**Exam 1 Study Guide**

Chapter 18

**Evolution**

What is evolution?

How do populations evolve? (remember, individuals do not evolve)

**Natural Selection**

What is the role of Natural Selection in evolution?

How does natural selection work?

What is required for natural selection to work?

What is an adaptation?

**Scientists**

Lamarckian evolution compared to Darwin/Wallace’s view of evolution

What observations did Darwin/Wallace make?

**Effect of Evolution**

How do mutations and sexual reproduction impact genetic diversity?

Convergent evolution vs divergent evolution

**Evidence of Evolution**

Fossil record, anatomy, embryology, biogeography, molecular biology

**What is a species?**

Ecological levels

Definition of species

Allopatric vs sympatric speciation

Gene flow and speciation

Adaptive radiation

**Reproductive isolation**

pre-zygotic

 temporal, habitat, behavior, mechanical

post-zygotic

 zygote inviable, hybrid offspring infertile

**Species Reconnection**

Hybrid zone

 Reinforcement, stabilization, fusion

**Rates of Speciation**

Punctuated equilibrium versus gradual speciation

Chapter 19

**Genetic info from Bio I**

 Gene, allele, phenotype, genotype, diploid, haploid

**Population Genetics**

Microevolution versus macroevolution

Allele frequency, genotype frequency

Hardy-Weinberg Equilibrium

p+q=1 where p is the dominant allele frequency and q is the recessive allele frequency

genotype frequency, p2 = homozygous dominant genotype, q2 = homozygous recessive genotype, 2pq = heterozygous genotype

p2 + q2 + 2pq = 1

Hardy-Weinberg Assumptions

 No genetic drift (large population)

 No mutation

 Random mating

 No natural selection

 No gene flow

**Adaptive Evolution**

Selects for beneficial traits and against deleterious traits

Relative Fitness

Stabilizing selection, directional selection, diversifying selection, sexual selection

 Handicap principle, good genes theory

Chapter 20

**Taxonomic levels**

 Inclusivity versus relatedness

Binomial naming system

**Phylogenetic Trees**

Rooted

Branch point (node)

Sister taxa

Basal taxon (outgroup)

Extinct vs. extant

Novel traits and how they impact phylogeny

Rotation around nodes

Changing order of branches

**Homologous versus Analogous structures/DNA**

 How are they related to ancestors, to other species

 DNA homologies

**Character traits**

Shared derived (synapomorphy)

Shared ancestral (plesiomorphy)

Novel derived (autapomorphy)

**Types of trees**

Monophyletic

Polyphyletic

Paraphyletic

Maximum Parsimony