Levels of Biological Organization

Living organisms show different levels of structural organization, starting from the simplest chemical level to the most complex biosphere.

[DATE]

WEBSITE

https://govtstudentinsindh.com/9th-class-biology-chapter-1-notes-introduction-to-biology-pdf-download/

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1. Atomic Level

- All matter is made up of elements.
- **Bio-elements** (C, H, O, N, S, P, etc.) are essential for life.
- Example: Oxygen (O), Carbon (C), Hydrogen (H).

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2. Molecular Level

- Atoms combine to form **molecules** (H_2O, CO_2, glucose).
- Biomolecules:
  - **Micromolecules** → small (glucose, amino acids, fatty acids).
  - **Macromolecules** → large (proteins, carbohydrates, lipids, nucleic acids).
- Molecules form the **chemical basis of life**.

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3. Cellular Level

- **Cell = basic unit of life.**
- Formed by protoplasm (organic + inorganic substances).
- Example: Amoeba (unicellular), human cell.

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4. Tissue Level

- Similar cells grouped together to perform specific functions.
- Example: epithelial tissue, muscle tissue, nervous tissue.

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5. Organ Level

- Different tissues combine to form an organ.
- Each organ has a specific function.
- Example: stomach, lungs, heart, leaf.

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6. Organ System Level

- Organs working together form an **organ system**.
- Example:
  - Digestive system (stomach, intestines, liver, pancreas).
  - Circulatory system (heart, blood vessels).

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7. Organism Level

- A complete living being made up of organ systems.
- Example: Frog, Human, Lion.

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8. Population Level

- Group of individuals of the **same species** living in one area.
- Example: Flock of birds, pride of lions, group of parrots.

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9. Community Level

- Different populations of species living in the same habitat.
- Example: Lions, zebras, and grass in one savanna.

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10. Ecosystem Level

- Community + non-living environment (air, water, soil).
- Example: Forest ecosystem, pond ecosystem.

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11. Biosphere Level

- The **highest level of organization**.
- Part of Earth where life exists (land, water, air).
- Includes all ecosystems together.

Summary Flow

Atom → Molecule → Cell → Tissue → Organ → Organ System → Organism → Population → Community → Ecosystem → Biosphere