Unit 4 Definitions

Absolute dating
A technique used to determine the actual age of a fossil.

Adaptation
Inherited characteristic that increases an organism's chance of survival in a particular environment.

Adaptive radiation
Another term for divergent evolution.
Process by which a single species or small group of species evolves into several different forms that live in different ways; rapid growth in the diversity of a population.

Allele
One alternate forms of a gene that can have the same locus on homologous chromosomes and are responsible for variation in genes.

Allele frequency
The relative proportion of a specific allele within a population.

Allopatric speciation
The formation of a new species as a result of an ancestral population's becoming isolated by a geographic barrier.
Two closely related species that are geographically isolated from each other.

Analogous structure
Structures that do not have a common evolutionary origin but are similar in function.

Aneuploidy
An abnormality involving a chromosome number that is not an exact multiple of the haploid number (one chromosome set is incomplete).

Animalia
Heterotrophic organisms with no cell wall.

Anticodon
A group of three bases on a tRNA molecule that are complementary to an mRNA codon.

Artificial selection
The selective breeding, by humans, of domesticated plants and animals to encourage the occurrence of desirable traits.

Artificial selection
Selective breeding of domesticated plants and animals to produce offspring with desired genetic traits.

Australopithecus
Extinct genus of African hominid.

Autosome
Any chromosome that is not a sex chromosome.

Behavioural variation
Variation in the way organisms behave. E.g. Behavioural patterns of dogs.

Binary fission
A form of asexual reproduction in single-celled organisms by which one cell divides into two cells of the same size. Normally occurs in prokaryotic organisms.

Biochemical variation
Differences in organism's metabolism. Any factor that is the result of enzymes is subject to this variation, for example.

Carrier
An individual who has one allele for a recessive trait but does not have the disease themselves.

cDNA
Single-stranded DNA that is complementary to messenger RNA or DNA that has been synthesized from mRNA by reverse transcriptase.

Chordata
Comprises true vertebrates and animals having a notochord.

Cloning
A general term for the research activity that creates a copy of some biological entity (a gene or organism or cell)

Co-dominance
A situation in which both alleles of a gene contribute to the phenotype of the organism.

Codon
A specific sequence of three adjacent bases on a strand of mRNA that provides genetic code information for a particular amino acid.

Co-evolution
The process in which species exert selective pressure on each other and gradually evolve new features or behaviours as a result of those pressures.

Continental drift
The gradual movement and formation of continents (as described by plate tectonics).

Continuous variation
Variation measured on a continuum rather than in discrete units or categories (eg height in human beings).

Convergent evolution
Process by which unrelated organisms independently evolve similarities when adapting to similar environments. (E.g. Shark & dolphin)

Crossing over
The interchange of sections between pairing homologous chromosomes during the prophase of meiosis I.

Cultural evolution
The adaptive changes of cultures in response to environmental changes over time.
cultural evolution

Developmental variation
Differences seen during the maturation processes within a species. E.g. variation of juvenile and mature birds.

Dihybrid
An organism that is heterozygous for two different traits. May or may not be linked.

Diploid
An organism or cell having two sets of chromosomes or twice the haploid number.

Discontinuous variation
Variation in phenotypic traits in which variation is grouped into discrete categories with few or no intermediate phenotypes. E.g. Eye colour in humans.

Divergent evolution
When two or more species sharing a common ancestor become more different over time (a.k.a. adaptive radiation).

DNA Ligase
A linking enzyme essential for DNA replication; catalyses the covalent bonding of adjacent nucleotides.

DNA sequencing
A technique used to work out the exact sequence of DNA bases along a segment of DNA.

DNA triplet
Sequence of 3 DNA nucleotides coding for a specific codon and subsequently; amino acid.

Dominant
Describes the allele that is fully expressed when carried by only one of a pair of homologous chromosomes.

Evolution
The gradual change in the phenotype of a species over time.

