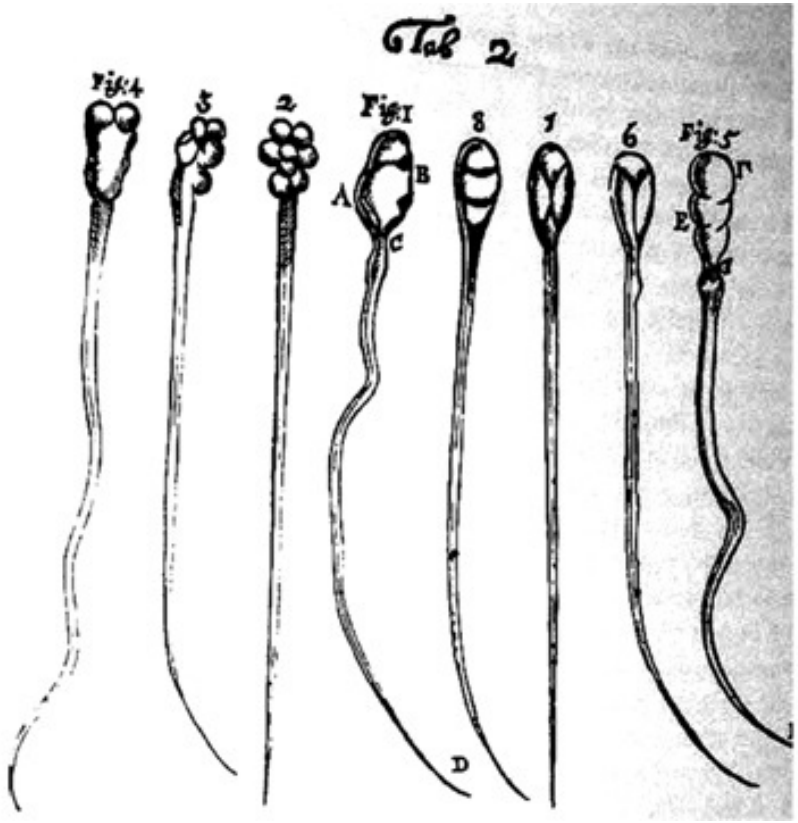
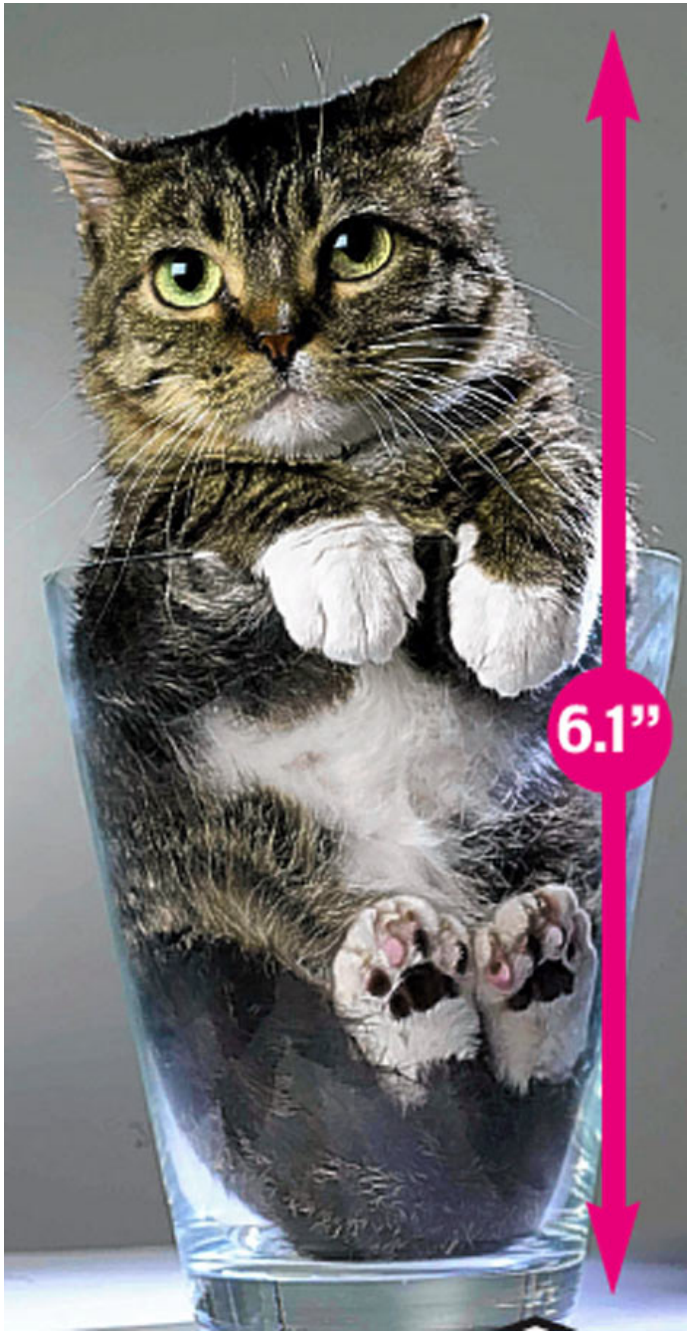
