

AP BIOLOGY

Midterm Study Guide

Chapter 2: The Chemical Basis of Life

- water's structure and properties
- pH p. 27

Chapter 3: The Molecules of Cells

- carbohydrates, **lipids**, **proteins**, nucleic acids
 - o structure and function of each (basic)
 - o Proteins as **enzymes**
 - o See page 48 – the table for Classes of Macromolecules

Chapter 8: Cellular Basis for Reproduction and Inheritance

- Prokaryotic cell division – binary fission
- Chromosome structure
- Cell Cycle p. 129
 - o Interphase and cell division
 - o Differences between plants animals
 - o Check points
 - o Cancer
- Meiosis p. 138-139
- Sex chromosomes/autosomes
- Diploid /Haploid
- Variations in offspring – orientation of homologous pairs, crossing-over, mutations
- Karyotyping/chromosomal disorders/non-disjunction
- Types of mutations

Chapter 9: Patterns of Inheritance

- dominant/recessive/homozygous/heterozygous
- phenotypes and genotypes
- law of independent assortment/law of segregation
- single gene mutations
- incomplete dominance (blending of parental traits)
- multiple alleles/codominance – blood typing
- pleiotropy: one gene effects many traits
- polygenic: many genes effect one trait

- genes on the same chromosome tend to be inherited together
- sex-linked genes

Chapter 10: Molecular Biology of the Gene

- Structure of DNA pp. 184-187
- DNA replication
- Transcription and translation p. 198
- Mutation
- Viruses/retroviruses
- Bacterial transformation

Chapter 11: The Control of Gene Expression

- Gene expression p.217
- Differentiation
- DNA packing
- Cloning
- Direction of development/homeoboxes
- Cancer

Chapter 12: DNA Technology and Genomics

- Plasmids/Recombinant DNA technology
- Gene cloning/restriction enzymes/genomic libraries
- Reverse transcriptase
- Using Recombinant Cells to produce products/Treat disease/vaccines
- DNA fingerprinting/electrophoresis/RFLPs
- PCR – copying of small amounts of DNA for analysis
- Transgenic organisms – risks and benefits

Chapter 4: Tour of the Cell

- Prokaryotes and Eukaryotes
- Diagrams p. 56 and 57

- Complexity of eukaryotic cells – structure and function of organelles: create another chart listing the different structures and their functions then compare plant to animal – note the differences
 - Mitochondria and chloroplast – relates to ch. 6 and 7
 - Think about what organelles would be present in more numbers in certain types of cells
 - Muscle cell: needs to lengthen and contract →
 - _____
 - Pancreatic cell: secretes insulin, a protein →
 - _____

Chapter 5: The Working Cell

- p. 76-77 Enzymes
 - Cell Membrane and transportation
 - Passive transport – concentration gradient
 - Osmosis
 - Facilitated Diffusion
 - **Tonicity/osmotic pressure/osmoregulation p.83 figure 5.17**
 - **Isotonic**
 - **Hypertonic**
 - **Hypotonic**
 - Active Transport
 - Exo and Endocytosis
- LOOK FOR EXAMPLES OF EACH

Chapter 6: How Cells Harvest Chemical Energy

- **Cellular Respiration overview** and diagram p. 93
- Focus on reactants, products and destination (within organelle/cell/organisms) of these products
- Use the other more detailed diagrams to help you understand and explain
- **Fermentation p.101**

Chapter 7: Photosynthesis

- p.109 leaf structure
- chemical equation for photosynthesis
 - $6 \text{ CO}_2 + 12 \text{ H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ H}_2\text{O} + 6 \text{ O}_2$

- note where each atom in the reactants ends up in the products
 - redox reaction
- Overview p.111 and p.117
 - Light reactions/pigments/wavelengths
 - Dark reactions – The Calvin Cycle
 - Again, focus on reactants, products and destinations