

Introduction to Genetics

Biology



Objectives

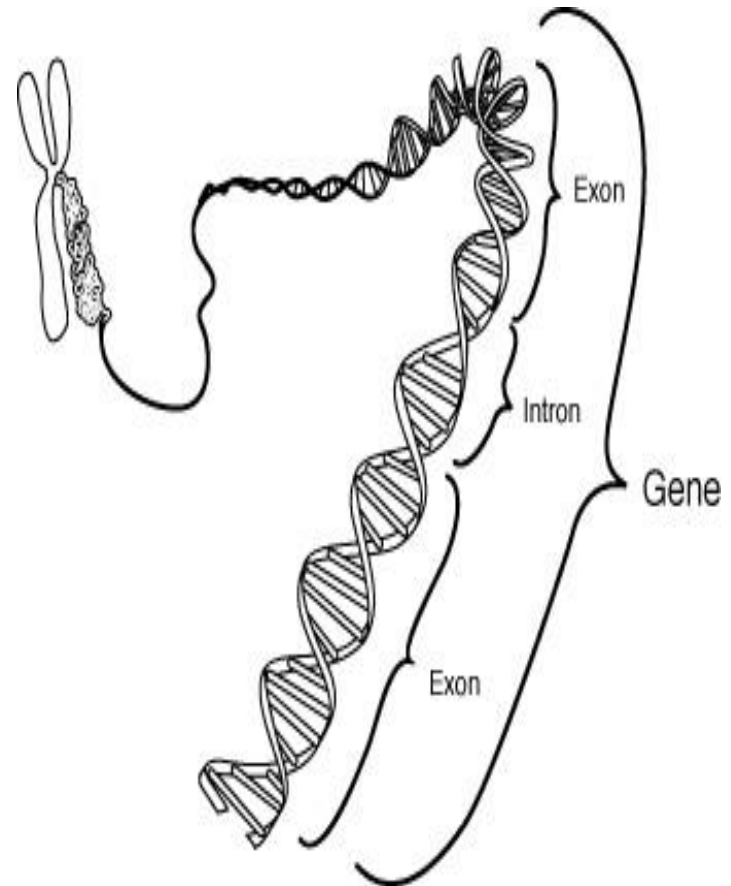
- Students will know what a gene is and how genes are passed from parents to their offspring
- Students will be able to explain what an allele is, how it relates to a gene, and what it means for an allele to be dominant or recessive
- Students will be able to recognize a Punnett Square and describe how it is used to look at heredity for sexually reproducing organisms

What is Genetics?

- Genetics studies how genes contribute to an organism's appearance and function
- Genetics also looks at heredity: how genes are passed from parents to offspring

What are Genes?

- Sequences of DNA, located on chromosomes, that determine which proteins are created during translation
- Genes are located on the chromosomes