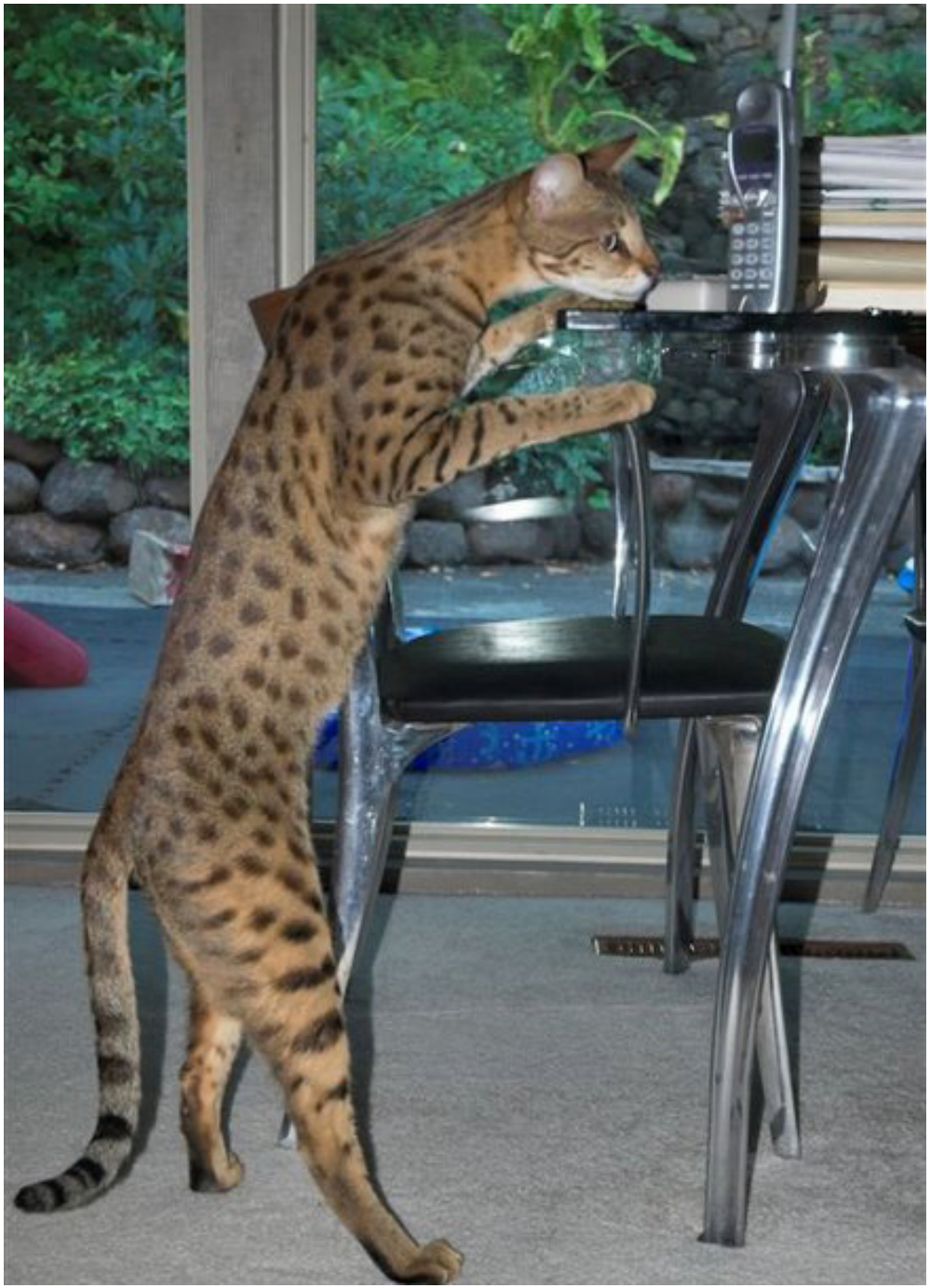
Demo-
The flaws of Blending



