**Cellular Organization Notes**

Cellular organization refers to a system where the parts that makes up life are categorized based on size. The organizer below shows organization from smallest to largest. This organization system will expand when we talk about ecological organization.

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|  | **Definitions** |
| **Atom**: smallest unit of matter |
| **Molecule**: smallest combination of an element (ex. O2 or H2 or N2) |
| **Compound**: two or more elements bonded together |
| **Organelle**: cell parts (like the mitochondrion, chloroplast, cell membrane, etc) |
| Example: | **Cell**: smallest unit of life |
| **Tissue**: a group of cells working together to perform the same function |
| **Organ**: a group of tissues working together to perform the same function |
| **Organ system**: a group of organs working together to perform the same function |
| **Organism**: a group of organ systems working together to maintain homeostasis and ensure survival |

This organization works for multicellular organisms. Different organisms have different kinds of organization: not all structures are the same for every organism; however the functions remain the same.



For example, a plant does not have the same organization as a human, but they still need to perform the same functions in order to survive. Instead of a skeletal system, plants have cell walls for protection and support. Instead of a circulatory and respiratory system, plants have xylem and phloem (vascular bundles) and a spongy layer within their leaves to transport materials throughout the plant. A sea sponge does not have a nervous system instead they have a nerve net but it still sends and receives electrical messages throughout the organism.

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| Ameoba | Euglena | paramecium |

Not all organisms have all levels of organization. Some organisms are only one cell big, such as euglena, amoeba, paramecium, or yeast. This means that the organelles within the cell have to perform the same functions as say organs in a person. For example, we use our lungs to get oxygen and get rid of carbon dioxide. A cell uses the cell membrane to perform this same function.

Organelles are not present in all cells. Cells can be further categorized as prokaryotic or eukaryotic.

A prokaryotic cell does NOT have organelles; instead the structures that carry out life processes are found embedded to the cell membrane or floating in the cytoplasm. A prokaryotic cell has a cell membrane, cytoplasm, and support molecules only. Examples of prokaryotic cells would be viruses, bacteria, and algae.

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| algae | bacteria | virus |

A eukaryotic cell is what we are used to seeing, studying, and talking about. Eukaryotic cells have organelles such as a nucleus, cell membrane, ribosomes, mitochondria, etc.