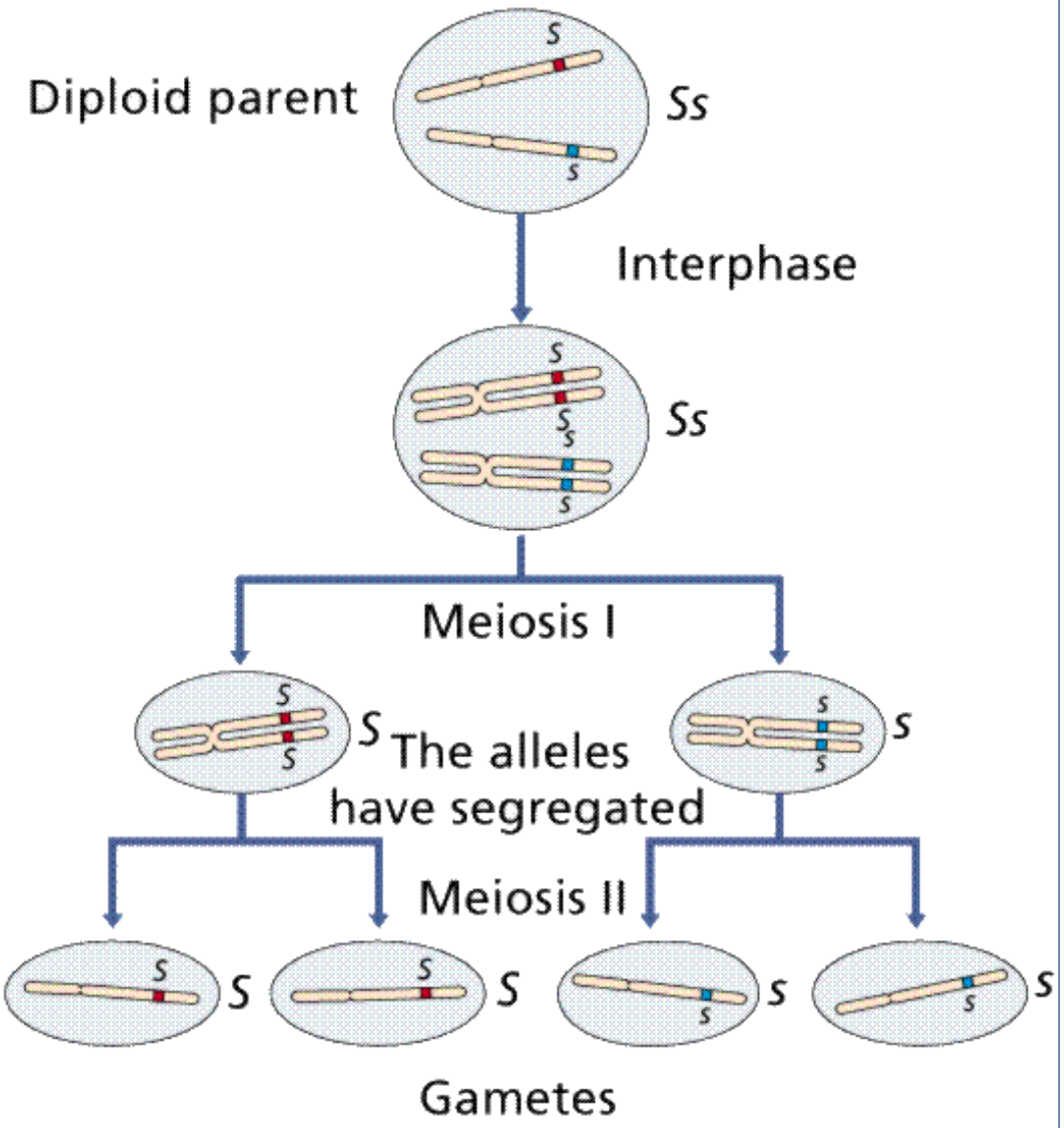


<u>Important Vocabulary</u>:

<u>Homologous Pairs-</u> Pairs of chromosomes with the same genes on them (one set came from mom other from dad)

<u>Allele</u> - Alternate forms of a gene; Example:

