

Why Is Carbon So Important?

- Organic vs. Inorganic in Chemistry
 - **Organic** refers to molecules containing a carbon skeleton
 - **Inorganic** refers to carbon dioxide and all molecules without carbon



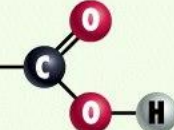
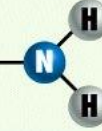
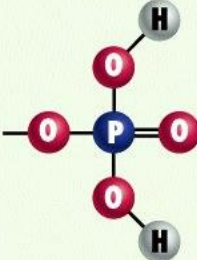
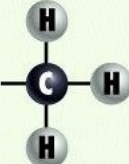
Why Is Carbon So Important?

- Carbon atoms are versatile and can form up to four bonds (single, double, or triple) and rings
- Functional groups in organic molecules confer chemical reactivity and other characteristics

Organic Molecule Functional Groups

- **Functional groups** are specific **groups** of atoms within molecules that are responsible for the characteristic chemical reactions of those molecules

Table 3-1 Important Functional Groups in Biological Molecules

Group	Structure	Properties	Found In
Hydrogen (—H)		Polar or nonpolar, depending on which atom hydrogen is bonded to; involved in dehydration and hydrolysis reactions	Almost all organic molecules
Hydroxyl (—OH)		Polar; involved in dehydration and hydrolysis reactions	Carbohydrates, nucleic acids, alcohols, some acids, and steroids
Carboxylic acid (—COOH)		Acidic; involved in peptide bonds	Amino acids, fatty acids
Amino (—NH_2)		Basic; may bond an additional H^+ becoming positively charged; involved in peptide bonds	Amino acids, nucleic acids
Phosphate ($\text{—H}_2\text{PO}_4$)		Acidic; links nucleotides in nucleic acids; energy-carrier group in ATP	Nucleic acids, phospholipids
Methyl (—CH_3)		Nonpolar; tends to make molecules hydrophobic	Many organic molecules; especially common in lipids