PLTW Virtual Learning

Medical Detectives

Lesson 8

April 15, 2020

7 & 8 Grade Medical Detectives
Lesson: April 15, 2020

Objective/Learning Target:
Lesson 8, Part 3

Students will be able to understand pedigree inheritance patterns and punnett squares.

Warm-Ups:

Now that you know what a pedigree is and how to create a simple chart, we're going to move forward to learn about pedigree inheritance patterns and punnett squares.

Take two minutes to write down:

a) What you know about each one.
b) What you would like to know.

Two Minute Timer

Lesson Introduction/Background Information: What is Pedigree Inheritance Patterns?

When analyzing a pedigree, you can determine genotypes, identify phenotypes, and predict how a trait will be passed on in the future. The information from a pedigree makes it possible to determine how certain alleles are inherited: whether they are dominant, recessive, autosomal, or sex-linked.

Definitions:

Genotype - The genetic makeup of an organism (ex: TT).

Phenotype - The physical characteristics of an organism (ex: tall).

Alleles - Two alleles for each gene are inherited, one from each parent. Paired alleles (one on each of two paired chromosomes) that are the same are called homozygous, and those that are different are called heterozygous.

Dominant Alleles - Allele that is phenotypically expressed over another allele.

Lesson Introduction/Background Information:
What is Pedigree Inheritance Patterns?

Definitions Continued:

Recessive Alleles - Allele that is only expressed in absence of a dominant allele.

Autosomal - Trait that is located on an autosome (non-sex chromosome).

Sex-linked - Trait that is located on one of the two sex chromosomes.

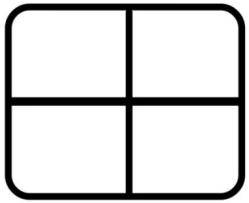
Homozygous - Having two identical alleles for a particular gene.

Heterozygous - Having two different alleles for a particular gene.

Practice:

1. Watch the video below to learn about the two types of Alleles. [Homozygous vs Heterozygous Alleles]

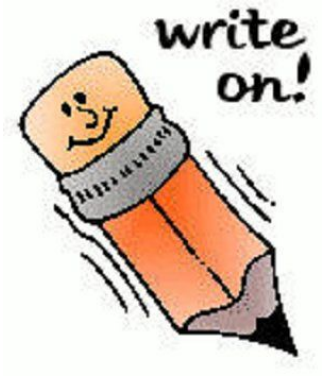
1. Watch the [Pedigree Chart for Beginners]
2. Recreate the punnett square from the end of the video writing down the results.

