Focus Questions
Evolution
Chapters 22-34
AP Biology

Chapter 22
- Describe some of the observations Darwin made during his trip on the H.M.S. Beagle. (22.2)
- What were Darwin's two key observations and two key inferences? Explain them. (22.2)
- Differentiate between natural and artificial selection and provide examples of each. (22.2)
- What are two ways evolution can be observed directly? (22.3)
- How does homology support the ideas of evolution? (22.3)
- What information does an evolutionary tree provide? (22.3)
- How can the fossil record support the ideas of evolution? (22.3)

Chapter 23
- What is genetic variation? Explain how this variation can be present within a population. Explain how this variation can be present between populations. (23.1)
- Explain the four main sources of genetic variation. (23.1)
- List and describe the conditions that must be met for a population to be in Hardy-Weinberg Equilibrium. (23.2)
- Describe the three ways populations will no longer be in Hardy-Weinberg Equilibrium (ways allele frequencies can be altered). (23.3)
- Identify and explain the different types of genetic drift. (23.3)
- Explain the issue with genetic drift in the Greater Prairie Chicken. (23.3)
- Describe the effect of genetic drift. (23.3)
- What is gene flow and provide an example. (23.3)
- Explain why "survival of the fittest" is a misleading phrase. (23.4)
- Describe the three modes of selection. (23.4)
- Explain the different types of sexual selection. (23.4)
- Explain heterozygote advantage using sickle-cell disease as an example. (23.4)
- Explain why natural selection will not result in a "perfect organism." (23.4)

Chapter 24
- What is reproductive isolation? What can cause it? (24.1)
- List and explain the different types of prezygotic and postzygotic barriors and provide examples of each. (24.1)
- What are the four different definitions of a species? How do they differ? (24.1)
- Explain the difference between allopatric and sympatric speciation. Provide examples of each. (24.2)
- Explain the three different possible outcomes of hybrid zones. (24.3)
- Explain the difference between punctuated equilibrium and gradualism. (24.4)

Chapter 25
- Explain the processes involved leading up to the appearance of the cell in order. (What was the step-by-step progression that lead to cells.) (25.1)
- Explain how the fossil record is used to document the history of life including how items are dated. (25.2)
- What were the first single-celled organisms? How did these organisms impact their environment? (25.3)
- Explain how eukaryotic organisms evolved from prokaryotic organisms. (25.3)
- What were the first multicellular eukaryotes? What was the Cambrian Explosion? (25.3)
- What factors were necessary for organisms to begin to colonize land? (25.3)
- What were the "Big Five" mass extinction events? When did they occur? Why do many believe we are currently in the midst of a mass extinction event? (25.4)
- What are the positive and negative consequences of mass extinctions? How does this relate to adaptive radiation? (25.4)
- How can changes in body form arise? Be sure to discuss heterochrony, paedomorphosis, homeotic genes, changes in genes, and changes in gene regulation. (25.5)

Chapter 26
- How are species formally (scientifically) named and classified? (26.1)
- What can we learn and what can we not learn from a phylogenetic tree? (26.1)
- How is molecular data used to evaluate a phylogenetic tree? (26.2)
- What information must be obtained to develop a phylogenetic tree? (26.3)
- How do maximum parsimony and maximum likelihood relate to the development and testing of phylogenetic trees? (26.3)
- Why is a phylogenetic tree considered a hypothesis? (26.3)
- How has new information provided us a new outlook the tree of life? Provide specific examples. (26.6)

Chapter 27
- What adaptations have prokaryotic organisms gone through that have made them so successful for so long? (27.1)
- Explain the difference between gram-positive and gram-negative bacteria. How are they differentiated in a lab? (27.1)
- How is genetic variation increased in prokaryotes? (27.2)

Key Terms

Chapter 22

adaptations
analogous
artificial selection
biogeography
catastrophism
convergent evolution
endemic
evolution
evolutionary tree
homologous structures
homology
natural selection
paleontology
Pangaea
strata
uniformitarianism
vestigial structure

Chapter 23

average heterozygosity
balancing selection
bottleneck effect
directional selection
disruptive selection
fitness
founder effect
gene flow
gene pool
genetic drift
genetic variation
geographic variation
Hardy-Weinberg equilibrium
heterozygote advantage
intersexual selection
intrasexual selection
microevolution
neutral variation
population
relative fitness
sexual dimorphism
sexual selection
stabilizing selection

Chapter 24

allopatric speciation
allopolyploid
autopolyploid
biological species concept
ecological species concept
hybrid zone
hybrids
macroevolution
microevolution
morphological species concept
paleontological species concept
phylogenetic species concept
polyploidy
postzygotic barrier
prezygotic barrier
punctuated equilibrium
reinforcement
reproductive isolation
speciation
sympatric speciation

Chapter 25

adaptive radiation
Cambrian explosion
endosymbiont theory
geologic record
half-life
homeotic genes
mass extinction
plate tectonics
protocells
radiometric dating
serial endosymbiosis
stromatolites

Chapter 26

analogy
branch points
clade
cladistics
cladogram
domain
horizontal gene transfer
ingroup
kingdom
molecular clock
molecular systematics
monophyletic
outgroup
paraphyletic
phylogenetic tree
phylogeny
polyphyletic
shared ancestral character
shared derived character
systematics
taxon
taxonomy

Chapter 27

anaerobic respiration
biofilm
chemoautotroph
chemoheterotroph
commensalism
conjugation
decomposer
endotoxin
exotoxin
extreme halophile
extreme thermophile
extremophile
facultative anaerobe
gram-negative
gram-positive
host
methanogen
mutualism
nitrogen fixation
obligate aerobe
obligate anaerobe
parasitism
pathogen
peptidoglycan
photoautotroph
photoheterotroph
pilus
plasmid
symbiosis
taxis
transduction
transformation