

Name:_____ Period:_____ Date:_____

HW 5.3: Sex-Linked Traits

In cats, the alleles for calico (multicolored) cats are **co-dominant**. This means that if both of the possible alleles are inherited, they will both be expressed. In other words, one allele is NOT more dominant than the other. Therefore, we will NOT use the same letter to represent these alleles, because one trait isn't dominant over the other. In cats, BB = black fur color, OO = orange fur color, and BO = calico (orange and black).

1. In addition, the genes for calico cats are **sex-linked**. Since they are sex-linked, on which chromosome are the alleles for cat fur color found? _____ Therefore, an allele that codes for black fur is not just B, it would look like this: _____ and an allele that codes for orange fur color would look like this: _____



CALICO CAT



BLACK CAT



ORANGE CAT

Female cats that receive a B and an O gene have black and orange splotches on their white fur coats. Their GENOTYPE would look like this: _____ . Males can only be black or orange, but never calico.

2. *Why can male cats not be calico?*

3. Show the cross of a female calico cat with a black male cat using a Punnett Square!

Mother's Genotype: _____

Father's Genotype: _____

What percentage of the kittens will be black and male? _____%

What percentage of the kittens will be calico and male? _____%

What percentage of the kittens will be calico and female? _____%

What percentage of the kittens will be orange? _____%

What percentage of the sons will be orange? _____%

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4. Show the cross of a female black cat with a male orange cat!

Mother's Genotype: _____

Father's Genotype: _____

What percentage of the kittens will be calico and female? _____%

All the male cats will have _____ color fur.

What percentage of the kittens will be orange? _____%

What percentage of the sons will be orange? _____%

HSA Questions

1. A sex-linked recessive gene results in color blindness in humans. Sade has normal color vision, but her father was color-blind. Sade marries a color-blind man named Michael.

A) What is Sade's father's genotype? _____

B) What is Sade's genotype? _____

C) What is Michael's genotype? _____

D) Create a Punnett Square to predict the probability of Sade and Michael's child being colorblind:

E) What is the percentage that Sade and Michael's son will be colorblind? _____%

2. A man who is colorblind marries a woman who is not a carrier. If they have a female child, what is the chance that she will be born with colorblindness? _____% Draw a Punnett Square to prove your answer:

3. Hemophilia is a sex-linked trait that is inherited in a similar way to colorblindness. Therefore, hemophilia most often results when the affected gene is passed from:

A) Father to son

B) Father to daughter

C) Mother to son

D) Mother to daughter

4. Which of these combinations results in the expression of a recessive trait?

A) Two dominant alleles

B) A Y Chromosome and a recessive sex-linked allele

C) A recessive allele and a dominant allele

D) Two X chromosomes, one with a sex-linked recessive allele and the other with a sex-linked dominant allele