

Name: Key

Codominance and Incomplete Dominance

* Note: You will see people use different letters in these crosses. I prefer the same letter since it is only dealing with one gene but it is ok if you use different letters.

1. In horses, chestnut and white coat colors are incompletely dominant. Heterozygous horses have a blend of both colors, which is a golden tan color. Such heterozygous horses are known as palominos (like Mr. Ed). A chestnut stud is bred with a white mare. What genotypes are produced from this mating? What is the probability of a white foal?; a chestnut foal?; a palomino foal?

1. $C = \text{chestnut}$ $c = \text{white}$

2. $CC = \text{chestnut}$ $Cc = \text{palomino}$
 $cc = \text{white}$

6. Genotypic: All Cc

Phenotypic: All palomino

3. $CC \times cc$

4. $\begin{matrix} \downarrow & \downarrow & \downarrow & \downarrow \\ \text{C} & \text{C} & \text{C} & \text{C} \\ \text{c} & \text{c} & \text{c} & \text{c} \end{matrix}$

5.

	C	c
C	Cc	Cc
c	Cc	Cc

7. Probability of white = 0,
 Chestnut = 0

Palomino = 100%

2. The same breeder as above wants to produce more palomino foals by breeding two palominos together. Is this a good way to produce more palaminos? What would be a better pairing to produce paliminos?

3. $Cc \times Cc$

4. $\begin{matrix} \downarrow & \downarrow & \downarrow & \downarrow \\ \text{C} & \text{C} & \text{C} & \text{C} \\ \text{c} & \text{c} & \text{c} & \text{c} \end{matrix}$

5.

	C	c
C	CC	Cc
c	Cc	cc

6. Geno: $1CC : 2Cc : 1cc$

Pheno: 1 Chestnut = 2 palomino = 1 white

7. Only 50% are palomino; a better cross would be the cross in # 1.

3. In humans, ABO blood types are an example of codominance. A and B are both dominant to O and A and B are codominant to each other. A man with blood type AO is married to a woman with blood type BO. What are the possible blood types of their children?

1. $I^A = A$ blood, $I^B = B$ blood, $i = O$ blood

2. $I^A i$, $I^A I^A = A$ blood
 $I^B i$, $I^B I^B = B$ blood
 $I^A I^B = AB$ blood
 $ii = O$

G. Gen: $I^A I^B$; $I^A i$; $I^B i$; ii
 Pheno: $1AB : 1A : 1B : 1O$

3. $I^A i \times I^B i$

4. $\begin{matrix} \swarrow & \downarrow & \swarrow & \downarrow \\ \textcircled{I^A} & \textcircled{i} & \textcircled{I^B} & \textcircled{i} \end{matrix}$
 $I^B \quad i$

5.

I^A	$I^A I^B$	$I^A i$
i	$I^B i$	ii

4. A man who has type A blood is positive that his wife has been cheating on him because his baby has type O blood and his wife has type B. Is this man right to use this evidence that his wife has been unfaithful?

- No; by the above cross, both people could be heterozygous and have a child with O type blood.

5. When a mouse with black fur is crossed with a mouse with white fur, all F1 generation offspring have gray fur. What genotypic and phenotypic ratios would be expected in the F2? What type of inheritance is this?

1. B = Black b = white

2. BB = Black, Bb = gray, bb = white

3. F₁ cross Bb × Bb

4. $\begin{array}{cc} \swarrow & \searrow \\ \textcircled{B} & \textcircled{b} \end{array} \times \begin{array}{cc} \swarrow & \searrow \\ \textcircled{B} & \textcircled{b} \end{array}$

5.

	B	b
B	BB	Bb
b	Bb	bb

6. Geno : 1BB : 2Bb : 1bb

Pheno 1 Black : 2 Gray : 1 white

This is incomplete dominance