Sperm images -Antoine Leeuwenhoek


Forum Istanbul
GUINNESS WORLD RECORDS LIVE!

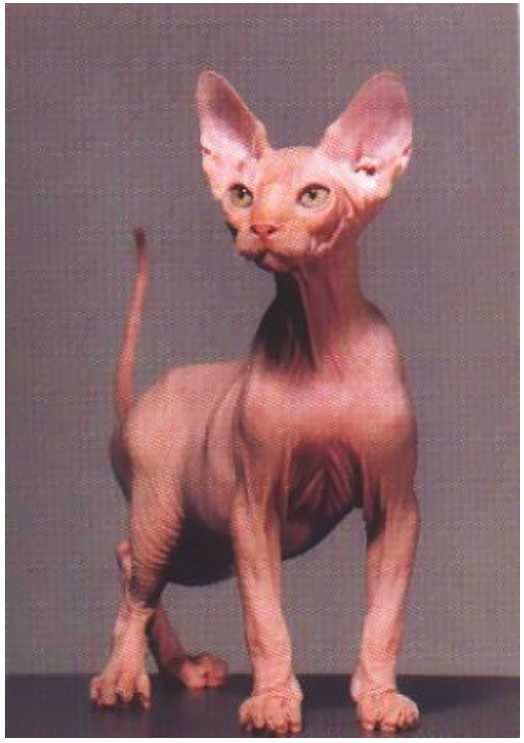

6.1”

