

Punnett Square Popcorn

Use the Punnett Square to learn about dominance and codominance in inherited traits.

You are a cofounder of Flav-R-Gro, Inc., a company that specializes in creating genetically engineered foods. You and your partner, Maisie Mantequilla, have recently been concentrating on developing new types of corn. Together, you have developed a type of corn that, fresh from the stalk, tastes like it has been roasted with just the perfect amount of butter and salt! Your new creation, which you and Maisie call WonderCorn, is bringing you the admiration of your peers and the loyalty of customers. Hungry corn consumers are eager to try your tasty creation because they can eat it without worrying about the health risks caused by adding butter and salt to food. You and Maisie succeeded through determination, hard work, and an understanding of *codominance*.

Background

In some cases of genetic inheritance, two dominant traits are expressed together instead of one trait being dominant and one trait being recessive. This phenomenon is known as codominance. When codominance occurs, both traits are evident in the phenotype. For example, a cross between a homozygous red horse and a homozygous white horse results in offspring with a roan coat, which consists of both red hairs and white hairs. Human blood types are also determined by codominant traits.

You and Maisie suspected that the taste trait in corn was codominant. To find out, you crossed two other types of corn that you created: a homozygous salty corn (*SS*) and a homozygous buttery corn (*BB*). The offspring were all WonderCorn. See the Punnett square below for this cross.

	<i>B</i>	<i>B</i>
<i>S</i>	<i>SB</i>	<i>SB</i>
<i>S</i>	<i>SB</i>	<i>SB</i>

Solve the Punnett Problems!

1. What is the genotype of WonderCorn?

2. What percentage of the offspring have this genotype?

Punnett Square Popcorn, continued

Your hunch about the codominant taste traits was right. You and Maisie then did another Punnett square to predict the offspring that would be produced by a second-generation (heterozygous) cross. Complete the cross in the Punnett square below.

	<i>S</i>	<i>B</i>
<i>S</i>		
<i>B</i>		

3. What percentage of these offspring will be WonderCorn?

4. What percentage of these offspring could you and Maisie use for another homozygous cross?

5. If the heterozygous cross produces 736 offspring, how many will be WonderCorn? Show your work.

6. How many of the 736 offspring will taste salty but not buttery? Show your work.

7. The demand for WonderCorn has been high! Grover's Grocery alone has ordered 50 bushels for delivery as soon as possible. Flav-R-Gro, Inc., is fresh out of WonderCorn, but you and Maisie are beginning another growing cycle. Would you be better off using a homozygous cross or a heterozygous cross to fill the order for Grover's Grocery? Explain your answer.
