Evolution II (8%)

I. Classification
   a. 5 Kingdoms
      i. Prokaryotae
         1. Singlecellular
         2. Prokaryotes
         3. Autotrophs/ Heterotrophs
         4. No nuclei
      ii. Protists
         1. Singlecellular/ Collonial
         2. Eukaryotes
         3. Autotrophs/ Heterotrophs
      iii. Fungi
         1. Singlecellular/ Multicellular
         2. Eukaryotes
         3. Heterotrophs
         4. Cell walls: Chitin
      iv. Plants
         1. Multicellular
         2. Eukaryotes
         3. Autotrophs
            a. Chloroplasts
         4. Cell walls: Cellulose
      v. Animalia
         1. Multicellular
         2. Eukaryotes
         3. Heterotrophs
         4. No cell walls
   vi. Further Classification
      1. Kingdom
      2. Phylum
      3. Class
      4. Order
      5. Family
      6. Genus
      7. Species
         (Kids Playing Chess On Freeway Get Squashed)
   vii. Binomial Nomenclature
1. Genus + Species
   a. i.e. Homo Sapien

b. 3 Domains
   i. Bacteria
      1. Prokaryotes
         a. Prokaryotae
   ii. Archaea
      1. Prokaryotes
         a. Prokaryotae
      2. Live in harsh environments
      3. Lipids are different
   iii. Eukarya
      1. Eukaryotes
         a. Protists
         b. Fungi
         c. Plants
         d. Animals

II. Phylogeny
   a. Relationship between organisms
      i. X Axis: Evolutionary Change
      ii. Y Axis: Time
   b. Types
      i. Monophyletic: Organisms that have a single common ancestor
      ii. Polyphyletic: Organisms that may have a common ancestor, yet group does not include the common ancestor
   c. Examples
      i. Punctuated Equilibrium: Lot of change over short amount of time
      ii. Gradualism: Gradual change over time

III. Relationships Between Organisms
   a. Parasitism: Good for one, bad for another
   b. Commensalism: Good for one, nothing for another
   c. Mutualism: Good for both
      i. i.e.
         1. Myccorhiza (+ Plant)
            a. Fungi that grow on the root of a plant
b. Fungi (heterotroph) absorb minerals from soil to give to plant
c. Plant (autotroph) gives organic nutrients to fungi

2. Lichen (+Cyanobacteria) or (+ Green Algae)
a. Fungi that grows on the bacteria or algae
b. Fungi (heterotroph) absorb minerals from soil to give to plant
c. Plant (autotroph) gives organic nutrients to fungi

IV. Fungal Genetics
a. Asexual reproduction
   i. Asexual spores
      1. On top of aerial hyphae

V. Bacterial Genetics
a. Asexual reproduction
   i. Bacteria exchange DNA
   ii. Types
      1. Transduction (1 bacterium)
         a. Bacteriophage injects virus into bacterium
         b. DNA inserted into chromosome of bacterium
         c. New genes in bacterium
         d. Result: Genetically different bacterium
      2. Transformation (1 bacterium)
         a. External DNA from broken cells enters bacterium
            i. i.e. Plasmid DNA
         b. Result: Genetically different bacterium
      3. Conjugation (2 bacteria)
         a. Bacteria come together
         b. Protein strand forms between bacteria: Protein Pilus
         c. Bacteria send genetic information between one another
         d. Result: Genetically different bacteria
VI. Random Information
   a. Saprobes
      i. Feed on dead or decaying matter