

Name Key

GENETICS: X LINKED GENES

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

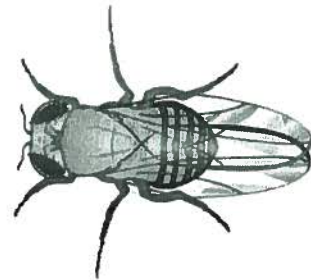
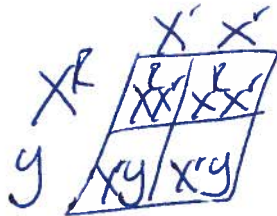
1. What are the sexes and eye colors of flies with the following genotypes:

$X^R X^r$ female Redeyes $X^R Y$ male Red eyes
 $X^R X^R$ female Redeyes $X^r Y$ male white eyes

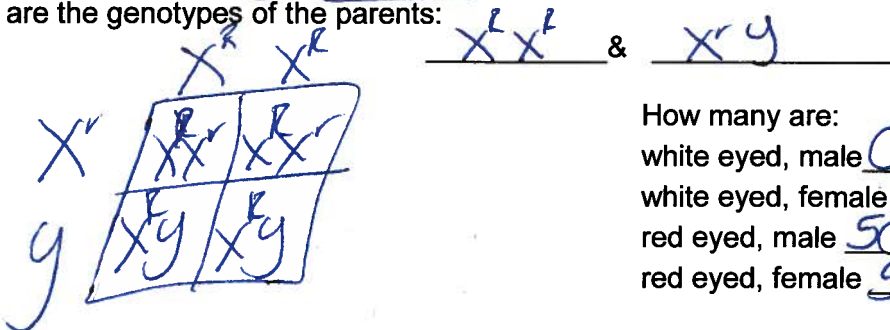
2. What are the genotypes of these flies:

white eyed, male $X^r Y$ red eyed female (heterozygous) $X^R X^r$
 white eyed, female $X^r X^r$ red eyed, male $X^R Y$

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



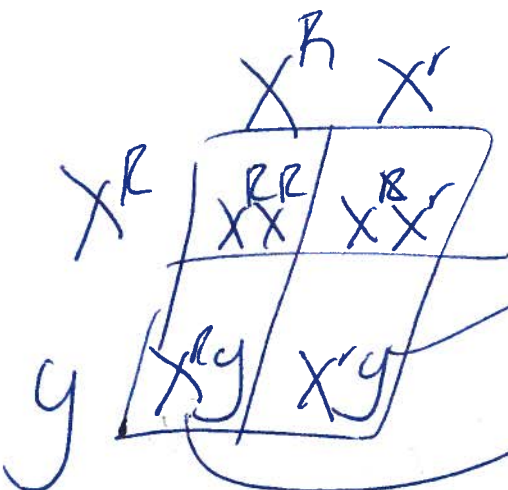
4. Show a cross between a pure red eyed female and a white eyed male. What are the genotypes of the parents:



How many are:
 white eyed, male 0
 white eyed, female 0
 red eyed, male 50%
 red eyed, female 50%

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

Parents: $X^R X^r$ & $X^R Y$



How many are:
 white eyed, male 1/4 (50% of males)
 white eyed, female 0
 red eyed, male 1/4 (50% of males)
 red eyed, female 2/4 = 1/2 (all females)

Math: What if in the above cross, 100 males were produced and 200 females. How many total red-eyed flies would there be? 250

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

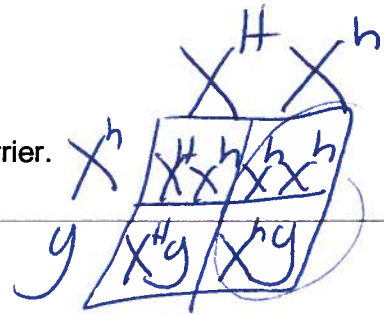
$X^H Y$ = male, normal

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

$X^h Y$ = male, hemophiliac

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

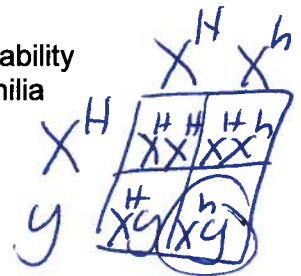
Show the cross of a man who has hemophilia with a woman who is a carrier.



What is the probability that their children will have the disease? 50%

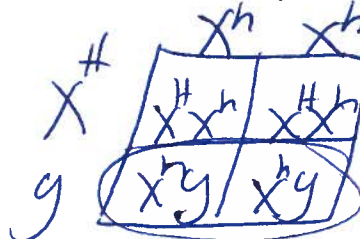
7. A woman who is a carrier marries a normal man. Show the cross. What is the probability that their children will have hemophilia? What sex will a child in the family with hemophilia be?

→ only 50% of males — male



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

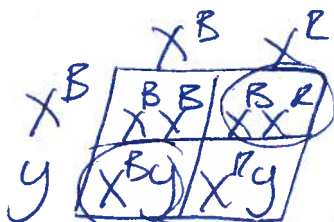
50% all males



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.

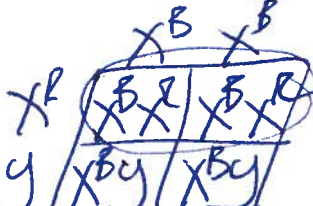
Here's what a calico female's genotype would look like. $X^B X^R$

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



What percentage of the kittens will be black and male? 25%
 What percentage of the kittens will be calico and male? 0%
 What percentage of the kittens will be calico and female? 25%

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



What percentage of the kittens will be calico and female? 50%
 What color will all the male cats be? Black