

CLASS 10

HEREDITY AND EVOLUTION

REFERENCE

Law of Dominance: If the two alleles at a locus differ, then one, the **dominant allele**, determines the organism's appearance; the other, the **recessive allele**, has no noticeable effect on the organism's appearance

Law of Segregation: the two alleles for a heritable character separate (segregate) during gamete formation and end up in different gametes

Law of Independent Assortment: each pair of alleles segregates independently of other pairs of alleles during gamete formation

TERMINOLOGY










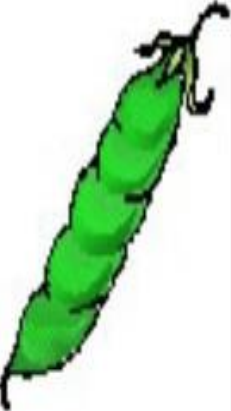




- **Character** - morphological, anatomical or behavioral feature of an organism.
- **Allele** - different alternative forms of gene ; e.g., a gene for height has two alleles: one for tall and one for dwarf.
- **Homozygous** – An individual with two identical alleles.
- **Heterozygous** - An individual with two different alleles.
- **Phenotype**: observable characteristic of the some organism like color, size, form and structure
Eg: tall, short
- **Genotype**: genetic composition of an organism and cannot be seen
Eg: TT, tt, Tt

Dominant

A phenotype or allele that completely masks the presence of the other, recessive allele in the heterozygote.

A phenotype or allele exhibited only when homozygous

Recessive

Seed Shape	Seed Color	Pod Shape	Pod Color	Flower Color	Flower Location	Plant Size
Round	Yellow	Inflated	Green	Purple	Axial	Tall
						
Wrinkled	Green	Constricted	Yellow	White	Terminal	Short (Dwarf)
						

Phenotypes:
Genotypes:

Gamete formation:

F₁ generation:

F₁ Cross:

F₁ gametes:

Random fertilization:

F₂ genotypes:

F₂ phenotypes:

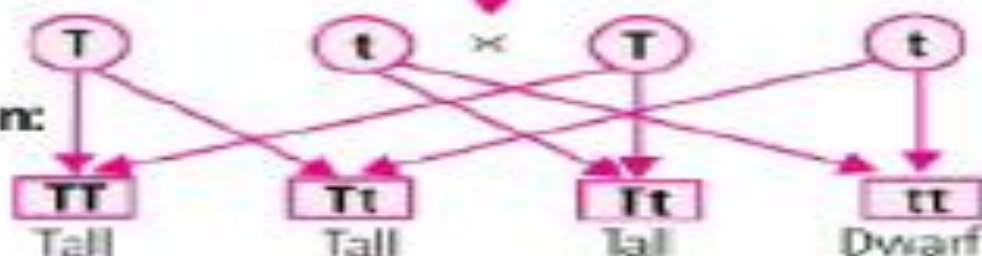
Designation:

