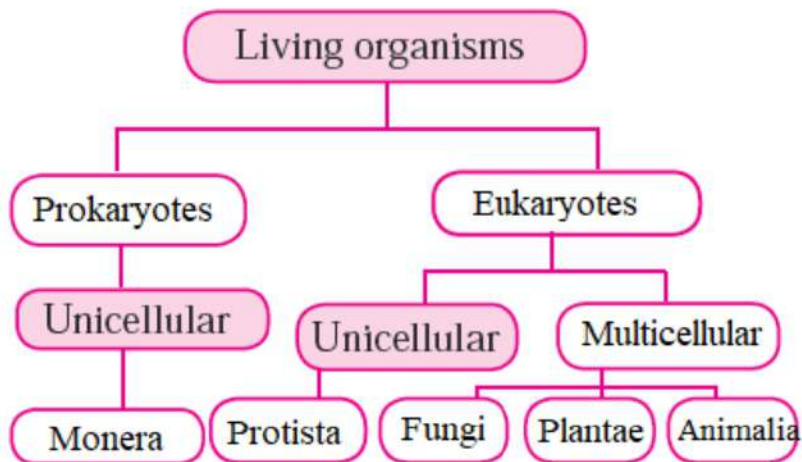


## Characteristics and Classification of Living Organisms



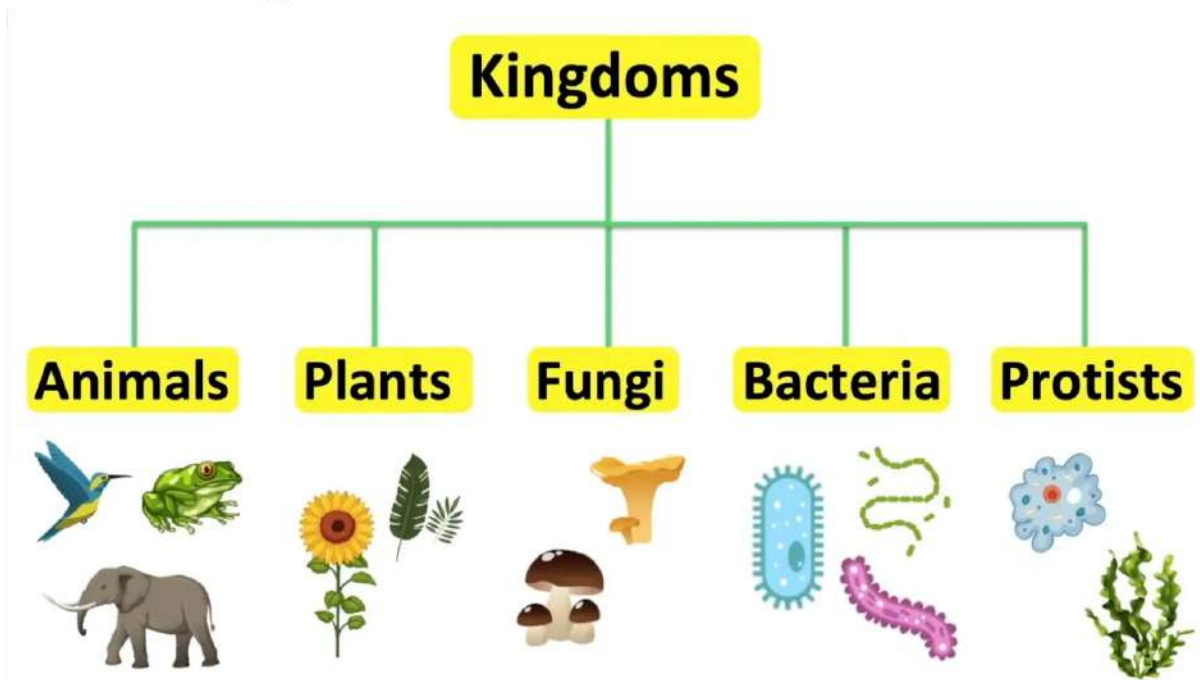
### Characteristics of Living Organisms:

All living organisms exhibit seven fundamental characteristics — Movement, Respiration, Sensitivity, Growth, Reproduction, Excretion, and Nutrition (often abbreviated as MRS GREN).

