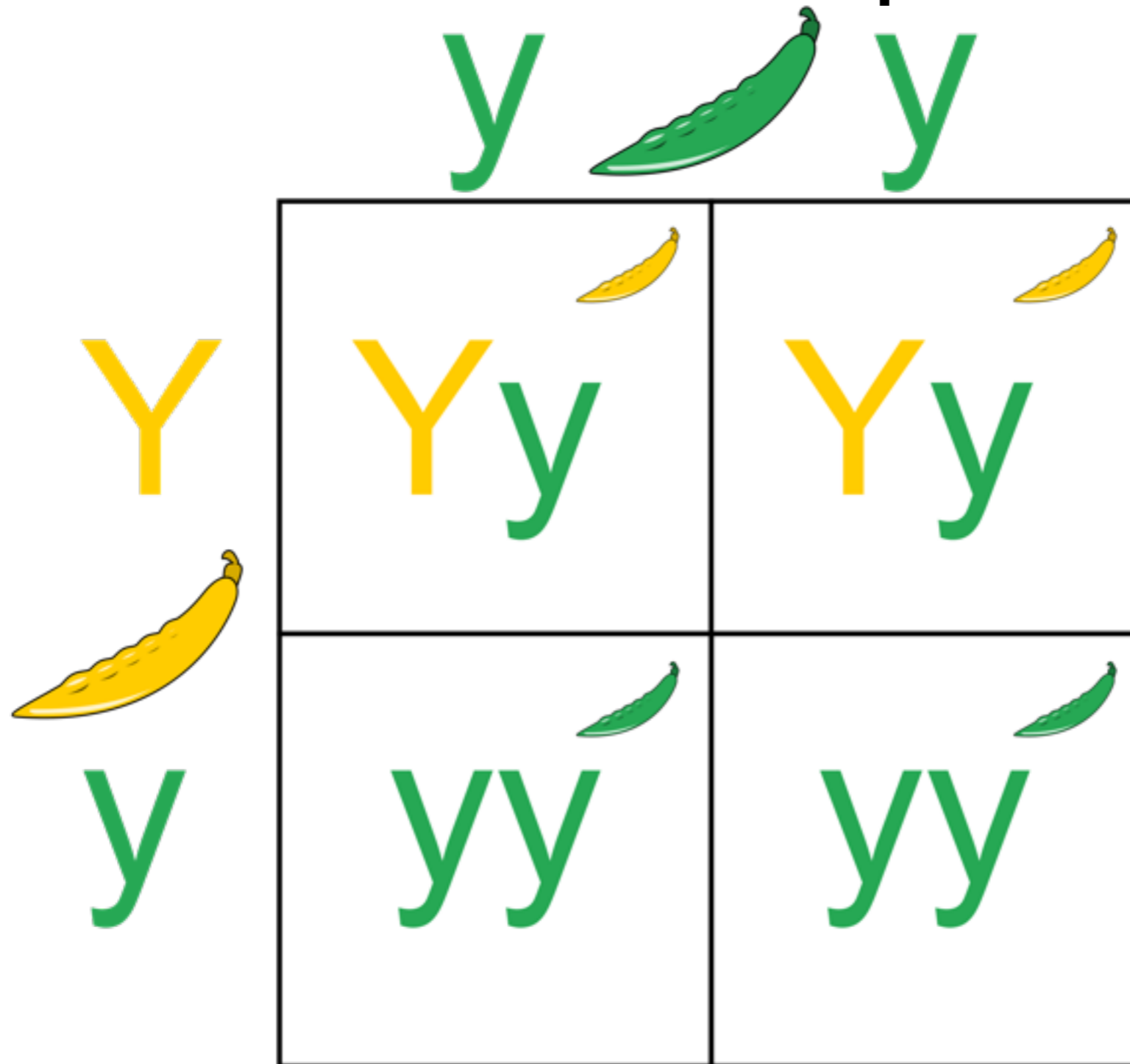
