

Focus Questions and Key Terms  
Biochemistry  
Chapters 2-5  
AP Biology

**Chapter 2**

- Explain the difference between essential elements and trace elements and provide examples of each. (2.1)
- What are examples of biological uses for radioactive isotopes? (2.2)
- Explain the differences between covalent bonds, ionic bonds, hydrogen bonds, and Van der Waals interactions. Provide examples of each. (2.3)

**Chapter 3**

- Explain how the structure of the water molecule allows for water's unique properties. (3.1)
- Explain how cohesion and adhesion work together to transport water in plants. (3.2)
- Explain the significance of water's high specific heat, and how it allows for evaporative cooling. (3.2)
- Explain why solid water floats on liquid water, and why this is so significant for life. (3.2)
- Explain why water is described as the solvent of life. (3.2)
- Describe how the pH scale works and the purpose of buffers in biological systems. (3.3)
- Explain how acidification occurs and what consequences could result. (3.3)

**Chapter 4**

- Explain the Miller-Urey experiment and what it was able to prove. (4.1)
- Explain how carbon, nitrogen, oxygen, and hydrogen form bonds with each other. (4.2)
- Explain the different ways carbon skeletons can vary. (4.2)
- Describe the different types of isomers and provide examples of each. (4.2)
- Draw the seven types of functional groups and give examples of the types of molecules in which they can be found. (4.3)

**Chapter 5**

- Draw and example of a dehydration reaction and a hydrolysis reaction. (5.1)
- Explain the difference between a storage and structural polysaccharides and give examples of each in both animals and plants. Also explain how they are structurally different. (5.2)
- Compare and contrast the three different classes of lipids in terms of their structure and function. (5.3)
- Explain how proteins are built. (5.4)
- Describe the different types of protein functions. (5.4)
- Describe the four levels of protein structure and explain what determines the structure of a protein. (5.4)
- Describe the functions of nucleic acids. (5.5)
- Describe the structure of nucleic acids both on the monomer and polymer levels. (5.5)

## Key Terms

### Chapter 2

anion  
atom  
atomic mass  
atomic nucleus  
atomic number  
cation  
chemical bond  
chemical equilibrium  
chemical reaction  
compound  
covalent bond

electron  
electronegativity  
element  
energy  
essential elements  
hydrogen bond  
ion  
ionic bond  
ionic compound  
isotope  
mass number

molecule  
neutron  
nonpolar covalent bond  
polar covalent bond  
potential energy  
proton  
radioactive isotope  
trace element  
valence shell  
van der Waals interactions

### Chapter 3

acid  
adhesion  
aqueous solution  
base  
buffer  
calorie (cal)  
cohesion  
colloid

evaporative cooling  
heat  
hydrogen ion  
hydronium ion  
hydrophilic  
hydrophobic  
hydroxide ion  
kinetic energy

ocean acidification  
pH  
polar molecule  
solute  
solution  
solvent  
specific heat  
surface tension

### Chapter 4

adenosine triphosphate (ATP)  
amino group  
carbonyl group  
carboxyl group  
cis-trans isomers

enantiomer  
functional group  
hydrocarbon  
hydroxyl group  
isomer

methyl group  
organic chemistry  
phosphate group  
structural isomer  
sulfhydryl group

### Chapter 5

alpha (α) helix  
amino acid  
antiparallel  
beta (β) pleated sheet  
carbohydrate  
catalyst  
cellulose  
chaperonin  
chitin  
cholesterol  
dehydration reaction  
denaturation  
deoxyribonucleic acid (DNA)  
disaccharide  
disulfide bridge  
double helix  
enzyme  
fat

fatty acid  
gene  
glycogen  
glycosidic linkage  
hydrolysis  
lipid  
macromolecule  
monomer  
monosaccharide  
nucleic acid  
nucleotide  
peptide bond  
phospholipid  
polymer  
polynucleotide  
polypeptide  
polysaccharide  
primary structure

protein  
purine  
pyrimidine  
quaternary structure  
ribonucleic acid (RNA)  
ribose  
saturated fatty acid  
secondary structure  
sickle-cell disease  
starch  
steroid  
tertiary structure  
trans fats  
triacylglycerol  
unsaturated fatty acid  
X-ray crystallography