**Lesson 6 – Alleles, Phenotype and Genotype**

**Learning Target:** #5. I can describe how the concepts of DNA, genes, chromosomes and alleles account for the transmission of hereditary characteristics.

**Lesson Objective: *How is genetic information represented in physical characteristics?***

· Each chromosome in a pair codes for the same genetic trait but they provide different details.

· **Gene** - A segment or band on a chromosome that determines a particular characteristic.

· Each gene has different possible forms called **alleles.**

· Since we have pairs of chromosomes, we have pairs of alleles that determine a particular characteristic.

· Of the two alleles, one is dominant over the other.

· The **dominant allele:**

– Represented by a capital letter (B)

– Always represented in the physical characteristics of the individual (if present)

· The **recessive allele:**

– Represented by a lower case letter (b)

– Only represented in the physical characteristics of the individual if the dominant allele is absent

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| **Dominant** | **Recessive** |
| Brown Eyes (B) | Not Brown Eyes (b) |
| Brown Hair (D) | Light Hair (d) |

· There are three possible combinations for each pair of alleles

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| **Alleles from Parent #1** | **Alleles from Parent #2** | **Genetic Make-Up** | **Physical Appearance** |
|   |   |   | Brown Eyes |
|   |   |   | Brown Eyes |
|   |   |   | Not Brown (Blue/Green) |

There are two terms used to describe the three possible combination of alleles.

**Homozygous (Purebred)**

· An individual in which both alleles are the same

· homozygous dominant = BB

· homozygous recessive = bb

**Heterozygous (hybrid)**

· An individual in which both alleles are different.

· heterozygous = Bb

· **Genotype** - The genetic make-up of the individual (i.e. BB, Bb, or bb).

· **Phenotype** - The physical appearance of the individual (i.e. brown eyes or blue eyes)

· **Important Note**: The homozygous dominant (BB) and heterozygous genotypes (Bb) will have the same phenotype because the dominant allele is present.

 **Let’s Take a Look at You!**

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| **Trait** | **Phenotype** | **Dominant or Recessive** | **Genotype** |
| Eye colour E/e |  |  |  |
| Hair colour C/c |  |  |  |
| Hairline L/l |  |  |  |
| Freckles F/f |  |  |  |
| Earlobe B/b |  |  |  |
| Thumb joint T/t |  |  |  |
| Folded hands H/h |  |  |  |
| Tongue Rolling R/r |  |  |  |
| Chin Dimple D/d |  |  |  |