## There are 7 characteristics:

- **M**ovement
- **R**espiration
- **S**ensitivity
- **G**rowth
- **R**eproduction
- **E**xcretion
- **N**utrition

**Classification of Organisms:**



Organisms are classified based on shared characteristics. Major taxonomic levels are Kingdom, Phylum, Class, Order, Family, Genus, and Species. Organisms are grouped into five main kingdoms: Animalia, Plantae, Fungi, Protista, and Monera.

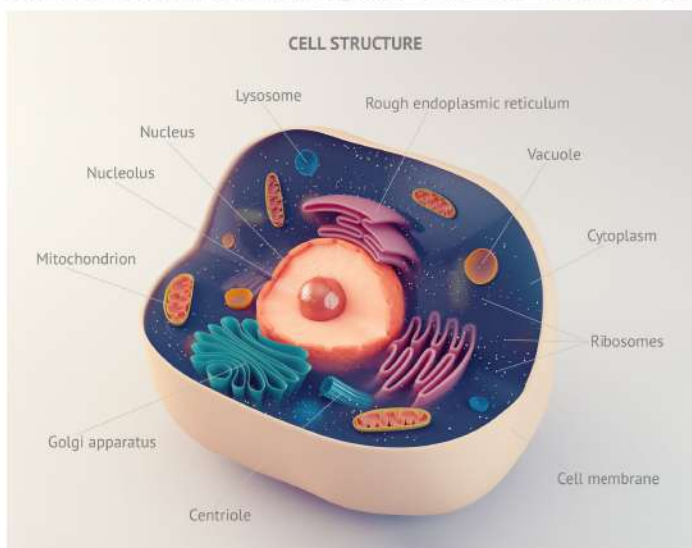
**Binomial Nomenclature and Identification Keys:**

Binomial nomenclature provides each organism with a two-part Latin name (genus and species). Identification keys help determine species based on physical characteristics.

**Cells**

**Cell Structure and Organization:**

Cells are the basic units of life. Animal cells have organelles like the nucleus, mitochondria, and cell membrane, while plant cells also contain chloroplasts, cell walls, and large vacuoles.

