

Name _____

Date _____ Period _____

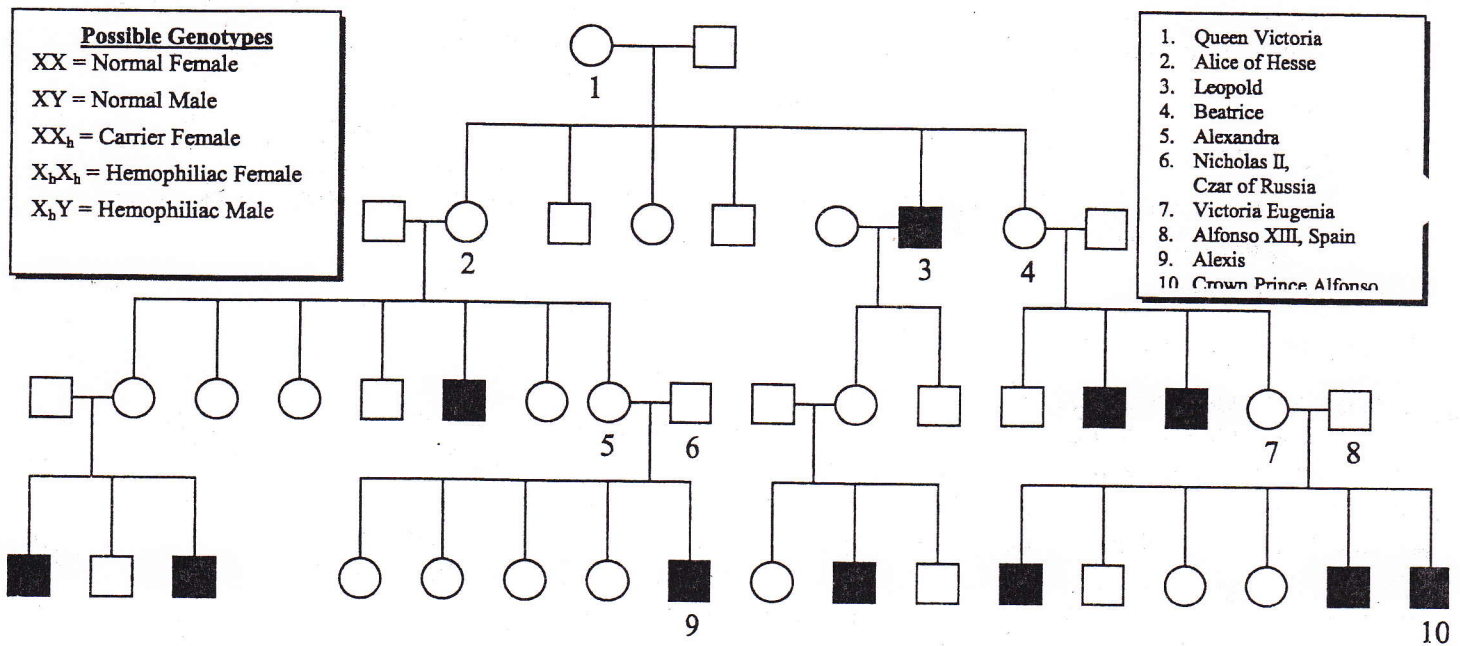
Sex-Linked Traits

Sex-linked traits are interesting for a number of reasons. The inheritance pattern is unusual in that in humans sex-linked traits are almost exclusively found in males, yet the male always inherits the trait from his mother. Oddly, the male never passes the sex-linked trait on to his sons.

Consider also the following sex-linked trait that helped change the course of history. Below is a partial pedigree of Queen Victoria of England. It is thought that she was a carrier of hemophilia due possibly to a mutation on one of her X chromosomes. Queen Victoria's granddaughter, Alexandra (# 5 on the pedigree), married Nicholas II (#6), Czar of Russia. They had a son (#9) named Alexis, who inherited hemophilia.

Rasputin, a mystic holy man of Russia claimed to have supernatural powers. He said that his powers would enable him to control the bleeding disease of young Alexis. Czarina Alexandra had faith in Rasputin, and he soon became a great influence in Russia. He helped decide national policies, which hastened the Russian Revolution of 1917. An empire was lost to communism in part because of Alexis' inherited hemophilia.

Below each person on the pedigree, list the possible (or probable) genotypes. Shaded Squares are hemophiliacs.



1. From whom did Leopold (3) inherit hemophilia? _____

2. What is extremely unusual about Leopold (#3)? _____

3. What are the chances of Alice of Hess (#2) or Beatrice (#4) being carriers? _____

4. What were Leopold's chances of passing hemophilia on to his son? Why? _____



5. Under what circumstances would it be possible for a father and son to be hemophiliacs?

6. What are the possible genotypes of the children of a woman whose father was a hemophiliac and whose husband is normal?

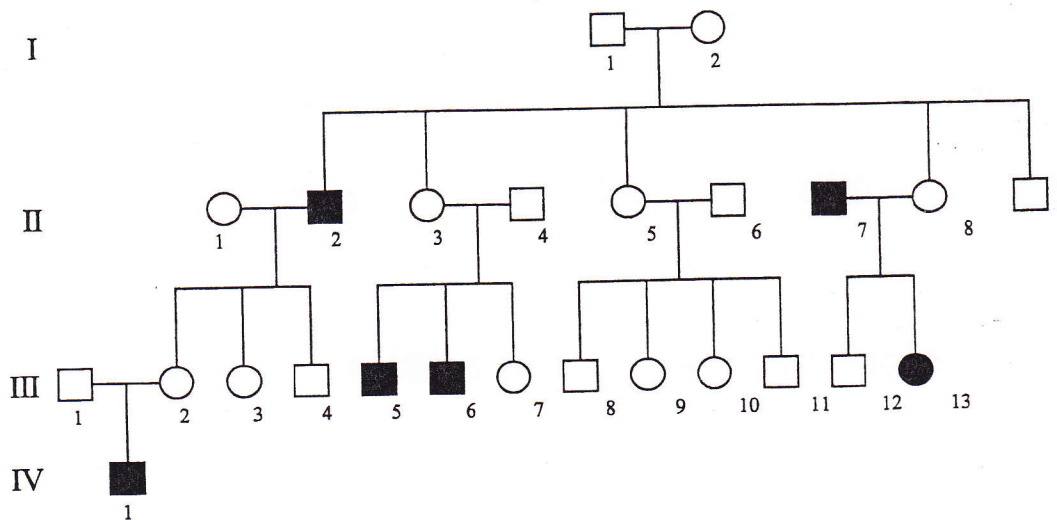
_____ X _____

Possible Genotypes



7. Color blindness is also a sex-linked characteristic in humans. Using the following table, fill in the probable genotypes of the individuals in the pedigree below.

<u>Possible Genotypes</u>	
XX = Normal Female	
XY = Normal Male	
XX _c = Carrier Female	
X _c X _c = Color Blind Female	
X _c Y = Color Blind Male	



Quick Review

What is the Chance of:



(Always assume the other part of the family is completely normal.)

8. #1 being a hemophiliac if his mother was? _____
9. #2 being a carrier for hemophilia if her father had it? _____
10. #1 being a hemophiliac if his mother's father had it? _____
11. #1 getting hemophilia from his father? _____
12. #2 being a hemophiliac if her father was one? _____
13. #1 being color blind if his father was? _____
14. #2 giving hemophilia to her sons if she is a carrier? _____