Definitions and Concepts for CAIE Biology IGCSE

Topic 17: Inheritance

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*Definitions in **bold** are for supplement only*

Allele - A version of a gene.

Blood group - **Classification of blood type as A, B, AB or O based on surface antigens on red blood cells and the presence of certain antibodies in the plasma. Blood group is controlled by three alleles, I^A, I^B and I^O.**

Chromosome - A long, coiled molecule of DNA that carries genetic information in the form of genes.

Codominance - **When both alleles for a gene in a heterozygous organism equally contribute to the phenotype.**

Colour blindness - **An X-linked recessive condition characterised by the inability to distinguish between colours. It is more common among males because they only inherit one X chromosome.**

Diploid cell - **A cell that contains a pair of each chromosome type e.g. human diploid cell has 23 pairs of chromosomes.**

Diploid nucleus - **A nucleus that contains two copies of each chromosome (i.e. a full set of chromosomes).**

Dominant - Describes an allele that is always expressed. Represented by a capital letter.

Gametes - Sex cells (sperm and egg cells) with half the usual number of chromosomes.

Gene - A length of DNA on a chromosome that codes for the production of a specific protein.

Gene expression - **All specialised cells contain the same set of genes, but only the genes required to code for certain proteins are switched on in any given cell.**

Genetic code - **The rules by which the sequence of bases in a gene codes for the sequence of amino acids in a specific protein.**

Genotype - An organism's genetic composition. Describes all alleles.

Haploid nucleus - **A nucleus that contains a single copy of each chromosome (i.e. half the number of chromosomes)**

Heterozygous - When someone has two different alleles of a gene e.g. Ff.

Homozygous - When someone has two identical alleles of a gene e.g. ff.

Inheritance - The transmission of genetic information from one generation to the next.

Meiosis - A form of nuclear division that produces four genetically different daughter cells (gametes). It involves two divisions. Chromosome number is halved, resulting in haploid cells.

Mitosis - A form of nuclear division that produces two genetically identical daughter cells from one parent cell. The copies of chromosomes are separated, maintaining the diploid chromosome number. Mitosis is important in the growth, repair and replacement of cells, as well as asexual reproduction.

Monohybrid inheritance - The inheritance of a single gene.

mRNA - A polymer of nucleotides that carries genetic information from the nucleus to the ribosomes during protein synthesis.

Pedigree diagram - A chart used to show the inheritance of a given characteristic in a family.

Phenotype - An organism's observable characteristics due to interactions of the genotype and the environment.

Punnett square - A grid used to predict the potential outcomes of a genetic cross.

Pure breeding - A type of breeding in which all of the offspring carry the same phenotype as the parents. This occurs when two identical homozygous individuals are crossed.

Recessive - Describes an allele that is only expressed in the absence of a dominant allele. Represented by a small letter.

Ribosomes - Sub-cellular structures that are the site of protein synthesis.

Sex chromosomes - A pair of chromosomes responsible for the determination of gender. XY in males, XX in females.

Sex-linked characteristic - A characteristic that is coded for by an allele found on a sex chromosome.

Stem cells - Cells that are unspecialised and capable of dividing by mitosis to produce a range of different cell types.

Test cross - An individual with a dominant phenotype is crossed with a homozygous recessive individual. The ratio of offspring indicates the genotype of the dominant individual.

Variation - The differences between individuals due to genes, the environment or a combination of both.