

# Mutt Mixer Modeling

## Instructions

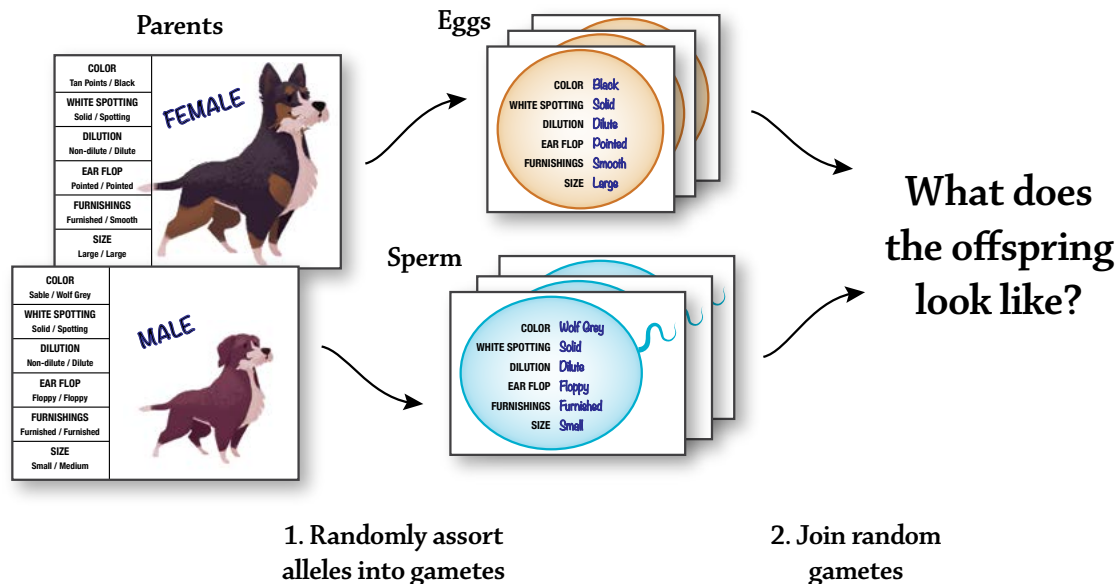
Now that you have played with *Mutt Mixer*, you'll model how random shuffling of parents' alleles leads to variation in the pups. You'll model allele shuffling in two steps:

### Part 1: Randomly distribute alleles into gametes

1. Start with two parent dogs.
2. Choose one of your dogs to be female and one to be male. Label them.
3. Make 3 gametes for each dog (on separate *Gametes* page).

### Part 2: Join two random gametes

4. Cut out your gametes and separate them into two groups: eggs and sperm.
5. Flip your gametes so they are face down.
6. At random, choose one egg and one sperm. Put them together to make an offspring!
7. Fill out the table on the student sheet and answer the questions.



# Mutt Mixer Modeling

## *Student Sheet*

### What does your pup look like?

Fill in the table to show the offspring's alleles and trait versions:

	Allele from egg	Allele from sperm	Trait
Color			
White spotting			
Dilution			
Ear Flop			
Furnishings			
Size			

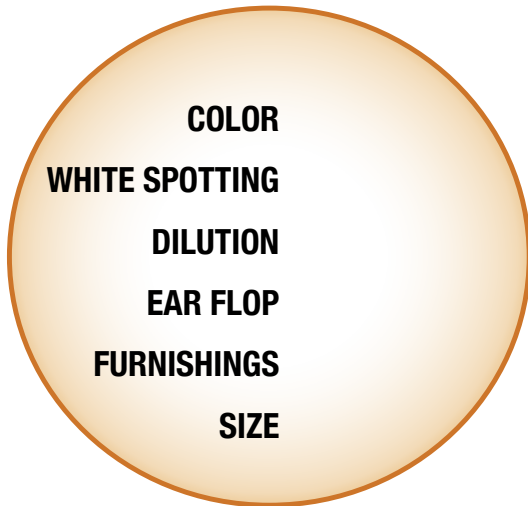
### Questions

1. Can you find a trait in the offspring that is different from both of its parents? Which trait?
2. If you chose two different gametes to make a second offspring, would it have the same traits as the first? Why or why not?
3. What does this activity teach you about how sexual reproduction leads to variation?