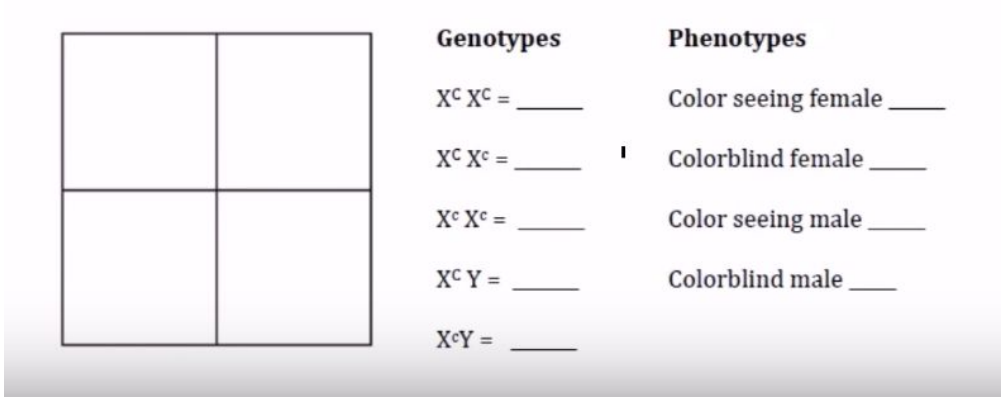


3. State what the result of the punnett square was and how that result was reached.

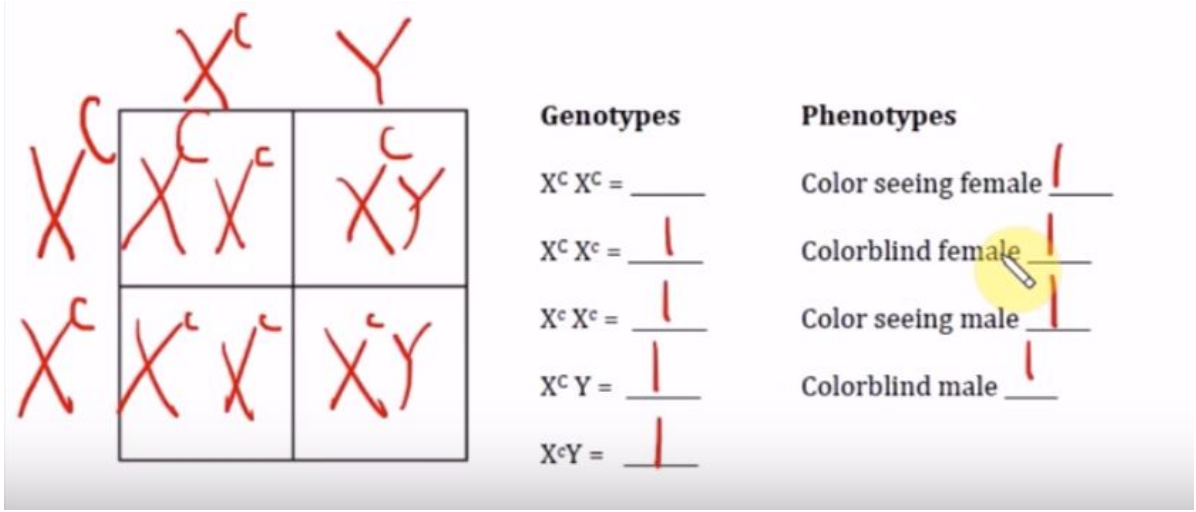
Practice:

Watch the video below about inherited color blindness and determine the following: if a female carrying the gene for color blindness marries a male that is color blind, what are the expected genotypes and phenotypes for their children? Use the example of the punnett square to help you. [Color Blindness: X-linked Trait]





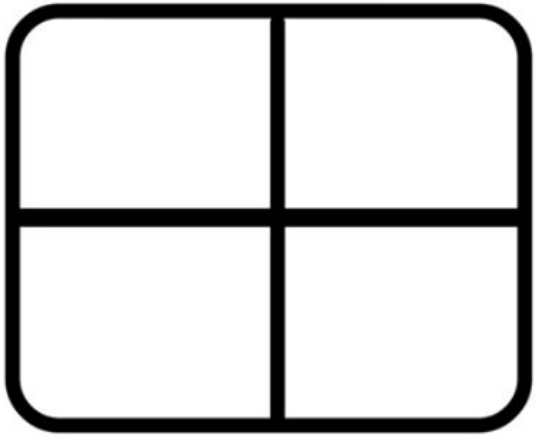
Practice: Answer Key

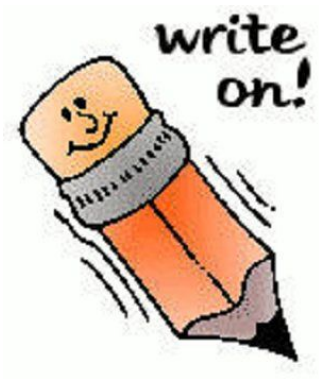


According to the punnett square you created, this would be a 1 to 1 to 1 situation for having color blind children.

Self Assessment:

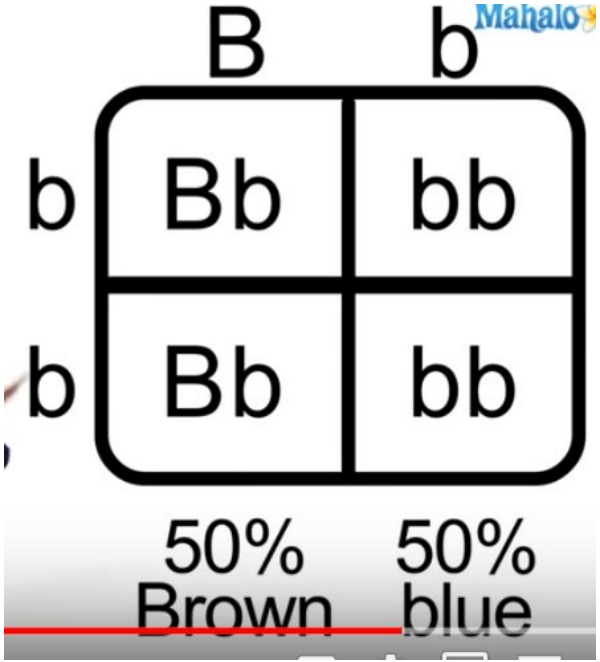
Watch the video How to Draw a Punnett Square and prepare a punnett square to determine whether or not the children will have brown or blue eyes.





Answer Key:

As you can see by the punnett square, there is a 50/50 chance for either brown eyes or blue eyes.



Extend Your Learning/Continued Practice:

Create a punnett square for the phenotypes of your parents and determine what the probability could be for you, and possibly your siblings, having a different eye color.