S = smooth, s = wrinkled

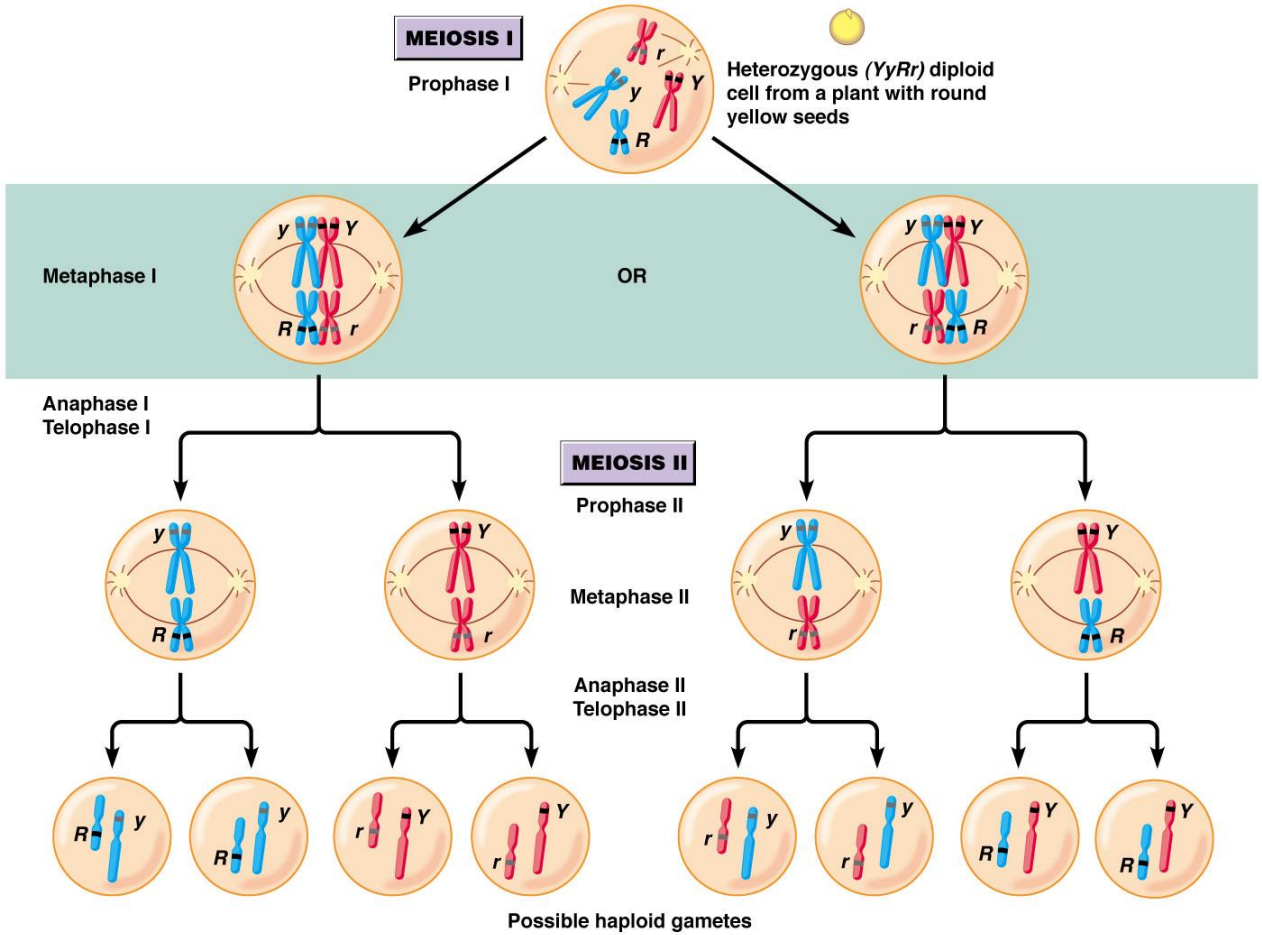
G=green, g=yellow

<u>Loci-</u> Location of the gene on the chromosome.

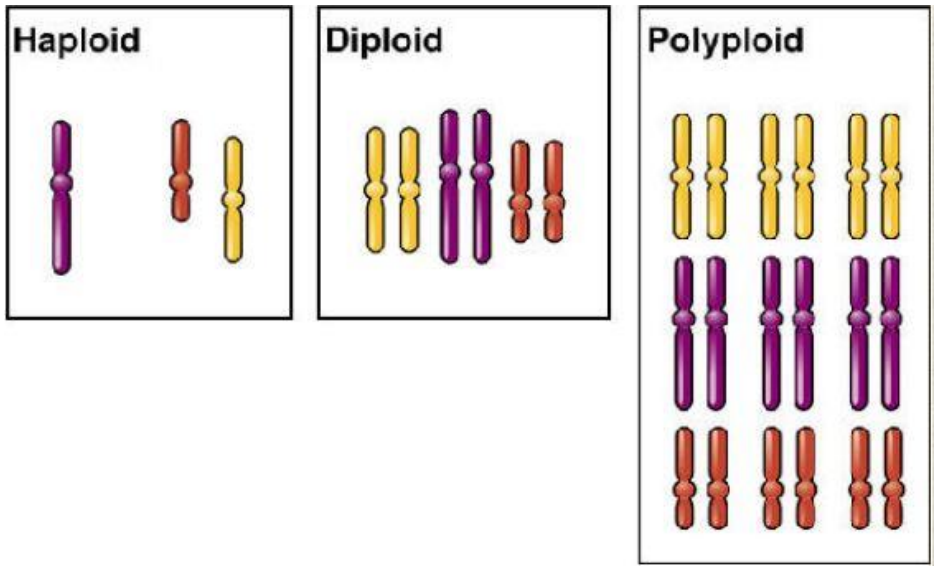
- **The same gene is located at the same spot on the homologous pairs!**

Meiosis – Homologous Pairs separate (half the number of chromosomes) produces gametes (egg & sperm)

Diploid (2n) → haploid/monoploid (1n)



Not all Plants are diploid, but lucky for us the American Chestnut is!

