Biol 99: Biology for Health Careers Placement Test Study Reference

To succeed in college biology, you need some background knowledge comparable to what you should get from a good high school biology course. This experience should be recent, because science changes with new discoveries each year. People also tend to forget facts and concepts over time.

If you have taken a course in biology, you may be able to "brush up" on major concepts and update your understanding so that you're ready to take college biology courses. The following topics are found in most high school biology courses and are covered on the placement exam.

Scientific Method

Steps of the scientific method

Experimental method (control *vs.* experimental groups; independent *vs.* dependent variables)

Metric System

Standard metric base units for length, mass, and volume

Temperature measurement and Celsius scale

Prefixes and conversions (e.g. milligrams to grams or grams to kilograms)

Biological Vocabulary

Commonly used roots for biology terms, and terms derived from these roots:

Prefixes for numbers, amount: mono-, bi-, di-, tri-, poly-, micro-, macro-, hypo-, hyper-, iso-

Prefixes for location: exo-, endo-, inter-, intra-

Miscellaneous prefixes: hydro-, aqua-, hetero-, homo-, anti-, pro-, auto-

Miscellaneous suffixes: -philic, -phobic, -biotic, -ology, -itis, -ectomy

Chemistry for Biology

Elements & structures of atoms (protons, neutrons, electrons, atomic number, mass number)

Octet rule and valence electrons

Types of bonds (polar covalent, nonpolar covalent, ionic, hydrogen bonds)

Structure of water molecule, properties of water; pH scale, acids, bases

Building blocks (monomers) and functions of carbohydrates, lipids, proteins, and nucleic acids

Cell Biology

Features of and differences between prokaryotic and eukaryotic cells

Functions of major eukaryotic cell organelles

Transport across the cell membrane (simple diffusion, facilitated diffusion, osmosis, active transport, exocytosis, endocytosis)

Metabolism and Energy in Biology

Types of energy (kinetic, potential); First and Second Laws of Thermodynamics

Catabolic reactions (dehydration synthesis) and anabolic reactions (including hydrolysis)

Enzymes: definition and characteristics

Chromosomes and Cell Division

Sex chromosomes, autosomes, and chromosome number (diploid, haploid) in humans

Functions and major stages of mitosis; function and major stages of meiosis

Basics of sexual life cycle in humans (meiosis, egg, sperm, fertilization, zygote, mitosis)

Inheritance

Definitions of gene, gene locus, allele, genotype, phenotype, homozygous, heterozygous

Dominant *vs.* recessive alleles

Work simple problems: set up a Punnett Square and predict offspring for a cross with one gene and two alleles, e.g. predict offspring of cross such as AA X Aa or Aa X Aa

DNA and protein synthesis

Structure of DNA and complementary base pairing rules

Main steps in the "central dogma" of cell biology: DNA, transcription, mRNA, translation, protein

Basic Human Biology

Levels of organization (molecular, cell, tissue, organ, organ system, organism)

Homeostasis (definition)

Major organ systems in the human body: functions and critical organs of each system

Resources for Study

There are a wealth of online resources that cover the concepts above. Here are some that could be very helpful if you need to refresh or update your understanding a suitable level.

- Concepts of Biology Textbook: https://openstax.org/details/concepts-biology
- CK-12 Foundation Tutorials & Activities by Topic: http://www.ck12.org/biology/
- CK-12 Free Textbook: http://www.ck12.org/book/CK-12-Biology-Concepts/
- Khan Academy Quizzes, Video Tutorials, Text: https://www.khanacademy.org/science/biology
- YouTube Channels (search on YouTube, browse Playlists): Bozeman Science, PenguinProf