**Study Guide - CP Biology Spring Final Exam**

The final will be a comprehensive exam, covering all the information we have studied since the beginning of the semester. You will need to use your notes, homework, quizzes, labs, and textbook to review the material. The focus on this test will be applying your knowledge. It is not enough just to memorize vocabulary; you need to understand the concepts and how they apply in different situations. Use this study guide to take notes and direct your review time. The study guide is due on the last class period before your final exam and will be your last official homework assignment for a grade. The final exam will be CLOSED NOTE/BOOK, only your brain will be allowed so be sure to study hard!

**Topics and Chapters**

Unit 1: Genetics – Chapter Chapters 6.3-6.5, 7, 8, 9
Unit 2: Ecology – Chapter 13.1–13.6, 14.1-14.5,
Unit 3: Evolution – Chapter 10.1-10.4, 11.1-11.3, 11.5-11.6,
Unit 4: Anatomy – Chapter 28.1-28.3, 29.1-29.5, 31.1-31.3, 31.5-31.6

**Unit 1 – Genetics/DNA**

**Vocabulary -** genotype, phenotype, allele, gene, homozygous, heterozygous, nucleotides, ribosome, tRNA, mRNA, rRNA, DNA polymerase, codon, anti-codon, carrier, epistatic gene

- ⇒ Practice reading and interpreting pedigrees for both sex-linked and autosomal genes
- ⇒ Describe how sex linked traits are inherited and why they are observed more in males (review Thomas Morgan's experiment)
- ⇒ How are blood types inherited? Describe the genotypes and phenotypes for each blood type and be able to determine probabilities.
- ⇒ Define homozygous and heterozygous
- ⇒ Explain the difference between dominant alleles and recessive alleles
- ⇒ Be able to determine probabilities for monohybrid crosses and convert into actual numbers of offspring.
- ⇒ What happens in meiosis that creates genetic variations (think about changes in chromosomes)
- ⇒ What are some ways DNA/genes can be affected by the environment? What are factors that affect gene expression?
- ⇒ Describe the process of crossing over. When and where does it occur? How does the process relate the Mendel's law of independent assortment
- ⇒ Explain the central dogma
- ⇒ Describe the structure of the DNA molecule
- ⇒ Explain the process of DNA replication and where it occurs in the cell
- ⇒ What is the base pairing rule and how do nucleotides in DNA pair up. How is it different in RNA?
- ⇒ Describe the difference between DNA and RNA
- ⇒ Explain the function of each stage of protein synthesis (transcription and translation)
- ⇒ Explain the function of stop codons and start codons
- ⇒ Identify and describe the molecules involved in translation.
- ⇒ In what part of the cell and how often does transcription occur? What molecules are in involved

**Unit 2 - Ecology**

- ⇒ Explain the difference between abiotic and biotic factors. Identify them in an ecosystem and how they are important
- ⇒ Know the types of symbiosis, examples, and effects on the ecosystem
  - o Commensalism
  - o Parasitism
  - o Mutualism
- ⇒ Analyze the types of succession that occur in environments, explain when and why each occurs
  - o Primary succession
  - o Secondary succession
  - o Pioneer species
  - o Climax community

⇒ Define and understand
  - Habitat vs. niche vs. ecosystem
  - Population vs. community
  - Species and Keystone species
  - Carrying capacity
  - Herbivore, carnivore, omnivore
  - Interspecific vs. intraspecific competition
  - Heterotroph vs. autotroph
  - Emigration vs. immigration

⇒ Evaluate the relationship between predator and prey
⇒ Explain the different trophic levels and types of organisms found in each
⇒ Explain the difference between and food web and a food chain
⇒ Describe an energy pyramid, a pyramid of numbers, and what they illustrate about ecosystems
⇒ Explain the nitrogen cycle and the role of bacteria, the steps of the hydrologic cycle, and the carbon cycle

### Unit 3 – Evolution

**Vocabulary:** adaptation, speciation, variation, gene pool, selection, vestigial structure, mutation

⇒ Explain and apply the concept of natural selection and survival of the fittest
⇒ Explain the concept of artificial selection and provide examples
⇒ Identify and describe the 3 types of selection that occur
⇒ Identify the main concepts included in Darwin's theory of evolution as compared to LaMarck's ideas.
⇒ What was the significance of Darwin's observations regarding finches and tortoises on the Galapagos?
⇒ Explain the idea of 'survival of the fittest'.
⇒ Describe the difference in gradualism and punctuated equilibrium
⇒ Explain how geographic isolation leads to reproductive isolation and speciation (define all of those terms)
⇒ Understand the importance of variation in populations and how variation occurs genetically
⇒ Evaluate how the fossil record, homologous structures, vestigial structures and DNA sequences (molecular evidence) provide evidence for evolution – know examples of all

### Unit 4 – Anatomy

**Vocabulary –** synapse, dendrite, axon, antigen, pathogen, vector

⇒ Describe the divisions of the nervous system and the functions of each
⇒ Which systems control voluntary vs. in voluntary motions (division of nervous system)
⇒ Know the structure of a neuron (identify all parts and their jobs)
⇒ Identify the 3 types of neurons and the function of each
⇒ Describe the process of a reflex arc
⇒ Know the lines of defense of the immune system (skin, membranes, blood)
⇒ Describe cellular and humoral immunity
⇒ Know the role of the following in the immune response and types of white blood cells: phagocytes, memory cells, B cells, T cells, antigens, antibodies, interferons
⇒ Compare and contrast passive and active immunity
⇒ Understand how vaccines and antibiotics work