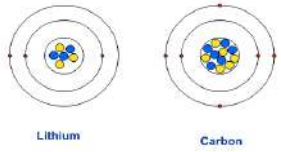
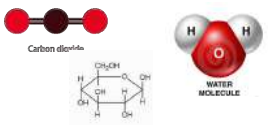
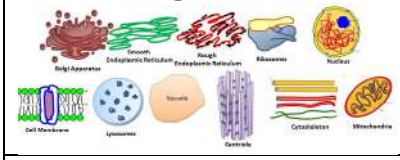
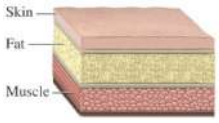
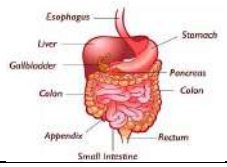
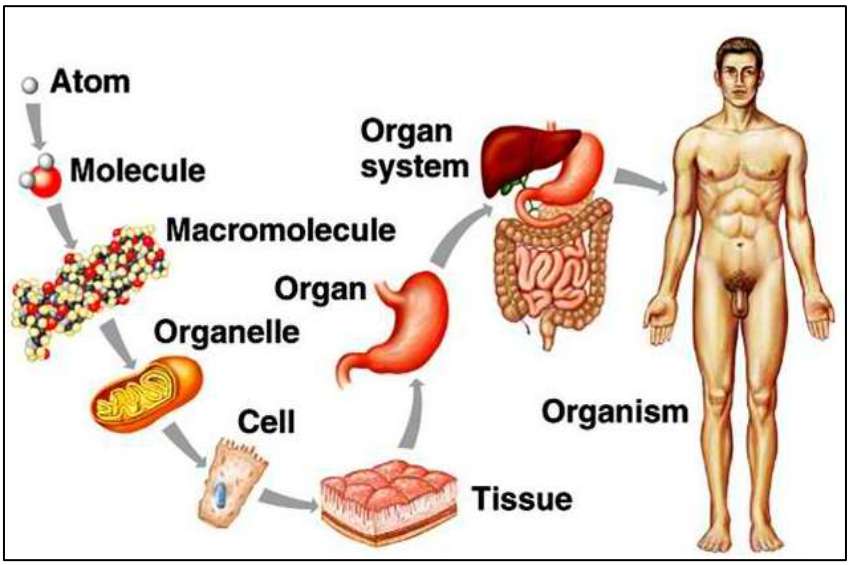
Levels of Organization in Multicellular Organisms

Level of Organization	Description	Example
Atom 	An atom is the smallest unit of an element that maintains the chemical and physical properties of that element. Atoms are composed of protons, neutrons, and electrons organized in a particular way.	Carbon (C), Hydrogen (H), Oxygen (O), Nitrogen (N)
Simple Molecule 	Molecules are composed of two or more atoms that are bonded together in a particular way. A molecule may have completely different properties than the elements of which it is made up.	Water (H_2O), Carbon Dioxide (CO_2), Oxygen (O_2), Ozone (O_3), Nitrogen (N_2), Glucose ($C_6H_{12}O_6$)
Complex Molecule 	Simple molecules can be bonded together to form larger, more complex molecules. These complex molecules, or macromolecules, have many functions in living things.	Complex Carbohydrates, Lipids, Proteins, Nucleic Acids
Organelle 	An organelle is a part of a cell with a specific function. Different organelles have different molecular structures. Eukaryotic cells have many more organelles than prokaryotic cells.	Nucleus, Mitochondria, Cell Membrane, Endoplasmic Reticulum, Chloroplasts, Centrioles, Golgi Apparatus
Cell 	Cells are the basic unit of structure and function in living organisms. Simple cells called prokaryotes lack internal organization; more complex cells called eukaryotes have an additional sublevel of organization called organelles.	**Single-Celled Organisms**: Ex. bacteria, amoeba **Specialized Cells in Multicellular Organisms**: Ex. skin cell, red blood cell
Tissue 	In multicellular organisms, different types of cells are arranged into tissues: groups of cells working together to perform a specific function.	Epithelial tissue, nervous tissue, muscle tissue, connective tissue
Organ 	An organ is made up of different types of tissue working together to perform a specific function.	Brain, Liver, Stomach, Pancreas, Kidneys, Lungs
Organ System 	An organ system is composed of multiple organs working together to perform a specific function.	Digestive System, Circulatory System, Renal System, Integumentary System
Organism 	A multicellular organism has several organ systems that function together and rely on each other. Multicellular organisms contain all of the levels of organization between cell and organism. Unicellular organisms are both cells and organisms, without additional levels of organization.	-Animals (Ex. humans), Plants (Ex. oak trees), and some Fungi (Ex. mushrooms) are multicellular organisms -All other living things are unicellular organisms

Levels of Organization in Multicellular Organisms

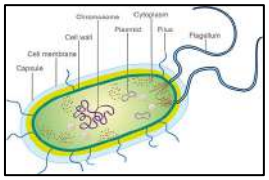
Multicellular organisms are organized on many different levels!

- The cell is the lowest level of organization that can be considered alive. Cells are made of parts called organelles. Individual organelles are not alive.
- The lowest levels of organization are found in both living and nonliving things.

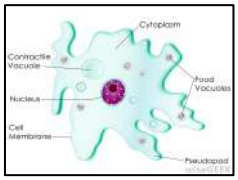


Unicellular Organisms

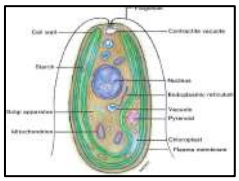
Single-celled organisms do not have as many levels of organization as multicellular organisms. Single-celled organisms may be prokaryotic (simple cells like bacteria) or eukaryotic (more complex cells like amoebas and algae).



Ex: bacterium



Ex: amoeba

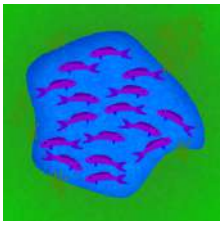


Ex: alga

Further Levels of Organization

-Populations

- A population is a group of members of the same species living within a particular area.



Ex: Fish in a pond

Ex: Bacteria in a petri dish

-Communities & Ecosystems

- A biological community consists of members of members of different species (different populations) living within a particular area. Members of communities may interact directly or indirectly.
- An ecosystem takes into account all of the living organisms within an area as well as nonliving aspects of the environment.