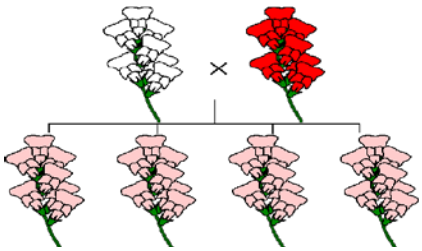
Name_____ Test Date_____

Incomplete Dominance, Codominance, and Sex-Linked Punnett Squares.

1. Incomplete Dominance

Some organisms have traits whose alleles show ___mixed phenotypes _____, which means that neither allele for a particular trait is _____ over the other. When you complete a Punnett Square for incomplete dominance, **you do not use lowercase letters** since neither allele is recessive to the other one. Instead, a _____is used for one allele, and the same capital letter with an apostrophe or tic mark after it represents the other allele. This is another way of showing incomplete dominance in more advanced genetics.

Example: Snapdragons are plants that show incomplete dominance in their flower color. If snapdragons with red flowers are crossed with snapdragons with white flowers, the phenotype of the offspring is between the two colors. They will have_____pink flowers_____, just like mixing red paint with white paint to get pink paint.



	R	R
R’	RR’	RR’
R’	RR’	RR’

R-Red allele

R’-White allele

RR’-Pink Flowers

Note: The Tic Mark is written last.

How can you tell if you are looking at a cross that shows incomplete dominance? First, there are three different_____. One for each parent and a different one for the offspring. Secondly, the phenotypes of the offspring will be a _____of the parent’s phenotypes.

Practice-Incomplete Dominance

1. A cross between a homozygous red snapdragon is crossed with a homozygous white snapdragon.
   R-Red allele R’-White allele RR’-Pink
   Genotype in Percent_____
   Phenotype in Percent_____

2. A cross between two heterozygous pink snapdragons.
   R-Red allele R'-White allele RR'-Pink

   Genotype in Percent: _____

   Phenotype in Percent: _____

3. Draw the correct Punnett square that shows, a cross between a homozygous purple flower and heterozygous lavender flower. What are the chances of having a lavender flower?
   P-Purple P'-White PP'-Lavender

4. A heterozygous rabbit will have medium fur length. What percent of offspring are expected to have medium fur length if the parent rabbits have medium fur (SS') and short fur (SS)?

Genotype	**Phenotype**
SS	Short Fur
S'S'	Long Fur
SS'	Medium Fur

5. A heterozygous plant has pink flowers. What percent of offspring are expected to have pink flowers, if one parent plant is Red and the other parent plant is pink?

Genotype	**Phenotype**
RR	Red
R'R'	White
RR'	Pink

2. Codominance

In Codominance both alleles are expressed___together or in patches_____. Both parental phenotype appear in the offspring together but not mixed. For example, in certain kinds of chickens, black feathers and white feathers have codominant alleles. When you cross a black chicken and a white chicken, you get offspring that are black and white speckled. In a Punnett Square Codominance does not use lowercase letters.

	F^B	F^B
F^w		
F^w		

F^{B-}Black Feather Allele

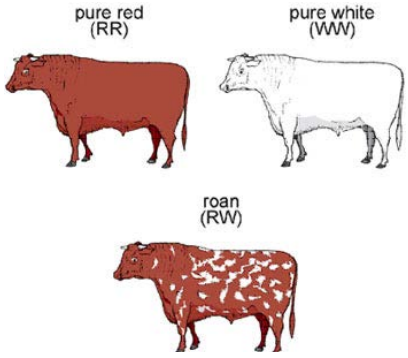
F^w-White Feather Allele

F^BF^w-Speckled Feathers

Roan color in cattle and horses is another codominance. In cows and horses, there is a fur color called roan. RR produces all red hairs and WW produces all white hairs. RW produces roan fur, which has red and white hairs all mixed together.

