obtain energy by consuming other organisms or materials produced by autotrophs
  - Ex: animals, some bacteria, fungi, some protists, carnivorous plants