P₁ Cross
Tall Dwarf

TT × **tt**



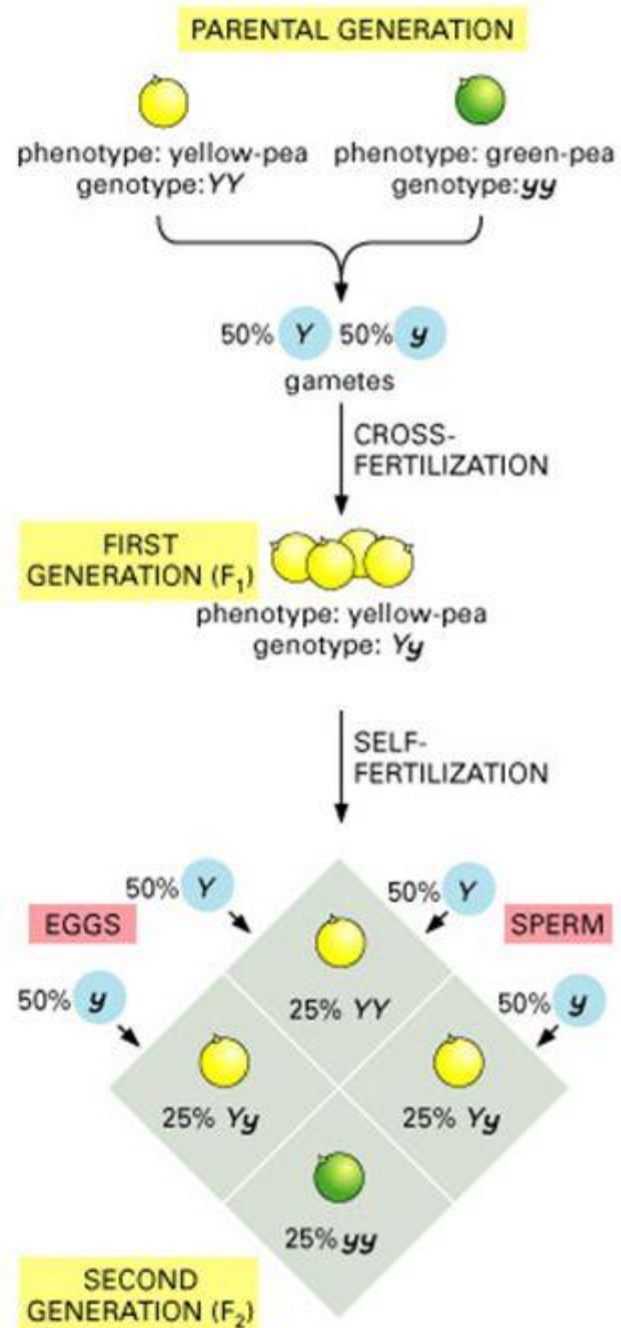
Tt
All tall

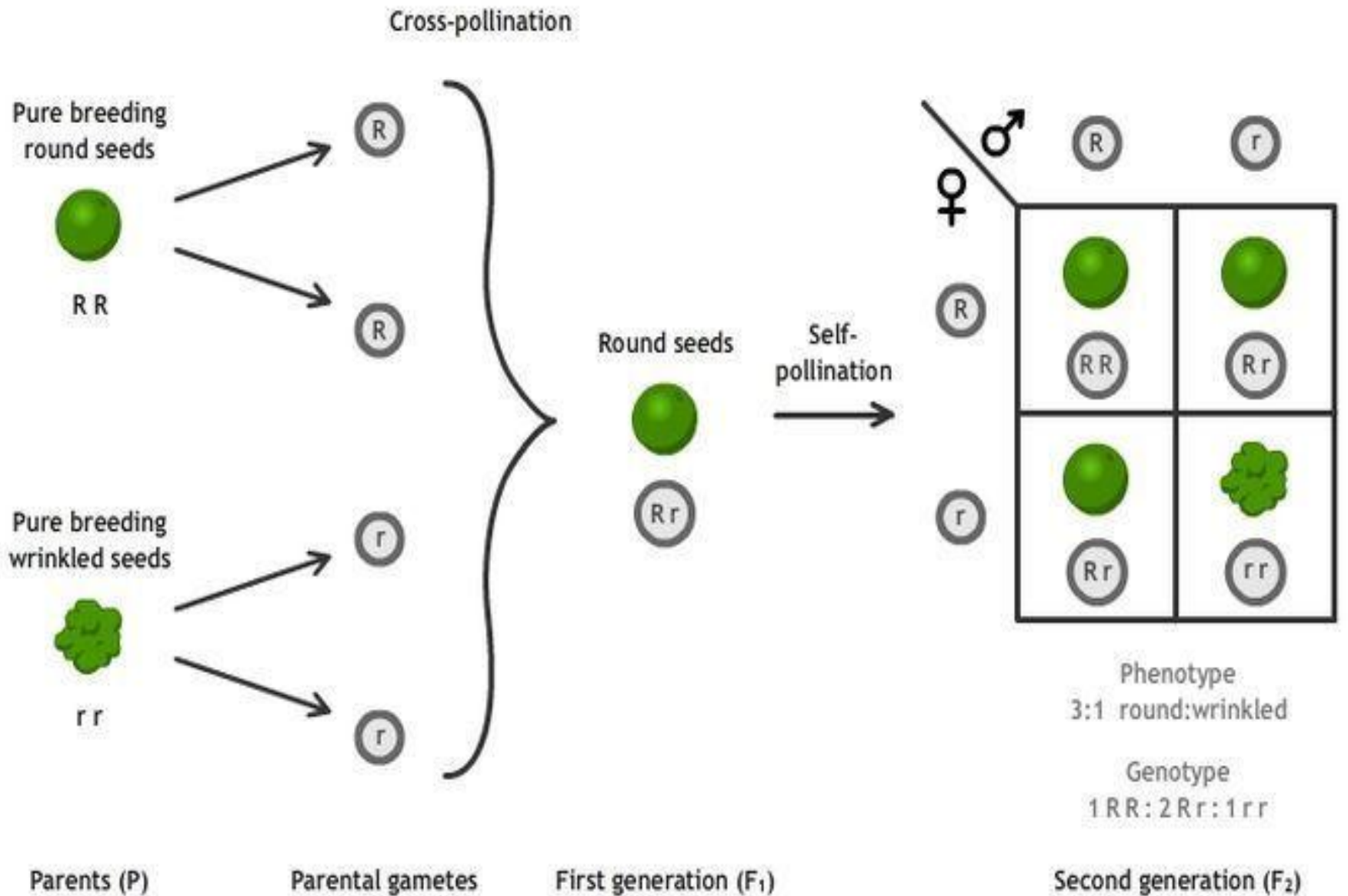