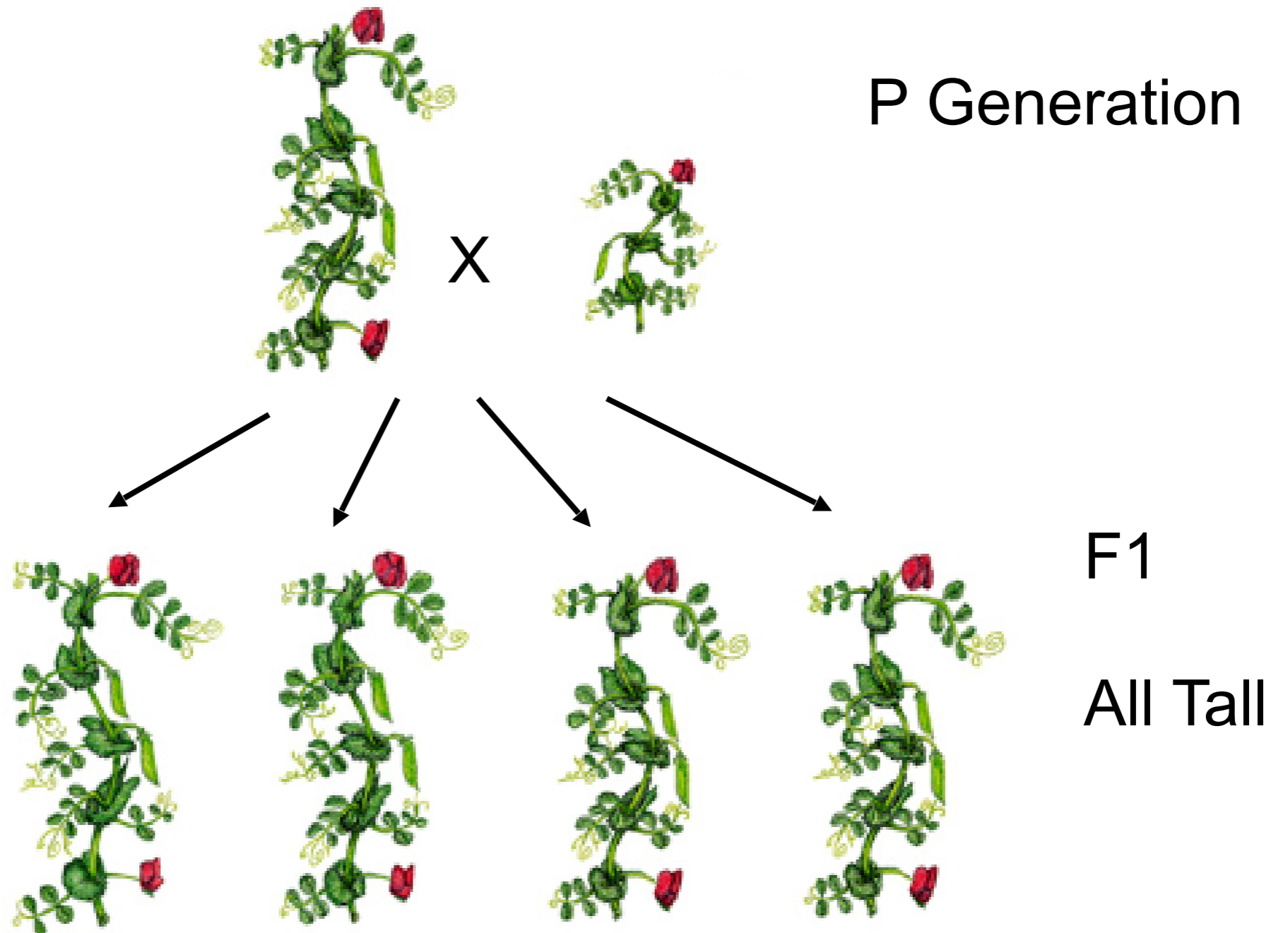


