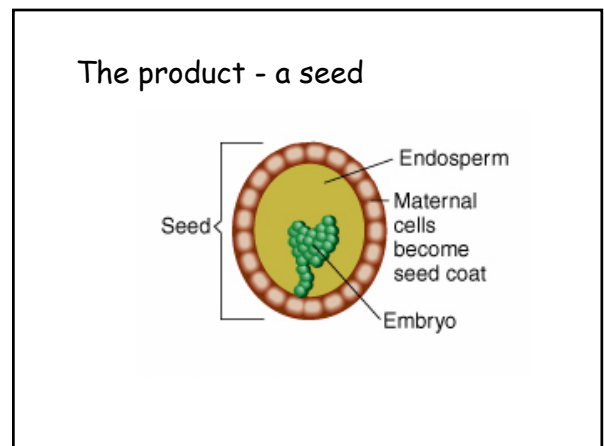
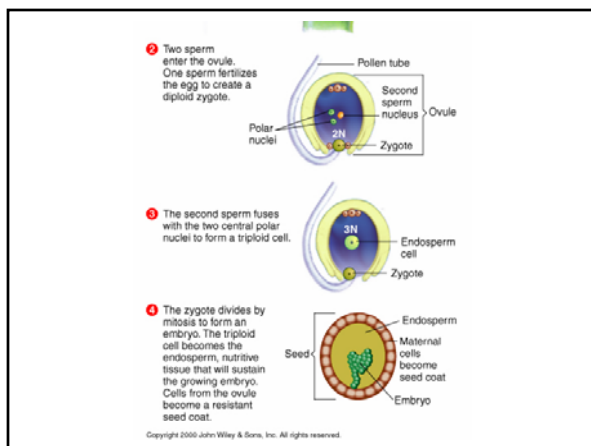
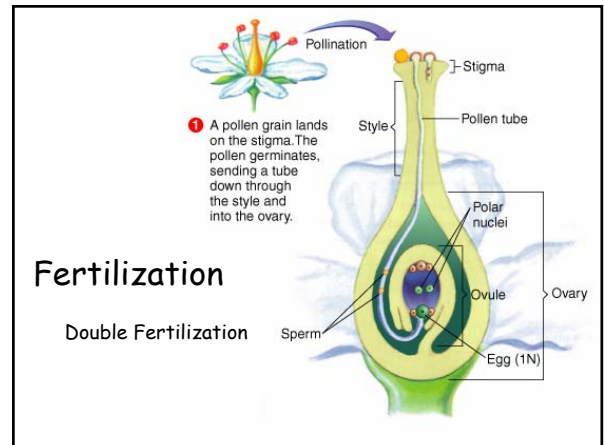
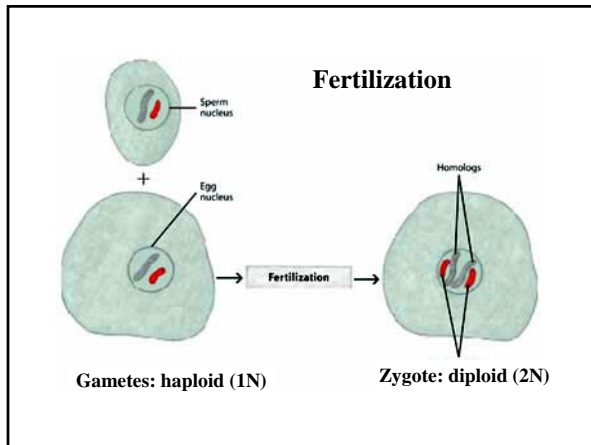
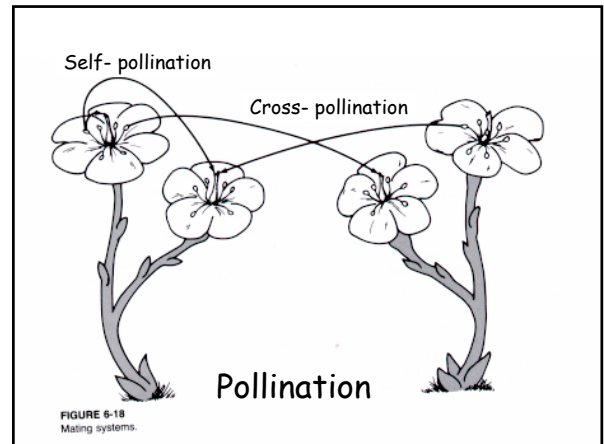
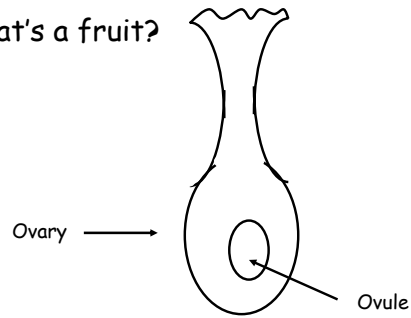