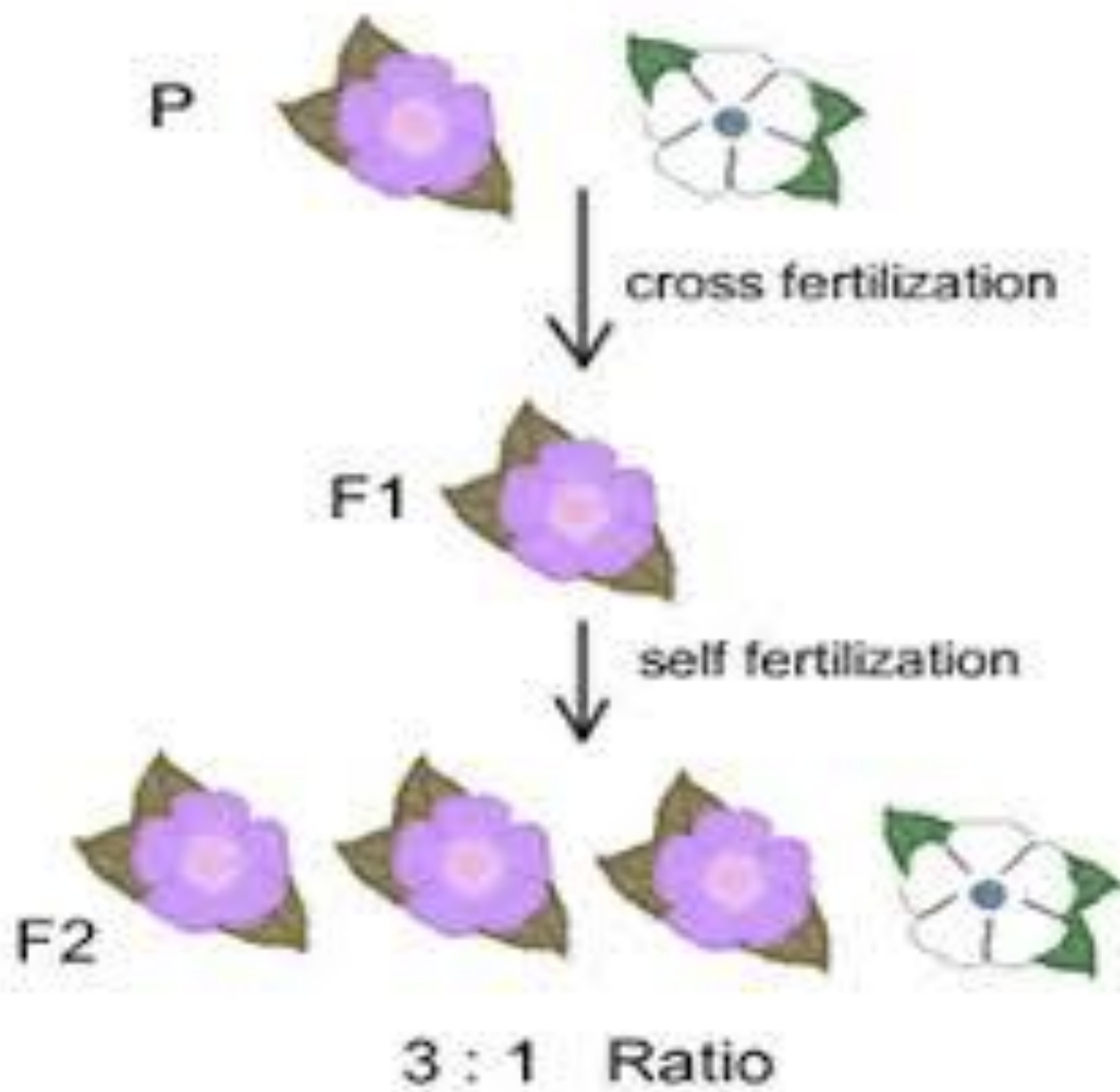
(Homozygous) (Heterozygous) (Heterozygous) (Homozygous)