Punnett Squares



RECALL

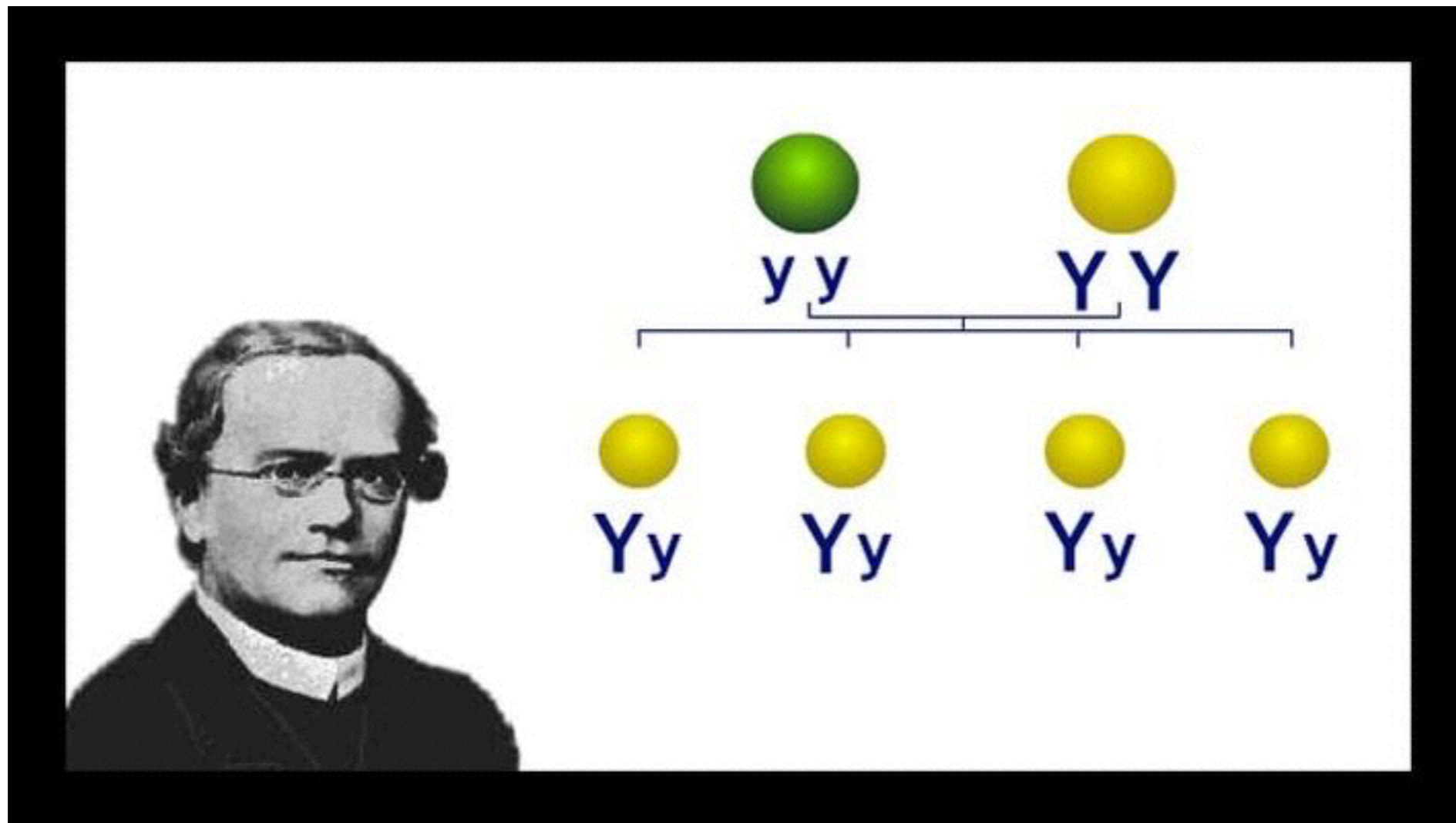
Mendel crossed TALL x SHORT plants

















Conclusion

- determined that:
 - tall plant (or purple flowers) = **dominant** allele (Factors)
 - short plants (or white flowers) = **recessive** allele (Factors)
- ***blending theory disproved***
- repeated for all 7 characteristics with same results

Principle of Dominance - when individuals with contrasting traits are crossed, the offspring will only express the dominant trait



NB: See the table 5.1 on pg 204 for the traits.

Character	Dominant Trait	×	Recessive Trait
Flower color	Purple 	×	White 
Flower position	Axial 	×	Terminal 
Seed color	Yellow 	×	Green 
Seed shape	Round 	×	Wrinkled 
Pod shape	Inflated 	×	Constricted 
Pod color	Green 	×	Yellow 
Stem length	Tall 	×	Dwarf 

Use a Punnett square to explain the outcome of the F1 generation

Let 'T' be the allele for Tall

Let 't' be the allele for dwarf




Tall Purebred TT



Dwarf
Purebred

tt

	T	T
t	Tt	Tt
t	Tt	Tt



Tall Purebred TT



Dwarf
Purebred

tt

	T	T
t	Tt	Tt
t	Tt	Tt

Therefore all offspring show the same genetic makeup

Phenotype = 100% tall plants

Genotype= all plants are heterozygous Tt

RECALL THE NEXT GENERATION

Mendel crossed F₁ X F₁ (tall x tall)



F₁ generation
(all tall)

