

Definitions and Concepts for CAIE Biology IGCSE

Topic 17: Inheritance

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.

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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.**

