Name _____ Period _____ Date _____

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:

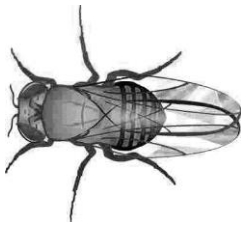
$X^R X^r$ Female, Red
$X^R X^R$ Female, Red
$X^R Y$ Male, Red
$X^r Y$ Male, White

2. What are the genotypes of these flies:

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

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

	X^r	X^r
X^R	$X^R X^r$	$X^R X^r$
Y	$X^r Y$	$X^r Y$



4. Show a cross between a pure red eyed female and a white eyed male.
What are the genotypes of the parents:
$X^R X^R$ & $X^r Y$

	X^R	X^R
X^r	$X^R X^r$	$X^R X^r$
Y	$X^R Y$	$X^R Y$

How many are:
white eyed, male 0
white eyed, female 0
red eyed, male 2
red eyed, female 2

5. Show the cross of a red eyed female (heterozygous) and a red eyed male. What are the genotypes of the parents?
$X^R X^r$ & $X^R Y$

	X^R	X^r
X^R	$X^R X^R$	$X^R X^r$
Y	$X^R Y$	$X^r Y$

How many are:
white eyed, male 1, white eyed, female 0
red eyed, male 1, red eyed, female 2 1:2:1 ratio (25/50/25)

6. Math: What if in the above cross, 100 males were produced and 200 females. (Think about the percentage of the total #.) How many total red-eyed flies would there be? 300 Total fruit flies
25% of 300 = 75 white males, 25% of 300 = 75 red males, 50% of 300 = 150 red females
Total red fruit flies = 75 + 150 = 225

7. 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^HX^H = female, normal

X^HX^h = female, carrier

X^hX^h = female, hemophiliac

X^HY = male, normal

X^hY = male, hemophiliac

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

	X^h	Y
X^H	X^HX^h	X^HY
X^h	X^hX^h	X^hY

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

9. 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?

3:1 probability (25%)
Male

	X^H	Y
X^H	X^HX^H	X^HY
X^h	X^HX^h	X^hY

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

50% probability – all male

	X^h	X^h
X^H	X^HX^h	X^HX^h
Y	X^hY	X^hY