

Name: Answer Key

Date: \_\_\_\_\_



# Pigeon Genetics

## Student Worksheet

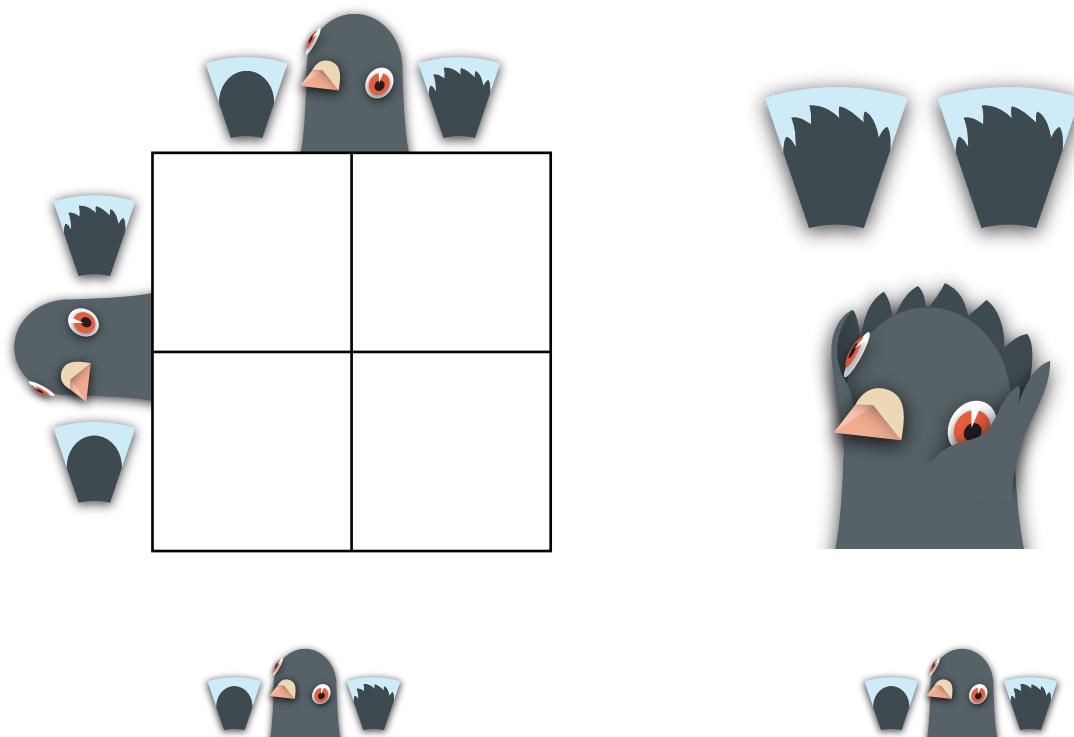
Answer the following. Use information from Pigeon Breeding: Genetics at Work on the Learn.Genetics website to learn more about each inherited characteristic.

### Crest

The crest characteristic in pigeons has two alleles: 'crest' and 'no crest'. 'crest' is recessive. Calculate the probability of the offspring of two heterozygous parents having a crest.

Using a Punnett Square:

Probability of offspring having a crest: **1/4**



Using Math: Possible 'crest' alleles from father **X** possible 'crest' alleles from mother

$$\frac{1}{2} \times \frac{1}{2} = 1/4$$

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**Crest**

Explain how the following work together to give a pigeon a crest using the following words: 'crest' alleles, protein (for a bonus include: nucleotide and amino acid sequence):

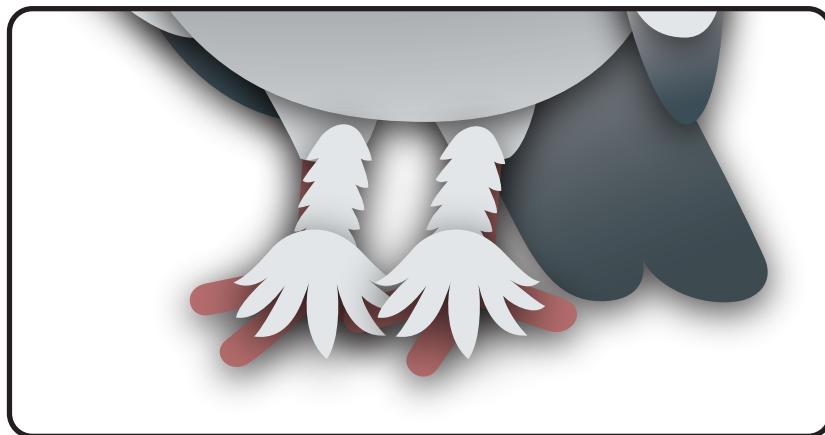
answers will vary

**Foot Feathering**

The Slipper characteristic is partially dominant, meaning what we see is the product of both alleles that are inherited.

