NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Sex-linked Practice Problems**

Go to [www.biology.arizona.edu](http://www.biology.arizona.edu), click on Mendelian Genetics, start with monohybrid cross. Be sure to write out your answers, not just the correct letter.

**Sex-Linked**

1. In a cross between a white-eyed female fruit fly and red-eyed male, what percent of the female offspring will have white eyes? (White eyes are X-linked, recessive)

2. A female Drosophila of unknown genotype was crossed with a white-eyed male fly, of genotype http://www.biology.arizona.edu/mendelian_genetics/problem_sets/sex_linked_inheritance/graphics/02qxya.gif (w = white eye allele is recessive, w+= red-eye allele is dominant.) Half of the male and half of the female offspring were red-eyed, and half of the male and half of the female offspring were white-eyed. What was the genotype of the female fly?

3. In a cross between a pure bred, red-eyed female fruit fly and a white-eyed male, what percent of the male offspring will have white eyes? (white eyes are **X**-linked, recessive)

4. What is the genotype of a red-eyed, yellow-bodied female fruit fly who is homozygous for the eye color allele?  
Red eyes (w+) and tan bodies (y+) are the dominant alleles. (Both traits are **X** chromosome linked).

5. A white-eyed female fruit fly is crossed with a red-eyed male. Red eyes are dominant, and **X**-linked. What are the expected phenotypes of the offspring?

6. Hemophilia in humans is due to an **X**-chromosome mutation. What will be the results of mating between a normal (non-carrier) female and a hemophilac male?

7. A human female "carrier" who is heterozygous for the recessive, sex-linked trait causing red-green color blindness (or alternatively, hemophilia), marries a normal male. What proportion of their male progeny will have red-green color blindness (or alternatively, will be hemophiliac)?

8. Women have sex chromosomes of **XX**, and men have sex chromosomes of **XY**. Which of a man's grandparents could not be the source of any of the genes on his **Y**-chromosome?

9. Women have sex chromosomes of **XX**, and men have sex chromosomes of**XY**. Which of a women's grandparents could not be the source of any of the genes on either of her **X**-chromosomes?

10. A human female "carrier" who is heterozygous for the recessive, sex-linked trait red color blindness, marries a normal male. What proportion of their female progeny will show the trait?

**Sex-linked #2**

1. The alleles for eye color and for body color are on the **X** chromosome of Drosophila, but not on the **Y**. Red eye color (w+) is dominant to white eye color (w), and tan body color (y+) is dominant to yellow body color (y). What is the genotype of a yellow-bodied, red-eyed female who is homozygous for eye color?

2. The alleles for eye color and for body color are on the **X** chromosome of Drosophila, but not on the **Y**. Red eye color (w+) is dominant to white eye color (w), and tan body color (y+ ) is dominant to yellow body color (y). What is the genotype of a tan-bodied, white-eyed male?

3. What offspring would you expect from a cross between the female Drosophila described in problem 1 (red eyes and a yellow body, homozygous recessive for the yellow body color allele and homozygous dominant for the eye color allele) and the male described in problem 2 (hemizygous for both the recessive (white) eye color allele and dominant (tan) body color allele?)

A reminder that the alleles for eye color and for body color are on the **X**chromosome of Drosophila, but not on the **Y**. Red eye color (w+) is dominant to white eye color (w), and tan body color (y+) is dominant to yellow body color (y).

4. If we mated the F1 female and male flies from the cross obtained in problem 3, what male phenotype in the F2 generation would be evidence that crossing over had occured during gamete formation?

Daughters were tan-bodied, red-eyed, heterozygous for both eye and body color. The sons were yellow-bodied, red-eyed hemizygous.