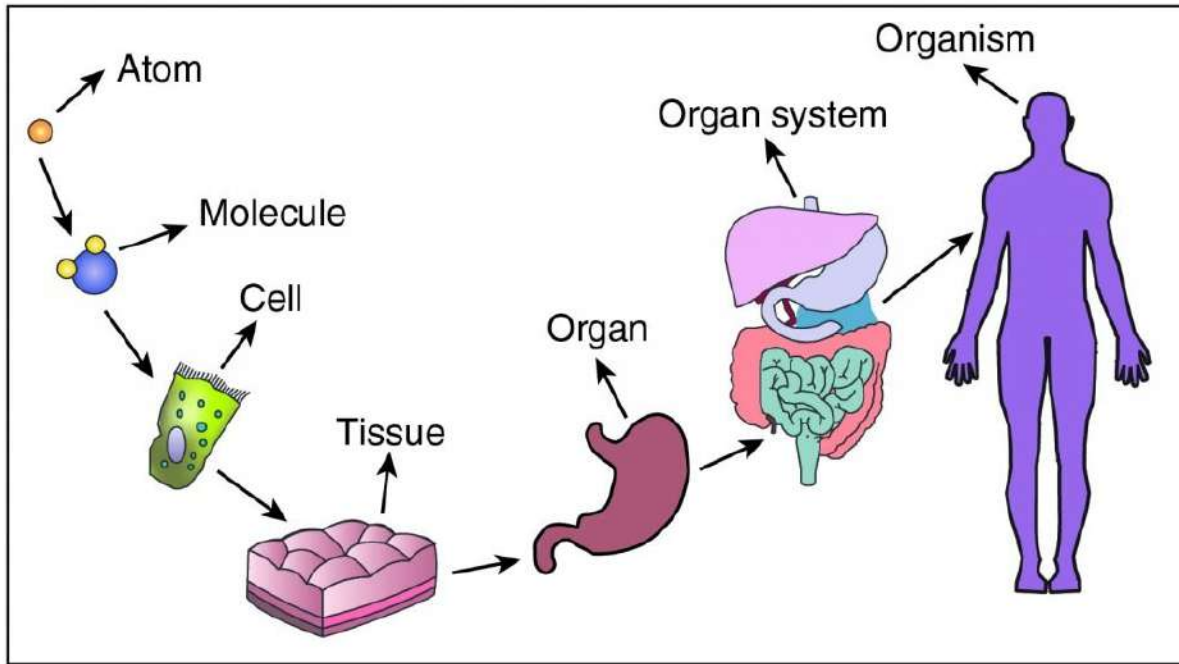


**Specialized Cells:**

Cells adapt to perform specific functions, such as red blood cells (transporting oxygen), root hair cells (absorbing water and nutrients), and nerve cells (transmitting signals).

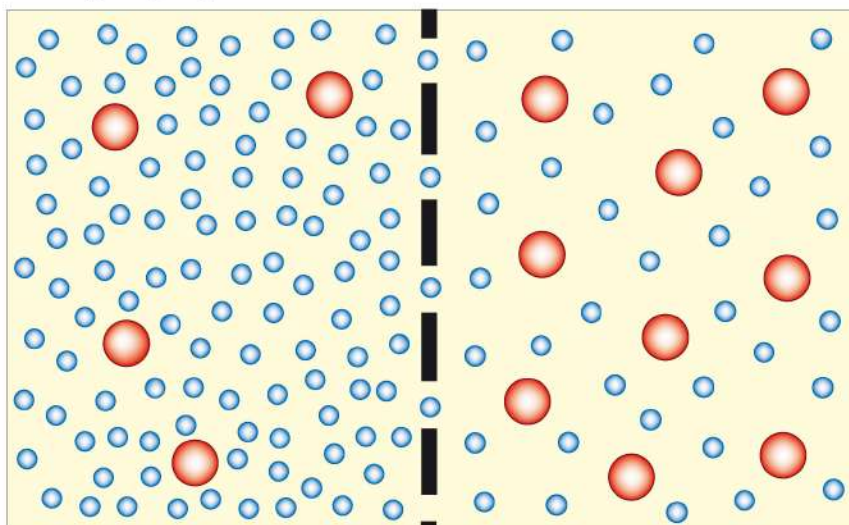
**Levels of Organization:**

Cells form tissues, which combine to create organs, and organs work together as systems, e.g., the circulatory system in animals or the vascular system in plants.



**Movement in and out of Cells**

- Diffusion: Movement of particles from a high to low concentration area, such as oxygen entering cells.
- Osmosis: Movement of water across a semi-permeable membrane, crucial for maintaining cell turgidity in plants.