Sexual Reproduction

Pollination



So what's a fruit?



a fleshy, sweet-tasting tissue derived from the ovary.

Fruits



The purpose: to increase seed dispersal.



Classical Genetics

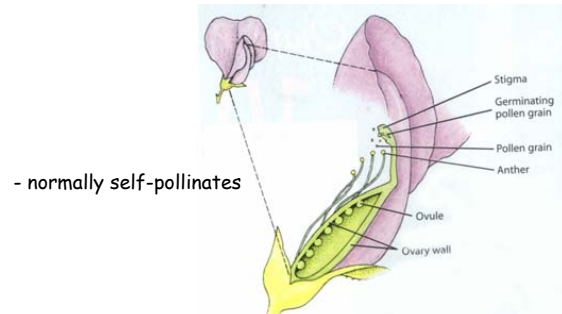
The Fruits of Mendel's Labors

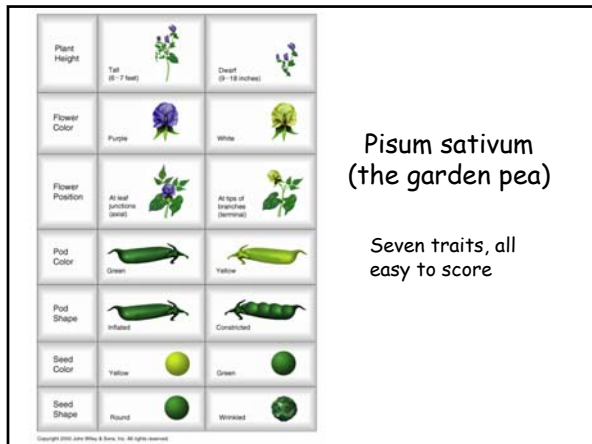
Gregor Mendel:

- Augustinian monk
- Father of *Genetics*

"The value and utility of any experiment are determined by the fitness of the material to the purpose for which it is used."

Pisum sativum
(the common garden pea)





Mendel's Approach

- 1) He tested a very specific hypothesis in a series of logical experiments.
- 2) Before crossing, he obtained true breeding lines.
- 3) He studied not only the offspring of the first generation but also those of subsequent generations and their crosses.
- 4) He counted the different types of offspring & analyzed the results mathematically.
- 5) He kept accurate records.