The 'No Grouse' characteristic is dominant.

Draw the foot feathering you'd see on a pigeon with the 'slipper', 'no slipper' and 'grouse', 'no grouse' genotype.



What is the genotype of the foot feathering seen here?



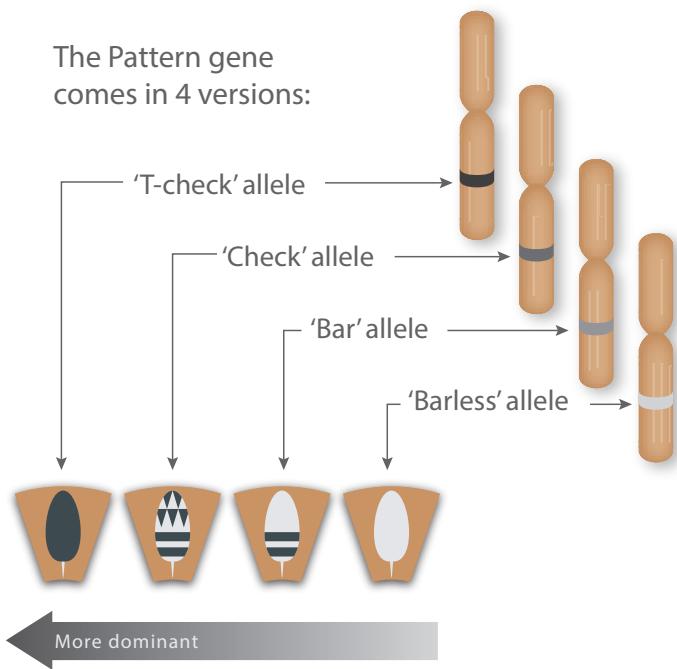
'slipper' , 'slipper'  
'grouse' , 'grouse'



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**Wing Pattern**

Wing pattern is determined by four alleles that follow a hierarchy of dominance.

**Wing Pattern**

Draw the correct phenotype for each genotype below.

Genotype	Phenotype
Two dark grey check patterns	Pigeon with dark grey check pattern on its back
One dark grey check pattern and one light grey check pattern	Pigeon with dark grey check pattern on its back
Two light grey check patterns	Pigeon with light grey check pattern on its back

Genotype	Phenotype
Two thin grey bar patterns	Pigeon with thin grey bars on its back
Two white (barless) patterns	Pigeon with no pattern on its back
One thin grey bar pattern and one white (barless) pattern	Pigeon with thin grey bars on its back

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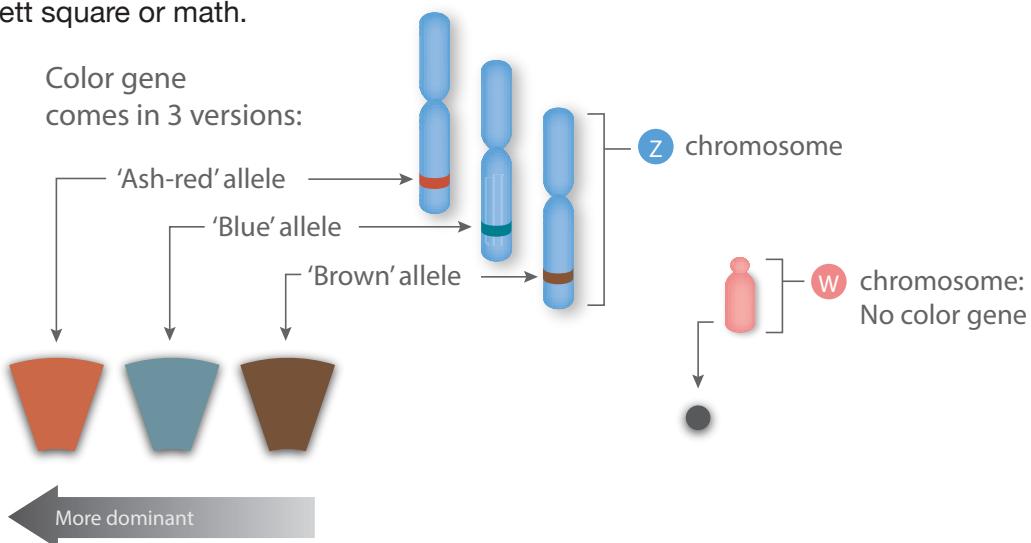
### Color

Color is determined mainly by one gene on the sex chromosome Z. This is known as 'sex-linked.'