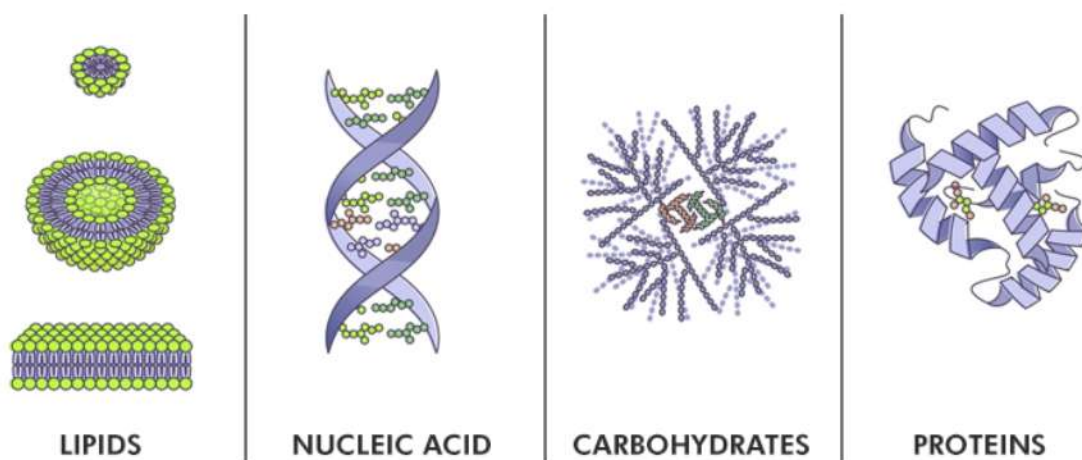


- Active Transport: Requires energy to move substances against a concentration gradient, essential for nutrient uptake in cells.

### Biological Molecules

- Carbohydrates: Provide energy; monosaccharides (glucose), disaccharides (sucrose), and polysaccharides (starch).
- Proteins: Built from amino acids, crucial for growth and repair; enzymes are proteins that act as catalysts.

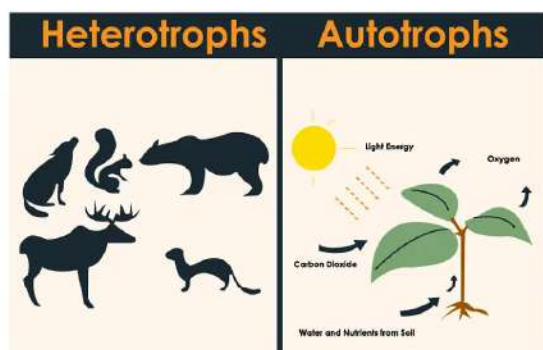
## BIOMOLECULES



- Lipids: Fats and oils, stored as energy reserves.
- Water: Acts as a solvent and medium for reactions, crucial for nutrient transport and temperature regulation.
- Enzymes: Catalysts that speed up chemical reactions, affected by factors like temperature and pH.

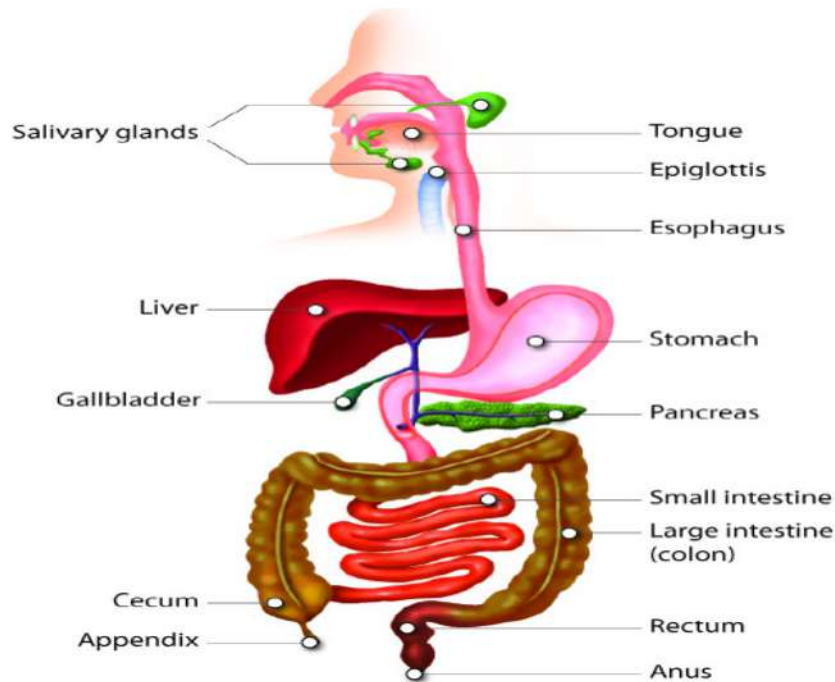
### Nutrition

- Types of Nutrition: Autotrophic (plants make their own food via photosynthesis) and heterotrophic (animals consume other organisms).

