

## Chapter 1 – The Foundations

### 1.1 Cellular Foundations

The following sub-sections are important:

- Cells Are the Structural and Functional Units of All Living Organisms
- Cellular Dimensions Are Limited by Diffusion
- Organisms Belong to Three Distinct Domains of Life
- Organisms Differ Widely in Their Sources of Energy and Biosynthetic Precursors
- Eukaryotic Cells Have a Variety of Membranous Organelles, Which Can Be Isolated for Study
- The Cytoplasm Is Organized by the Cytoskeleton and Is Highly Dynamic

### 1.2 Chemical Foundations

The following sub-sections are important:

- Biomolecules Are Compounds of Carbon with a Variety of Functional Groups
- Cells Contain a Universal Set of Small Molecules
- Macromolecules Are the Major Constituents of Cells
- Three-Dimensional Structure Is Described by Configuration and Conformation
- Interactions between Biomolecules Are Stereospecific

### 1.3 Physical Foundations

The following sub-sections are important:

- Living Organisms Exist in a Dynamic Steady State, Never at Equilibrium with Their Surroundings
- Organisms Transform Energy and Matter from Their Surroundings
- Creating and Maintaining Order Requires Work and Energy
- Energy Coupling Links Reactions in Biology