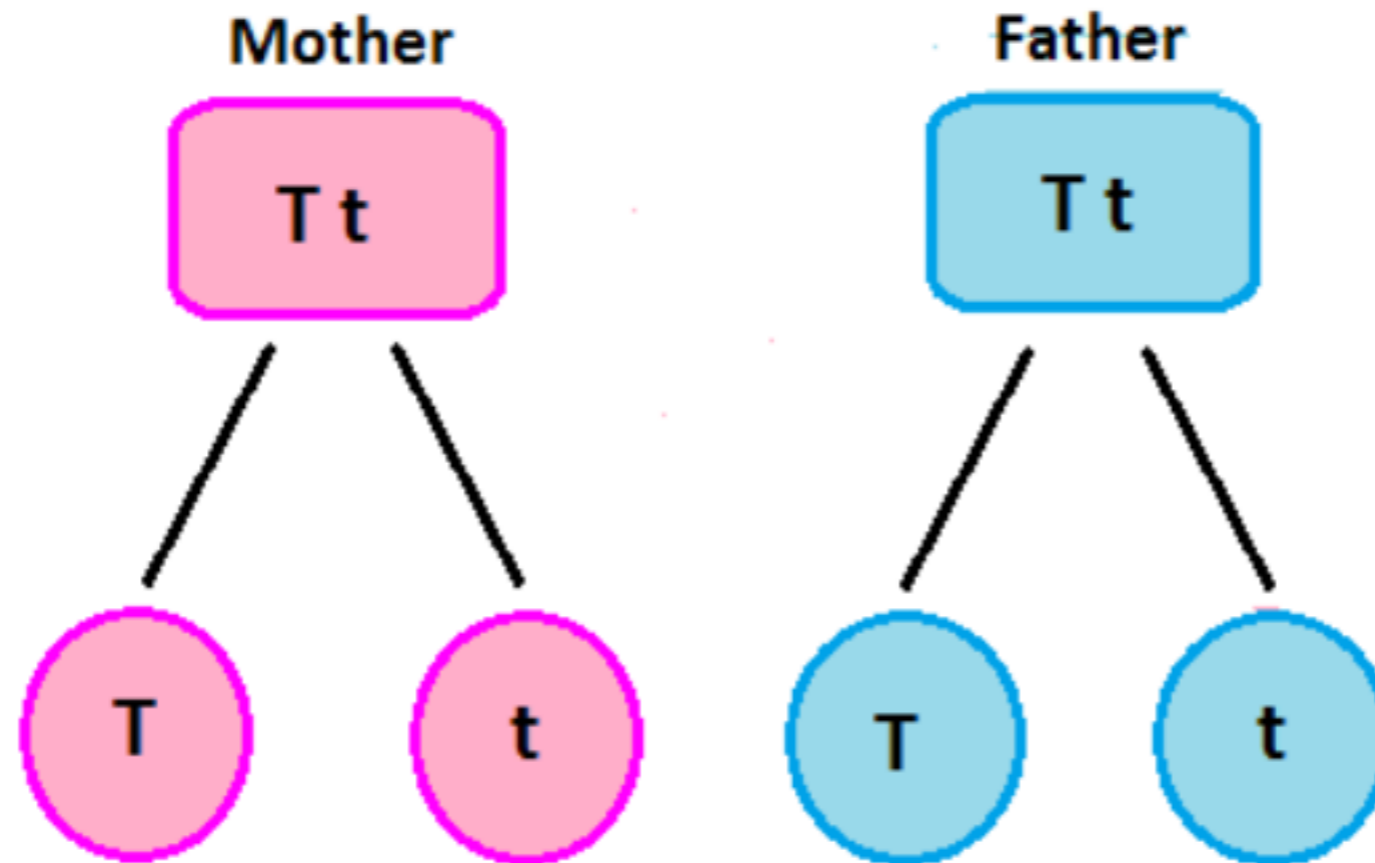


F₂ generation
(3 tall : 1 dwarf)

Conclusion

- > 3 of 4 plants were tall & 1 of 4 was short
 - **75% : 25% ratio = Mendelian ratio 3:1**
 - observed for all 7 characteristics

Law of Segregation - inherited traits are determined by pairs of factors. These factors separate in gametes (one in each).



homozygous - state when the alleles are the same
(2 dominant or 2 recessive..ie purebred for a trait)
(P generation for Mendel eg. TT or tt)

heterozygous - when the alleles are different
(1 dominant, 1 recessive) (F1 generation eg. Tt)

Punnett Squares:

- **genotype** - genetic make-up of an organism (alleles)

