

# INTRODUCTION TO PUNNETT SQUARES

Today make it a point to memorize the following:

**Homozygous Dominant** = two capital letters = TT

**Homozygous Recessive** = two lowercase letters = tt

**Heterozygous** = a capital and a lowercase = Tt

**FACT**: if a capital letter is present it is always the winner

**FACT**: in order for a lower case letter to be the "winner" you must have 2 of them

**Genotype**: what the genes look like, Example = tt

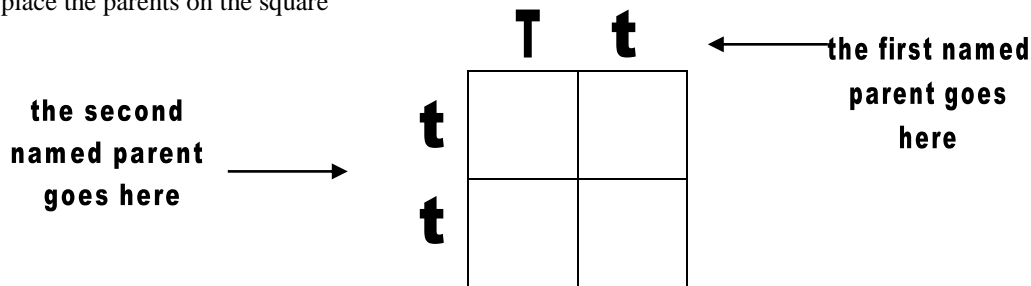
**Phenotype**: what the organism looks like, Example = small

EXAMPLE CROSS:

Cross a heterozygous plant (Tt) with a homozygous recessive (tt)

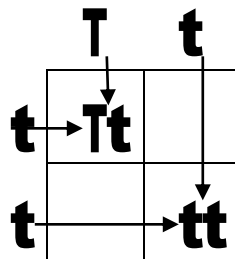
## 1) STEP ONE

place the parents on the square



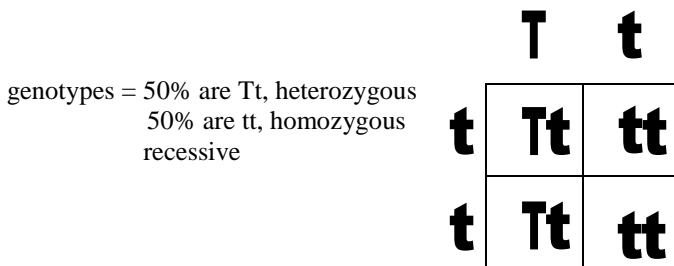
## 2) STEP two

fill in the alleles by column and by row



## 3) STEP three

record the genotypes of all the offspring



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## 4) STEP four

record the phenotypes of all the offspring

phenotypes = 50% are tall  
50% are short

	<b>T</b>	<b>t</b>
<b>t</b>	<b>Tt</b>	<b>tt</b>
<b>t</b>	<b>Tt</b>	<b>tt</b>

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Now practice for yourself:

1) Cross a homozygous dominant with a homozygous recessive. Record the genotypes and the phenotypes.  
(6 points)

Genotypes =


Phenotypes =

2) Cross a heterozygous with a heterozygous. Record the genotypes and the phenotypes.  
(6 points)

Genotypes =


Phenotypes =

3) Cross a homozygous dominant with a heterozygous. Record the genotypes and the phenotypes.  
(6 points)

Genotypes =


Phenotypes =

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4) Cross a heterozygous with a homozygous dominant. Record the genotypes and the phenotypes.  
(6 points)

Genotypes =


Phenotypes =

5) Look carefully at the genotypes and the phenotypes for question 3 and question 4. Did you get different answers? Why or why not? (2 points)

6) Is the genotype Tt the same as the genotype tT? What would the phenotype be for these allele combinations? (2 points)

7) Cross a homozygous recessive with a homozygous recessive. Record the genotypes and the phenotypes.  
(6 points)

Genotypes =


Phenotypes =

8) How do homozygous recessive offspring always turn out?

9) If blue eyes are a recessive trait and both parents have blue eyes, how will the children turn out?

10) Cross a homozygous recessive and a heterozygous. Record the genotypes and the phenotypes.  
(6 points)

Genotypes =


Phenotypes =

11) Cross a homozygous dominant and a homozygous dominant. Record the genotypes and the phenotypes.  
(6 points)

Genotypes =


Phenotypes =

12) How do all offspring of a homozygous dominant/homozygous dominant cross turn out?