Exon
Sequence of a gene's DNA that transcribes and translates into protein structures.

Extinction
Disappearance of a species from all parts of its geographical range.

Foramen magnum
The large opening at the base of the cranium through which the spinal cord passes.

Fossil
The remains (or an impression) of an organism that existed in a past geological age and that has been excavated from the rock/soil.

Founder effect
When a few individuals become isolated from a larger population, this smaller group may establish a new population whose gene pool isn't reflective of the source population.
Change in allele frequencies as a result of the migration of a small subgroup of a population.

Gene
A segment of DNA that is involved in producing a polypeptide chain.

Gene expression
Conversion of the information encoded in a gene first into messenger RNA and then to a protein.

Gene flow
The movement of alleles into or out of a population, often due to migration.
Movement of alleles into or out of a population due to the migration of individuals to or from the population.

Gene linkage
Traits that tend to be inherited together as a consequence of an association between their genes.

Gene pool
Combined genetic information of all the members of a particular population.
The sum of all the genes and their alleles within a population.

Gene regulation
Ability of an organism to control which genes are transcribed in response to the environment.

Gene therapy
The insertion of working copies of a gene into the cells of a person with a genetic disorder in an attempt to correct the disorder.

Genetic bottleneck
The concept that when populations are severely reduced in size, they lose some of their genetic diversity also.

Genetic drift
The gradual changes in gene frequencies in a population due to random events. No selection pressures influence this change.

Genome
The complete genetic content in an organism.

GMOs
Organisms whose genetic code has been altered by artificial means such as gene transfer.

Half-life
The time it takes for 50% of the parent material to be converted into the daughter isotope.

Haploid
An organism or cell having only one complete set of chromosomes.

Hemizygous
In a diploid organism, having only one allele for a given trait, typically the case for X-linked genes in male mammals.

Heterozygote advantage
Greater reproductive success of heterozygous individuals compared to homozygotes; tends to preserve variation in gene pools.

Heterozygous
Having dissimilar alleles at corresponding chromosomal loci.

Hominid
Primates that walks upright, all Great Apes and humans and our ancestors.

Hominidae
No tail, large body, complex cerebral cortex.
FAMILY: Gorillas, chimps, orangutans, Human and human-like ancestors represented in the fossil record back to ca. 6-7 million years ago.

Hominin
A species on the human branch of the evolutionary tree. Include Homo sapiens and our ancestors, a group of extinct species that are closely related to us. (Ardipithecus, australopithecus etc.)

Hominini
Erect walking. (Homo sapiens, erectus, australopithecus, ardopithecus etc. (bipedal)), TRIBE/SUBFAMILY: Human and human-like ancestors represented in the fossil record back to ca. 6-7 million years ago.

Homo
Bipedal gait, arms shorter than legs, make tools.

Homo erectus
Extinct species of primitive hominid with upright stature but small brain.

Homologous structure
Body parts that are structurally similar in various species; provide evidence that the structures were inherited from a common ancestor.

Homonid
Any creature that walks on two feet. (including Homo Sapiens(humans)).

Homozygous
Having identical alleles at corresponding chromosomal loci.

Incomplete dominance
A condition in which a trait in an individual is intermediate between the phenotype of the individual's two alleles because the neither allele is able to express itself fully.
Creates a blended phenotype; one allele is not completely dominant over the other.

Independent assortment
The random distribution of the pairs of genes on different chromosomes to the gametes. Does not apply to linked genes.

Intron
Sequence of a eukaryotic gene's DNA that is not translated into a protein.

Karyotype
The appearance of the chromosomal makeup of a somatic cell in an individual or species (including the number and arrangement and size and structure of the chromosomes).

Locus
The specific site of a particular gene on its chromosome.

Macro-evolution
Evolution on a large scale extending over geologic era and resulting in the formation of new taxonomic groups

Mammalia
Fur/hair, milk producing females, 3 bones in the middle ear. specialised dentition, 2123 tooth structure.

