

Unit D
"Plantae"
"Animalia"

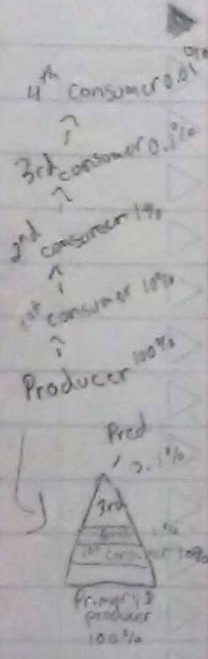
Dumb King Philip Came Over From German Soil
Domain Kingdom Phylum class Order Family Genus species
Derived character = a trait that arose in the most recent common ancestor of a particular lineage and was passed along to its descendants.
Domain - Archea, Bacteria, Eukarya

Genus = a similar group of species Ex. Ursus
Taxa = organization of living things into groups that biological meaning. (Taxonomy)
Cladograms = links groups of organisms by showing how evolutionary lineages or lineages branched off from common ancestor
descendants (1, 2, 3, 4)
JR

Unit E

Species -> Population -> Community -> ecosystem -> biome -> biosphere.
Biosphere consists of all life on earth and all parts of earth in which life exists. (land, water and the atmosphere)

Ecology - The study of how organisms interact with each other and their physical environment
Biotic factors - Any living part of the environment that may interact (Ex. animals, plants, mushrooms, and bacteria)
Abiotic factors - Any non-living part of the environment. Such as sunlight, heat, rain, water current, and soil.
Ecological methods - "O-E-M"



Experiments can be used to test hypotheses. Modeling ecological models consists of mathematical formulas based on data collected through observation and experimentation.
Autotroph = self-feeder - stores energy from sunlight or chemicals. Autotrophs are primary producers meaning the energy they stored used by other organisms.
Photosynthesis = captures light energy and uses it to power chemical reactions that convert carbon dioxide and water into oxygen and other energy rich carbohydrates, (sugars, starches, etc.)
Chemosynthesis = Organisms that can produce food using chemical reactions that do not involve energy from light. Bacteria that live in the deep sea.
Heterotroph = must acquire energy from other organisms by eating them. Organisms that rely on other organisms for energy and nutrients are called "consumers".
The different types of consumers are Carnivores, herbivore, scavengers, omnivores, decomposers, detritivores.

Energy flows through an ecosystem in a one-way stream from primary producers to various consumers.
Food chain is a series of steps in which organisms transfer energy by eating and being eaten.
Food web: more accurate and more complex depiction of energy than a food chain.
Decomposers and detritivores are as important in most food webs as other consumers are. Without decomposers nutrients would remain locked within dead organisms.

each step in a food chain or food web is called a "Trophic Level".
Ecological pyramids show the relative amount of energy or matter contained within each trophic level - in a given food chain or food web. There are three pyramids of energy, of biomass, of numbers.
P. of energy shows the relative amount of energy at each trophic level. P. of biomass illustrates the relative amount of living organic matter at each trophic level in an ecosystem.
P. of #s shows the relative number of individual organisms at each trophic level in an ecosystem.

Types of cycles "water cycle" = evaporate = transpiration = condensation = precipitation = runoff
Nutrient cycles: Carbon, Nitrogen, and Phosphorus. Phosphorus is needed for living to form DNA/RNA. It does not enter the atmosphere (Doesn't get recycled). Primary productivity = the rate which producers create organic matter. Controls primary productivity = fertilizer, Micronutrients = Potassium, Phosphorus, Nitrogen.

Bio mass is the total amount of living tissue within a given level

Unit E

Charles Darwin is a scientist who developed the modern theory of evolution and proposed the principle of natural selection.

Darwin developed a scientific theory of biological evolution - explanation of how modern evolved over time through descent from common ancestor. Three patterns of biological diversity.
1) Species vary globally 2) Species vary locally 3) Species vary over time.

Charles Lyell is a geologist who suggested the earth was as much as 240 million years old and provided the first detailed description of the tertiary period. Tertiary period = mass extinction that ended the dinosaurs.

Lamarck's Theory: 19th century theory that stated that acquired characteristics can be inherited resulting in permanent change in populations.

Traits altered by an individual organism during its life are called "acquired characteristics".
Thomas Malthus reasoned if the human population grew unchecked, there wouldn't be enough living space and food for everyone.

Natural Selection: The process of survival and reproduction of better genotypes. Better adapted individuals are more likely to survive and reproduce than those who are less adapted.
Artificial Selection: People choose the desirable characteristics of animals or plants to breed down to the offspring. can be also called selective breeding.

Adaptation: is any heritable characteristic that increases an organism's ability to survive and reproduce in its environment.
Fitness: How well an organism can survive and reproduce in its environment.

Survival of the fittest: is difference in rates of survival and reproduction.

