Mendelian Genetics Vocabulary

* True Breeding – plants that produce offspring of the same variety when they self-pollinate
* P generation – parent generation
* F1 – 1st generation after a cross
* F2 – 2nd generation after a cross
* Alleles – alternative versions of a gene
* Dominant Allele – presence determines phenotype
* Recessive Allele – allele whose phenotypic effect is not observed in a heterozygote
* Phenotype – The physical and physiological traits of an organism, which are determined by its genetic makeup
* Genotype – genetic makeup of an organism
* Homozygous – containing two identical alleles for a gene
* Heterozygous – containing two different alleles for a gene
* Punnett Square – a diagram used in the study of inheritance to show the predicted results of random fertilization in genetic crosses
* Testcross – breeding an organism of unknown genotype with a homozygous recessive individual to determine the unknown genotype. The ratio of phenotypes in the offspring reveals the unknown phenotype
* Law of segregation – Mendel’s 1st law stating that the two alleles in a pair segregate into different gametes during gamete formation
* Law of independent assortment – Mendel’s 2nd law stating that each pair of alleles segregates, or assorts, independently of each other pair during gamete formation; applies when genes for two characters are located on different pairs of homologous chromosomes
* Monohybrid – cross of one character
* Dihybrid – cross of two characters
* Probability rules:
  + Rule of Multiplication – probability that two or more independent events will occur together. (i.e. coin flipping chance of having head, head in a row ½ x ½ = ¼ )
  + Rule of Addition – probability that any of the two or more mutually exclusive events will occur (i.e. tossing a die chances of having face with 4 dots or 5 dots 1/6 +1/6 = 1/3 )
* Epistasis: the effect of one gene being dependent on the presence of one or more 'modifier genes' (genetic background)
  + Example: like coat color in some animals, is controlled by a pigment (P). Different genes contribute to the steps needed to make P from a precursor molecule. In order to get to P, all these steps have to be fully functional. If there is a mutation in one of these genes, the reaction cannot take place and the phenotype, or in this case, the production of pigment resulting from coat color, is affected.
* Multiple Allele: a series of three or more alternative or allelic forms of a gene, only two of which can exist in any normal, diploid individual.
  + Example: The human ABO blood type
* Polygenic Traits: A polygenic trait is one whose phenotype is influenced by more than one gene
  + Example: height
* Pleiotropy: one gene influences multiple, seemingly unrelated phenotypic traits
  + Example: phenylketonuria, which is a human disease that affects multiple systems but is caused by one gene defect