

# Punnett Square Worksheet

Coded within the DNA of an organism are thousands of genes. Each of these genes contain the code for certain characteristics. Genes are passed down from the parents to the offspring. They come in pairs, called alleles, which are either dominant or recessive. The combination of these alleles determines which characteristic can be displayed.

Gregor Mendel, an Austrian monk, discovered this principle as he conducted an experiment with peas in the 1860's. He observed that his pea plants had different traits – tall or short plants, wrinkled or smooth pods, green or yellow peas, and white or purple flowers. He conducted an experiment in which he controlled the breeding of the plants through pollination.

Through this experiment, he discovered that some traits appeared more often than others. We now know that those traits are dominant. The other traits that appear less frequently are known as recession. We also know that hybrid offspring result from a combination of a dominant trait and a recessive trait. Typically the dominant trait masks or covers the appearance of the recessive trait.



Thanks to the work of Reginald Punnett, we have a graphic representation of what Mendel discovered known as the Punnett Square. Using this tool, we can predict the potential offspring of a set of parents.

## A Sample Punnett Square

Let's look at the Punnett Square for the tall/short allele genes (T = tall gene, t = short gene). The possible combinations you could get would be dominant tall (TT), hybrid tall (Tt), and recessive short (tt).

So if I have a dominant tall (TT) parent and a hybrid tall (Tt) parent, here is what their possible offspring would look like:

	T	T
T	TT	TT
t	Tt	Tt

This Punnett square shows us that these parents have 50% chance of producing a dominant tall offspring, 50% chance of producing a hybrid tall offspring, and a 0% chance of producing a recessive short offspring.

## Practice Problems

For the sample problems let's look at possible Punnett Square's for the pea colour allele genes (G = green pea gene, g = yellow pea gene). The possible combinations you could get would be dominant green pea (GG), hybrid green pea (Gg), and recessive yellow pea (gg).

1. Complete the Punnett Square for a parent with a dominant green pea allele and another parent with the hybrid green pea allele.

	G	G
G		
g		

- \_\_\_\_\_ % chance of a dominant green pea offspring
- \_\_\_\_\_ % chance of a hybrid green pea offspring
- \_\_\_\_\_ % chance of a recessive yellow pea offspring

2. Complete the Punnett Square for two parents with the hybrid green pea allele.

	G	g
G		
g		

- \_\_\_\_\_ % chance of a dominant green pea offspring
- \_\_\_\_\_ % chance of a hybrid green pea offspring
- \_\_\_\_\_ % chance of a recessive yellow pea offspring

3. Complete the Punnett Square for a parent with a recessive yellow pea allele and another parent with the hybrid green pea allele.

	g	g
G		
g		

- \_\_\_\_\_ % chance of a dominant green pea offspring
- \_\_\_\_\_ % chance of a hybrid green pea offspring
- \_\_\_\_\_ % chance of a recessive yellow pea offspring

4. Complete the Punnett Square for a parent with a dominant green pea allele and another parent with the recessive yellow pea allele.

	G	G
g		
g		

- \_\_\_\_\_ % chance of a dominant green pea offspring
- \_\_\_\_\_ % chance of a hybrid green pea offspring
- \_\_\_\_\_ % chance of a recessive yellow pea offspring