Below, you will find several situations that will require you to fill out a Punnett Square, which geneticists use to determine the probability that the offspring of two individuals will have a particular genotype. Genotype is the specific genetic makeup of a trait in an individual's DNA, which is then displayed by their phenotype, which is what the trait looks like.

In the situations below, you will be first examining Dominant traits, and then Partial Dominance traits. In a dominant trait, the presence of the dominant allele causes the individual to have the dominant phenotype. In a partial dominance trait, having a genotype that is heterozygous causes a phenotype that is a mixture of the dominant and recessive phenotypes.

**Situation 1: Dominant Traits**

You are breeding pea plants. One of your pea plants is very tall, and the other one is short. This is due to their genotypes. The tall plant is homozygous dominant (HH) and the short plant is homozygous recessive (hh). Height is a dominant trait. Fill out the following Punnett square to determine the probability of the genotypes of the offspring of these two plants.

\[
\begin{array}{c|c|c}
\text{Tall Plant (HH)} & \text{H} & \text{H} \\
\hline
\text{Short Plant (hh)} & \text{h} & \text{h} \\
\end{array}
\]

What will be the genotype of these offspring? __________________

What will be the phenotype of these offspring? __________________

Suppose we let these offspring pollinate one another. Fill out the Punnett square to determine the genotype of the second generation of offspring.

\[
\begin{array}{c|c|c|c}
\text{H} & \text{h} & \text{H} & \text{h} \\
\end{array}
\]

What will be the genotypes of the offspring? __________________

What will be the phenotypes of the offspring? __________________
Situation 2: Partial Dominance Traits

You are breeding pea plants. One of your pea plants has red flowers, and the other one has white flowers. This is due to their genotypes. The plant with red flowers is homozygous dominant (RR) and the plant with white flowers is homozygous recessive (rr). Flower color is a partially dominant trait, so a heterozygous genotype would result in a phenotype that is a mixture of the dominant and recessive traits. Fill out the following Punnett square to determine the probability of the genotypes of the offspring of these two plants.

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R</th>
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<tbody>
<tr>
<td>r</td>
<td></td>
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<tr>
<td>White Flowers</td>
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<tr>
<td>r</td>
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</tbody>
</table>

Red Flowers

What will be the genotype of these offspring? ___________________

What will be the phenotype of these offspring? ___________________

Suppose we let these offspring pollinate one another. Fill out the Punnett square to determine the genotype of the second generation of offspring.

What will be the genotypes of the offspring? ____________________

What will be the phenotypes of the offspring? ____________________________