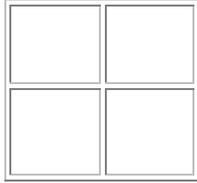


## SEX LINKAGE PROBLEMS

Use these genotypic symbols for the sex linked trait of red-green color blindness in humans to solve the problems that follow. Show your work.

"Normal" female	$X^B X^B$
Carrier female	$X^B X^b$
Color-blind female	$X^b X^b$
Normal male	$X^B Y$
Color-blind Male	$X^b Y$

1. A normal female marries a color-blind male. (A) What are the chances that the offspring will be color-blind if they are females? (B) What are the chances that the offspring will be color-blind if they are males?



A. \_\_\_\_\_  
B. \_\_\_\_\_

2. A color-blind female marries a normal male. How many of the female offspring will be carriers of the color-blind allele?



A. \_\_\_\_\_

3. A carrier female marries a normal male. (A) How many of the the male offspring can be expected to be color-blind? (B) How many of the the male offspring can be expected to have normal vision? (C) How many of the the female offspring can be expected to be carriers? (D) How many of the the female offspring can be expected to be normal?



A. \_\_\_\_\_  
B. \_\_\_\_\_  
C. \_\_\_\_\_  
D. \_\_\_\_\_

4. A man whose mother is color blind marries a woman with normal vision. (A) What is the genotype of the husband? (B) What percent of their offspring can be expected to be color-blind? (C) What percent of the male offspring can be expected to be color-blind? (D) What percentage of their offspring can be expected to be carriers?



A. \_\_\_\_\_  
B. \_\_\_\_\_  
C. \_\_\_\_\_  
D. \_\_\_\_\_

5. A normal man marries a woman whose mother is a known carrier of a sex-linked recessive lethal gene on the X chromosome. This gene results in the slow degenerative death of all male infants within the first year. The woman is known to be a carrier as well. (A) Of the offspring, what percentage will be normal? (B) Of the males, what percentage will be normal?



A. \_\_\_\_\_

B. \_\_\_\_\_

### Extension

A woman who is a carrier for hemophilia marries a normal man. Show the cross. What is the probability that their children will have hemophilia? What sex will a child in the family with hemophilia be?

A woman who has hemophilia marries a normal man. How many of their children will have hemophilia, and what is their sex?

In cats, the gene for calico (multicolored) cats is codominant. Females that receive a B and an R gene have black and orange splotches on white coats. Males can only be black or orange, but never calico.

Here's what a calico female's genotype would look like.  $X^B X^R$

Show the cross of a female calico cat with a black male?

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? \_\_\_\_\_

In Guinea pigs, the genotype (BB) is black, and the genotype (bb) is white color, and (Bb) is grey color, The gene (B) and (b) are sex-linked. What type of offspring are to be expected in a cross between a grey female and a black male?