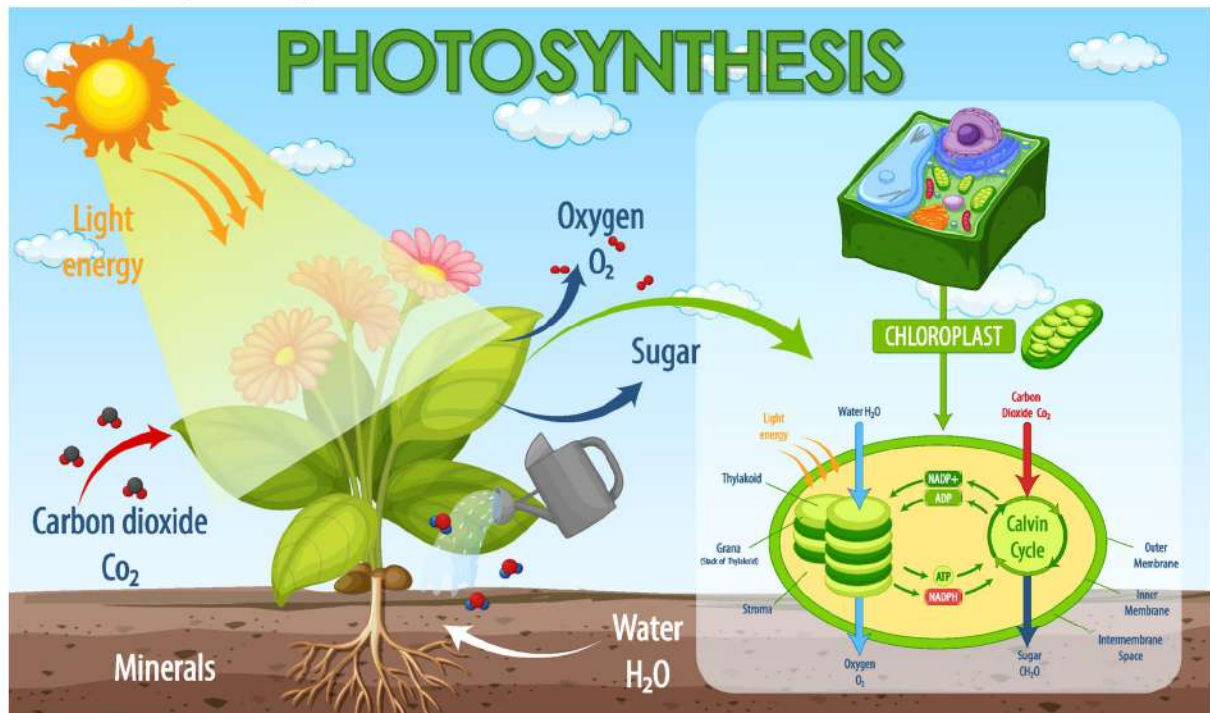


**•Human Digestive System:**

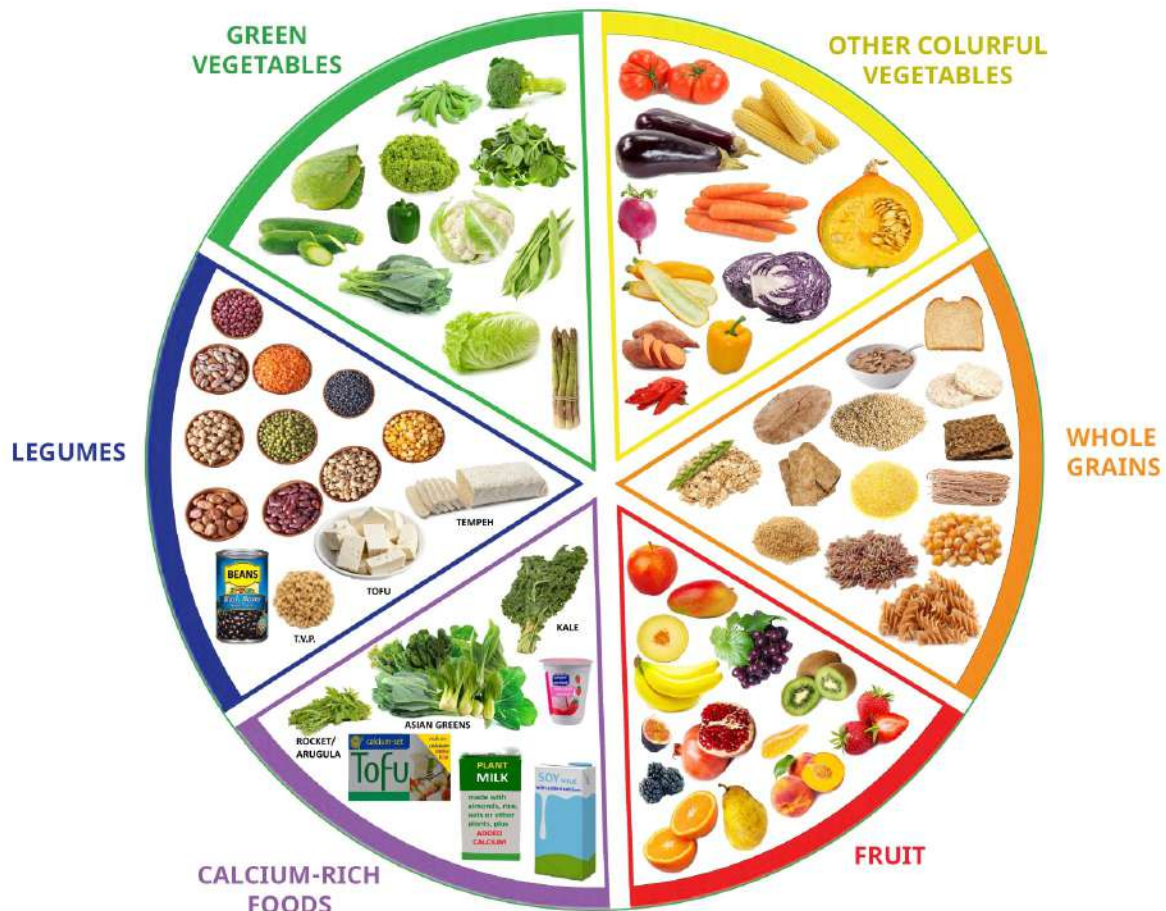
Includes organs like the mouth, esophagus, stomach, intestines, and associated glands, breaking down food into nutrients for absorption.



**•Photosynthesis in Plants:** Process where chlorophyll in plant cells absorbs light to convert  $\text{CO}_2$  and water into glucose and oxygen. Factors affecting it include light intensity, carbon dioxide levels, and temperature.



•**Balanced Diet and Malnutrition:** A balanced diet includes carbohydrates, proteins, fats, vitamins, and minerals. Malnutrition can result from deficiency or excess of certain nutrients.



## Conclusion

The biology curriculum provides a foundational understanding of essential biological concepts, equipping students with knowledge about the building blocks of life, processes that sustain living organisms, and the interactions within ecosystems. From the cellular level to complex systems, the curriculum emphasizes how different structures and processes are interconnected, highlighting the adaptability of organisms and the importance of maintaining balance in nature. Understanding these topics helps students appreciate the diversity and unity of life forms, the critical role of humans in the environment, and the impact of scientific advancements on health and sustainability. This foundation prepares students not only for more advanced studies but also for making informed decisions about biological and environmental issues in daily life.