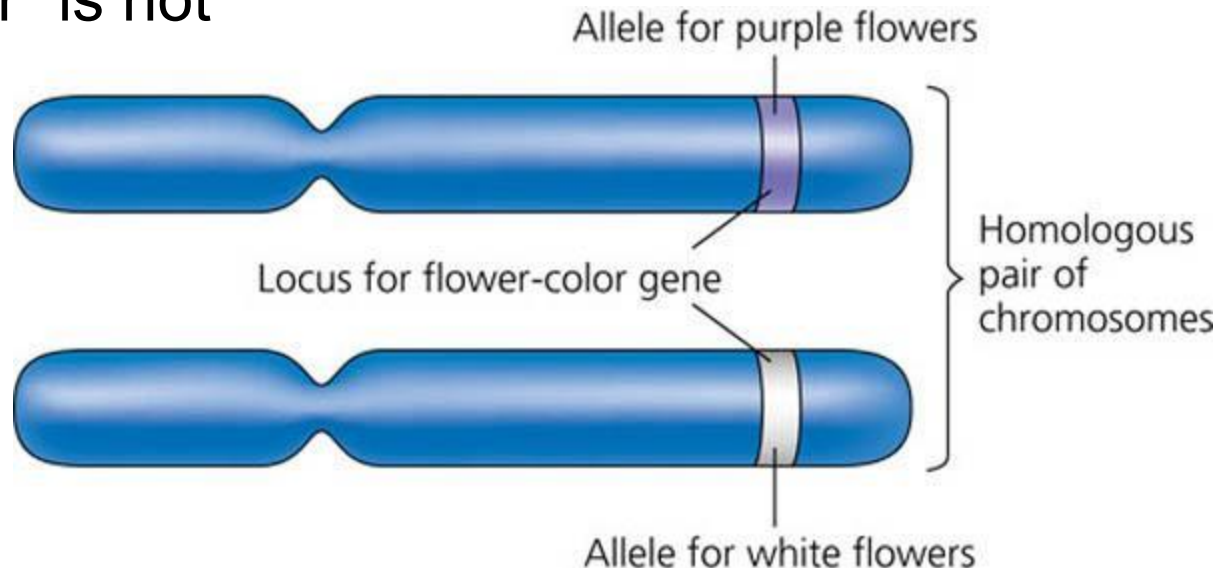


Genes and Alleles

→ version of a gene

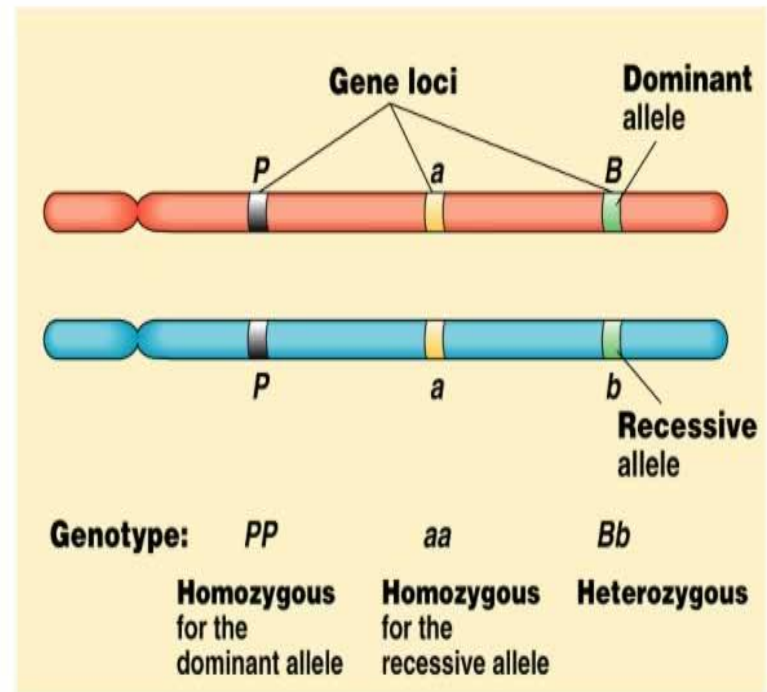
- Genes refer to a general class of functions rather than a specific function
- For example: “flower color” is a gene, but “purple flower” is not

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ALLELE



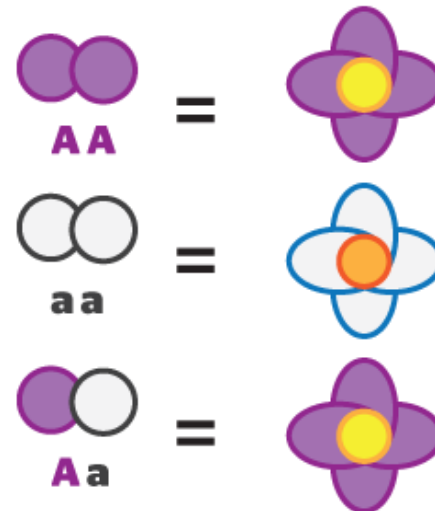
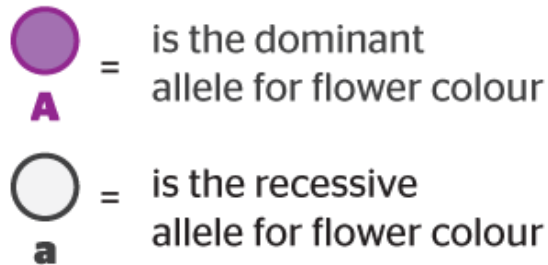
Genes and Alleles (continued)

- Diploid organisms (that reproduce sexually) contain two copies of each gene
- Different versions of genes are called **alleles**









Dominant and Recessive Alleles

- Alleles are called dominant if they determine a trait even if they only show up on one chromosome (capital letter abbreviation)
- Alleles are recessive if both chromosomes need the same allele for the the trait to appear (lower case abbreviation)



