

Introduction to Genetics

- Today, scientists know how you inherit your traits and are even able to calculate the probabilities of having a specific trait or getting a genetic disease according to the information they have from the parents and family history
- How is this possible?
- Between 1856 - 1863, Gregor Mendel, an Austrian monk and biologist, grew and studied pea plants
 - o While doing so, Mendel discovered the principles that rule heredity
- From his experiments, he inferred that each trait depends on a pair of factors, one coming from your mother and one coming from your father
 - o We now know these factors to be called alleles
- Allele: a variation of a gene
 - o Ex. blue vs. brown eyes, curly vs. straight hair
 - o You have 2 alleles for every gene because you have a set of chromosomes from your mother and a set of chromosomes from your father.
- Gene: a section of DNA that controls a trait
 - o Ex. eye colour, hair texture.

- We represent alleles with letters
 - o If the allele is dominant, meaning that it masks the other allele, we use a capital letter for it
 - Eg. Brown eyes → B
 - o If the allele is recessive, meaning that the trait only shows up if there is no dominant allele present, we use a lower case letter to represent it
 - Eg. blue eyes → bb
- The combination of alleles is known as a genotype
- The physical expression of the trait is known as a phenotype
- If both alleles are identical, we describe the organism as being homozygous for the trait
 - o i.e. BB or bb
- If the 2 alleles are different, we describe the organism as being heterozygous for the trait
 - o i.e. Bb
- To visualize how alleles are distributed among offspring and predict proportions and probabilities, we use a tool called a Punnett Square

	B	B	
b	Bb	Bb	100% genotype Bb 100% phenotype brown eyes
b	Bb	Bb	

	B	b	<u>Genotypes</u>
b	Bb	bb	50% Bb 50% bb
b	Bb	bb	<u>Phenotypes</u> 50% brown eyes 50% blue eyes