

## CHAPTER 4 NOTES

### I. THE IMPORTANCE OF CARBON TO DIVERSITY AND EVOLUTION

#### A. Carbon (C) atoms are versatile building blocks

1. Carbon has 4 unpaired valence e-, so it seeks 4 additional e-. (forms 4
2. Carbon's 3D geometry is a stable tetrahedron that supports covalent with many different atoms.



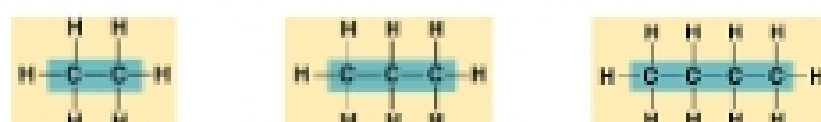
bonds)  
bonding

#### B. Carbon atoms combine in multiple ways, permitting formation of diverse organic molecules

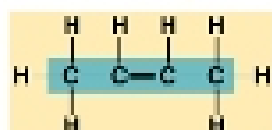
1. The number of unpaired valence e- indicates how many chemical bonds an element will form.



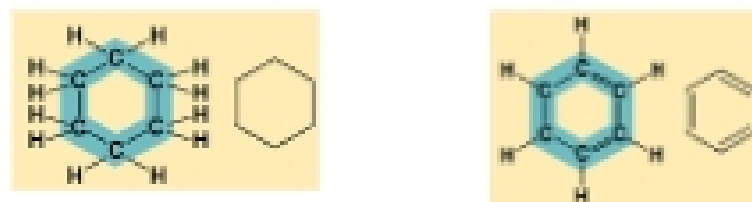
2. Many lengths are possible for C-based molecules



3. Double bonds and triple bonds are possible

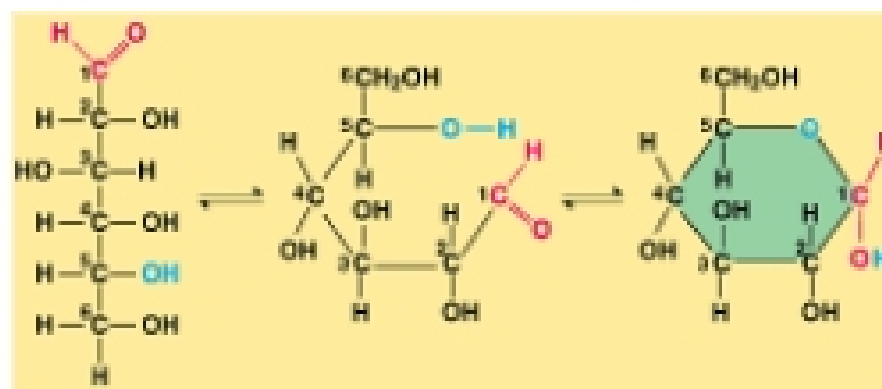


4. Rotation around C—C bonds enable ring shapes

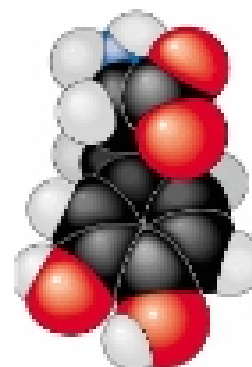


5. Isomers (def.)- **same molecular formula**  
**different molecular structure**

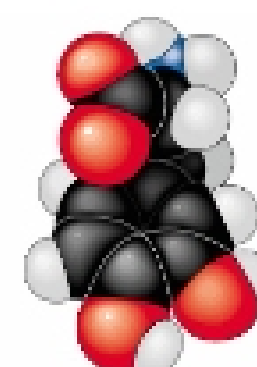
- a. molecular formula of simple sugars ( $C_6H_{12}O_6$ )



- b. biological importance  
\* shape correlates with function!



**L-Dopa**  
(effective against  
Parkinson's disease)



**D-Dopa**  
(biologically  
inactive)

**II. FUNCTIONAL GROUPS BOND TO CARBON SKELETONS, CONFERRING PREDICTABLE CHEMICAL BEHAVIOR TO MOLECULES**

A. Hydroxyl

B. Carbonyl

C. Carboxyl

D. Amino

E. Sulfhydryl

F. Phosphate

G. Methyl