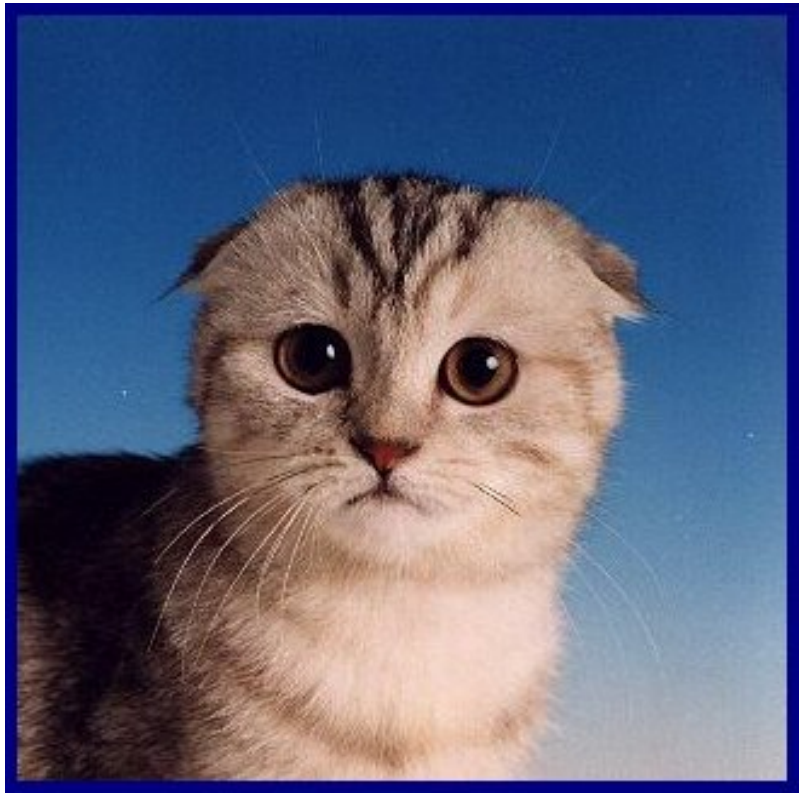


Genetic Inheritance

traits - distinguishing characteristics

- breeders can select for certain traits





traits - distinguishing characteristics

- breeders select for certain traits

eg. - disease resistance in wheat

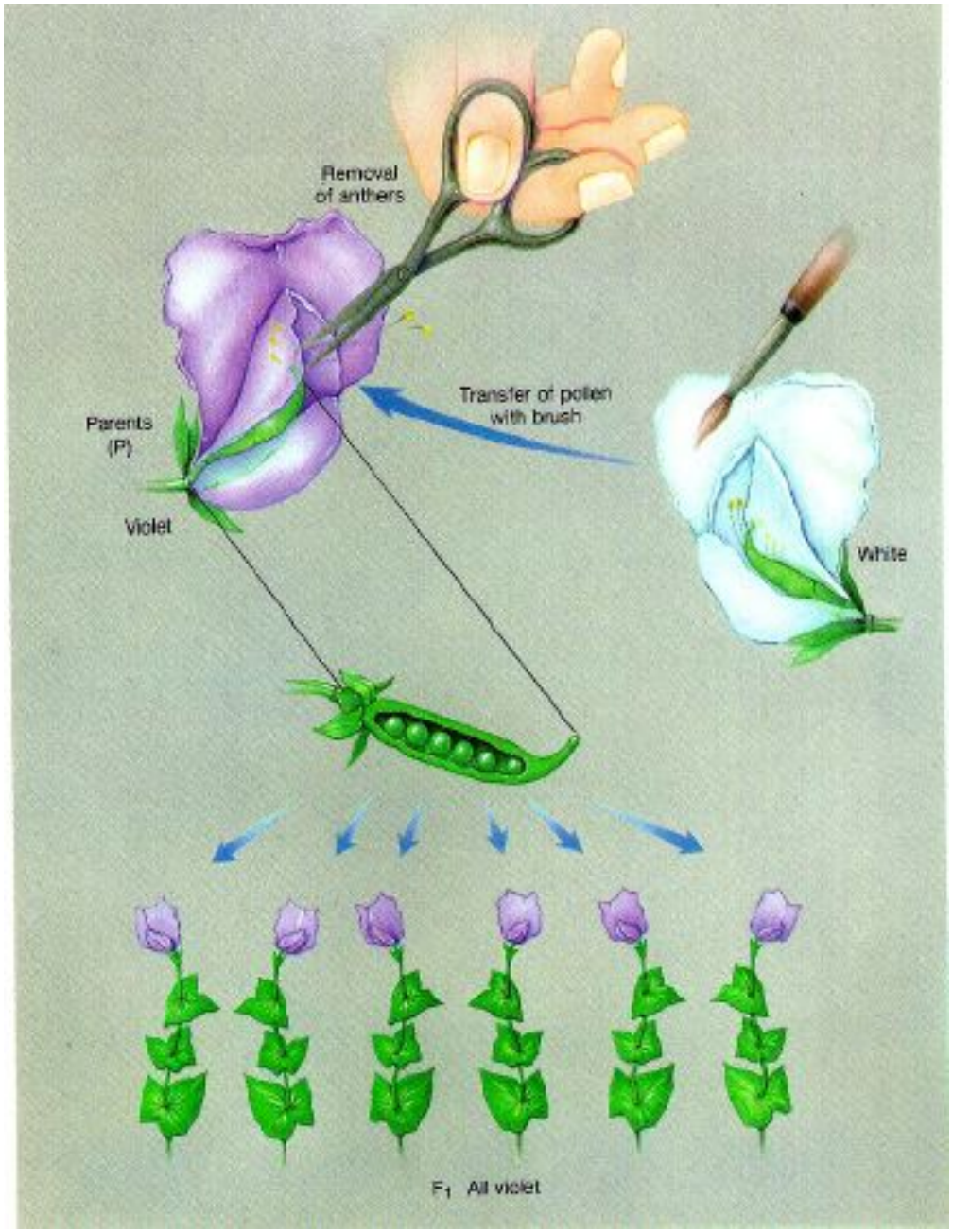
- extra spots on a dalmatian
- hairlessness cats (Rex)

The Inheritance of One Trait

Gregor **Mendel**

Austrian monk who studied heredity from 1853-61


Album Benary
Tab. XXIII
Ernst Benary Erfurt


Removal of anthers
Transfer of pollen with brush
Parents (P)
Violet
White
F1 All violet

