

Name: _____

Date: _____

HR: _____

Practicing Punnett Squares

A **Punnett Square** is a chart that shows all the possible ways alleles can combine in a genetic cross.

Alleles are the different forms of a gene. An organism inherits two alleles for each gene, one from the mother and one from the father. An organism may inherit two of the same alleles or two different alleles from the parents. If they inherit two of the same alleles, they are **homozygous** for that gene. If they inherit two different alleles, they are **heterozygous** for that gene.

Some alleles are referred to as dominant. A **dominant allele** is an allele whose characteristic will be displayed in the organism when present. A **recessive allele** is hidden when the dominant allele is present. If an organism has one dominant and one recessive allele, the dominant trait will be displayed. Dominant alleles are represented by a capital letter. Recessive alleles are represented by a lower-case letter. We call the two alleles that an organism carries for each gene its **genotype**.

When making a Punnett Square...

1. We first start by drawing a square and dividing it into four boxes. The male parent's alleles are written along the top of the square. The female parent's alleles are drawn on the left side of the square.
2. Copy the female parent's alleles into the boxes to their right.
3. Copy the male parent's into the boxes beneath them.
4. The completed square shows all of the possible combinations the offspring can have.

EXAMPLE: Let's do an example using eye color. Two alleles exist for eye color, Brown, which is dominant, and Blue/Green, which is recessive. Brown: B Blue: b

Each parent will carry two alleles (which they inherited from their parents). The parents Genotypes are as follows:

Father: Bb

Mother: bb

We will use the step-by-step directions above to complete the Punnett Square.

	B	b
b		
b		

Step 1

	B	b
b	b	b
b	b	b

Step 2

	B	b
b	Bb	bb
b	Bb	bb

Step 3

The possible combinations of the cross between the mother and father for eye color are 50% heterozygous dominant and 50% homozygous recessive. The probability of this cross is that 50% of the children will have brown eyes and 50% of the children will have blue eyes.

Step 4

Punnett Square Practice

Directions: Use the step by step instructions on the front of the page to complete the Punnett Squares for each problem.

1. In pea plants, tall (T) is dominant and short (t) is recessive. Complete the Punnett square for the following cross: **Mother: TT Father: Tt**

What percentage of offspring will be Tall? _____

What percentage of offspring will be short? _____

2. In a certain flower, Red (R) is dominant over white (r). Complete the Punnett Square for the following cross: **Mother: Rr Father: rr**

What percentage of offspring will be Red? _____

What percentage of offspring will be White? _____

3. In chickens, Black feathers (B) are dominant over white feathers (b). Complete the Punnett Square for the following cross:

Mother: BB

Father: bb

What percentage of offspring will be Black? _____

What percentage of offspring will be White? _____

4. In a certain flower, Red (R) is dominant over white (r). Complete the Punnett Square for the following cross: **Mother: rr Father: rr**

What percentage of offspring will be Red? _____

What percentage of offspring will be White? _____