**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 RX r\_\_\_\_\_\_\_\_\_ X R Y \_\_\_\_\_\_\_\_\_\_ X rX r\_\_\_\_\_\_\_\_\_\_

X RX R\_\_\_\_\_\_\_\_\_\_\_\_ X rY \_\_\_\_\_\_\_\_\_\_\_\_

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 rX rwith 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:

\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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? \_\_\_\_\_\_\_\_

**Human Sex Linkage**

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)

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| 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.

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?

**Calico Cat Genetics**

9. In cats, the gene for calico (multicolored) cats is codominant. Females that receive a **B** and an **R** gene have black and o**R**ange 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 BX 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? \_\_\_\_\_\_