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 

Mendel's First Experiment: A Monohybrid Cross

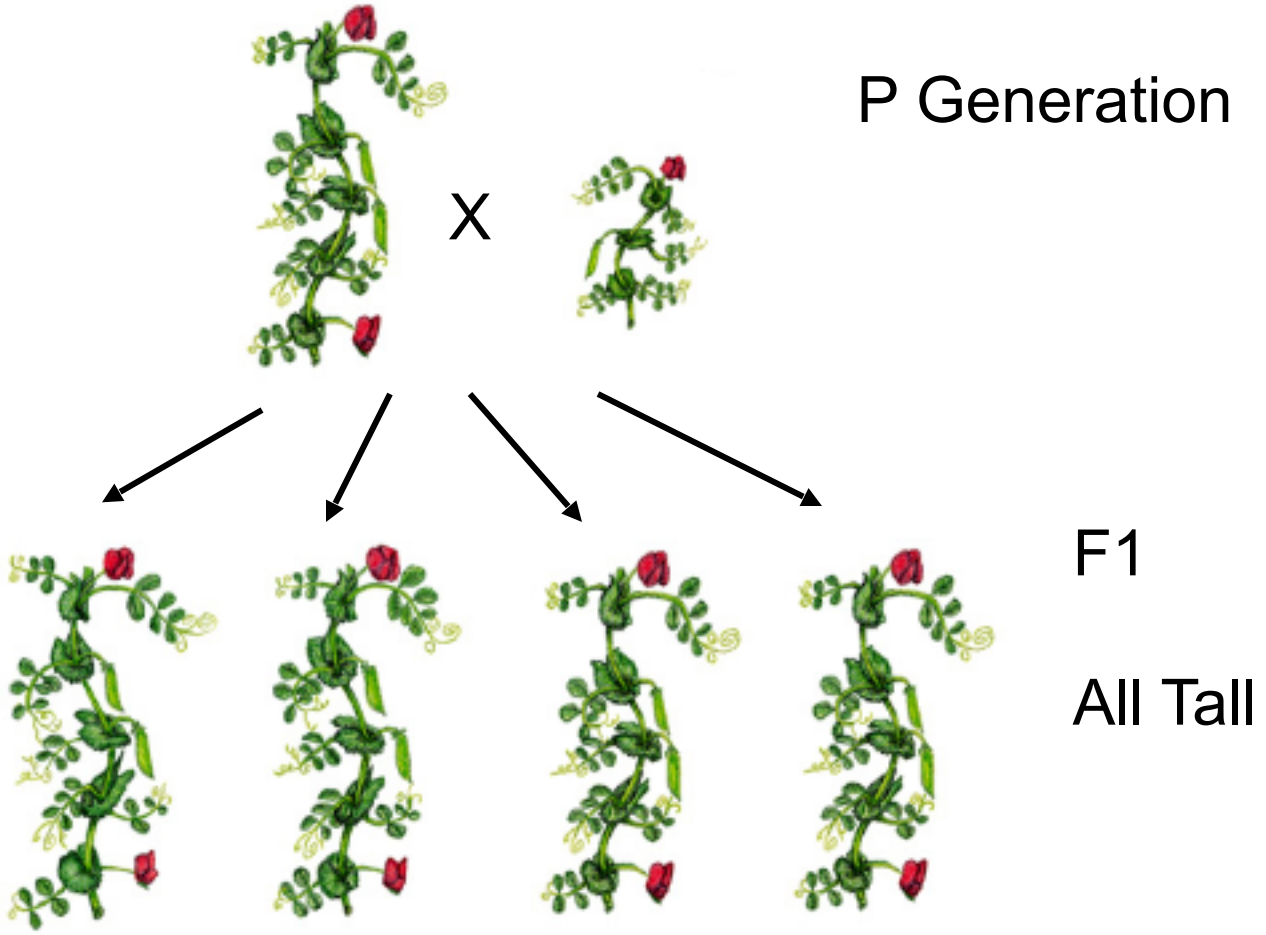
Parent generation = **P** generation (pure line)

1st generation = **F1** (filial generation or cross between pure line)

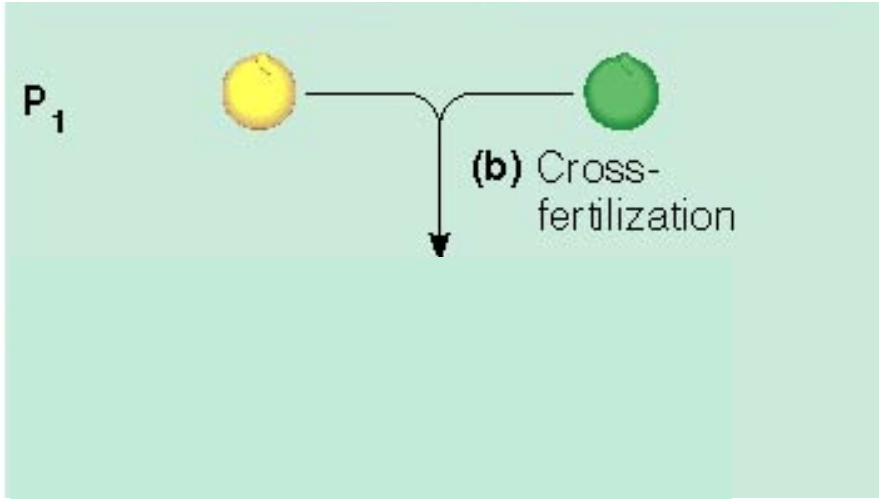
2nd generation = **F2** (cross between F1)

