

## Sex Linked Traits Practice Problems

For each of the following crosses remember that hemophilia, muscular dystrophy, baldness, and color blindness are recessive sex-linked traits in humans. In sex linked traits men will always express the trait if they carry it on the X chromosome. Women can express the trait only if it is found on both X chromosomes. Women have two normal phenotypes: homozygous normal and carrier. Men have only one normal phenotype because they have only one X chromosome.

1. A woman that is a carrier of hemophilia marries a hemophiliac man. What is the probability that their first child will be a hemophiliac?
2. A hemophiliac woman has a mother who is phenotypically normal. What are the genotypes of her mother and her father?
3. What is the probability that the woman above will have a normal child if she marries a normal male?
4. What is the probability that a normal (non carrier) vision women who marries a man who is color blind, will have a daughter who is color blind?
5. Can a color blind female have a son that has normal vision? Explain answer and use a punnet square.
6. What parental genotypes would produce a bald woman?
7. What parental genotypes would produce a bald man?

8. A normal man who has a brother with M.D. marries a homozygous normal woman. What is the probability that any of their children will have M.D?

9. If a normal sighted woman, whose father was colorblind marries a normal man, what is the probability they will have a son who is colorblind? What is the probability they will have a color blind daughter?

10. A normal woman marries a normal male. They have four children. They have a normal son, a hemophiliac son and two normal daughters. How does this happen?

11. In *Drosophila*, the gene for red eyes (R) is dominant for the gene for white eyes (r). This is sex-linked. Determine the possible genotype and phenotype ratios expected from a cross between, (b), (c) a homozygous dominant female and a red-eyed male, and

(a) heterozygous female and red-eyed male,

a. Genotype \_\_\_\_\_ Phenotype \_\_\_\_\_

(b) heterozygous female and a white-eyed male

a. Phenotype \_\_\_\_\_ Genotype \_\_\_\_\_

(c) homozygous dominant female and a red-eyed male

a. Genotype \_\_\_\_\_ Phenotype \_\_\_\_\_

(d) homozygous dominant female with a white-eyed male.

a. Genotype \_\_\_\_\_ Phenotype \_\_\_\_\_

12. In cats, the gene for calico (multicolored) cats is codominant. Females that receive a B and an R gene have black and orange 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.  $X^B X^R$

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? \_\_\_\_\_

13. 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? \_\_\_\_\_