



iTeachly

Monohybrid Cross Punnett Squares

Unit 8 Lesson 2

Monohybrid Cross Punnett Squares

Students will be able to:

- Learn how to set-up a Punnett Square.
- Predict the possible offspring of a monohybrid cross using a Punnett Square.
- Determine the genetic probability of an offspring inheriting a trait from the parents.

Key Vocabulary:

allele, dominant, genotype, heterozygous, homozygous, monohybrid cross, phenotype, probability, Punnett squares, recessive, trait

Who is Reginald Punnett?

- An English biologist and geneticist.
- In 1905, he devised a shorthand way of finding the expected proportions of possible genotypes in the offspring of a cross.
- This tool was called Punnett Squares.



Punnett Squares

	A	a
A	AA	Aa
a	Aa	aa

Punnett Square

- It is a graphical representation of the possible genotypes of an offspring arising from a particular cross.
- In using this tool, the knowledge of the genetic composition of parents is required.

Important Terms to Remember

- Allele – the different gene forms for the variation of trait of an organism
- Dominant trait – the visible and observable trait of an organism; masks the recessive form of a particular trait
- Recessive trait – the hidden trait of an organism; expressed only in homozygous state

Important Terms to Remember

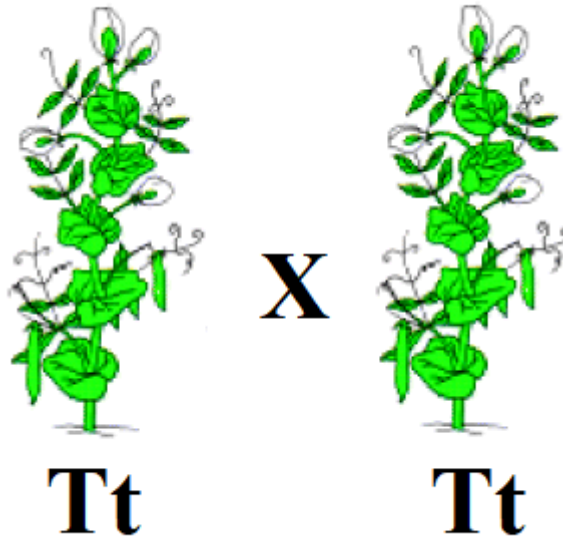
- Homozygous – having identical/ the same alleles for a certain trait
- Heterozygous – having unidentical/ different alleles for a certain trait
- Probability – possibility; the likelihood of something to happen

Punnett Squares for Monohybrid Cross

- This is used when dealing with two parents that differed only by a single trait.
- A Punnett square for monohybrid cross is two boxes wide and two boxes tall since each parent can produce two kinds of gamete for each trait.

Punnett Squares for Monohybrid Cross

- Example: Consider a cross between two tall pea plants from F_1 generation. Each has a genotype Tt .



Setting-up Punnett Squares for Monohybrid Cross

- Example: Consider a cross between two tall pea plants from F_1 generation. Each has a genotype Tt .

STEP 1: Draw a 2x2 Punnett Square.

Setting-up Punnett Squares for Monohybrid Cross

- Example: Consider a cross between two tall pea plants from F_1 generation. Each has a genotype Tt .

STEP 2: Write the alleles of the first parent on the left side of the Punnett square.

T		
t		

Setting-up Punnett Squares for Monohybrid Cross

- Example: Consider a cross between two tall pea plants from F_1 generation. Each has a genotype Tt .

STEP 3: Write the alleles of the second parent above the Punnett square.

	T	t
T		
t		

Setting-up Punnett Squares for Monohybrid Cross

- Example: Consider a cross between two tall pea plants from F_1 generation. Each has a genotype Tt .

STEP 4: Fill the squares with the alleles of the first parent.

	T	t
T	T	T
t	t	t

Setting-up Punnett Squares for Monohybrid Cross

- Example: Consider a cross between two tall pea plants from F_1 generation. Each has a genotype Tt .

STEP 5: Fill the squares with the alleles of the second parent.

	T	t
T	TT	Tt
t	Tt	tt

Monohybrid Cross Punnett Squares

Interpreting the Punnett Squares for Monohybrid Cross

Consider a cross between two tall pea plants from F_1 generation. Each has a genotype Tt .

Genotypes

	T	t
T	TT	
t		

25 % homozygous
dominant

	T	t
T		Tt
t	Tt	

50 % heterozygous

	T	t
T		
t		tt

25 % homozygous
recessive

Monohybrid Cross Punnett Squares

Interpreting the Punnett Squares for Monohybrid Cross

Consider a cross between two tall pea plants from F_1 generation. Each has a genotype Tt .

Phenotypes

	T	t
T	TT	Tt
t	Tt	

75 % tall

	T	t
T		
t		tt

25 % short

Summary

- Monohybrid cross refers to the cross between two parents, considering only one trait.
- A Punnett square is a tool used to predict the proportions of possible genotypes in the offspring of a cross.
- A Punnett square for monohybrid cross contains 2x2 boxes.