**A. Cell Theory**

**Cell** **Theory**

* All organisms are made of one or more cells.
* Cells are the basic structure and function in all organisms.
* All cells come from other cells.

**B. Cell Vocabulary**

Prokaryote (Prokaryotic)- an organism whose cells do NOT have a nucleus.

Eukaryote (Eukaryotic)- an organism whose cells have genetic material enclosed in a nucleus.

Organism- any living thing.

Organelle- any part of a cell.

Structure- how a part or organism is built

Function- the job, processes, or activities that are done

**C. Cell Organelles**

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| **Organelle** | **Location** | **Function** |
| \*Cell Wall | In Plant Cells Only; Outside the cell membrane | Rigid structure that gives support and protection to the cell |
| \*Cell Membrane | Separates the inside of the cell from the outside environment | Acts as a barrierControls what goes in and out |
| \*Nucleus | In the cytoplasm; in the middle; Eukaryotes ONLY | Control center of the cell; contains the cell’s DNA |
| \*Nuclear Envelope (Membrane) | Surrounds the nucleus | Acts a barrier; controls what goes in and out of the nucleus |
| \*Chromatin (DNA) | In the nucleus of eukaryotes; In the cytoplasm of prokaryotes | Set of instructions for the cell; genetic information that determines characteristics |
| Nucleolus | Dark shaded part of the nucleus | Where the cell begins to make proteins |
| \*Cytoplasm | Inside all cells | Gel-like material/liquid that fills the cell and holds organelles |
| \*Mitochondria (mitochondrion) | In the cytoplasm | Food energy/sugar is broken down to produce energy “Powerhouse of the cell” Cellular Respiration happens here. |
| Endoplasmic Reticulum (ER) | In the cytoplasm close to the nucleus | Passage ways that carry proteins and materials through the cell |
| \*Ribosomes | On the ER or in the Cytoplasm; small and plentiful | Makes proteins |
| Golgi Bodies | In the cytoplasm | Processes, packages, and transports materials out of the cell |
| \*Chloroplasts | In cytoplasm; PLANT CELLS ONLY | Captures energy from sunlight and uses it to make food (sugar) for the cell. Photosynthesis happens here. (Filled with “green” chemical-chlorophyll) |
| \*Vacuoles | In the cytoplasm; HUGE in Plant cells; may not be in animal cells | Stores water or other materials |
| Lysosomes | In cytoplasm of cells | Breaks down waste, food, worn-out cell parts, or foreign invaders, “Clean-up Crew” |
| Vesicle | In ER, Golgi, or cytoplasm, can be outside cell too | Small sac that contains materials to be moved in or out or the cell |





**D. Compare and Contrast**: Plant Cell, Animal Cell, Bacteria Cell

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| **Plant Cell** | **Animal Cell** | **Bacteria Cell** |
| NucleusChloroplasts & MitochondriaCell Wall & Cell MembraneLarge Central Vacuole | NucleusCell Membrane OnlyMitochondria Only | No NucleusMitochondria (May have Chloroplasts or Cell Wall, but depends on type) |

**E. Organization of Living Things**

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| **Level** | **Definition** | **Example** |
| Biosphere | All living things on Earth |  |
| Biome | A region with similar living things and climate | Temperate Deciduous Forest, Tundra, Desert |
| Ecosystem | A community plus abiotic factors | Dogs and Cats playing in the mud |
| Community | Two or more populations in the same area | Dogs and Cats |
| Population | A group of the same kind of living things | Dogs |
| Organism | Any living thing | Bacteria, Tree, Human |
| Organ System | A group of organs that work together to perform body functions | Digestive System, Respiratory System, etc. |
| Organ | A structure made up of different types of tissues that carry out of a specialized function of the body | Heart, Brain, Lungs, Skin |
| Tissue | Groups of similar cells that perform a common function | Muscle tissues  |
| Cell | The smallest most basic unit of life | Red Blood Cell, Nerve Cell, Bacteria Cell |
| Organelle | Membrane-bound structures found inside the cell | Nucleus, Mitochondria, Chloroplasts, ER, Ribosomes etc. |

**F. Benefits to being Multicellular**

1. **Larger Size** – Multicellular organisms can grow to be a larger size

 Larger size means less predators

2. **Longer Life**- Multicellular organisms can have a longer life

If one cell dies it can be replaced by others. If it was a single cell the whole organism would die.

3. **Specialized Cells**- Multicellular organisms have cells that perform one function.

This makes cells more efficient. Instead of having to do everything, one cell has one job, which helps the cell work faster and better. The specialized cells make tissues -> which make organs -> with make organ systems -> which makes the organism function.