

The Diversity of Cells

- **Most cells are so small that they can't be seen by the naked eye. It wasn't until the _____ was invented in the mid-1600s that scientists were able to discover cells.**

Cell – The smallest unit that can perform all the processes necessary for _____.

Cells and Cell Theory:

- _____ was the first person to describe cells. He saw them through a microscope in thin slices of _____.
- Hooke thought the cork looked like it was made of little boxes, so he named them cells (“_____” in Latin).
- Hooke saw that the cells of living plants were filled with a “_____”.
- Hooke only observed cells in _____, not in _____, so he thought only _____ are made of cells.

- In 1673, Anton van Leeuwenhoek used his homemade microscopes to observe pond water. He saw small one-celled organisms in the water which he called _____ (“little animals”).
- Leeuwenhoek was also the first to observe _____ cells (and notice that they were different in various organisms), observe _____, and discover that _____ is actually a single-celled organism.

The Cell Theory:

- In 1838, Matthias Schleiden concluded that all _____ parts are made of cells.
- In 1839, Theodor Schwann concluded that all _____ tissues are made of cells.
- Schwann wrote the first two parts of what is now known as the *cell theory*.

Cell Theory

- ✓ All organisms are made of one or more _____.
- ✓ The cell is the _____ of all living things.
- ✓ All cells come from _____ cells.

- **(The third part of the cell theory was added by Rudolf Virchow in 1858).**

Cell Size:

- **Most cells are too small to be seen with the unaided eye. However, some cells, like an _____, are large.**
- **Most cells need to stay small because they take in _____ and get rid of _____ through their outer surface.**
- **The larger a cell, the more _____ it needs and the more _____ it produces.**
- **As a cell grows, its _____ increases, but its _____ increases faster.**
- **If a cell gets too large, the cells surface area will not be large enough to bring in the food and remove the waste that the cell needs.**
- **The surface area-to-volume _____ of a cell can be determined by:**

Surface area-to-volume ratio = surface area ÷ volume

Parts of a Cell:

- **Cells come in many shapes and sizes, but all cells have four things in common:**

- 1. Cell Membrane – A protective layer that covers the cells surface and acts as a _____.**
 - **The cell membrane controls materials going into and out of a cell.**
- 2. Cytoplasm – The _____ inside a cell.**
- 3. Organelles – Small bodies in a cell's _____ that are specialized to perform a specific function.**
 - **Most organelles are surrounded by _____.**
- 4. Genetic Material – All cells contain _____ at some point in their life.**
 - **DNA is passed on from _____ cells to new cells.**
 - **DNA controls the _____ of a cell.**
 - **In some cells, DNA is enclosed inside an organelle called the _____.**

Two Kinds of Cells:

- **There are two basic kinds of cells: those with a _____, and those without a _____.**

Prokaryotes: Bacteria and Archaea:

Prokaryotes – Single-celled organisms

that do not have a _____ or membrane-bound organelles.

- _____ **are the most common prokaryotes.**
- **Bacteria are the _____ cells known.**
- **A bacterium's DNA is not in a nucleus; it is _____, and twisted like a rubber band within the cytoplasm.**
- **Bacteria have no membrane-covered _____.** They do have small organelles called *ribosomes* that make _____.
- **The other type of prokaryote is _____.**
- **Archaea are similar to bacteria in that they are single-celled organisms, have ribosomes, a cell membrane, and**

- circular DNA. Both lack a _____ and membrane-bound organelles.**
- **Archaea differ from bacteria in that their ribosomes are more like the ribosomes of _____. Their cell walls and cell membranes are also different from other cells.**
 - **Archaea often live in _____ environments that no other organism could live in.**
 - **Three types of archaea:**
 - 1. heat-loving – live in _____ environments**
 - 2. salt-loving – live in very _____ conditions**
 - 3. methane-making – create or live off of _____ gas.**
 - **Archaea are often called _____ because they often live in extreme conditions.**

Eukaryotic Cells and Eukaryotes:

- **Eukaryotic cells are the largest cells.**

Eukaryotes – Organisms made up of cells that have a _____ enclosed by a membrane.

- **Eukaryotic cells have other membrane-covered organelles that perform specialized _____.**
- **Many eukaryotes are _____, meaning “many cells”.**
- **Almost all organisms you can see with your naked eye are eukaryotes (i.e. plants, animals, algae, fungi)**