

hey

## Mendelian Genetics

Brain dump: Mendels legacy

- Wasn't appreciated until death
- transmission genetics
- provided proper experimental methodology

What makes Pisum Sativa the perfect model organism?

- self fertilizing
- easy to grow
- matures in one season
- 2 distinct traits/characteristics
- true breeding strains

What is a monohybrid cross? What does the P, F<sub>1</sub>, and F<sub>2</sub> generation stand for?

- only 1 pair of traits is observed

P = Parent

F<sub>1</sub> = offspring of Parent

F<sub>2</sub> = offspring of offspring

What is the result of crossing two plants heterozygous for a tall stem? (Use Pp as the genotype)

phenotype	genotype
3 tall	1 PP
1 dwarf	2 Pp
	1 pp

What is a reciprocal cross?

Not sex dependent



What are Mendel's 3 postulates?

- unit factors (alleles) exist in pairs
- Dominance & recessive
- segregation (unit factors must split)

What do homozygous and heterozygous genotypes look like?

Homo =  $RR$  or  $rr$

Hetero =  $Rr$

What is a testcross? What are the possible outcomes for a monohybrid test cross?

A test to solve if the genotype is homo/hetero.  
Must cross with a homozygous recessive

EX:

$D? \times dd$

This cross resulted in zero recessive traits,  
indicating the genotype is homozygous dom  
If it resulted in a recessive cross, it would  
be heterozygous



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## Dihybrid Mendelian

What is a dihybrid cross? What is its ratio?

2 pairs of contrasting traits  
9:3:3:1

What is independent assortment?

when the 2 traits are inherited separately  
can do them as 2 independent events

What is the product law?

Predict the occurrence of 2 or more independent events  
occurring at the same time.

If you cross a plant with the traits for purple or green petals and for tall or dwarf stems?

What is the produced genotype and phenotype? What is the probability of producing a green and dwarf plant? (P= dominant purple & p=recessive green; R= dominant tall & r=recessive dwarf)

$PpRr \times PpRr$

	PR	Pr	pR	pr
PR	PPRR	PpRR	PPRr	PpRr
Pr	PpRR	Pprr	PpRr	Pppr
pR	PPRr	PpRr	ppRR	ppRr
pr	PpRr	Pppr	pRrr	pprr

genotype	
1 PPRR	9 Purple + tall
2 PpRR	
2 PpRr	
4 PpRr	
1 PPrr	3 Purple and dwarf
2 Pprr	
1 ppRR	3 green and tall
2 ppRr	
1 pprr	1 green and dwarf

1/16 or 6.25%

★ Make sure to write the letters next to each other  
- should be PPRR NOT PR PR ★



What is a trihybrid cross? What is used to solve these crosses?

you now have 3 independent traits

forked-line method

If you cross a plant with the following traits, what is the probability of producing a plant that is tall, has green petals, and is wrinkled?

Tall = A

green = b

wrinkled = c

Abc

$$= 3/64$$

★ you need to know what common traits  
are recessive or dominant ★