Things you have to learn as it’s written below, or you will end up regretting it!

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| define the term clade | a group of organisms that consists of a common ancestor and all its lineal descendants |
| define ecological niche | the role and space that an organism fills in an ecosystem, including all its interactions with the biotic and abiotic factors of its environment |
| define keystone species | a plant or animal that plays a unique and crucial role in the way an ecosystem functions |
| define the term carrying capacity | the size of the population that can be supported indefinitely on the available resources and services of that ecosystem |
| define the term genome | all the genetic material in the chromosomes of an organism, including its genes and DNA sequences |
| define the term gene | region/s of DNA that are made up of nucleotides; the molecular unit of heredity |
| define polygenic inheritance | when one characteristic is controlled by two or more genes |
| define evolution | change in the genetic composition of a population during successive generations, which may result in the development of new species |
| define microevolution | small-scale variation of allele frequencies within a species or population, in which the descendant is of the same taxonomic group as the ancestor |
| define macroevolution | the variation of allele frequencies at or above the level of species over geological time, resulting in the divergence of taxonomic groups, in which the descendant is in a different taxonomic group to the ancestor |
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| identify one example of an interspecific hybrid that does not produce fertile offspring | Mule |
| identify the features of pioneer species | ability to fixate nitrogen, tolerance to extreme conditions, rapid germination of seeds, ability to photosynthesise |
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| describe the process of making recombinant DNA | isolation of DNA  cutting of DNA (restriction enzymes)  insertion of DNA fragment (plasmid vector)­  joining of DNA (DNA ligase)­  amplification of recombinant DNA (bacterial transformation) |
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| recall that common assumptions of cladistics | a common ancestry, bifurcation and physical change |
| recall the structure of DNA | nucleotide composition of deoxyribose sugar, phosphate and nitrogenous base.  Complementary base pairing­ by weak, base-specific hydrogen bonds between DNA strand.  Adenine = Thymine  Cytosine Ξ Guanine |
| recall an example of a transcription factor gene that regulates morphology | HOX transcription factor family |
| recall an example of a transcription factor gene that regulates cell differentiation | Sex-determining region Y |
| recall how speciation and macroevolutionary changes occur | from an accumulation of microevolutionary changes over time. |
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| biodiversity includes the diversity of species and ecosystems | |
| biological classification can be hierarchical and based on different levels of similarity of physical features, methods of reproduction and molecular sequences | |
| conserved sequences (e.g. mitochondrial DNA) are assumed to accumulate mutations at a constant rate over time and, therefore, provide a method for dating divergence. | |
| many functions of ‘noncoding’ DNA are yet to be determined | |
| the purpose of gene expression is to synthesise a functional gene product (protein or functional RNA); that the process can be regulated and is used by all known life | |
| differential gene expression, controlled by transcription factors, regulates cell differentiation for tissue formation and morphology | |
| the application of DNA sequencing is to map species’ genomes | |
| the application of DNA profiling is to identify unique genetic information | |
| evolutionary radiation refers to an increase in taxonomic diversity or morphological disparity | |
| natural selection occurs when the pressures of environmental selection confer a selective advantage on a specific phenotype to enhance its survival (viability) and reproduction (fecundity) | |
| mutation is the ultimate source of genetic variation, as it introduces new alleles to a population | |
| a large number of chemical mutagens are carcinogenic and interact directly with DNA | |
| In eukaryotic cells, DNA is a double-stranded molecule that occurs bound to proteins (histones) in chromosomes in the nucleus and as circular DNA in the mitochondria and chloroplasts   * Is contained within a nucleus * Is bound to histone proteins * Genomes contain large amounts of non-coding and repetitive DNA (including introns) * Do not contain plasmids (but organelles such as the mitochondria may contain their own chromosomes) * Are linear in shape | |
| In prokaryotic cells, DNA is present as unbound circular DNA in the cytosol of prokaryotes   * Is found freely in the cytoplasm (within a region called the nucleoid) * Is naked (i.e. not bound with proteins and therefore doesn’t form chromatin) * Genomes are compact (contain little repetitive DNA and no introns) * Contains extra-chromosomal plasmids * Is circular in shape | |