In addition, Color alleles have a hierarchy of dominance. In order of most to least dominant they are: 'ash red,' 'blue,' 'brown'

### Color

Calculate the probability of female offspring of the following cross **NOT** being red. Use a Punnett square or math.



Male — Z Z	
Genotype	Phenotype
[Orange shape] [Blue shape]	Ash-red

Female — Z W	
Genotype	Phenotype
[Orange shape] [Grey circle]	Ash-red

Probability is 1/4

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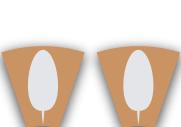
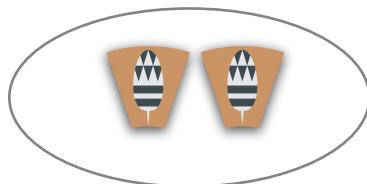
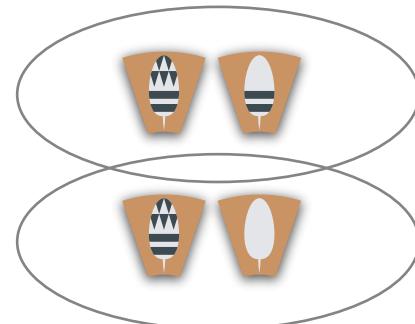
### Spread

Pigment distribution is determined by the Spread gene, the 'spread' allele being dominant to 'no spread'. The 'spread' allele masks underlying wing pattern, which is known as epistasis.

Circle the parental genotypes that could possibly produce the offspring shown:



Possible parental genotypes:



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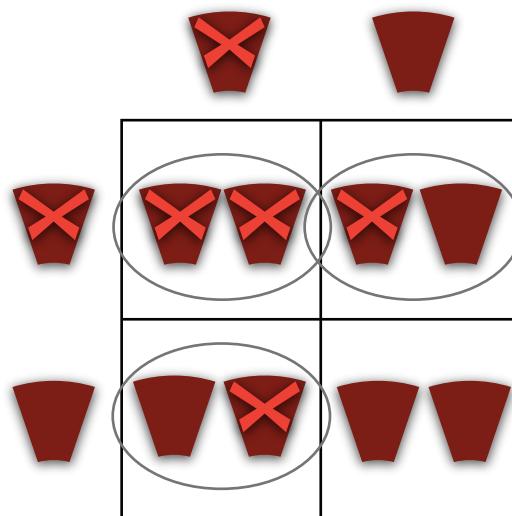
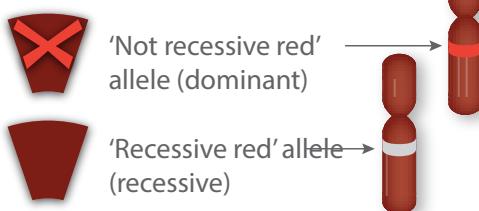


### Recessive Red

The Recessive Red gene also determines feather color and is different from the Color gene. The recessive red characteristic is recessive (meaning two copies of the allele must be inherited) and epistatic to wing pattern.

Calculate the probability that offspring from the following cross will show a wing pattern. Circle the genotypes that would show a wing pattern.

The Recessive Red gene comes in 2 versions:

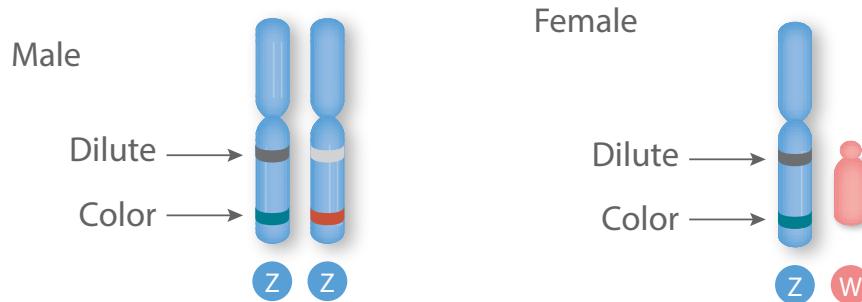


Probability is 3/4

### Dilute

The Dilute gene also influences color, making some pigeons a lighter shade of their inherited feather color. The Dilute gene is sex-linked, residing on the Z chromosome and has two alleles: 'dilute' and 'not dilute'.

Calculate the probability of male offspring of the following cross being a lighter shade. Use a Punnett square or math.



Probability is 2/2 or 100%