Example: A homozygous red cow and a homozygous white cow cross. What are the chances of having a cow that is roan color? C^R-Red C^W-White

	C^R	C^R
C^w		
C^w		

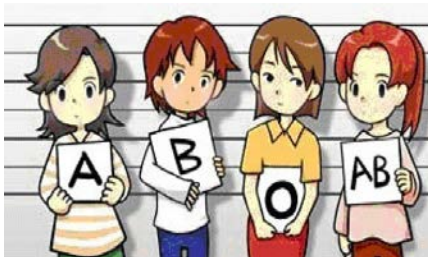


Practice-Codominance

1. A roan color horse crossed with homozygous white horse. What are the chance of having a roan color offspring? _____

2. A speckled chicken is crossed with a white feather chicken. What are the chances of having a white chicken? _____

3. Blood Types



Blood Type	Genotype
A	
B	
AB	
O	

Blood typing is important because a person getting a blood transfusion would die if the wrong type of blood was given. The wrong blood type would cause the red blood cells to clump together and the person would die.

Practice-Blood Types

1. Which blood type is recessive? _____
2. Which blood type is codominant? _____

3. The Father is Type O and the Mom is Type O.

The offspring(s) will be:
_____% O
_____% A
_____% B
_____% AB

4. Father is Type A homozygous and the mother is Type B homozygous.

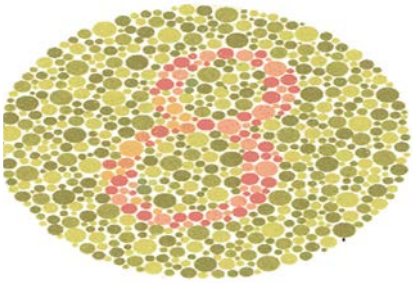
The offspring(s) will be:
_____% O
_____% A
_____% B
_____% AB

5. If a child has Type AB blood and the mother has Type A blood, could a man with Type O be the father? _____ Show ALL Work

6. A child with blood type O has a mother with blood type A and father with blood type B. What is the parents blood genotype?_____ Show ALL Work

7. A woman with type AB blood marries a man with type O blood. What is the blood type of the children? _____Show ALL Work

4. X-Linked Traits



Found only on the SEX CHROMOSOME_____X_____. When a characteristic is Sex-Linked, it occurs most commonly in ___males_____.

The traits are_colour blindness, hemophilia, muscular dystrophy.

A. _____is when one can't distingu
   Colorblindness affects about 8% of the male population.
B. _____the inability to form blood clots.
C. _____destroys an individual muscle tissues.

Note: If a male is color blind, has hemophilia, or the muscular dystrophy gene; he has inherited the gene from his _____. If a female inherit any of these traits (hemophilia, color-blindness, or muscular dystrophy) they received one recessive gene from mom and one from dad. Example: X^b X^b

Gender	Genotype	Phenotype
Male	X^BY	Normal Color Vision
Male	X^bY	Color Blind
Female	X^BX^B	Normal Color Vision
Female	X^BX^b	Normal but a Carrier
Female	X^bX^b	Color Blind

Gender	Genotype	Phenotype
Male	X^HY	Normal
Male	X^hY	Affected Male
Female	X^HX^H	Normal
Female	X^HX^h	Normal but a Carrier
Female	X^hX^h	Hemophilia

Gender	Genotype	Phenotype
Male	XY	Normal
Male	X'Y	Affected Male
Female	XX	Normal
Female	XX'	Normal but a Carrier
Female	X'X'	Affected Female

Practice-Sex-Linked Traits

1. If a woman who has normal color vision but who carries the recessive allele for color blindness marries a man with normal color vision, what are the chances of having a son(s) that is color blind?

2. In humans, red-green color blindness (X^b) is recessive, and normal color vision (X^B) is dominant. A female with red-green color blindness would have which genotype?

3. Hemophilia, a bleeding disorder, is a human sex-linked trait. A man with hemophilia (X^hY) marries a woman who carries one gene for the disorder (X^HX^h). What are the chances their girls will have hemophilia?

4. Muscular dystrophy is sex-linked disorder that causes muscle weakness and wasting. A female who carries the disorder marries a man who is normal. What percentage of their son(s) will be affected by Muscular dystrophy?