Chapter 1 Exploring Life
- What is life? What are the basic components of life, cells?
- Science is composed of observation, hypotheses, testing and development of theories…
- Technology is developed my science and feedback into each other

Chapter 2 The Chemical Context of Life
- The elements of life C, H, O, N
- Structure of an element and their charges: protons, electrons, neutrons, valence shells
-

Chapter 3 Water and the Fitness of the Environment
- What makes water unique (properties that support life)
- What is Molarity?
-

Chapter 4 Carbon and the Molecular Diversity of Life
- What properties of Carbon make it useful in organic compounds?
- What are the functional groups that are common in organic molecules?

Chapter 5 The Structure and Function of Macromolecules
- Dehydration and hydrolysis reactions
- Properties of macromolecules: polypeptides, phospholipids, polysaccharides, nucleic acids

Chapter 6 A Tour of the Cell
- What is a microscope?
- Limits of cell size
- Compare contrast plant and animal cells.
- What are the major components of cells (organelles) and their functions?

Chapter 7 Membrane Structure and Function
- What is the fluid mosaic model?
- What are the main components of a membrane and their function?
- How do membranes function: molecules move across, membrane potential, etc.

Chapter 8 An Introduction to Metabolism
- What is metabolism, catabolism, anabolism?
- The Laws of Thermodynamics.
- Energy of reactions and Gibbs Free Energy ($\Delta G = \Delta H - T\Delta S$)
- ATP and how it works
- Enzyme functions

Chapter 9 Cellular Respiration: Harvesting Chemical Energy
- $C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O$ + Energy; what are the steps to accomplish this reaction
- Energy production via $FADH_2$, NADH and ATP where are each produced
- Interpret what is happening in the Citric Acid Cycle
- How does the Electron Transport Chain function?
- What is the difference in fermentation?

Chapter 10 Photosynthesis
- Autotrophs vs heterotrophs
- Wavelengths of light, what are the differences and how do they affect Photosynthesis
- What is the Calvin Cycle and the results of it?
- Wht are the differences between C3, C4, CAM and Crassulean Acid Metabolism plants
- Understand what is happening in the light reactions.

Chapter 12 The Cell Cycle

- The basics of what DNA is and role it plays in cell division (how much DNA is apparent in each phase)
- Each of the parts that play a role in cell division: centrioles, spindles, centromeres, chromatids, etc.; know what is happening in each phase and what parts are paying a role.
- How mitosis differs in plants and animals.
- What factors promote and regulate cell division

Chapter 13 Meiosis and Sexual Life Cycles

- Know what a karyotype and the number of chromosomes beginning and resulting from meiosis. Understand what homologous chromosomes are.
- What are life cycles and examples of differing cycles?
- Identify the stages of meiosis and contrast it with mitosis. Amount of DNA material in each phase.
- Principles of crossing over and Independent Assortment.

Chapter 14 Mendel and the Gene Idea

- Who was Gregor Mendel, what were his experiments and the results of them?
- Know how to use a Punnet Square
- Understand patterns of behavior and predict results of it.

Chapter 15 The Chromosomal Basis of Inheritance

- Principles of sex linked, linkage and recombination, translocation, etc
- Griffiths experiments with bacteria and transformation.
- Hershey and Chases contributions to understanding DNA.

Chapter 16 The Molecular Basis of Inheritance

- The proteins/enzymes involved in DNA transcription and translation
- DNA is the genetic material

Chapter 17 Gene Expression: From Gene to Protein

- Rules of base pairing and coding via codons.
- Effects of altering gene expression, chemical modification of DNA.
- Protein synthesis: the parts that play a role and their function.
- mRNA, tRNA and ribosomes: initiation, transcription and termination
- Mutations; their types and effects

Chapter 18 Regulation of Gene Expression

- What are operons?
- Repressible and Inducible operons and Positive Gene Regulation
- Stages of gene regulation

Chapter 20 DNA Tools and Biotechnology

- Understand roles of plasmids and how they are used in research
- What is PCR and why is it useful?
- What are the effects of gene expression?
- What are stems cells and why are they important in research?

Chapter 23 The Evolution of Populations

- Principles of Natural election and how it works.
- The role of genetic variation
- The Hardy Weinberg Equation, what it is and how it works.
- Principles of gene flow and natural selection.

Chapter 26 Phylogeny and the Tree of Life

- What is phylogeny?
- What are classification systems and how do they relate to phylogeny?
- Principles in generating a phylogenetic tree.