

Exploring Genetics

Do genes segregate independently, or are traits linked in some way?

Mendel conducted an experiment in which he crossed a true-breeding plant with round and yellow peas with a true breeding wrinkled green pea plant.

$$(RRYY) \times (rryy)$$

The F₁ generation produced all plants with round, yellow peas (the dominant characteristics).



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You can use a Punnett square to show the combinations possible for 2 gene traits:

Round Yellow Peas (RRYY)

	RY	RY	RY	RY
ry				
ry				
ry				
ry				

Wrinkled Green peas (rryy)

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To determine whether or not these genes segregated independently, he allowed the plants to self-pollinate and create an F₂ generation.

Use a Punnett square to predict the F₂ offspring traits:

Heterozygous Round Yellow Peas (RrYy)

	RY	Ry	rY	ry
RY				
Ry				
rY				
ry				

Heterozygous Round yellow peas (RrYy)

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Summarize your results using the following table:

	Number	Percentage
Round Yellow peas:	9	
Wrinkled yellow peas:	3	
Round green peas:	3	
wrinkled yellow peas:	1	

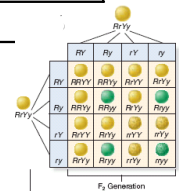


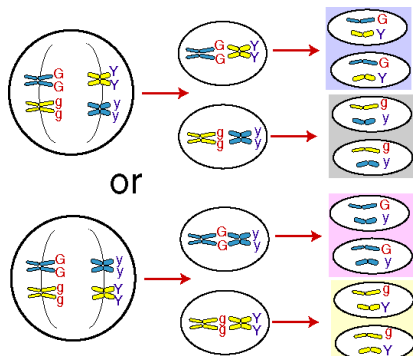
Figure 11 - 10, p. 271

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Since some of the F₂ offspring does not look like either parent, Mendel was able to conclude that genes segregate independently.

(Just because you get one gene, doesn't mean you'll automatically get the other one as well.)

This principle is known as **independent assortment**



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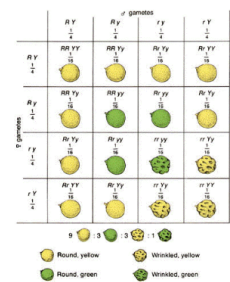
A **monohybrid cross** is a cross between two heterozygous organisms for a single gene.

ex: Heterozygous tall pea plants (Tt x Tt)

A **dihybrid cross** is a cross between two heterozygous organisms for two genes.

ex: Heterozygous round yellow peas (RrYy x RrYy)

mono-hybrid		
Aa x Aa		
	A	a
A	AA	Aa
a	aA	aa
Phenotype - 3:1 (normal : albino)		
Genotype - 1:2:1 (normal : het for albino : albino)		



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The rules of genetics we have seen so far do not account for the diversity of traits in all organisms. In some cases, alleles are neither dominant or recessive.


Use your TB to create a working definition of the following genetic concepts:

- Incomplete dominance
- Codominance
- Multiple alleles
- Polygenic traits

Use pages 272 - 274 to complete this work.

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PATTERNS OF INHERITANCE

Type	Description 	Examples

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Do an inheritance lab
(see file!)



<http://www.phschool.com/webcodes10/index.cfm?wcprefix=cbp&wcsuffix=4112&fuseaction=home.gotoWebCode&x=0&y=0>

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