

Amoeba Sisters Video Recap: Pedigrees

Autosomal Recessive Pedigree

Directions: Consider a pedigree that is tracking an autosomal recessive trait, where two recessive alleles (tt) result in the inability to taste a chemical known as PTC. The ability to taste PTC is determined by the presence of a dominant allele (T). Complete the missing boxes in the chart. The first row has been done for you as an example!

*Note: The ability to taste PTC may be more complex than a simple gene trait.

	Individual Phenotype	Shape (in Pedigree)	Shaded?
Male with genotype TT	PTC taster	Square	No
Male with genotype Tt	1.	2.	3.
Male with genotype tt	4.	5.	6.
Female with genotype TT	7.	8.	9.
Female with genotype Tt	10.	11.	12.
Female with genotype tt	13.	14.	15.

Design an Autosomal Recessive Pedigree!

A couple with **the ability to taste PTC** have two grown sons and one grown daughter. The sons have **the ability to taste PTC**. Their daughter is a **PTC non-taster**. She married a **PTC non-taster** man, and they have two sons.

Draw a pedigree in the box on the right that **fully represents the above scenario and tracks the inability to taste PTC (non-taster)**, which is caused by two recessive “t” alleles. In your illustrated pedigree, please make sure that:

- (A) generations are listed as Roman numerals and the individuals are numbered.
- (B) the correct shapes for males and females are used.
- (C) the shapes that require shading are shaded.
- (D) the **genotypes** are listed next to each pedigree shape.

16.

17. What is the **phenotype** of the sons in generation III? How do you know? _____

Sex-Linked Pedigrees

Sex-linked traits that are tracked in pedigrees are typically on the X chromosome. Assume the following questions refer to colorblindness, which is a sex-linked recessive trait on the X chromosome.

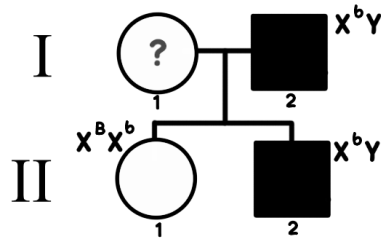
18. Circle the genotype(s) that represent(s) a **female** with the sex-linked recessive trait.

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

19. Circle the genotype(s) that represent(s) a **male** with the sex-linked recessive trait.

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





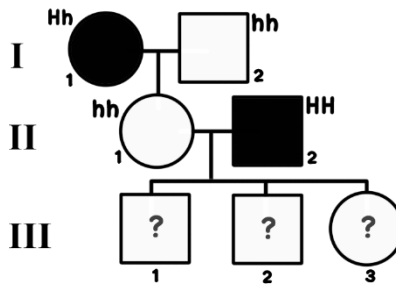
20. View the above sex-linked recessive pedigree. Can you be certain of generation I, individual #1's genotype? Why or why not? _____

21. All males receive their X chromosome from their _____.

22. How are sex-linked pedigrees different from autosomal pedigrees? _____

Autosomal Dominant Pedigree

What about tracking an *autosomal dominant* trait, such as having a widow's peak? The presence of one dominant allele for this widow's peak hairline (H) will result in an individual having a widow's peak. Since this pedigree is tracking an autosomal dominant trait, shaded shapes have a widow's peak hairline. **Note: In reality, this trait may be more complex than just a simple gene.*



23. How many dominant alleles does an individual need in order to have the autosomal dominant trait? _____

24. Is it possible to know the genotypes of the three children in generation III? _____
Should their shapes be shaded? _____ Explain your answer to both questions.