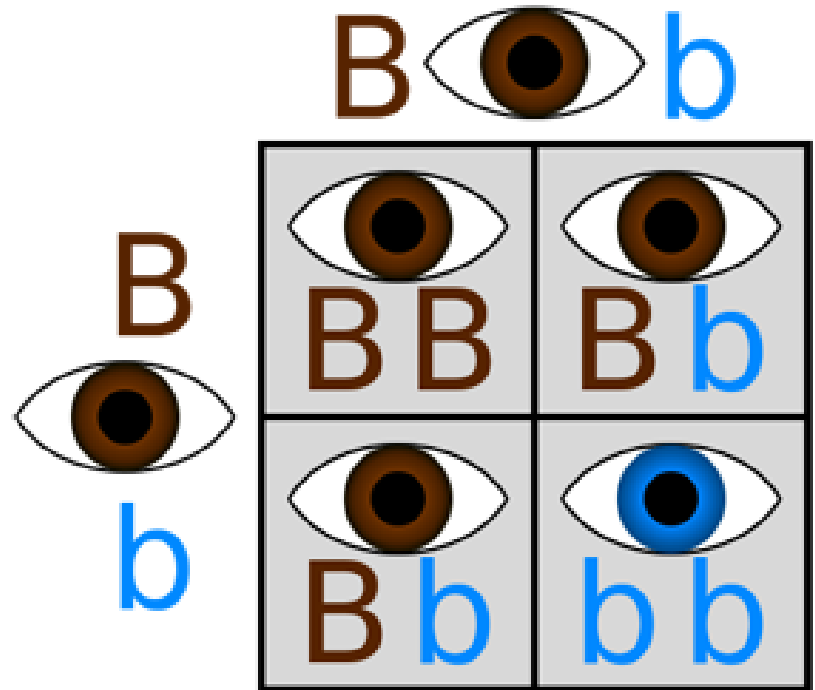
Punnett Squares

- Shows the genetic combinations that parents can pass to their offspring
- Columns and rows show the alleles each parent can contribute
- Boxes show possible allele combinations of offspring

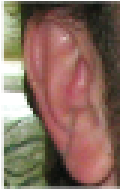

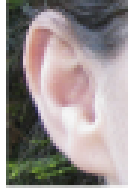
		 pollen ♂	
		B	b
 pistil ♀	B	 BB	 Bb
	b	 Bb	 bb

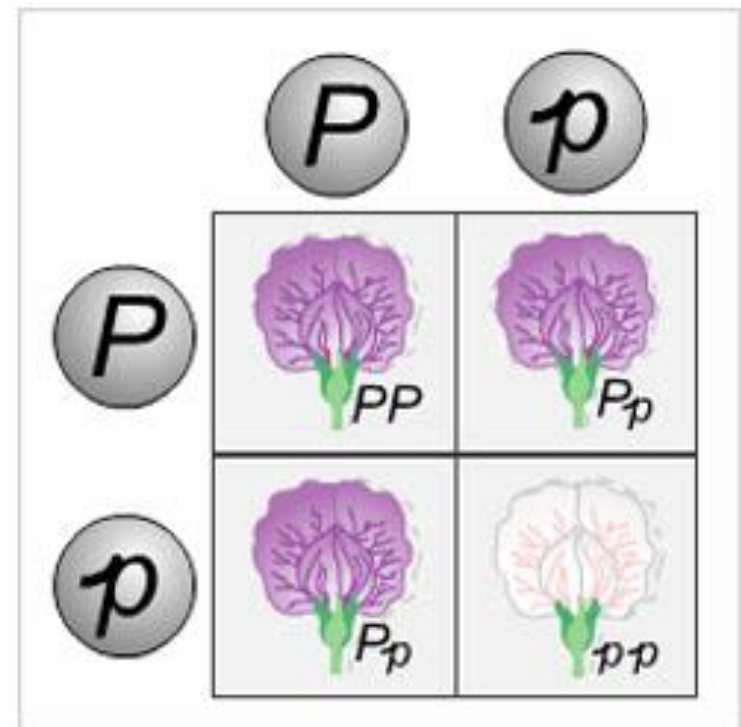
Homozygous vs. Heterozygous

- Homozygous means offspring has two identical alleles (can be dominant or recessive)
- Heterozygous means offspring has two different kinds of alleles



Examples of Possible Allele Combinations

Genotype	Phenotype
EE Homozygous dominant	Detached Earlobes 
Ee Heterozygous	Detached Earlobes 
ee Homozygous recessive	Attached Earlobes 



Try One (theanswerpad.com):

- Identify dominant and recessive alleles
- Describe all four possible allele combinations for offspring

Gene for Big Toe Length	Longer Big Toe (T)	Smaller Big Toe (t)
Longer Big Toe (T)		
Smaller Big Toe (t)		