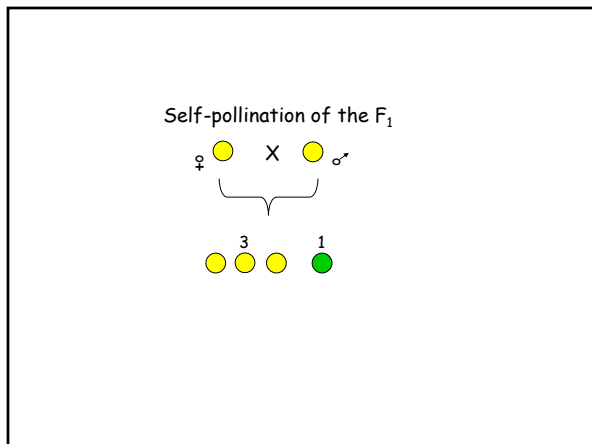
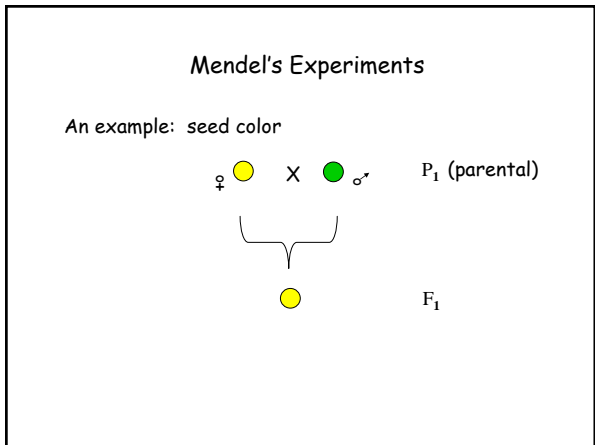
Definitions:

Phenotype - the **visible expression** of information contained in the genetic make-up of an individual

Genotype - the **genetic make-up**, latent or expressed. The sum of all genes present in an individual.

P₁ - the **parental lines**

F₁ - the first filial generation, the **offspring** resulting from a cross. F₂/F₃ the second and third generations.



The Results of Mendel's Experiments

Trait	Original cross		2nd filial (F ₂) Generation	
	Dominant	X Recessive	Dominant	Dominant Recessive
seed color	yellow	X green	all yellow	6022 2001
seed form	round	X wrinkled	all round	5474 1850
flower position	axial	X terminal	all axial	651 207
flower color	purple	X white	all purple	705 224
pod form	inflated	X constricted	all inflated	882 299
pod color	green	X yellow	all green	428 152
stem length	tall	X dwarf	all tall	787 277

Mendel's Principles of Inheritance

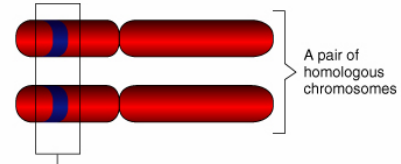
1) Genetic characteristics are controlled by unit factors (*elemente*) that exist in pairs in individual organisms.

These unit factors represent units of inheritance today called **genes**.

Alternative forms of a single gene are called **alleles**.

Individuals can have identical alleles (**homozygous**) or different alleles (**heterozygous**) for a single gene.

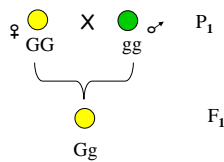
Unit factors (*elemente*) = genes on chromosomes



- the two members of an homologous pair carry alleles for the same genes and, therefore, affect the same traits.

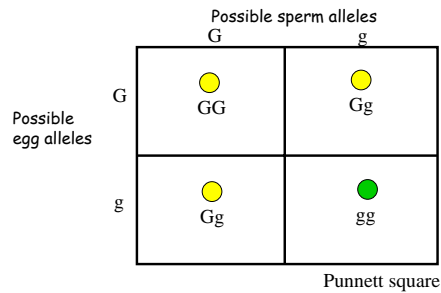
Dominance/Recessiveness

When two unlike alleles responsible for a single character are present in a single individual, one is **dominant** (expressed) to the other which is said to be **recessive** (silent).

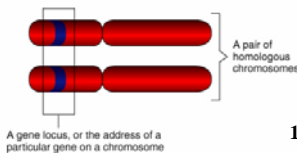


Segregation

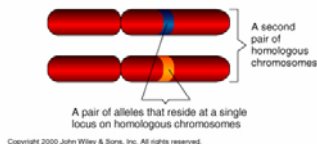
During formation of the gametes, the paired alleles separate or **segregate randomly** so that each gamete receives either with equal likelihood.