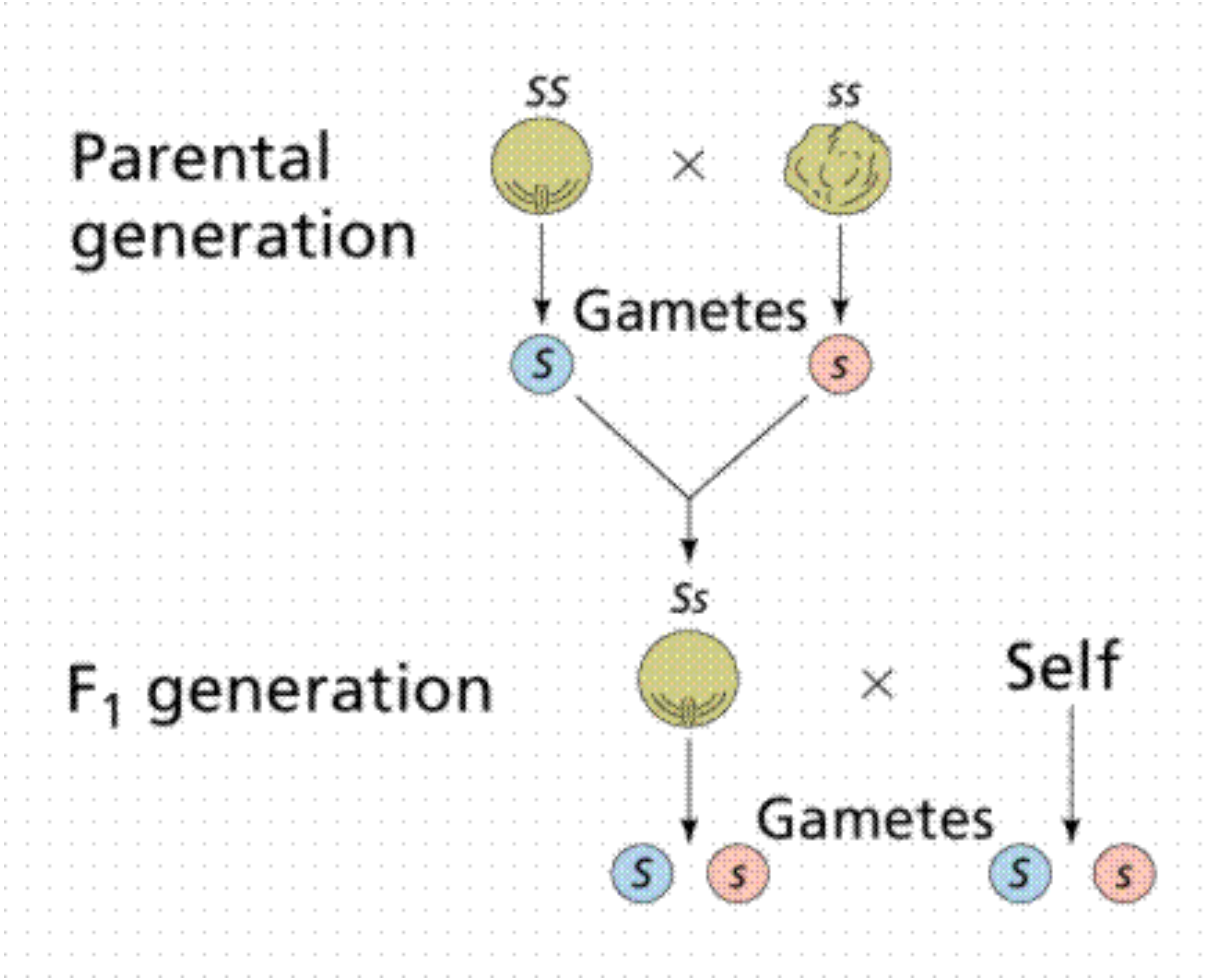


Polyploidy

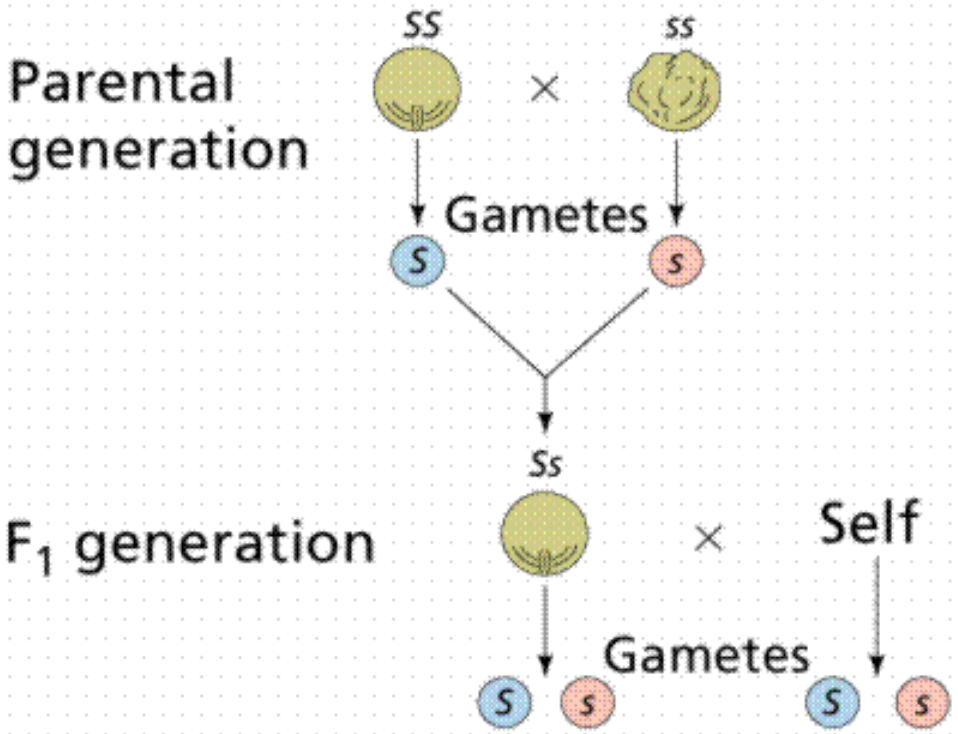
Examples of Polyploid Plants	
Name	**Number**
Common wheat	**6N** = 42
Tobacco	**4N** = 48
Potato	**4N** = 48
Banana	**3N** = 27
Boysenberry	**7N** = 49
Strawberry	**8N** = 56

