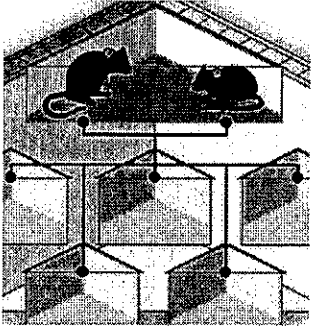


Mouse Genetics (One Trait) Gizmo



Gizmo Warm-up

Heredity is the passage of genetic information from parents to offspring. The rules of inheritance were discovered in the 19th century by **Gregor Mendel**. With the *Mouse Genetics (One Trait) Gizmo*[™], you will study how one **trait**, or feature, is inherited.



1. Drag two black mice into the **Parent 1** and **Parent 2** boxes. Click **Breed** five times. What do the offspring look like?

The “physical” appearance of each mouse is also called its **phenotype**.

2. Click **Clear**, and drag **two white mice** into the parent boxes. Click **Breed** five times. What is the **phenotype** of the offspring now? _____

Part A: Intro Activity

1. Click **Clear**.
2. Drag a black mouse and a white mouse into the parent boxes, but don't click **Breed** yet.
3. Click “Breed” 5 times and record the results below:

Generation	# of Black Offspring	# of White Offspring
1		
2		
3		
4		
5		



- Drag two offspring into the **Holding Cages**. These mice are called **hybrids** because their parents had different traits. Click **Clear**, and then breed the two hybrids.
- Click "Breed" 5 times and record the results below:

Generation	# of Black Offspring	# of White Offspring
1		
2		
3		
4		
5		

- Turn on **Show statistics**. Click **Breed** until there are **100 offspring**.

How many offspring were black? _____ How many were white? _____

Part B: Genetics Basics

- Click **Clear**
- Drag a **black mouse** and a **white mouse** into the parent boxes.

Background Information:

Inherited traits are encoded on a molecule called **DNA** (deoxyribonucleic acid). **Genes** are segments of DNA that control a particular trait. Most genes have several different versions, or **alleles**. The **genotype** is the allele combination an organism has.

What are genes? _____

What is a genotype? _____

- Turn on **Show genotype**. Move your cursor over a mouse to see its genotype.

What is the genotype of the black parent? _____

What is the genotype of the white parent? _____

These mice are **homozygous** for fur color, meaning both alleles are the same.

What does homozygous mean?

- Click **Breed**. Record the genotype of the 5 offspring below:



Offspring	Genotype of Offspring
1	
2	
3	
4	
5	

These mice are **heterozygous** for fur color, meaning the alleles are different.

What does heterozygous mean? _____

Analyze your Data:

Dominant alleles are always expressed when present.

Recessive alleles are not expressed when the dominant allele is also present.

Look at the two alleles for fur color.

A. Which allele is dominant, and which fur color does it produce? _____

B. Which allele is recessive, and which fur color does it produce? _____

5. Place two of the *Ff* offspring into the **Holding Cages**.

6. Click **Clear**, and then place them into the parent boxes.

7. What are the possible genotypes of the offspring?

_____, _____, and _____

8. Click **Breed** five times, and look at the genotypes and phenotypes over 5 generations. Record the results below.

Generation 1:

Offspring	Genotype of Offspring (allele combination)	Phenotype (Fur Color)
1		
2		
3		
4		
5		



Generation 2

Offspring	Genotype of Offspring (allele combination)	Phenotype (Fur Color)
1		
2		
3		
4		
5		

Generation 3

Offspring	Genotype of Offspring (allele combination)	Phenotype (Fur Color)
1		
2		
3		
4		
5		

Generation 4

Offspring	Genotype of Offspring (allele combination)	Phenotype (Fur Color)
1		
2		
3		
4		
5		

Generation 5

Offspring	Genotype of Offspring (allele combination)	Phenotype (Fur Color)
1		
2		
3		
4		
5		



9. Click on "Show Statistics". Record how many black and white offspring were produced over a 5 generation period below:

Black offspring = _____

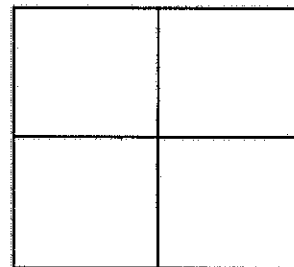
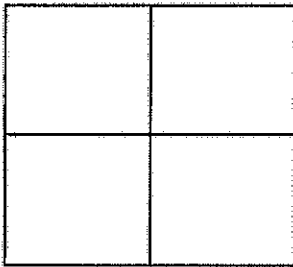
White offspring = _____

Part C: Modeling Inheritance with Punnett Squares

1. Click **Clear**.
2. Use the Punnett squares below to model each parent combination. After filling in each Punnett square, predict the percentages of black and white offspring.

Parent 1: Heterozygous black (*Ff*)
 Parent 2: Heterozygous black (*Ff*)

Parent 1: Heterozygous black (*Ff*)
 Parent 2: Homozygous white (*ff*)



Predicted % black offspring: _____

Predicted % black offspring: _____

Predicted % white offspring: _____

Predicted % white offspring: _____

3. Now test your Punnett Square Models:

- a. Turn on **Show statistics** and **Show as approximate percentage**. For each combination, breed approximately **500 offspring**.
- b. Record the results in the table below. (*Hint: To obtain an Ff mouse, breed an FF mouse to an ff mouse. Place two Ff offspring into the holding cages, click Clear, and then drag the Ff mice into the parent boxes.*)

Parent 1 Genotype	Parent 2 Genotype	% Black offspring	% White offspring
<i>Ff</i>	<i>Ff</i>		
<i>Ff</i>	<i>ff</i>		

4. How well did the Punnett squares predict the offspring percentages for each parent pair?



