

- Chimps and human-sister groups
- Gorillas-sister to chimps and humans
- Clade-common ancestor and all of its descendants
 - Also called monophyletic
 - If you can cut off everything to the right with one cut then it's monophyletic
- Evolution by Natural Selection was proposed by Charles Darwin-1809-1882
 - 1831-1836-Naturalist aboard the HMS beagle
 - In England-collectionist notes from voyage and breeding of new varieties of pigeons and other species
 - "Traits evolve through natural selection"-1859
 - Evolution never appears in early edition of the book
- Natural Selection
 - West new Mexico-white gypsum sand and brown lizards near white sand and desert
 - Loggerhead shrikes-prey on lizards
 - Matching body coloration (crypsis) to habitat evolved under Natural Selection
 - Variation in coloration is partly inherited which is important because it can be passed to the offspring
 - Genotypes-description of genetic basis of an individual-either entirely or specific to a trait
 - Phenotypes-coloration
 - Live to reproduce
 - Lizard coloration has adapted to the white sands environment
 - Match of body coloration to substrate or crypsis
 - Adaptations-inherited traits favored by Natural Selection
- Evolution by Natural Selection:
 - Variation that is genetically based (heritable)
 - Certain genotypes produce more surviving offspring than others
 - Differences in survival among genotypes are due to an agent of selection
- Agent of Selection-loggerheaded shrift
 - Can be-predator, weather, moisture, food quality, bacteria, pathogens
 - Evolutionary process lead to color in the forms we see-NS
 - Selections of colors
 - Potential mates
 - Prey attracted to bright colors
 - Predators to avoid potential toxins
- Humans are agents of artificial selection
 - Dogs, leafy greens
- Kinds of inherited traits on which selection can act
- Discrete traits-controlled by one or two genes, and one form of that gene (allele) is dominant
- Many traits are continuous or quantitative, height, tail length, crop yield, animal behavior

- Quantitative traits are often distributed as a bell curve
- Also called “normal distribution”-height
- Lizard color-discrete trait because no tan color
- 3 forms of Natural selection on normally distributed shape
- Directional Selection-genotypes @ 1 end of distribution do worse than the other (means it will shift to factor good trait) ex-maze running in performance rate done to see if it is based on genetics
- Stabilizing Selections average genotype does best ex-Human birth weight
- Disruptive Selection-genotypes at both ends of distribution do best ex-bill size in African seed cracker

Day 3

- Evolution-change in allele frequency over time in a population of organisms
- Populations-a group of potentially interbreeding individuals of the same species ex-all catfish in a lake
- Allele-form a gene
- Allele frequency-proportion of that allele in a particular population ex-ABO blood type
- Diploid-2 copies of gene
- What can happen with alleles over time-when an allele hit's one it is fixed-only that allele evolution occurs with allele frequency changes
- Natural Selection-variation, genetic, certain genotype has more survivor, difference in reproduction to an agent of selection
- Pepper moth, biston betularia, rest on same callared tree bark, pollution put soot on trees, dark morph appeared in 1840s, watched sooty tree, dark and light have different alleles at a single gene, dark morph increased to >95% in 1950. Agent of selection-insectivorous bird. In the 1950s pollution was reduced so that lichens returned to the trees so dark morphs plummeted
- Human influenced-resistance to antibiotics
 - Evolves-bacteria
 - Agent of selection-antibiotics (toxins in them)
 - Where are the bacteria and antibiotics? -In the body
 - Result-antibiotic resistance
 - Difficult-finish course of antibiotics
 - Other bacteria to displace
- HIV resistance to drugs-public health concern
- 8 million people on antibiotics-retroviral drugs
- Bighorn sheep-big horns=hunted
- Gill nets catch fish of particular size, large size nets select for fish that grow more slowly or small as adults
- Industrial melanin in pepper moths
- Resistant to antibiotics in bacteria
- Evolution of virulence in viruses
- Evolution can occur without NS
- Genetic Drift-random changes in allele frequency from 1 generations to the next