Survival meaning stay alive.
Descent with modification - All living species are descended, with modification from common ancestors.

Doesn't make organisms perfect just good enough to pass genes down.

"Struggle for existence"

Genetic drift: random changes in the frequency of alleles from gen to gen, in small populations can lead to the elimination of a particular allele by chance.

Bottleneck effect: A change in allele frequency following a dramatic reduction in size of a population, severely reduces a population's gene diversity.

Founder effect: A situation in which allele frequencies change as a result of the migration of a small subgroup of a population.

Hardy-Weinberg Principle: Allele frequencies in a population should remain constant if things can't disturb g-eq. equilibrium and cause evolution.

Genetic Equilibrium: If a population is not evolving, allele frequencies in its gene pool do not change.

- 1. Non-random mating
- 2. Small pop size
- 3. Immigration
- 4. Emigration
- 5. Mutations
- 6. Natural selection

Tree of life: implies all organisms are related. The Principle of common descent, all species - living and extinct are descended from ancient common ancestors.

Closely related but different or distantly related but similar?

Biogeography: The study of where organisms live now and where they and their ancestors lived in the past.

Fossils: The remains or traces of prehistoric life preserved in rocks of the earth's crust.

Many discovered fossils form series that trace the evolution of modern species from extinct ancestors.

Embryology: The scientific study of embryos and their development.

Homologous structure: structures that are shared by related species and that have been inherited from a common ancestor.

Analogous structure: Body parts that share common function but not structure. Ex. wings of a bee and wings of a bird.

Vestigial structure: inherited from ancestors but have lost much or all of their original function due to different selection pressures acting on the descendants.

All living cells use information coded in DNA and RNA to carry out info from one gen to the next and to direct protein synthesis. All genetic code is nearly identical in almost all organisms. (bacteria - yeasts, plants, fungi, and animals.)

Hox genes role is to specify positional identity in the embryo.



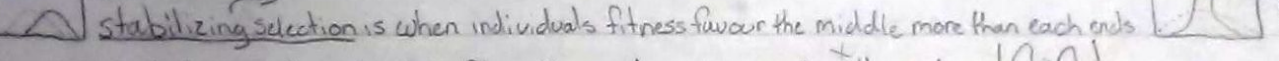
Evaluating Evolutionary Theory. Advances have been made in the fields of biology to confirm and expand on most of Darwin's hypotheses.

Gene Pool: consists of all genes including all different alleles for each gene in a population.

Allele frequency: the # of times an allele occurs in a gene pool compared to the total # of alleles in that gene pool for the same gene.

Single-gene trait: a trait controlled by one gene. Polygenic Traits: are controlled by two or more genes.

Directional selection are when individuals at one have higher fitness than the middle or other end.



Stabilizing selection is when individuals fitness favour the middle more than each ends.

Disruptive selection is when individuals fitness favours the ends more than the middle.

Speciation: The formation of a new species. 3 types of isolation = Behavioral, Geographic, Temporal.

Law of Segregation: When gametes form, alleles are separated so that each gamete carries only one allele for each gene.

Law of Independent Assortment: The segregation of alleles for one gene occurs independently to that of any other gene.

Principle of Dominance: Recessive alleles will be masked by dominant alleles.

Incomplete dominance: where one allele is not completely dominant over another. "Blending"

Codominance: Both phenotypes produced by both alleles are clearly expressed. "cooperate"

Diploid cells: organisms with two complete set of inherited chromosomes and set of genes.

Haploid cells: cells only containing one set chromosomes and set of genes.

meiosis: The process of cell division leading to the production of daughter nuclei with half the genetic complement of the parent cell.

Mitosis: The division of the cell nucleus and nuclear material of a cell. 4 stages "PMAT"

Eukaryotes: Organisms that have a well-defined nucleus to house and protect the DNA.

Prokaryotes: organisms whose cells lack a nucleus and therefore have DNA floating loosely in the liquid center of the cell.

weather: day to day condition of Earth's atmosphere. Climate: A region's climate is defined by year-to-year patterns of temperature and precipitation.

Greenhouse effect: Greenhouse gases in the atmosphere allow solar radiation to enter the biosphere but slow down the loss of reradiated heat to space. (Gases = Carbon dioxide, methane, water vapor): Kind of a warm blanket.

Habitat: the place where an organism lives. An "address". Niche: What an organism does in its habitat. (Resources, Physical, and Biological) are all aspects of a niche. Competition: can occur in members of the same species (Intraspecific comp) between members of different species (Interspecific comp)

Symbiosis: live together 3 types: Mutualism: Both organisms benefit. Parasitism: Harms/feeds off the host generally doesn't kill it right away. Commensalism: a relationship where one organism benefits and the other isn't harmed or helped.

Genetic Variation Sources: Mutations, Recombination in sexual reproduction, Lateral gene transfer

Climate Zones, Ocean currents, Wind, Latitude Geography