

SCIENCE B NTI DAY 4

Name _____

Prokaryotic Cells The simplest type of cells were most likely the first type of cells that formed on Earth. These are called *prokaryotic cells*. All prokaryotic cells have a cell membrane surrounding the cell, cytoplasm where all of the metabolic processes happen, ribosomes that make proteins, and a circular DNA molecule called a nucleoid where the genetic information is held. The majority of prokaryotic cells also have a rigid cell wall that is used for protection. All prokaryotic organisms are unicellular, meaning the entire organism is only one cell.

Prokaryotic organisms are asexual, meaning they do not need a partner to reproduce. Most reproduce through a process called binary fission where basically the cell just splits in half after copying its DNA. This means that without mutations within the DNA, offspring are identical to their parent. It is possible they were the first living organisms on Earth when life was first forming.

Eukaryotic Cells The other, much more complex, type of cell is called the *eukaryotic cell*. Like prokaryotic cells, eukaryotic cells have cell membranes, cytoplasm, ribosomes, and DNA. However, there are many more organelles within eukaryotic cells. These include a nucleus to house the DNA, a nucleolus where ribosomes are made, rough endoplasmic reticulum for protein assembly, smooth endoplasmic reticulum for making lipids, Golgi apparatus for sorting and exporting proteins, mitochondria for creating energy, a cytoskeleton for structure and transporting information, and vesicles to move proteins around the cell. Some eukaryotic cells also have lysosomes or peroxisomes to digest waste, vacuoles for storing water or other things, chloroplasts for photosynthesis, and centrioles for splitting the cell during mitosis. Cell walls can also be found surrounding some types of eukaryotic cells.

Most eukaryotic organisms are multicellular. This allows the eukaryotic cells within the organism to become specialized. Through a process called differentiation, these cells take on characteristics and jobs that can work with other types of cells to create an entire organism. There are a few unicellular eukaryotes as well. These sometimes have tiny hair-like projections called cilia to brush away debris and may also have a long thread-like tail called a flagellum for locomotion. Eukaryotes may use either asexual or sexual reproduction depending on the organism's complexity. Sexual reproduction allows more diversity in offspring by mixing the genes of the parents to form a new combination and hopefully a more favorable adaptation for the environment.

1. How do prokaryotic cells reproduce? Explain what that means _____

2. What 4 features do all prokaryotic cells have?

1. _____ 3. _____
2. _____ 4. _____

3. In prokaryotic cells, what is the purpose of the cell wall? _____

4. What does it mean that prokaryotic cells are unicellular? _____

5. For eukaryotic cells, list the purpose of the following organelles.

Nucleolis-----

Rough ER----

Smooth ER---

Golgi apparatus—

6. Photosynthesis takes place within the _____

7. In eukaryotes, there is a long tail-like structure used for locomotion. What is that structure? _____

8. What is the process whereby the cells work together to create an entire organism? _____

9. How does sexual reproduction lead to diversity among organisms? _____

10. How do eukaryotes reproduce? _____