Many **ferns** are polyploid with chromosome number up to 400N

Fertilization: 1n egg + 1n sperm = 2n offspring (zygote)



Punnett Squares – Used to predict the different possible allele combinations of offspring based on parent's allele combination (genotype).



P generation

	S	S
s	Ss	Ss
s	Ss	Ss

F_1

$F_1 \times F_1$

	S	s
S	SS	Ss
s	Ss	ss

F_2

Vocabulary Review

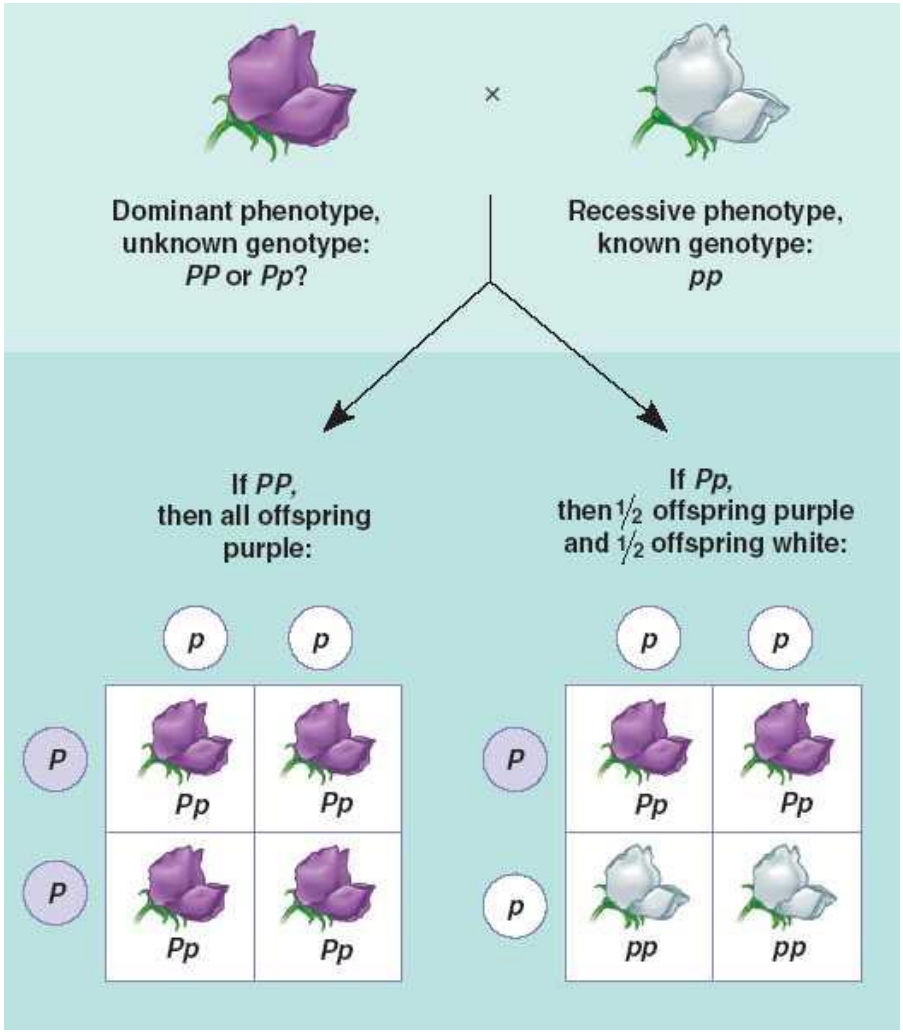
1. Phenotype
2. Genotype
3. Homozygous
4. Heterozygous
5. True Breeding
6. Hybrid

1. Physical characteristic (what you see)
2. What the alleles are (AA, Aa, aa)
3. The alleles are the SAME (AA or aa)
4. The alleles are different (Aa)
5. Same as homozygous
6. Cross between two different types of parents (ie. American and Chinese chestnut) [NOTE: term can also mean heterozygous]

Let’s Practice!

- In peas green pods (G) are dominant to yellow pods (g). What are the phenotype and genotype frequencies for a cross between a heterozygous green plant and a homozygous dominant green plant.

Test Cross



- Used to determine the genotype (homozygous dominant or heterozygous?) of a dominant phenotype.
- Cross the dominant plant with a recessive plant (pp)

Practice

In mice black fur is dominant to white fur. How would you determine the genotype of a black mouse? Show your work!

