



# Chapter 11: Inheritance















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## 11.2 Dihybrid Inheritance

# Dihybrid Inheritance

- involves inheritance of two characteristics, each characteristic is controlled by a different gene located at a different locus

# Mendel's Experiment

	Height	Seed Shape	Seed Color	Seed Coat Color	Pod Shape	Pod Color	Flower Position
<b>Dominant</b>	 Tall	 Round	 Yellow	 Green	 Inflated (full)	 Green	 Axial
<b>Recessive Trait</b>	 Short	 Wrinkled	 Green	 White	 Constricted (flat)	 Yellow	 Terminal

Key:

B: dominant allele for round seed

b: recessive allele for constricted seed

K: dominant allele for yellow seed

k: recessive allele for green seed

### Cross of parental generation

Parental phenotype (P) : Round and yellow seed      Constricted and green seed



Parental genotype : BBKK      bbkk

Meiosis

Gamete : BK      bk

Fertilisation

F<sub>1</sub> genotype : BbKk

F<sub>1</sub> phenotype : All round and yellow seeds

Purebreed parents used in fertilisation

Seed shape characteristic is controlled by a pair of Bb alleles and seed colour is controlled by a pair of Kk alleles. Only the dominant traits, namely round and yellow are observed.

### Self-crossed F<sub>1</sub> generation

















F<sub>1</sub> phenotype : Round and yellow seed      Round and yellow seed

F<sub>1</sub> genotype : BbKk      BbKk

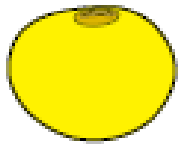
Meiosis

Gamete : BK Bk bK bk      BK Bk bK bk

During formation of gametes, any allele for seed shape can pair with any allele for seed colour.

Male gamete Female gamete	<b>BK</b>	<b>Bk</b>	<b>bK</b>	<b>bk</b>
<b>BK</b>	 <b>BBKK</b> Round, yellow	 <b>BBKk</b> Round, yellow	 <b>BbKK</b> Round, yellow	 <b>BbKk</b> Round, yellow
<b>Bk</b>	 <b>BBKk</b> Round, yellow	 <b>BBkk</b> Round, green	 <b>BbKk</b> Round, yellow	 <b>Bbkk</b> Round, green
<b>bK</b>	 <b>BbKK</b> Round, yellow	 <b>BbKk</b> Round, yellow	 <b>bbKK</b> Constricted, yellow	 <b>bbKk</b> Constricted, yellow
<b>bk</b>	 <b>BbKk</b> Round, yellow	 <b>Bbkk</b> Round, green	 <b>bbKk</b> Constricted, yellow	 <b>bbkk</b> Constricted, green

Phenotypic ratio produced in F<sub>2</sub> generation:



Round, yellow seed : Round, green seed : Constricted, yellow seed : Constricted, green seed  
9 : 3 : 3 : 1

# Mendel's Second Law

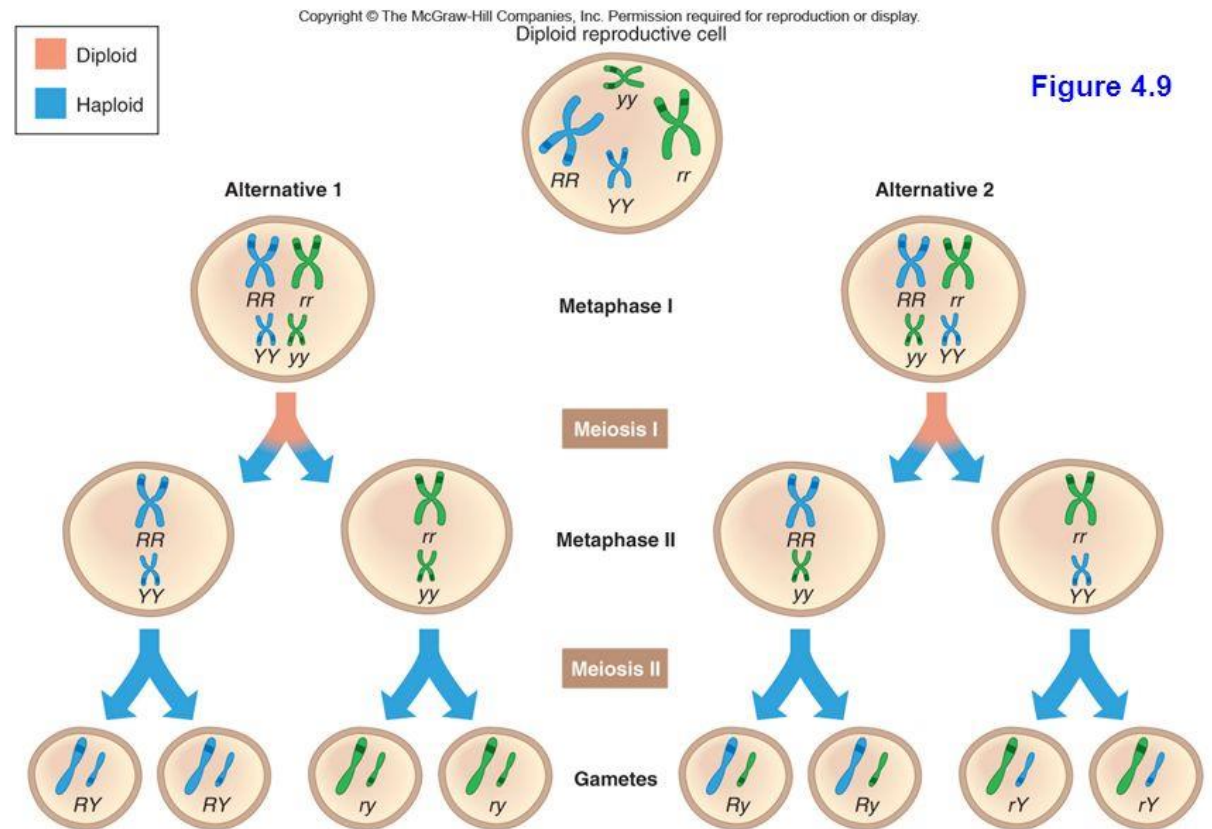
Mendel introduced Mendel's Second Law, also known as Law of Independent Assortment which states:

- During gamete formation, each allele from a pair of alleles can combine randomly with any allele from another pair of allele.

# Mendel's Second Law

- New combinations of characteristics are produced in the F2 generation namely constricted yellow seed and round green seed
- Two characteristics (seed shape and colour) are combined in F1 generation but later they separate and react freely in F2 generation.

## Mendel's Second Law – Independent Assortment





# Mendel's Second Law

