

Sex-Linked Genes

One example of a sex-linked trait is the blood disorder hemophilia A. Normally when a blood vessel is ruptured, such as when a wound in the skin occurs, the wound bleeds, but then the blood clots and a scab is formed.

People who have hemophilia A are unable to make certain proteins necessary for blood to clot properly. When cuts and other injuries are obtained, bleeding is difficult to stop without medical treatment. Hemophilia A is a recessive trait and the allele is carried on the X chromosome. This means that a female can be a carrier of the trait without actually suffering from the disorder. A male who receives the trait on the X chromosome will exhibit the disorder.

Answer the following questions on a separate sheet of paper.

1. Complete the Punnett square shown here where X^h represents an X chromosome carrying the allele for hemophilia A.

	X^h	X
X		
Y		

- a. What percentage of the children of these parents will probably have hemophilia A? What gender will they be?
 b. What percentage of the children of these parents will be carriers of hemophilia A? What gender will they be?
2. Complete the Punnett square shown here where X^h represents an X chromosome carrying the allele for hemophilia A.

	X^h	X
X^h		
Y		

- a. What percentage of the children of these parents will probably have hemophilia A?
 b. What percentage of the children of these parents will be carriers of hemophilia A?
3. A husband and wife have three children: two boys and one girl. The father has hemophilia A. Neither of the boys has hemophilia A. The girl is a carrier of hemophilia A. What are the possible genotypes of the parents?

Name _____ Date _____ Class _____

Modern Genetics ▪ *Guided Reading and Study*

The Sex Chromosomes

7. Is the following sentence true or false? Genes on chromosomes determine whether a baby is a boy or a girl. _____
8. Females have two _____ chromosomes. Males have one _____ chromosome and one _____ chromosome.
9. Circle the letter of each sentence that is true about human sex chromosomes.
 - a. All eggs carry one X chromosome.
 - b. Half of a male's sperm cells have an X chromosome.
 - c. None of a male's sperm cells have a Y chromosome.
 - d. The egg determines the sex of the child.
10. Genes on the X and Y chromosomes are called _____.
11. Why are males more likely than females to have a sex-linked trait that is recessive?

12. Is the following question true or false? A carrier for colorblindness is colorblind. _____
13. Why is a son who receives the allele for colorblindness from his mother always colorblind?

The Effect of Environment

14. The effects of genes are often altered by the _____.
15. List one environmental factor that can affect a person's height.

