

“Fowl” Colors: Peafowl Color Mutations

“The sight of a feather in a peacock’s tail, whenever I gaze at it, makes me sick!”

– Charles Darwin, 1860

Indian blue peafowl (*Pavo cristatus*) are commonly bred and exhibited by zoos and other institutions around the world because of their beautiful, exaggerated, and colorful display. Males, known as peacocks, possess a set of vibrant tail feathers called a “train.” Females find these features attractive and research has shown that males with the longer, more elaborate trains attract more females and these females produce more chicks for these males.

Zoos manage populations of animals to maintain genetic diversity and preserve the species. However, sometimes color mutations show up in the offspring. Though these color mutations would probably not be successful in the wild, in zoos where predators are absent, they flourish and can get passed on to subsequent generations. In this activity, you will complete some sample genetic crosses for a few of the countless genetic combinations that result in color mutations. You will also determine the mode of transmission for these genetic mutations.

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Breeding issue #1:

A pair of Indian blue peafowl produced a clutch of chicks and one of them was white. This chick was male and eventually matured and developed the stereotypical train like the one pictured. This lack of all pigments is called “leucism.” Using the letters “L/l,” show how this cross occurred and circle the leucistic offspring within the Punnett square.



What is the probability of producing a leucistic chick from this pairing?

What is the genotype of the peacock? _____

What is the genotype of the peahen? _____

Do another cross in the Punnett square at the left that shows a cross between the peacock pictured and a normal peahen.

What is the genotype of the peacock? _____

What is the genotype of the peahen? _____

What is the probability of producing a leucistic chick from this pairing?

What type of allele is the leucistic gene based on your crosses? _____



Breeding Issue #2:

A pair of peafowl were bred where one had white patches, known as pied (PW), like the one pictured at the left and the peahen was white (WW). They produced some white chicks and some pied chicks. The “PP” genotype results in a bird that looks normal though it can pass the pied allele to its offspring.

Complete this cross using the Punnett square at the right.

What mode of transmission does the pied mutation follow? _____

What is the genotypic probability for the offspring? _____

What is the phenotypic probability for the offspring? _____

What would be the probable results for a Pied x Pied breeding? Do the Punnett square to the left to show your results.

What is the genotypic probability for the offspring? _____

What is the phenotypic probability for the offspring? _____

Breeding Issue #3:

Cameo (Z^c), which results in a light brown color (pictured), is a sex-linked recessive allele to the wild type (Z^o) color. Because birds follow the opposite sex-linked inheritance pattern than mammals, male birds are ZZ (similar to XX in mammals) and female birds are ZW (similar to XY in mammals).

Suppose a Cameo peacock is crossed with a wild type peahen. Use the Punnett square to show this cross, being sure to assign ‘ ZZ ’ for male and ‘ ZW ’ for females. The Cameo gene is only located on the Z sex chromosome.

What are the odds overall of producing a Cameo chick? _____

What gender will receive the Cameo gene? _____