TT or Tt

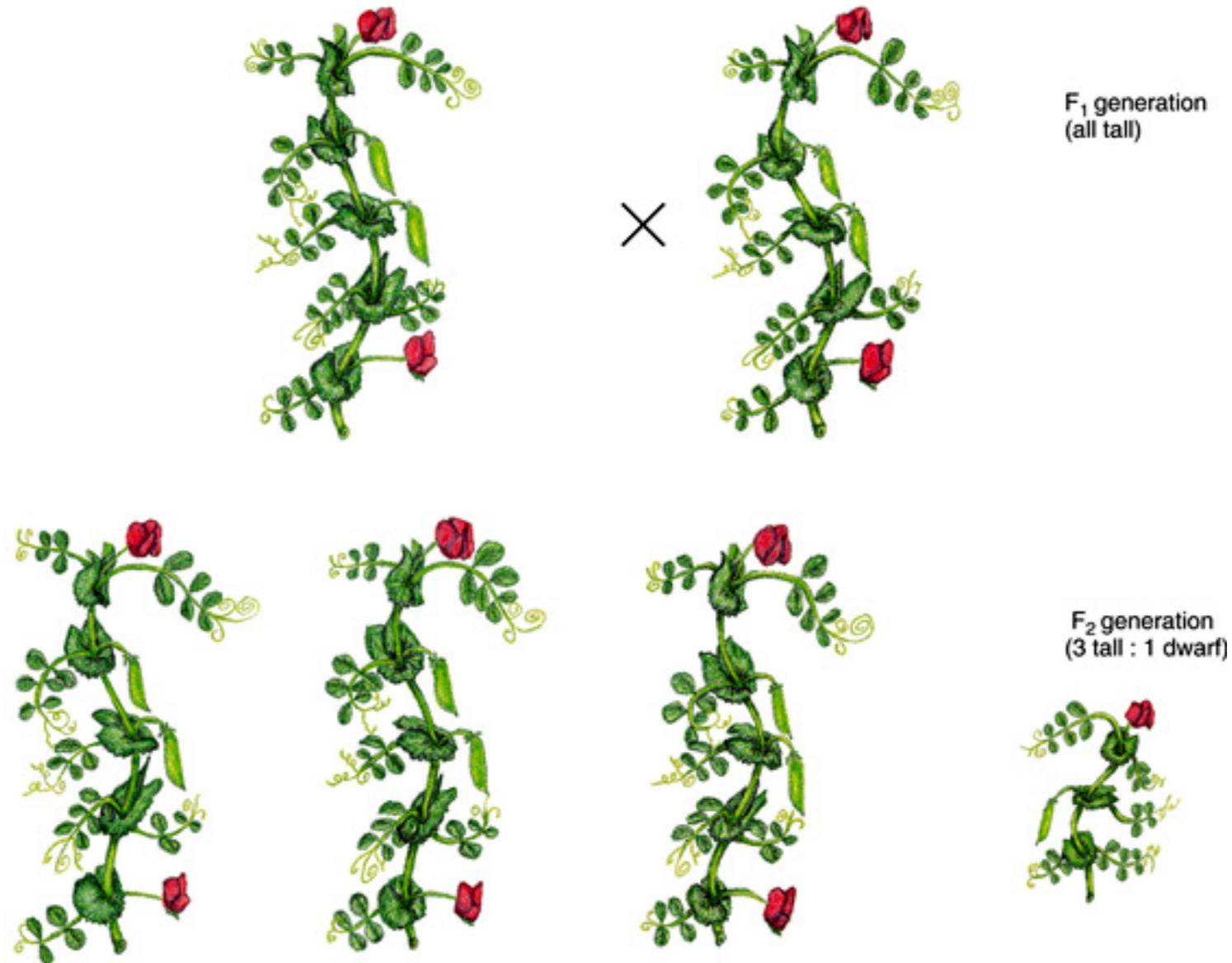


tt



B- Next, Mendel crossed F1 X F1 (tall x tall)

Recall that...




B- Next, Mendel crossed
F1 X F1 (tall x tall)

Let ' ' be the gene for Tall

Let ' ' be the gene for dwarf



F1 Tall

F1 Tall



B- Next, Mendel crossed
F1 X F1 (tall x tall)



F1 Tall

F1 Tall



F2 -Result



Phenotype = tall plants : short plants
Genotype= TT : Tt : tt

Punnett Squares:

- Use both laws, punnett squares can determine what we will see in the F1 & F2 generations.
 - tool used to calculate the probability of getting a trait
 - allows you to determine the phenotype and genotype

1. A pure dominant brown mouse (homozygous) is crossed with a **heterozygous** brown mouse (tan is the recessive colour). Show the results using a Punnett



A heterozygous white rabbit is crossed with a homozygous black rabbit.

