

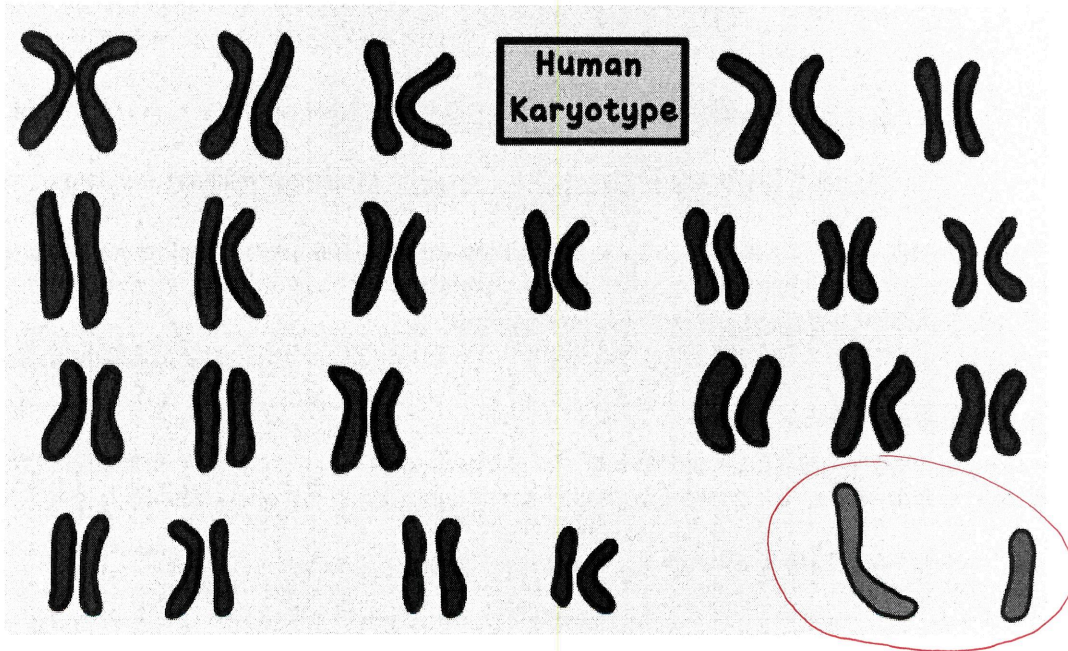


# Amoeba Sisters | Video Recap

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

## Amoeba Sisters Video Recap: "Sex-Linked Traits"

Below is a picture of a human karyotype.



- Place numbers by each chromosome pair. How many chromosome pairs are there? 23
- How many chromosomes in total are there? 46
- Circle the sex chromosomes. How many sex chromosomes are there? 2
- Is this individual a male or female? Male
- How were you able to determine your answer for #4?

Sex chromosomes look different: Y is shorter than X.

(If female, both sex chromosomes would be the same length.)

6. Color blindness is a sex-linked recessive disorder on the X chromosome. If the allele "b" is used to denote color blindness, circle the genotype(s) that correctly represent(s) a **female that is color blind**.

BB    Bb    bb     $X^B X^B$      $X^B Y^B$      $X^B X^b$      $X^b Y$      $X^b X^b$      $X^b Y^b$      $X^B Y$

7. Color blindness is a sex-linked recessive disorder on the X chromosome. If the allele "b" is used to denote color blindness, circle the genotype(s) that correctly represent(s) a **male that is color blind**.

BB    Bb    bb     $X^B X^B$      $X^B Y^B$      $X^B X^b$      $X^b Y$      $X^b X^b$      $X^b Y^b$      $X^B Y$



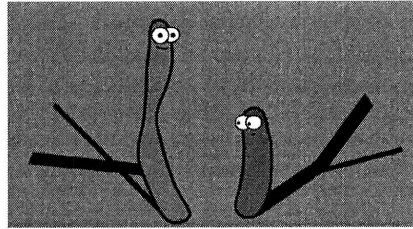
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## Sex-Linked Punnett Square Practice!

8. Bob is color blind, but he knows that neither of his parents were color blind. He is wondering if he received the gene for color blindness from his mother, his father, or both of his parents. What would you tell Bob? Show a Punnett square to prove your answer!

From his mother, who was a carrier.  
X was inherited from mom, Y from dad.  
Colour-blindness is found on the X chromosome.

	$X^b$	$X^B$
$X^B$	$X^B X^b$	$X^B X^B$
$Y$	$X^b Y$	$X^B Y$

9. Consider the below Punnett square cross. Explain how you could use it to determine which parent determines the biological sex of a baby---is it the mother, father, or both? Why?

Father:  
Mother is XX: offspring must all inherit an X chromosome.  
Father is XY: offspring have 50% chance of inheriting X or Y chromosome.

	$X$	$Y$
$X$	$XX$ female	$XY$ male
$X$	$XX$ female	$XY$ male

10. In the video example, the sex-linked disorder was a recessive trait. However, sex-linked disorders can be dominant! (Conduct a search to see some of the sex-linked dominant disorders that exist). Sex-linked dominant disorders will **show even if there is only one dominant allele present**. Using the allele D to stand for a dominant sex-linked trait, show a cross with a woman who does not have a dominant sex-linked disorder ( $X^D X^d$ ) with a man that does. Will the disorder in this particular cross be more common in daughters or sons?

Phenotypes: All daughters are affected;  
no sons are affected.  
The disorder is more common in daughters.

	$X^d$	$X^D$
$X^D$	$X^D X^d$	$X^D X^D$
$Y$	$X^d Y$	$X^D Y$



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