History of Life

Connections:

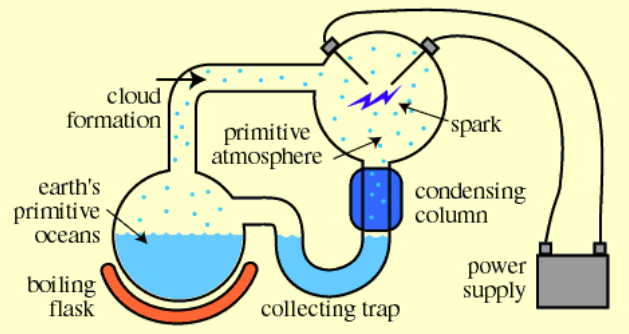
- Know the results of the Miller-Urey experiment, and how they contributed to our understanding of the history of life on Earth.
- Understand the current complications of the Miller-Urey experiment, and how it does not discredit the creation of organic molecules on primitive earth.
- Know how the Endosymbiotic Theory explains the evolution of eukaryotic cells, and the evidence used to support the theory.

Review

- We understand that species evolve from other _____.
    - But, where did the ancestor come from?
- Remember all living organisms are composed of _____.
    - All cells are composed of _____.
    - Where did the molecules come from?

Miller-Urey Experiment

- Stanley L. Miller and Harold C. Urey conducted an experiment to determine _____ organic molecules could be made from the substances in _____ Earth.
    - Methane – CH_4, Ammonia – NH_3, Hydrogen (H_2), and water (H_2O).



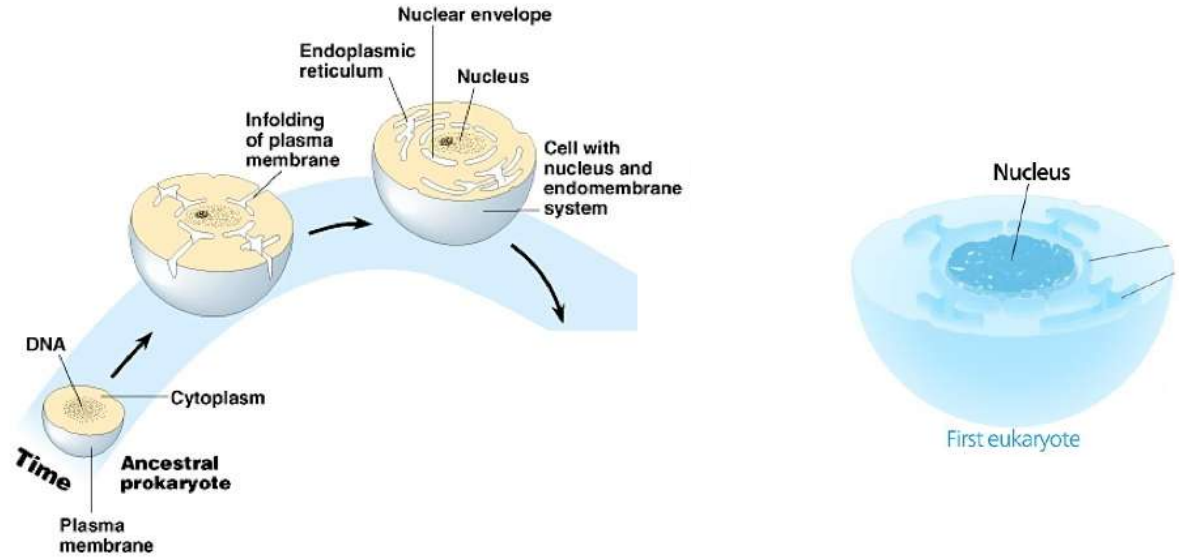
- Miller and Urey designed an apparatus that would allow them to _____ possible conditions of early earth.
- They added _____ as an energy source and after a week analyzed the contents of the experiment.
    - They found organic compounds (in particular _____) had been created!

Complications

- New _____ have arisen that state the conditions of early earth did not contain all the _____ used in the Miller-Urey Experiment.
    - Performing this experiment with what is now hypothesized as the conditions of early earth do not _____ amino acids.
- However, many other experiments using various hypothesized early earth _____ have yielded _____ molecules.
    - The _____ of organic molecules relies on _____ experiments, not just the Miller-Urey experiment.

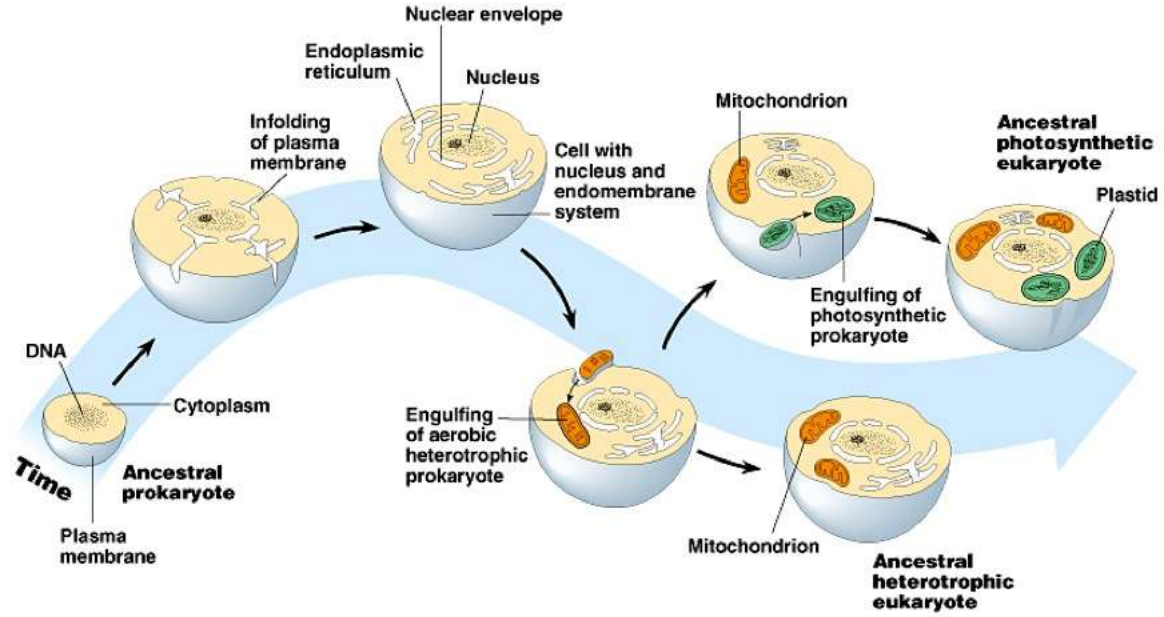
What About Cells?

- Remember, once we have _____ they will form membranes without additional help.
    - Due to the _____ and _____ layers.
- Over time we develop _____ prokaryotic cells.
- Primitive eukaryotic cells develop when the _____ folds in on itself.
- Primitive eukaryotic cells did not have mitochondria or chloroplasts.



Endosymbiotic Theory

- The theory proposes the _____ and _____ were once _____ cells living inside the primitive eukaryotic cell.
- Overtime, the two organisms form a _____ relationship.



Evidence

- There are _____ pieces of evidence used
  1. Mitochondria and chloroplasts have _____.
  2. Mitochondria and chloroplasts are surrounded by _____ membranes.
     - Outer membrane from the _____ from when the prokaryote was engulfed.
     - Inner membrane from the _____ of the prokaryote.
  3. Mitochondria and chloroplasts _____ in the same way as prokaryotes.
     - Using binary fission (splitting in _____)