

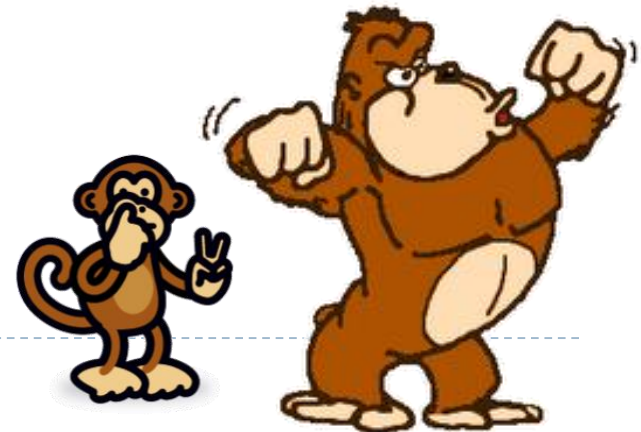


Mendelian Genetics

EQ: How do genes get passed from parent to offspring?

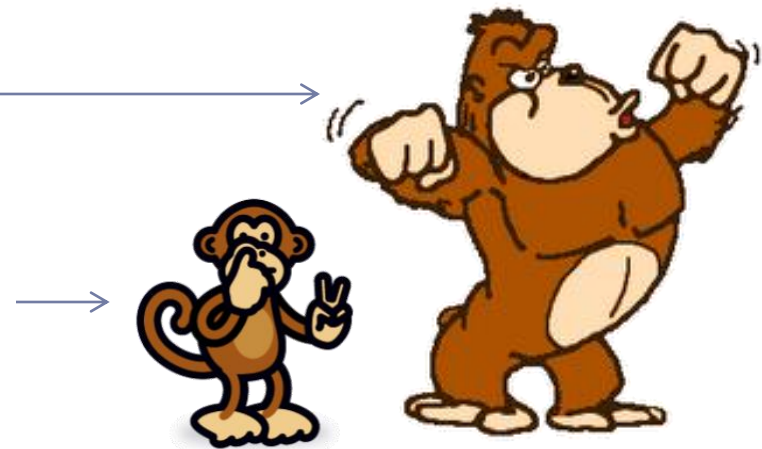
Genetics

- ▶ Genetics is the study of inheritance of genes.
 - ▶ i.e. genetics is how traits are passed down from parents to offspring
- ▶ Gregor Mendel discovered that these traits are inherited through units called **genes**
- ▶ The passing of traits from parents to offspring is called **heredity**



Genetics

- ▶ Every individual offspring inherits at least two copies of every gene – one from the mother and one from the father.
 - ▶ Each version of a gene is called an allele.
 - ▶ You inherit at one allele from both parents for every gene.
- ▶ Genes can either be dominant or recessive –
 - ▶ Dominant genes are **always** expressed if they are present
 - ▶ Recessive genes are only expressed if no dominant genes are present.



Source: blogography.com

Source: techcynic.wordpress.com

Dominant vs. Recessive

- ▶ Not all genes an organism has will be expressed
- ▶ Although they are not expressed, recessive genes may still be passed on
- ▶ **Dominance** – principle of one gene being expressed over another
 - ▶ Dominant genes will mask/hide recessive genes
 - ▶ The recessive gene is not expressed, but is still there to be passed on to future generations



Homozygous vs. Heterozygous

- ▶ The combination of genes that you have can be described by *homozygous* or *heterozygous*.
- ▶ Homozygous means that both of your genes are the same – either both are dominant or both are recessive
 - ▶ AA would be Homozygous Dominant (both alleles are dominant)
 - ▶ aa would be Homozygous Recessive (both alleles are recessive)
- ▶ Heterozygous means that you have both a dominant and a recessive copy of a gene.
 - ▶ Aa would be Heterozygous (one dominant allele, one recessive allele)



Genotype vs. Phenotype

- ▶ Genotype is the term for the genes that an organism has.
- ▶ Phenotype are the physical characteristics created by the combination of genes that an organism has.
 - ▶ For example, Ms. Bustos is heterozygous for eye color – her genotype has genes for both blue and brown eyes.
 - ▶ However, Ms. Bustos's phenotype is brown eyes – the blue eye color is not expressed because it is recessive.

	A	A
a	Aa	Aa
a	Aa	Aa

Punnett Squares

- ▶ A Punnett Square is a tool used for determining the possible genetic outcomes of the offspring of two parents
 - ▶ Punnett Squares can be used to determine the parents' or offsprings' phenotypes and genotypes.
 - ▶ Punnett Squares show all of the possible combinations of offspring genotypes that a couple could have.

	A	A
a	Aa	Aa
a	Aa	Aa

The diagram illustrates a Punnett square for eye color inheritance. The top parent is homozygous dominant (AA) with brown eyes. The bottom parent is homozygous recessive (aa) with blue eyes. The Punnett square shows all offspring are heterozygous (Aa) with brown eyes.

