

Pedigree Activity

Cystic Fibrosis (CF) is the most common lethal genetic disorder among the Caucasian population in the United States. About 1 in 2,500 births has CF. Found on chromosome #7, CF is a condition that causes the mucus lining of the lungs to get too thick. As a result, the gas exchange process is inhibited. To facilitate the breathing, excessive mucus can be loosened by clapping the back. Extensive research has been done to improve the quality of life for CF patients. Many CF patients today are prescribed antibiotics to control persistent infections of the lung lining as well as other drugs, which try to thin the mucus that accumulates. Gene therapy may be an option in the future.

The following is a description of a family tree for the Walters family of Waterloo, Washington. Many members of the Walters family have Cystic Fibrosis. Your assignment is to construct a family tree using the information below. Correctly identify family relations (mother, father, brother, sister) and indicate whether each individual is afflicted with CF, a carrier, or "normal." Remember, someone with CF should be shaded in fully. If you are unsure about the genotype of an individual: ?.

1. Mark and Marge are married and have 4 children: Martha, Matthew, Dave and Donald.
2. Martha is married to Paul.
3. Matthew is married to Mary.
4. Dave is married to Diane.
5. Donald is married to Denise.
6. Martha and Paul have 3 kids: Samuel, Samantha, and Seth.
7. Matthew and Mary have 2 kids: Johanna and John.
8. Dave and Diane have 2 kids: Lynne and Luke.
9. Donald and Denise also have 2 kids: Nathan and Natalie.
10. Samuel is married to Sheila.
11. Samantha is married to Doug.
12. Seth is not married.
13. Johanna, Seth's cousin, is also single.
14. John, Johanna's brother, is married to Jessica.
15. Lynne is not married.
16. Luke is married to Leslie.
17. Nathan is married to Valerie.
18. Natalie, Nathan's sister, is married to Vincent.
19. Samuel and Sheila have 2 girls.
20. John and Jessica have 4 boys.
21. Luke and Leslie have a boy and a girl.
22. Nathan and Valerie have 3 boys.
23. Mark and Marge's daughter, Martha, is afflicted with CF.
24. Donald's wife has CF.
25. Jessica, John's wife, has CF.
26. Nathan's wife, Valerie, has CF.
27. Dave and Luke are carriers.
28. John is not a carrier.

Group Names _____

Full credit will not be given to a question if **ALL** parts of the question are not answered.

1. Is Cystic Fibrosis a dominant or recessive trait?
2. In order for Mark and Marge to have kids with CF, what must be their genotypes? Explain how you determined this.
3. What is the chance that Samuel and Sheila's girls are CF carriers? Explain how you determined this.
4. Based upon the genotypes of Jess and John, what are the genotypes of their boys? Explain why there is only one option.
5. Samantha and Doug are thinking about having children. So are Natalie and Vincent. All are concerned about the frequency of CF in the family and don't want their children to have CF. Will any of Samantha and Doug's children have CF? Explain why.
6. What are the possible genotypes for Valerie and Nathan's boys? Explain how you determined this.