

Class 10 Terminology and Definitions on Heredity

- **Genetics:** The branch of biology that studies heredity and the causes of variation in living organisms.
- **Heredity:** The transmission of characters or traits from parents to offspring across generations.
- **Inheritance** is the biological process by which genetic information, traits, or characters are transmitted from parents to their offspring across generations.
- **Variation:** The differences in physical or genetic traits among individuals of the same species.
- **Gene:** The basic functional unit of heredity; a specific sequence of DNA located on a chromosome that codes for a specific protein or trait.
- **Allele:** An alternative form of a gene occupying the same position on homologous chromosomes (e.g., T for tallness and t for dwarfness).
- **Inherited Traits:** Characteristics controlled by germ cell DNA that are passed from parents to offspring (e.g., eye color, attached/free earlobes).
- **Acquired Traits:** Features acquired during an organism's lifetime due to environment, practice, or injury; these do not alter germ cell DNA and cannot be inherited (e.g., muscle strength, cut marks).
- **Dominant Trait:** A trait or allele that expresses itself in both homozygous and heterozygous conditions (e.g., T in Tt).
- **Recessive Trait:** A trait or allele that expresses itself only in the homozygous condition and remains masked in the presence of a dominant allele (e.g., t in tt).
- **Genotype:** The genetic makeup or combination of alleles for a specific trait in an organism (e.g., TT, Tt, or tt).
- **Phenotype:** The physical, observable characteristic resulting from the genotype and environment (e.g., Tall or Dwarf).
- **Homologous Chromosomes :** A pair of matching chromosomes—one inherited from the maternal parent and one from the paternal parent—that have the same length, centromere position, and sequence of gene loci.
- **Homozygous (Purebred):** Having two identical alleles for a given trait (e.g., TT or tt).
- **Heterozygous (Hybrid):** Having two different alleles for a given trait (e.g., Tt).
- **Monohybrid Cross:** A cross between two parents considering a single pair of contrasting traits (e.g., plant height).
- **Dihybrid Cross:** A cross between two parents considering two pairs of contrasting traits simultaneously (e.g., seed color and seed shape).

- **Phenotypic Ratio:** The numerical ratio expressing the proportion of different observable physical characteristics or traits (phenotypes) among offspring resulting from a genetic cross.

Example: In the F₂ generation of a monohybrid cross, the ratio of tall to dwarf pea plants is 3 : 1 (3 Tall : 1 Dwarf).

- **Genotypic Ratio:** The numerical ratio expressing the proportion of different combinations of alleles (genotypes) present among offspring resulting from a genetic cross.

Example: In the F₂ generation of a monohybrid cross, the ratio of pure tall to hybrid tall to pure dwarf plants is 1 : 2 : 1 (1\ TT : 2\ Tt : 1\ tt).