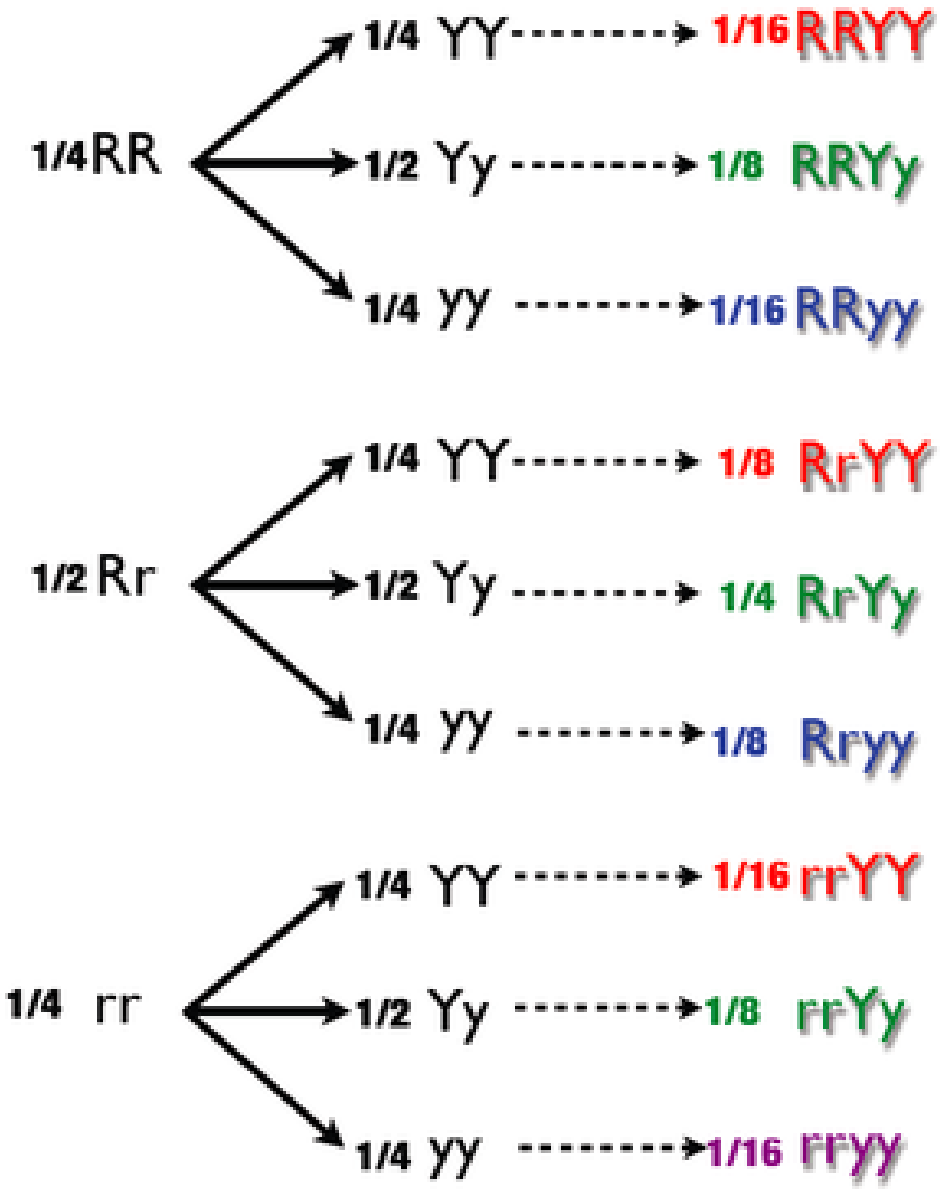
Predicting Inheritance of more than one unlinked trait