Mendelian 'Model' of Inheritance

- The true-breeders had two copies of one type of allele (homozygous)
- Each parent passes on one of the alleles to the offspring randomly
- The first generation will all be heterozygous (have two different alleles)
- One of the alleles is able to block the other (is dominant vs. being recessive)
- The F₁'s pass on both of their alleles randomly
- Simple math provides the expected ratios of phenotypes and genotypes







Dihybrid Cross



P Generation



F₁ Generation

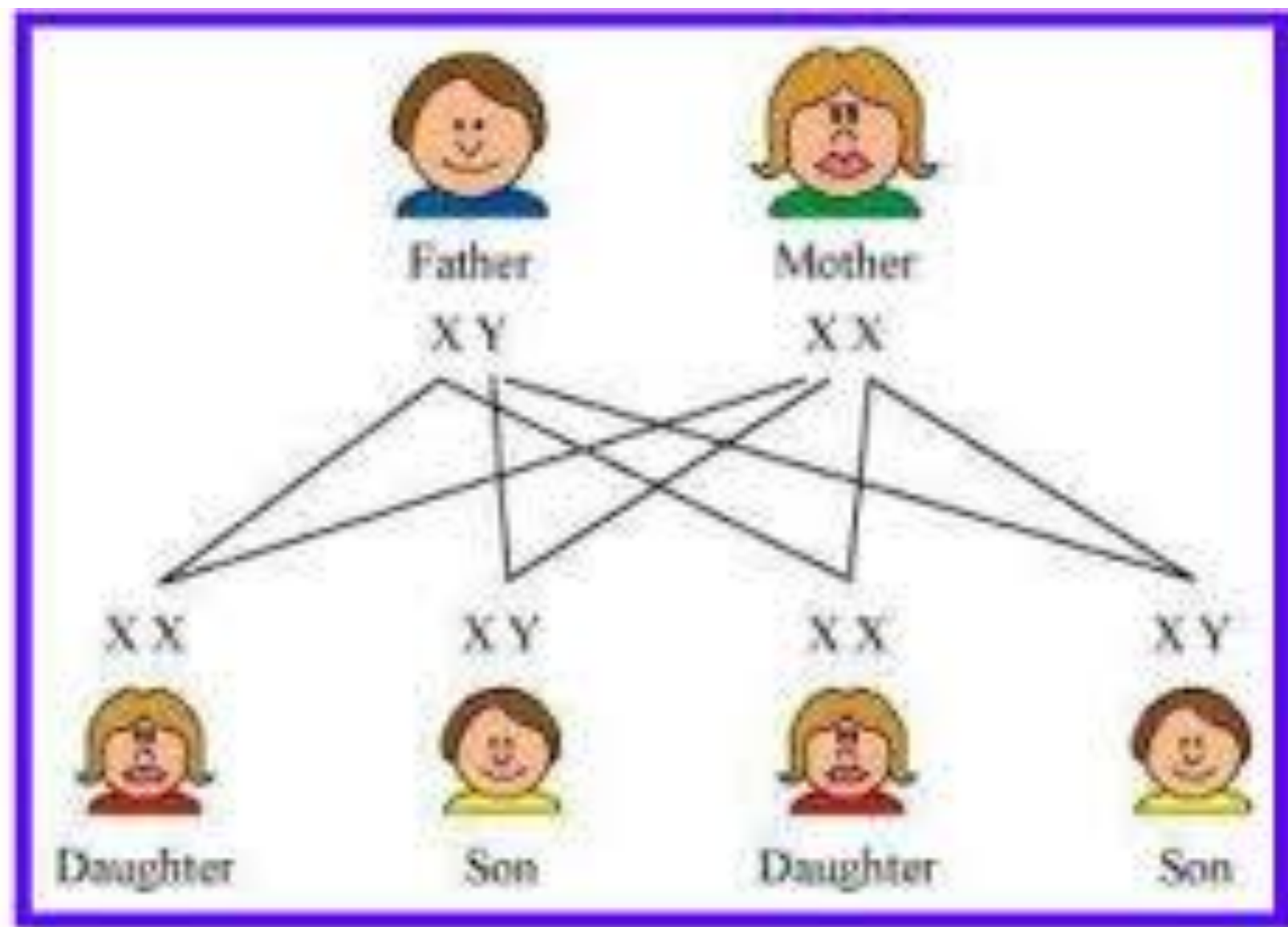
Phenotype:

gametes from heterozygous parent
YR
yR
Yr
yr

gametes from heterozygous parent	YR				
	yR				
	Yr				
	yr				

F₂ Generation

Phenotype: 9 : 3 : 3 : 1 :



Sex determination in humans