A. Mendel crossed TALL x SHORT plants

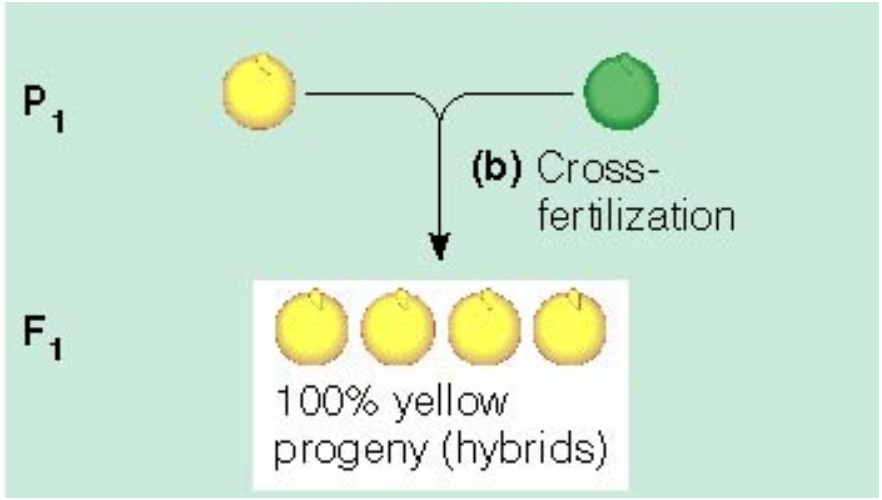
A. Mendel crossed TALL x SHORT plants



Mendel crossed Yellow x Green Pea



Mendel crossed Yellow x Green Pea



Conclusion

- determined that;
  - tall plant and yellow peas = **dominant** traits
  - short plants and green peas = **recessive** trait

- blended theory disproved

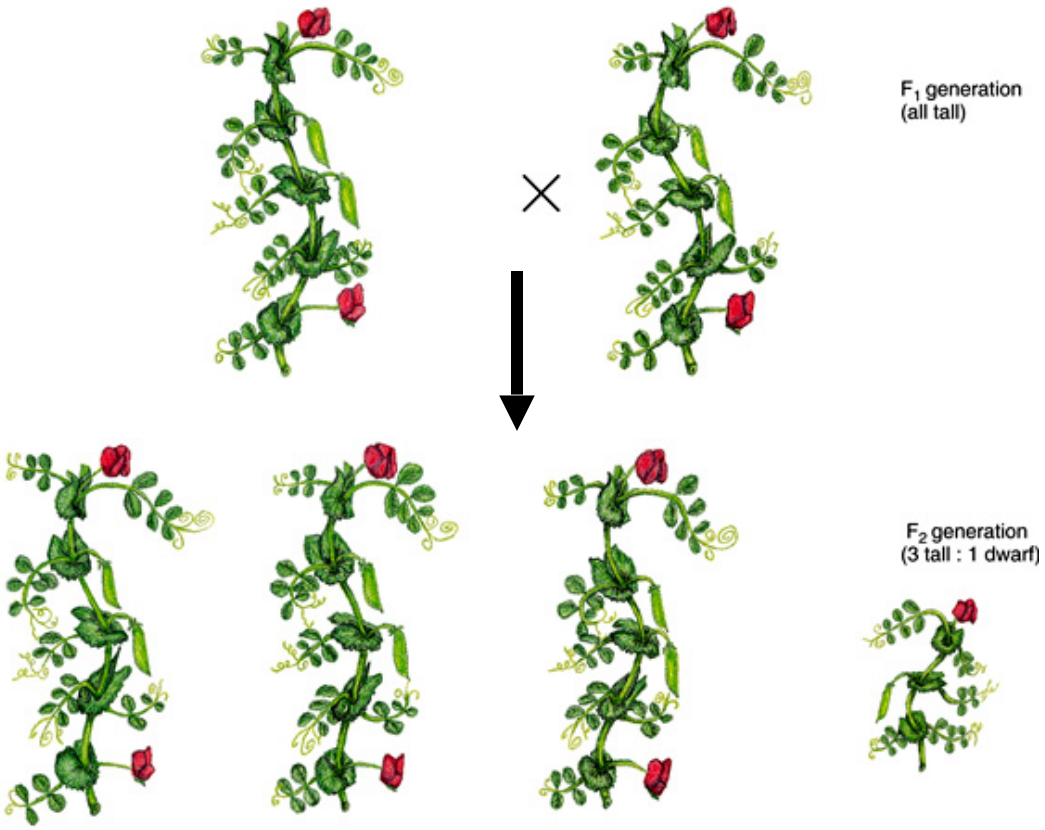
- repeated for all 7 characteristics with same results