Unlinked= Genes are not on the same chromosome

RrYy x RrYy

	R	r
R	RR	Rr
r	Rr	rr

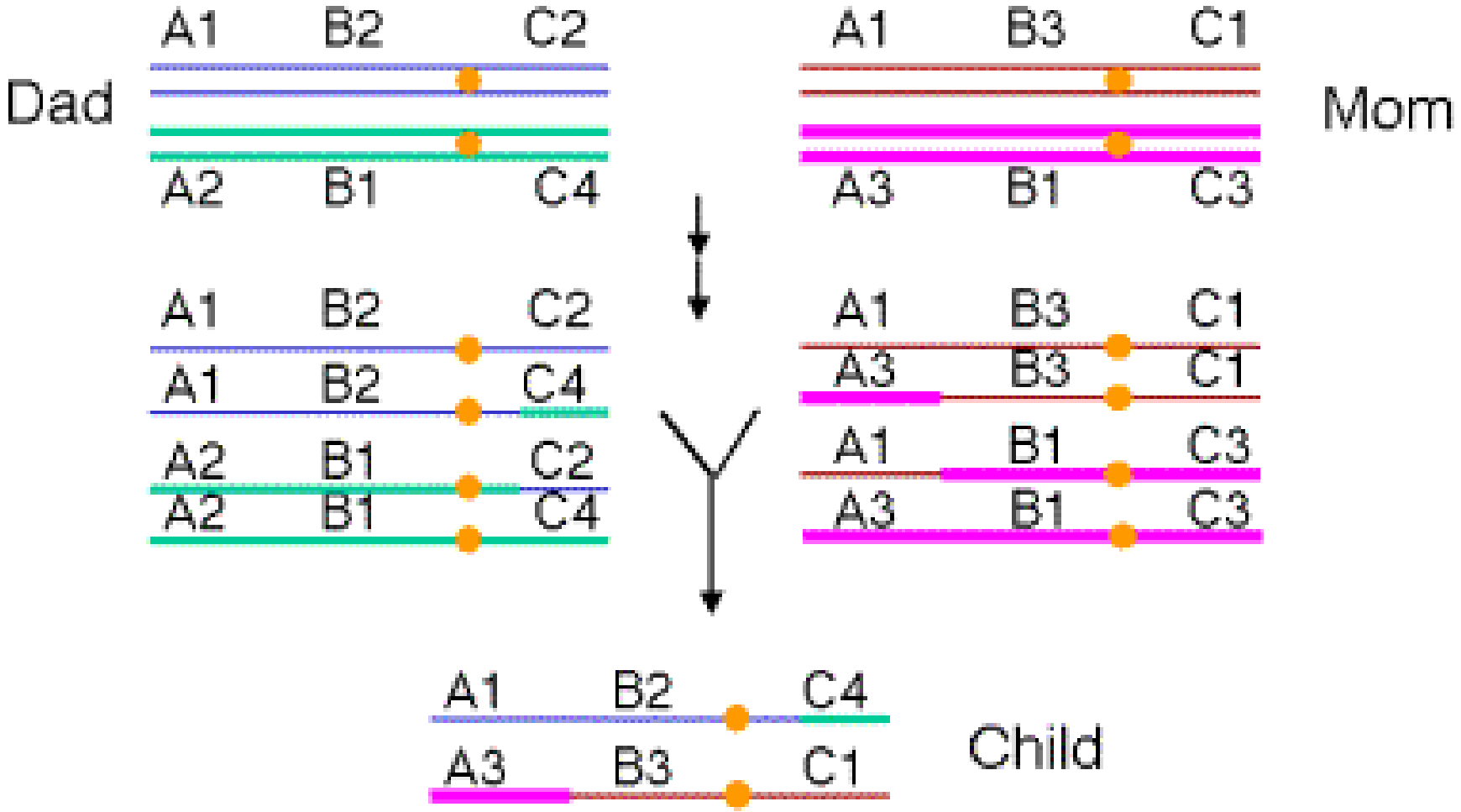
	Y	y
Y	YY	Yy
y	Yy	yy



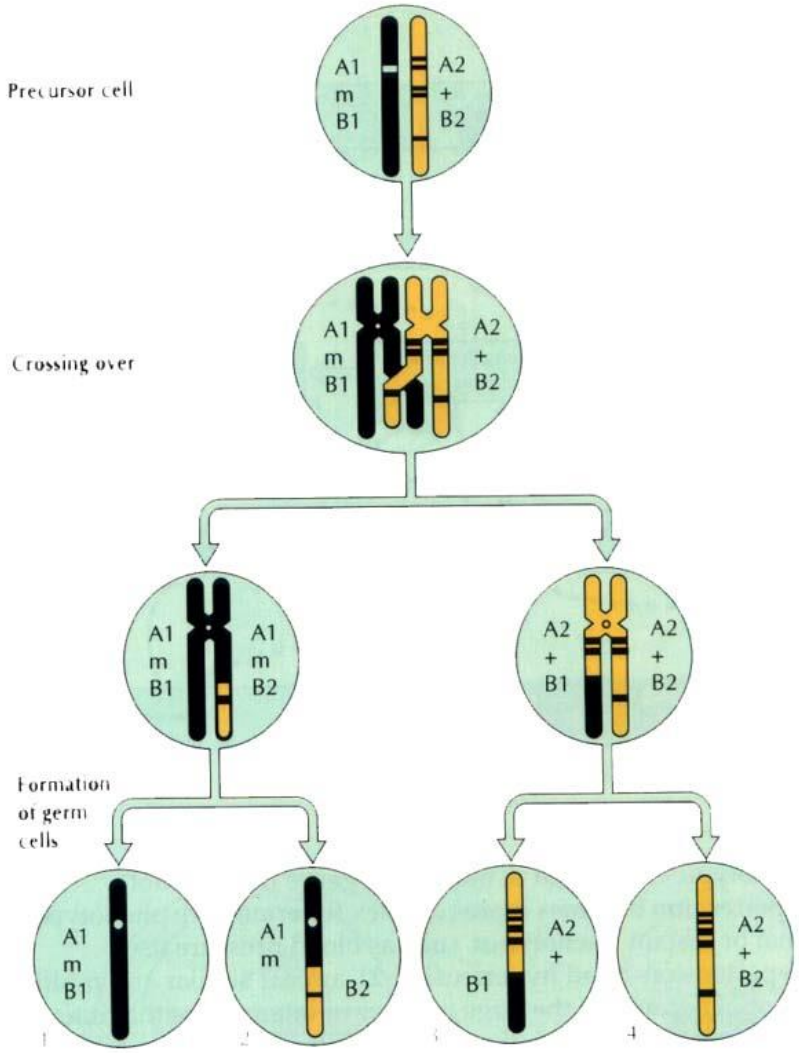
Let's Practice!

- In plants green peas (G) are dominant to yellow peas (g) and round peas (R) are dominant to wrinkled peas (r). What are the phenotype and genotype ratios for a cross between a heterozygous green & round pea (GgRr) and a yellow wrinkled pea?