Meiosis
Cell division that produces reproductive cells in sexually reproducing organisms. The nucleus divides into four nuclei each containing half the chromosome number of the original cell.

Micro-evolution
Evolution resulting from small specific genetic changes that can lead to a new subspecies.

Mitosis
Cell division in which the nucleus divides into nuclei containing the same number of chromosomes and the daughter cells are identical to the parent.

mRNA
Type of RNA that carries instructions from DNA in the nucleus to the ribosome.

mtDNA
The DNA of mitochondria; allows them to function outside of the nucleus.

Multiple Allelic
Being controlled by a single gene with more than two alleles.

Multipotent stem cells
Stem cells that differentiate into only a limited type of cells.

Mutagen
Any agent (physical or environmental) that can induce a genetic mutation or can increase the rate of mutation

Natural selection
The principle that, among the range of inherited trait variations, those that lead to increased reproduction and survival will most likely be passed on to succeeding generations.

Out of Africa theory
The theory that Africa is the birthplace for all human species; humans migrate from Africa towards other areas of the world around 1.5 million years ago.

Parallel evolution
Two related species that have made similar evolutionary adaptations after their divergence from a common ancestor.

PCR
DNA is copied multiple times to produce many copies of the original molecules helpful when there's only a small DNA sample.

Phyletic evolution
The aggregate changes that create a new species from a previously existing one. Species continue to adapt to new environmental and biological selection pressures over the course of their history, gradually becoming new species.

Plasmid
A circular DNA molecule that is usually found in bacteria and that can replicate independent of the main chromosome.

Pluripotent stem cells
Cells in red bone marrow that give rise to precursors of all the different mature blood cells and many other cells.

Polygenic
Of or relating to an inheritable trait that is controlled by several genes at once.

Polymorphic
The genetic variation within a population that natural selection can operate on.

Polyploidy
A chromosomal alteration in which the organism possesses more than two complete chromosome sets.

Primate
Mammals with binocular vision, opposable thumbs, bicuspid teeth.

Recessive
A trait producing its characteristic phenotype only when its allele is identical.

Recognition site
Specific sequence of bases where a restriction enzyme cuts DNA.

Recombination
A combining of genes or characters different from what they were in the parents.

Relative dating
Method of determining the age of a fossil by comparing its placement with that of fossils in other layers of rock or the rock itself.

RNA polymerase
Transcription enzyme that links RNA nucleotides together.

Selection pressure
Environmental factors that favour certain phenotypes and thus drive evolution in a particular direction.
The process of selecting a few organisms with desired traits to serve as parents of the next generation.

Semi-Conservative
Refers to the fact that half of a newly made DNA is the old template. Occurs in both DNA replication and PCR.

Sex linked
An inheritance pattern in which traits are controlled by genes located on the X chromosome.

Speciation
The formation of two new species as a result of evolution from one original species.

Stem cells
Unspecialized cells that retain the ability to become a wide variety of specialized cells.

Structural variation
Variation that exists within structures of the body. E.g. Bone length, nose size etc.

Sympatric speciation
The formation of a new species as a result of a genetic change that produces a reproductive barrier between the changed population (mutants) and the parent population. No geographic barrier is present.

Sympatric species
Closely related species whose distribution overlaps.

Test cross
The crossing of an individual of unknown genotype with a homozygous recessive individual to determine the unknown genotype.

TGOs
Organism that contains genes from another species.

Totipotent stem cells
Stem cells that can differentiate into any type of specialised cells found in organisms of that species.

Transfection
When foreign DNA is inserted into eukaryotic genome.

Transformation
Modification of a cell or bacterium by the uptake and incorporation of external DNA (includes plasmids).

tRNA
Short-chain RNA molecules present in the cell (in at least 20 varieties, each variety capable of combining with a specific amino acid) that attach the correct amino acid to the protein chain that is being synthesized at the ribosome of the cell.