

Background Information:

In this experiment you will learn how probability affects genetics. You will be using two coins in each of these simulations to learn how probability affects the cross between two pea plants. Round peas are dominant to wrinkled peas, which are recessive. We will use "R" to represent the dominant round allele and "r" to represent the recessive wrinkled allele.

Simulation 1 - Homozygous Round x Homozygous Wrinkled pea

1. Get two pennies and some tape from your instructor.
2. On one penny tape both sides of the penny and write a capital "R".
3. On the other penny tape both sides and write a lower case "r".
4. Now flip both pennies at the same time.
5. Record the genotype produced by putting a tally mark in the appropriate row in the table below.
6. Repeat the "experiment" 19 more times. Record the genotype each time by putting a tally mark in the appropriate column.

Genotypes	Tally marks (out of 20)	$\frac{\text{ }{20} \times 100$ = %
RR		
Rr		
rr		

Simulation 2 - Heterozygous Round Pea x Homozygous Wrinkled Pea

7. Tape both sides of 1 penny, label one side "R" and the other side "r".
8. Tape both sides of the other penny, label both sides "r".
9. Now flip both pennies at the same time.
10. Record the genotype produced by putting a tally mark in the appropriate row in the table below.
11. Repeat the "experiment" 29 more times. Record the genotype each time by putting a tally mark in the appropriate column.

Genotypes	Tally marks (out of 30)	$\frac{\text{ } / 30 \times 100}{= \text{ } \%}$
RR		
Rr		
rr		

Simulation 3 - Heterozygous Round Pea x Homozygous Round Pea

12. Tape both sides of a penny, label one side "R" and the other "r".
13. Tape both sides of your other penny, label both sides "R".
14. Now flip both pennies at the same time.
15. Record the genotype produced by putting a tally mark in the appropriate row in the table below.
16. Repeat the "experiment" 29 more times. Record the genotype each time by putting a tally mark in the appropriate column.

Genotypes	Tally marks (out of 30)	$\frac{\text{ } / 30 \times 100}{= \text{ } \%}$
RR		
Rr		
rr		

Simulation 4 - Heterozygous Round Pea x Heterozygous Round Pea

17. Tape both sides of a penny, label one side "R" and the other "r".
18. Tape both sides of your other penny, label one side "R" and the other "r".
19. Now flip both pennies at the same time.
20. Record the genotype produced by putting a tally mark in the appropriate row in the table below.
21. Repeat the "experiment" 39 more times. Record the genotype each time by putting a tally mark in the appropriate column.

Genotypes	Tally marks (out of 40)	$\frac{\quad}{40} \times 100$ = %
RR		
Rr		
rr		

QUESTIONS

1. What does flipping the penny represent?

2. Why do you use two pennies?

3. Compare the percentages from simulation 3 and simulation 4. Are any of the percentages similar? Why or why not?

4. If you repeated this whole lab again do you think you would end up with the exact same percentages in all your simulations? Why or why not?