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25pts

# Genetics: X Linked Genes

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

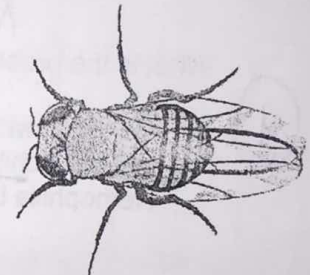
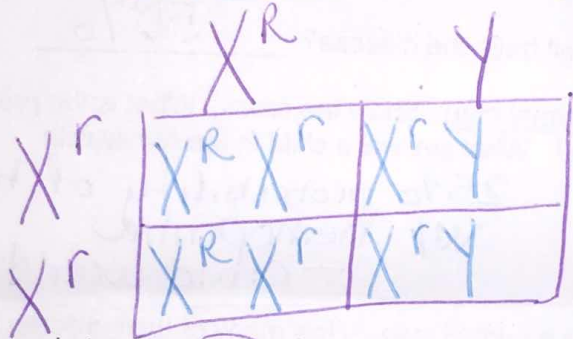
2) 1. What are the sexes and eye colors of flies with the following genotypes:

$X^R X^r$  female - red eyes  
 $X^R X^R$  female - red eyes  
 $X^R Y$  male - red eyes  
 $X^r Y$  male - white eyes

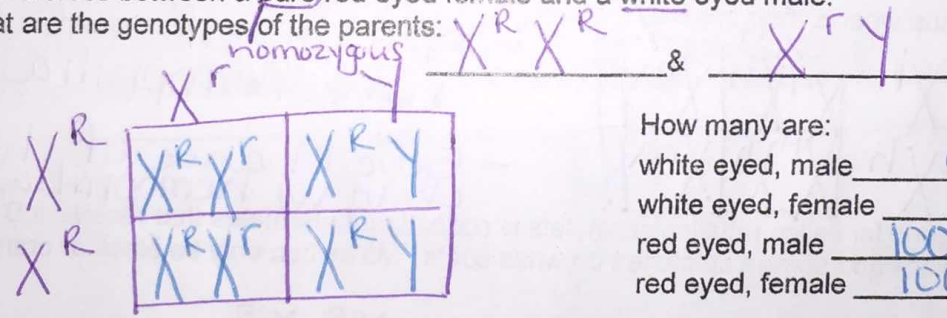
2) 2. What are the genotypes of these flies:

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

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

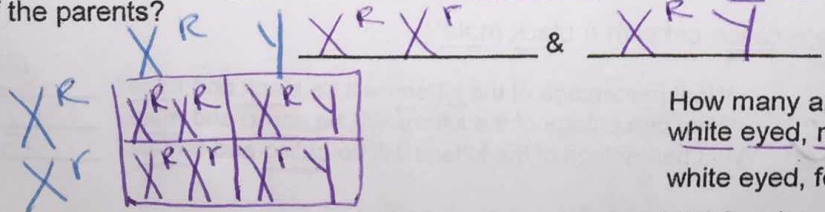


4) 4. Show a cross between a pure red eyed female and a white eyed male. What are the genotypes of the parents:



How many are:  
 white eyed, male 0  
 white eyed, female 0  
 red eyed, male 100%  
 red eyed, female 100%

4) 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 50%  
 white eyed, female 0%

Math: What if in the above cross, 100 males were produced and 200 females.

How many total red-eyed flies would there be?  
 both male + female 250 (50% red)

all red  
 red eyed, male 50  
 red eyed, female 200

EC

3. In humans, hemophilia is a sex linked trait. Females can be normal or carriers. Males will either have the disease or they won't ever be a carrier. the disease.

$X^H X^H$ = 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.

$X^H$	$X^h$	$Y$
$X^H$	$X^h Y$	$X^H Y$
$X^h$	$X^h X^h$	$X^h Y$

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

4. 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?

$X^H$	$X^H$	$Y$
$X^H$	$X^H X^H$	$X^H Y$
$X^h$	$X^H X^h$	$X^h Y$

25% probability of have child w/ hemophilia  
- child would be male

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

$X^h$	$X^H$	$Y$
$X^h$	$X^H X^h$	$X^h Y$
$X^h$	$X^h X^h$	$X^h Y$

- 100% of all sons will have hemophilia  
- 50% chance of having child w/ hemophilia

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?

$X^B$	$X^B$	$Y$
$X^B$	$X^B X^B$	$X^B Y$
$X^R$	$X^B X^R$	$X^R Y$

3. What percentage of the kittens will be black and male? 50%  
What percentage of the kittens will be calico and male? 0%  
What percentage of the kittens will be calico and female? 50%

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

$X^B$	$X^R$	$Y$
$X^B$	$X^B X^R$	$X^B Y$
$X^B$	$X^B X^R$	$X^B Y$

2. What percentage of the kittens will be calico and female? 100%  
What color will all the male cats be? black