

# Genetics: X Linked Genes

In fruit flies, eye color is a sex linked trait. Red is dominant to white.

1. What are the sexes and eye colors of flies with the following genotypes:

$X^R X^r$  \_\_\_\_\_  
 $X^R X^R$  \_\_\_\_\_

$X^R Y$  \_\_\_\_\_  
 $X^r Y$  \_\_\_\_\_

2. What are the genotypes of these flies:

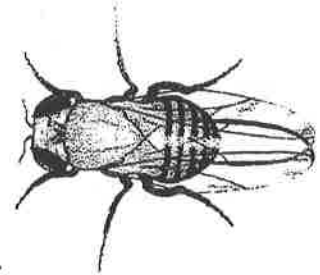
white eyed, male \_\_\_\_\_

red eyed female (heterozygous) \_\_\_\_\_

white eyed, female \_\_\_\_\_

red eyed, male \_\_\_\_\_

3. Show the cross of a white eyed female  $X^r X^r$  with a red-eyed male  $X^R Y$ .



4. Show a cross between a pure red eyed female and a white eyed male.  
 What are the genotypes of the parents:

\_\_\_\_\_ & \_\_\_\_\_

How many are:

white eyed, male \_\_\_\_\_

white eyed, female \_\_\_\_\_

red eyed, male \_\_\_\_\_

red eyed, female \_\_\_\_\_

5. Show the cross of a red eyed female (heterozygous) and a red eyed male. What are the genotypes of the parents?

\_\_\_\_\_ & \_\_\_\_\_

How many are:

white eyed, male \_\_\_\_\_

white eyed, female \_\_\_\_\_

red eyed, male \_\_\_\_\_

red eyed, female \_\_\_\_\_

Math: What if in the above cross, 100 males were produced and 200 females. How many total red-eyed flies would there be?  
 \_\_\_\_\_

6. In humans, hemophilia is a sex linked trait. Females can be normal, carriers, or have the disease. Males will either have the disease or not (but they won't ever be carriers)

$X^H X^H$  = female, normal

$X^H Y$  = male, normal

$X^H X^h$  = female, carrier

$X^h Y$  = male, hemophiliac

$X^h X^h$  = female, hemophiliac

Show the cross of a man who has hemophilia with a woman who is a carrier.

What is the probability that their children will have the disease? \_\_\_\_\_

7. A woman who is a carrier 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?

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

9. 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? \_\_\_\_\_

10. Show the cross of a female black cat, with a male orange cat.

What percentage of the kittens will be calico and female? \_\_\_\_\_  
 What color will all the male cats be? \_\_\_\_\_