The address of genes - loci



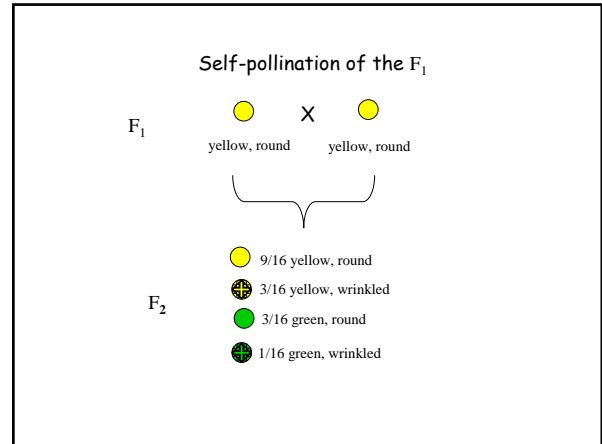
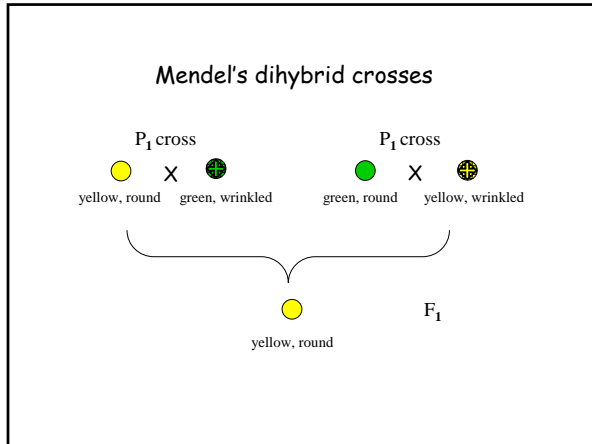
1 locus (monogenic),
2 different alleles
3 combos possible





















Copyright 2000 John Wiley & Sons, Inc. All rights reserved.

Dihybrid cross

- crosses between individuals that differ in **two** traits.



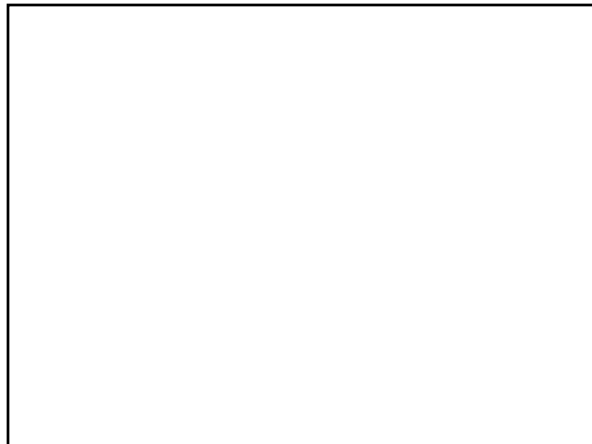
 X 
 yellow (Gg), round (Ww) yellow (Gg), round (Ww)

♂	GW	Gw	gW	gw	
♀ GW	 GGWW	 GGWw	 GgWW	 GgWw	F ₂ Generation
Gw	 GGWw	 GGww	 GgWw	 Ggww	
gW	 GgWW	 GgWw	 ggWW	 ggWw	
gw	 GgWw	 Ggww	 ggWw	 ggww	

Mendel's dihybrid ratio 9:3:3:1

Mendel's Second Principle of Inheritance

Independent Assortment - during gamete formation, segregating pairs of unit factors assort independently of each other.



Summary of Mendelian Genetics

Mendel's "rules of the game"

- Unit factors in pairs** - Genetic characteristics are controlled by unit factors that exist in pairs.
 - **Dominance/Recessiveness**- When two unlike unit factors responsible for a single character are present in a single individual, one is **dominant** (expressed) to the other which is said to be **recessive** (silent).
 - **Segregation**- during formation of the gametes, the paired unit factors separate or **segregate randomly**.
- Independent Assortment** - during gamete formation, segregating pairs of unit factors assort independently of each other.