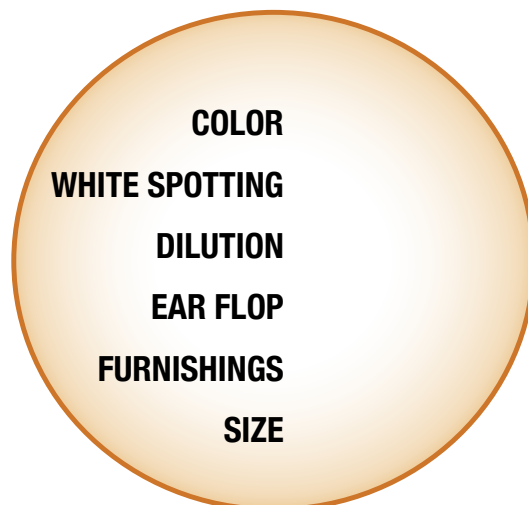
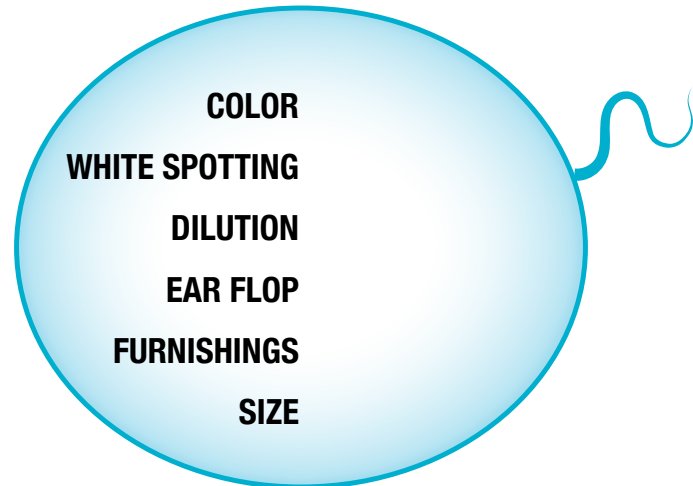
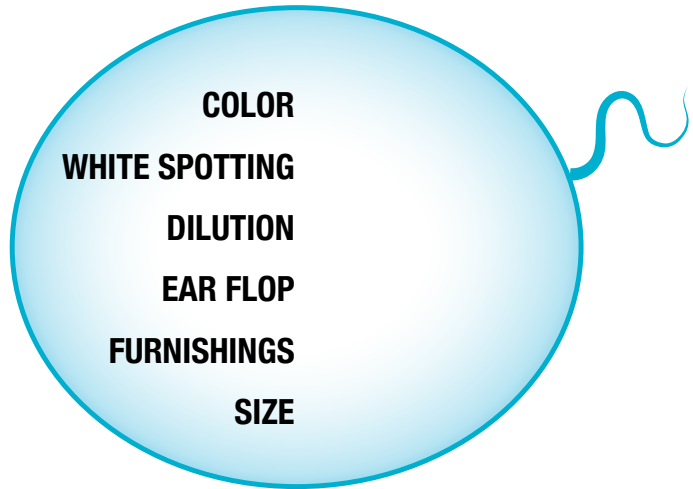
## Gametes

- For each gene, give each gamete ONE allele – chosen at random – from the parent.
- Write the name of the chosen alleles inside the gamete.

Eggs from mom



Sperm from dad



<b>COLOR</b>
Tan Points / Black
<b>WHITE SPOTTING</b>
Solid / Spotting
<b>DILUTION</b>
Non-dilute / Dilute
<b>EAR FLOP</b>
Pointed / Pointed
<b>FURNISHINGS</b>
Furnished / Smooth
<b>SIZE</b>
Large / Large



<b>COLOR</b>
Tan Points / Sable
<b>WHITE SPOTTING</b>
Solid / Spotting
<b>DILUTION</b>
Non-dilute / Dilute
<b>EAR FLOP</b>
Pointed / Pointed
<b>FURNISHINGS</b>
Smooth / Furnished
<b>SIZE</b>
Medium / Medium



<b>COLOR</b>
Tan Points / Tan Points
<b>WHITE SPOTTING</b>
Solid / Solid
<b>DILUTION</b>
Non-dilute / Dilute
<b>EAR FLOP</b>
Pointed / Floppy
<b>FURNISHINGS</b>
Furnished / Smooth
<b>SIZE</b>
Large / Medium



<b>COLOR</b>
Black / Black
<b>WHITE SPOTTING</b>
Spotting / Spotting
<b>DILUTION</b>
Non-dilute / Dilute
<b>EAR FLOP</b>
Floppy / Pointed
<b>FURNISHINGS</b>
Furnished / Smooth
<b>SIZE</b>
Small / Large



**COLOR**

Sable / Wolf Grey

**WHITE SPOTTING**

Solid / Spotting

**DILUTION**

Non-dilute / Dilute

**EAR FLOP**

Floppy / Floppy

**FURNISHINGS**

Furnished / Furnished

**SIZE**

Small / Medium

**COLOR**

Tan Points / Wolf Grey

**WHITE SPOTTING**

Spotting / Solid

**DILUTION**

Non-dilute / Dilute

**EAR FLOP**

Floppy / Floppy

**FURNISHINGS**

Smooth / Smooth

**SIZE**

Small / Small

**COLOR**

Sable / Wolf Grey

**WHITE SPOTTING**

Solid / Solid

**DILUTION**

Non-dilute / Dilute

**EAR FLOP**

Pointed / Floppy

**FURNISHINGS**

Smooth / Smooth

**SIZE**

Medium / Large

**COLOR**

Black / Wolf Grey

**WHITE SPOTTING**

Solid / Solid

**DILUTION**

Non-dilute / Dilute

**EAR FLOP**

Floppy / Pointed

**FURNISHINGS**

Smooth / Smooth

**SIZE**

Medium / Small