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

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

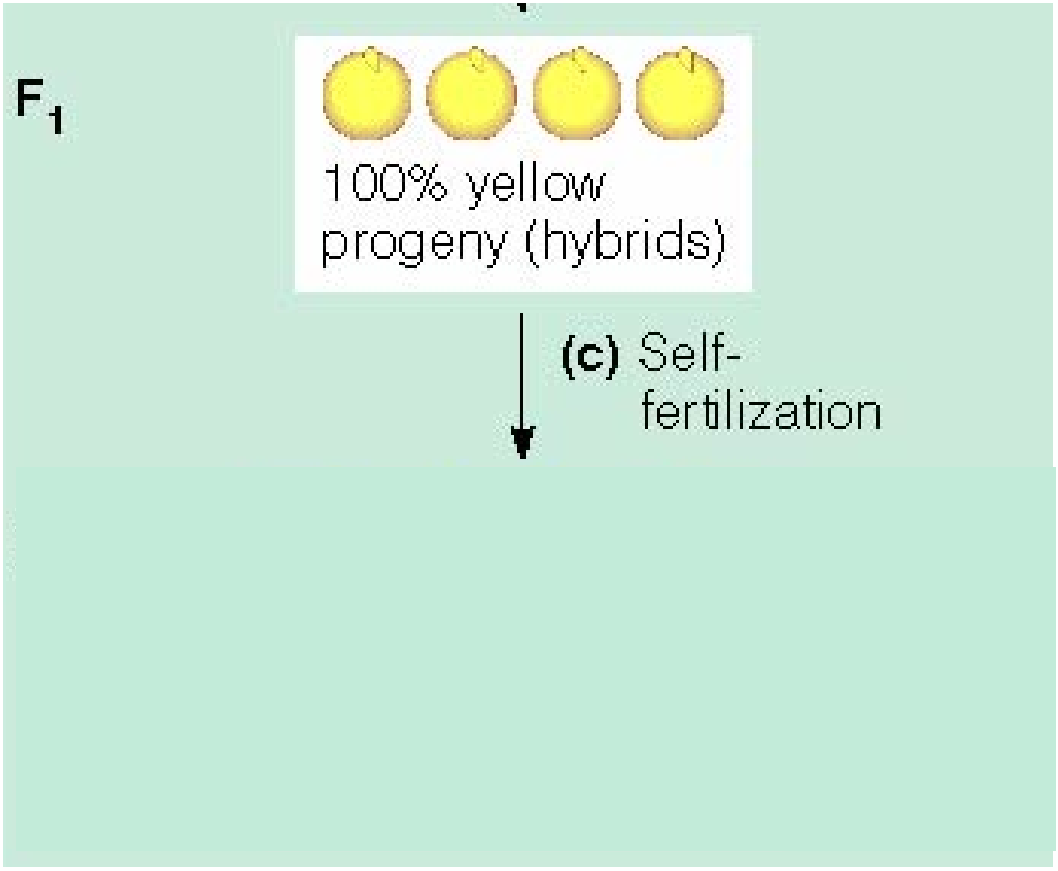
F_1 generation
(all tall)

