

Name Key

Period _____

Date _____

Non-Mendelian Genetics Problems

1. Coat color in rabbits is determined by a single gene that has at least 4 different alleles. Different combinations of these alleles result in four different phenotypes listed below.

Rabbit coat color

Allele	Phenotype
C	Rabbit with fully colored coat
c ^{ch}	Rabbit with light gray coat
c ^h	Himalayan rabbit: white with dark ear tips, nose, paws, and tail
c	Albino rabbit

For the problems below, show your work and list the potential genotypes and phenotypes of the offspring. (c^{ch}= chinchilla)

Order of dominance C → c^{ch} → c^h → c

- a. What pattern of inheritance does rabbit fur color display? multiple alleles
- b. Cross a homozygous full-colored rabbit with a heterozygous full-colored rabbit.

	C	c
C	CC	Cc
C	CC	Cc

- Doesn't matter which allele is

- c. Cross an albino rabbit with a heterozygous Himalayan rabbit.

	c ^h	c
c ^h	c ^h c ^h	c ^h c
c	c ^h c	cc

6	#	P
c ^h c ^h	2	Himalayan
cc	2	albino

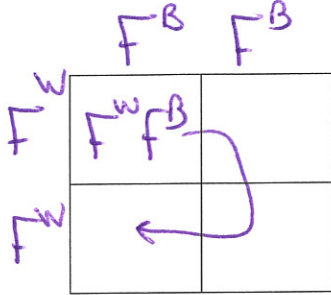
- d. Cross a heterozygous chinchilla with an albino rabbit.

	c ^{ch}	c
c ^{ch}	c ^{ch} c ^{ch}	c ^{ch} c
c	c ^{ch} c	cc

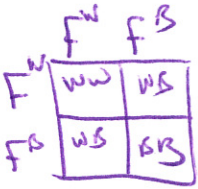
or c^{ch}c^{ch}

6	#	P
c ^{ch} c ^{ch}	2	chinchilla
c ^{ch} c	2	albino
<hr/>		
or		
c ^{ch} c	2	Himalayan

2. The Andalusian fowl has three varieties splashed white, black and blue. A cross between a white fowl and a black fowl produces offspring that are blue (bluish-slate). The colors of Andalusian fowls are determined by just two alleles. *greyish*



- What are the genotypes of the parent fowls in the original cross?
- What is/are the genotype(s) of the blue offspring?

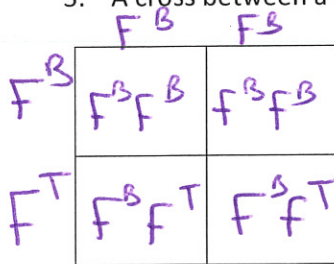


- What would be the phenotypic ratios of offspring produced by two blue fowls?

2 blue : 1 white : 1 blk

- What pattern of inheritance is being displayed here? *incomplete dom.*

3. A cross between a black cat & a tan cat produces a tabby pattern (black & tan fur together).



- What pattern of inheritance does this illustrate? *codominance*
- What percent of kittens would have tan fur if a tabby cat is crossed with a black cat? *0%*

4. A man with blood type B has a child with a woman with blood type AB. Draw two Punnett squares to show the two possible combinations that could occur between this couple.

Do they have any chance of having a child with type O blood? *0%*