Gene Linkage

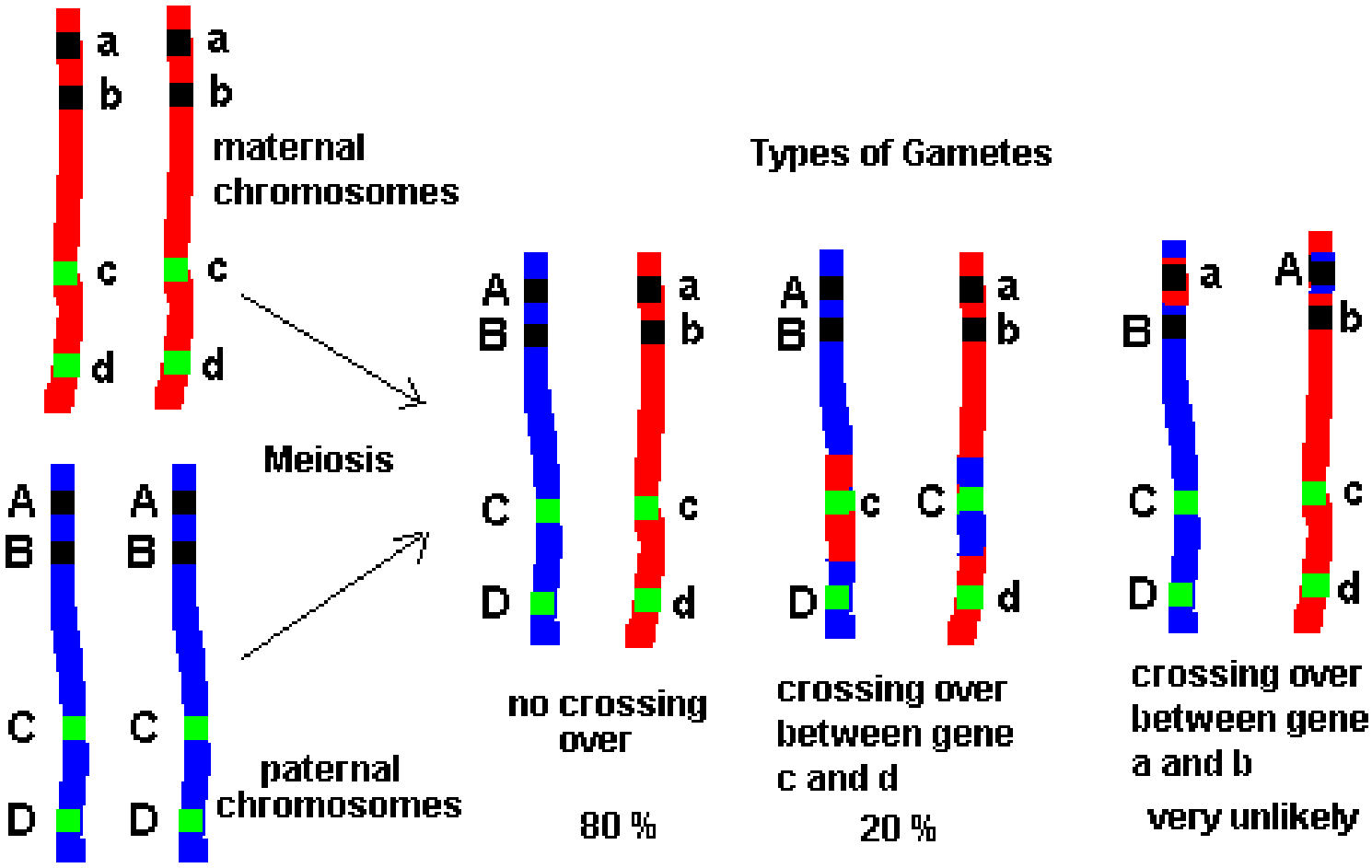


Gene Linkage

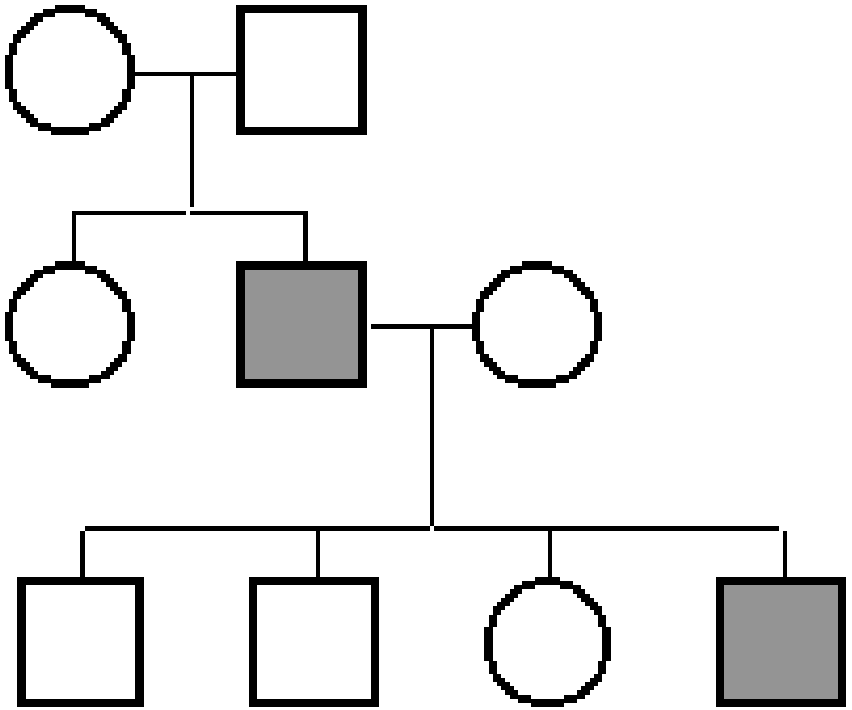


- Alleles on the same chromosome are often inherited together.
- The closer the genes are to each other on a chromosome the more likely they are to be inherited together.
- Alleles that are far apart can be separated by crossing over.