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

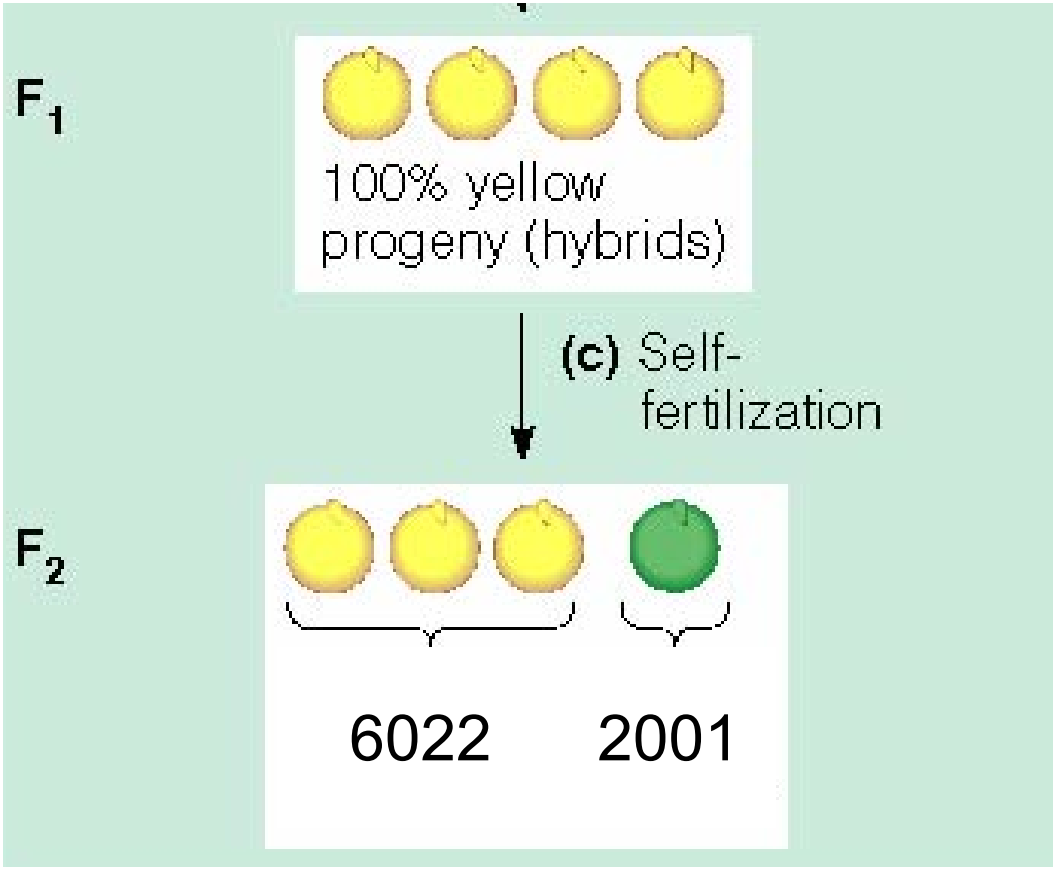


787 offspring 277 offspring

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



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



Conclusion part 2

--->- 75% : 25% ratio = **Mendelian ratio**

or 3:1 ratio of Dominant : Recessive

- observed for all 7 characteristics

Mendel explained these results as…

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

factors = allele

alleles = alternative forms of a gene (or different options)

eg., yellow and green are different alleles for seed colour

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:

- Using these two 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**

Punnett Squares:

- **phenotype** - visible appearance of a trait
  eg: the plants are tall or dwarf

Punnett Squares:

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

TT or Tt

Punnett Squares:

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

TT or Tt

tt

Use a Punnett square to determine the phenotype & genotype 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

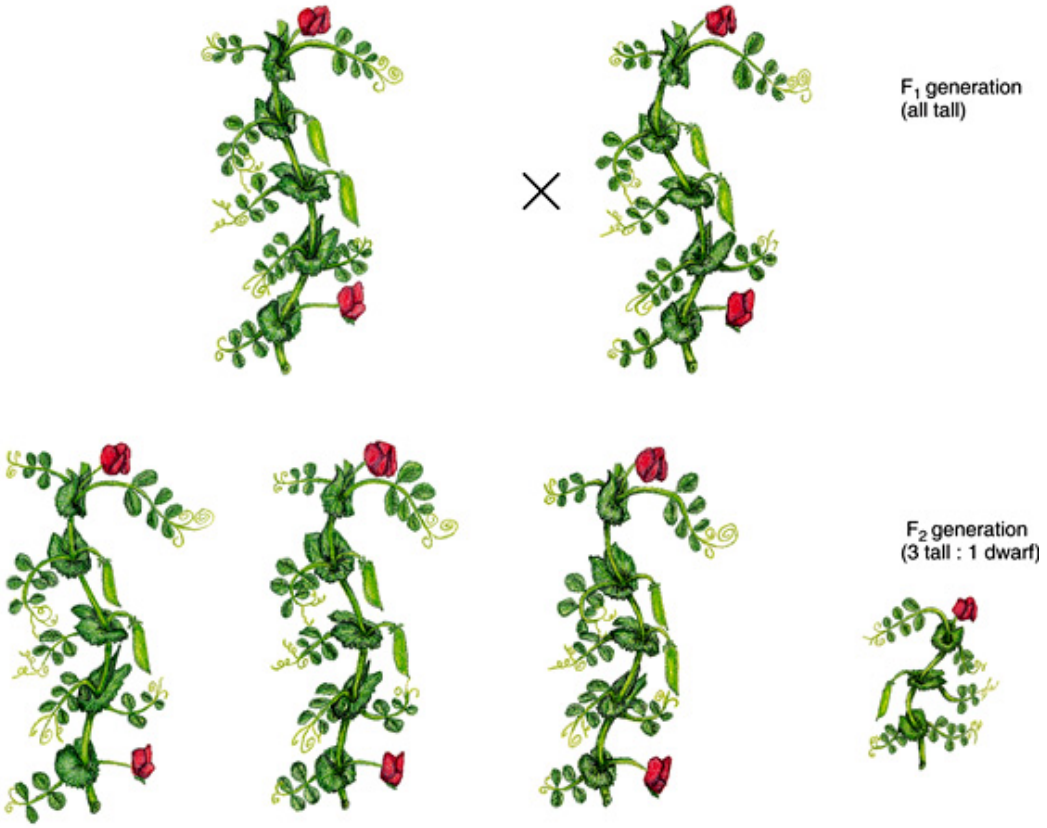
	T	T
t	Tt	Tt
t	Tt	Tt

Therefore all offspring show the same genetic makeup

Phenotype = 100% tall plants
Genotype= all plants are heterozygous Tt

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

Recall that…



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

Let ‘T’ be the gene for Tall

Let ‘t’ be the gene for dwarf

F1 Tall Tt

F1 Tall

Tt

	T	t
T	TT	Tt
t	Tt	tt

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

F1 Tall Tt

	T	t
T	TT	Tt
t	Tt	tt

F1 Tall Tt

F2

Phenotype = 3 tall plants : 1 short plants

Genotype= 1 TT : 2 Tt : 1 tt