Name _____ 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^RX^r _____ X^RY _____ 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^r with a red-eyed male X^RY .

Genotypic ratio: _____

Phenotypic ratio: _____

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)

X^HX^H = sex:_____, phen: _____ X^HY = sex:_____, phen: _____
X^HX^h = sex:_____, phen: _____
X^hX^h = sex:_____, phen: _____ X^hY= sex:_____, phen: _____

7. 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? _____

8. 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? _____

9. 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

10. In cats, the gene for calico (multicolored) cats is **sex-linked codominant**. Females that receive a **B** and an **O** gene have black and orange splotches on white coats. Males can only be black or orange, but never calico. A calico female's genotype would look like: X^BX^O

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? _____

11. 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? _____

12. Color blindness is caused by a sex-linked recessive allele.

* use $\mathbf{X^N}$ = normal vision and $\mathbf{X^n}$ = color blind

Can a color blind female have a son that has normal vision? _____

Genotype female _____

Genotype male _____

13. Baldness is a sex-linked trait. *use $\mathbf{X^H}$ = normal hair and $\mathbf{X^h}$ = bald

What parental genotypes could produce a bald woman? Show your answer.