| the Linnaean system does not rely solely on physical features for classification | |
| Gross inputs of respiration are oxygen and glucose | |
| Gross outputs of respiration are carbon dioxide and water and ATP | |
| Gross inputs of photosynthesis are carbon dioxide and water | |
| Gross outputs of photosynthesis are oxygen and glucose | |
| Examples of biotic limiting factors of population growth are competition for resources, predation and disease | |
| Examples of abiotic limiting factors of population growth are space, availability of nutrients, pollution, natural disasters, extreme climatic events (drought, cyclones, global temperature  change). | |
| Lincoln Index :  *Where:*  *M = number of individuals caught, marked and released initially*  *n = number of individuals caught on second sampling*  *m = number of individuals recaptured that were marked* | |
| Symbiosis is any type of a close and long-term interaction between two different organisms | |
| the competitive exclusion principle states that two species that compete for the exact same resources in the same niche cannot stably coexist. | |
| A keystone species has a disproportionately large effect on its ecosystem relative to its abundance. They can be described as playing an important role in maintaining the structure the community. Such species help to maintain local biodiversity within a community either by controlling populations of other species that would otherwise dominate the community or by providing critical resources for a wide range of species. | |
| Primary succession occurs in an area without any initial vegetation (bare rock). | |
| Secondary succession occurs in an area with initial vegetation (soil already exists). | |
| Helicase unwinds the DNA double helix and separates the strands by breaking the hydrogen bonds between the two complementary strands. Creates a replication fork region so the bases are exposed. | |
| DNA polymerase forms new complementary strands using each original strand as a template to produce a copy. It adds complementary nucleotides to the exposed bases and also proofreads the strand.The direction of replication is 5’ to 3’. | |
| Genotype refers to the combination of alleles that an organism has. | |
| Microevolutionary changes can occur through mutation, gene flow and genetic drift. | |
| Divergent evolution is the process whereby groups from the same common ancestor evolve and accumulate differences, resulting in the formation of new species.  Adaptive radiation is a type of divergent evolution where there is rapid diversification of an ancestral population into several ecologically different species. | |
| Convergent evolution is the independent evolution of similar features in species of different periods in time. | |
| Parallel evolution is the similar development of a trait in distinct species that are not closely related, but share a similar original trait in response to similar evolutionary pressure. | |
| Coevolution is the influence of closely associated species on each other in their evolution. | |
| Allopatric speciation is when two populations of the same species become isolated from each other due to geographic changes, finally becoming different species. | |
| Sympatric speciation is when two groups of the same species live in the same geographic location, but they evolve differently until they can no longer interbreed and are considered different species. | |
| Parapatric speciation is when the populations that are diverging maintain a zone of contact and do not cease the exchange of genes completely. The species are spatially separated, but still exchange migrants. Nothing is stopping individuals from mixing and mating, but it doesn’t happen. The lower fitness of hybrids drives increased differentiation, eventually resulting in premating isolation. | |
| Without genetic variation, a population cannot evolve in response to changing environmental variables and, as a result, may face an increased risk of extinction. | |
| Island populations are typically small and isolated, and as a result, inbreeding and reduced genetic diversity elevate their extinctionrisk. | |
| Simpson’s Diversity Index :    *∑ = sum of*  *n = number of individuals*  *N = total number of individuals* | |
| The process of stratified sampling   * 1. purpose (estimating population, density, distribution, environmental gradients and profiles, zonation, stratification)­ * 2. site selection­ * 3. choice of ecological surveying technique (quadrats, transects) * 4. minimising bias (size and number of samples, random-number generators, counting criteria, calibrating equipment and noting associated precision)­ * 5. methods of data presentation * 6. analysis | |
| An exponential growth pattern (J curve) occurs in an ideal, unlimited environment. Tends to be seen in populations that are very small or in regions that are newly colonised by a species | |
| A logistic growth pattern (S curve) occurs when environmental pressures slow the rate of growth. Will eventually be seen in any stable population occupying a fixed geographic space | |