Gene Linkage & Crossing Over

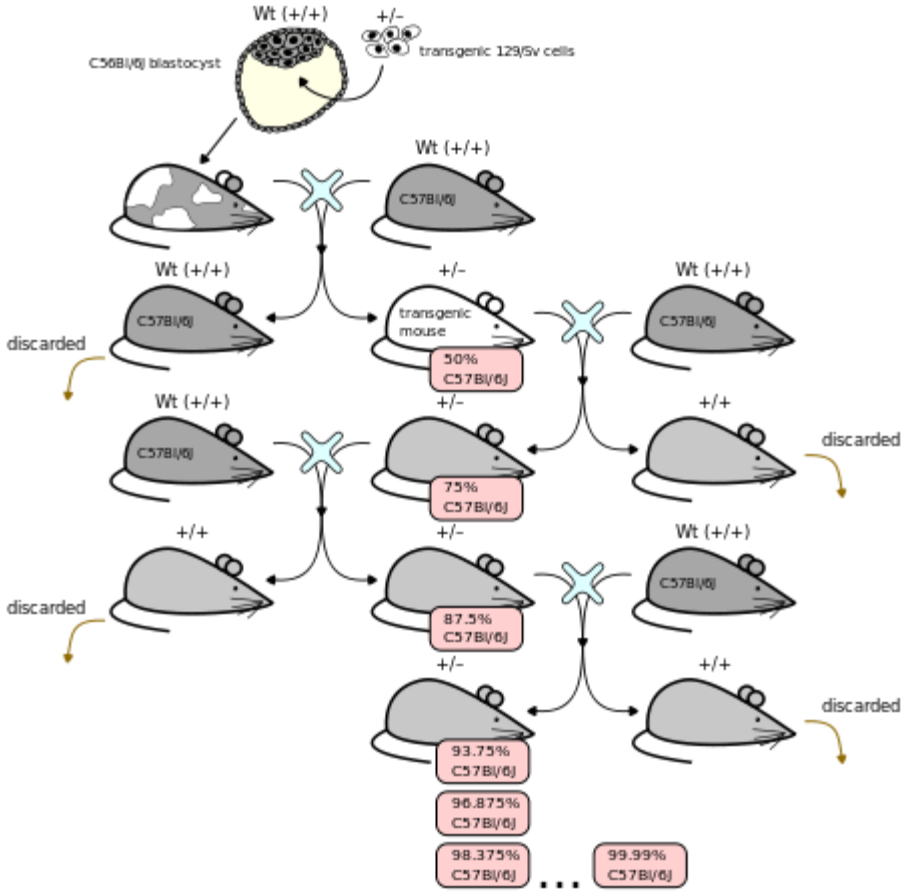


Pedigrees



- Circles are females & squares are males.
- If it is shaded then the individual has the phenotype that is being tracked.
- P1 = parent generation
- F1 = offspring of first cross
- F2= offspring of second cross

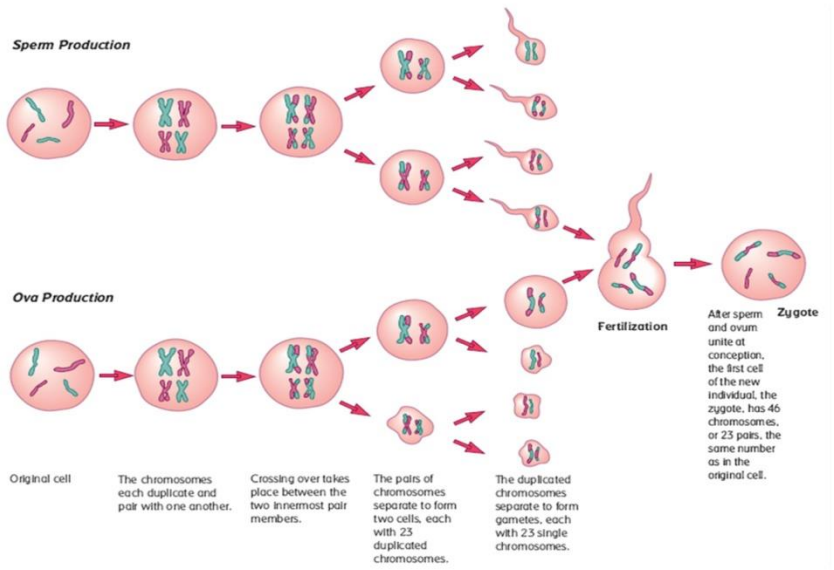
Backcross (B1)



- Crossing a hybrid with one of its parents or an individual who is genetically similar to its parent.
- Useful for isolating certain characteristics (Example: Resistance to the American Chestnut blight)

Recombination versus Propagation

- Recombination = meiosis + Fertilization



- Vegetative propagation = cloning (mutation is the only way to achieve diversity)