

Genetic Probability

6974

INTRODUCTION

Because the calculator deals with numbers more efficiently than with letters, we will use the number 1 to represent dominant allele (**A**) and the number 2 to represent recessive allele (**a**).

- For homozygous dominant individuals that are (AA), the alleles will be represented by the number 2 (because $1 + 1 = 2$).
- For individuals that are heterozygous (Aa), the alleles will be represented by the number 3 ($1 + 2 = 3$),
- For individuals that are homozygous recessive (aa), the alleles will be represented by 4 ($2 + 2 = 4$).

A Punnett square for a cross between two heterozygous individuals normally looks like the square on the left. When numbers are used instead of letters, the Punnett square looks like the one on the right.

GAMETES	A	a
A	AA	Aa
a	Aa	aa

GAMETES	1	2
1	2	3
2	3	4

Based on the Punnett square above, we can make some predictions about the offspring of the cross.

- What percentage of offspring will be homozygous recessive?
- What percentage will be homozygous dominant?
- What percentage will be heterozygous?
- What percentage of offspring will have the same phenotype? List those genotypes.

Activity Overview

In this activity we will

- use the Sci Tools App to simulate a Punnett square
- make predictions about genetic crosses
- learn about the following concepts: genes, alleles, dominant alleles, recessive alleles, homozygous individuals, heterozygous individuals, phenotypes, and genotypes

Approximate Total Time: 15 minutes

Science Objective

Random “parent” alleles are generated and crossed to illustrate the variance in dominant and recessive alleles imparted to offspring.

PROCEDURE

1

We are going to simulate a cross between two heterozygous individuals (Aa × Aa). To begin, use the following steps to tell the calculator to generate 200 random integers from 1 through 2. List L1 will contain one allele for each of the 200 gametes of one parent. Recall that the number 1 represents A, and the number 2 represents a. You will be generating 200 offspring from this cross.

2

Press **[STAT]**, **[ENTER]**. Highlight L1. Press **[MATH]**, **[↓]**. Highlight 5:RAND INT(. Press **[ENTER]**. Enter **[1]**, **[,]**, **[2]**, **[,]**, the number 200, then **[ENTER]**.

```
MATH NUM CPX PRE
1:rand
2:nPr
3:nCr
4:!
5:randInt(
6:randNorm(
7:randBin(
```

