Evolution and Natural Selection

1. Genetic Variation and Evolution
   1. Evolution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      1. Species accumulate difference
      2. Descendants differ from their ancestors
      3. New species arise from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Individuals don’t evolve – populations do
   3. A Brief History of Evolution
      1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ was born on February 12, 1809 in Shrewsbury, England.
      2. From 1831 to 1836 Darwin served as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ aboard the H.M.S. Beagle on a British science expedition around the world.
      3. He observed much \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in related or similar species of plants and animals that were geographically isolated from each other.
      4. These observations were the basis for his ideas.
   4. Evidence of Evolution
      1. STRUCTURAL ADAPTATIONS
         1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
         2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
         3. MILLIONS OF YEARS
      2. PHYSIOLOGICAL ADAPTATIONS
         1. CHANGE IN A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ PROCESS
      3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_
      4. ANATOMY
         1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ STRUCTURES - similar structures that evolved from a common ancestor.
         2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ STRUCTURES - various structures in different species having the same appearance, structure or function but have evolved separately, thus do not share common ancestor
   5. Mechanisms for Evolution
      1. HOW CAN THE GENE POOL CHANGE?
         1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- permanent alteration of the nucleotide sequence of the genome
         2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - the change in the frequency of an allele in a population due to random sampling of organisms
         3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - the transfer of alleles or genes from one population to another
         4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - mating that has not occurred due to chance
         5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - survival and reproduction or elimination of individuals with certain genotypes (genetic compositions), by means of natural or artificial controlling factors.
      2. WOULD THESE THINGS EFFECT A LARGE POPULATION OR A SMALL POPULATION MORE? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   6. Hardy–Weinberg Principle
      1. states that the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ frequencies in a population remain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or are in equilibrium from generation to generation unless specific disturbing influences are introduced.
      2. Those disturbing influences include:
         1. non-random mating
         2. new mutations
         3. selection
         4. random genetic drift
         5. gene flow
   7. Evolution of Species
      1. Based on 3 mechanisms
         1. Sources of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
            1. Genetic diversity thru mutations that are not \_\_\_\_\_\_\_\_\_\_\_\_
            2. Physical or behavioral traits
            3. Sexual reproduction between genetically \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ individuals
         2. Method of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
            1. Reproductive fitness is the method of selection
            2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, escaping from and eluding predators
            3. Finding a good mate
            4. Two Types:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: environmental conditions determine which individuals in a population produce the most offspring

3 conditions for natural selection to occur:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ must exist among individuals in a population

Variation among individuals must result in differences in the number of offspring surviving

Variation must be genetically \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Selection: a breeder selects for desired characteristics

* + - 1. Maintenance of Variation
         1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ selection: depends on how frequently or infrequently a phenotype occurs in a population

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ frequency-dependent selection: rare phenotypes are favored by selection

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ frequency-dependent selection: common phenotypes are favored; variation is eliminated from the population

* + - * 1. Strength of selection changes through time
        2. Example of Negative Frequency-Dependent Selection: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
        3. Example of Positive Frequency-Dependent Selection: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  1. Fitness and Its Measurement
     1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: A phenotype with greater fitness usually increases in frequency
        1. Most fit is given a value of 1
     2. Fitness is a combination of:
        1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: how long does an organism live
        2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: how often it mates
        3. Number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ per mating that survive