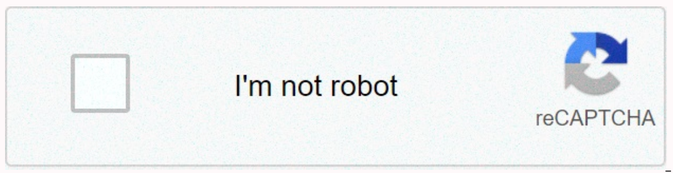

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Genetic processes x-linked pedigree worksheet answers

Sex (X)-linked White Pedigree Recessive Inheritance (PDF) Sex (X)-tied recessive inheritance Pedigree Example responses (PDF) When completing this pedigree with recessive inheritance linked to X, use the symbols X and Y in the genotype to represent the sex chromosomes transmitted from the previous generation. The X chromosome will contain the allele for the shot and the Y chromosome will have no allele for this shot. By completing this pedigree with X-linked recessive inheritance, shaded females who express the recessive phenotype and can only have the XrXr genotype, shaded males who express the recessive phenotype and can only have xrY genotype, and unshaded males who express the dominant phenotype and can only have the XRY genotype. Use this knowledge and additional knowledge about how genes are passed from generation to generation to complete the rest of the pedigree. Patterns for recessive inheritance linked to X After filling genotypes for individuals in various family trees that present this mode of inheritance, some patterns that can be noticed are: The trait is more common in males than in females. If a mother has the shot, all her children should have it, too. There is no male-to-male transmission. It has the same inheritance patterns as recessive autosomal for human females. The son of a female carrier has a 50 percent chance of having the shot. The mothers of males who have the trait are carriers of heterozymotics or homozygous and express the trait. Real examples: Haemophilia, Muscular and Fragile Dystrophy X. Remember: The father passes his X sex chromosome (and all his genes) to his daughters and his sexual chromosome Y (with his genes) to his children. Genes act as a pair, one of each parent for females. For this way of inheritance, males obtain their gene for the trait of their mother. Gene pairs are separated during meiosis and the formation of sex cells together with chromosomes. When the sperm fertilizes the egg, the father's genes (and chromosomes) bind to the mother, or both contribute to the genetic composition of the offspring. A form of a gene can be dominant over another form that is recessive and the dominant form would be expressed. X-inactivation X, also known as lyonization after Mary Lyon, who discovered the phenomenon, is a process by which one of the copies of the X chromosome present in female mammals is inactivated very early in embryonic development. In xx females, most x chromosome genes are mutated. This prevents females from having twice as much genetic product compared to males. The choice of the X chromosome is inactivated is random and should occur at approximately a 50/50 ratio. If this inactivation does not occur in a 50/50 is called biased X-inactivation, or skewed lyonization. Biased X inactivation causes more product of an X to express, which can disrupt the typical recessive X-linked model. If more of the genetic product of the variant gene (mutated) is expressed in a female, the recessive condition linked to X can be expressed. A woman with biased X inactivation will still go through the gene variant in half of her children, with the males affected and females normally not affected 'carriers'. It is important to remember that some conditions, such as haemophilia, may not always follow the typical X-linked recess model and may have heterozyrotic females showing signs and symptoms. Other things to keep in mind: A female with Turner syndrome will only have an X and therefore will express recessive conditions linked to X in the same way that a male would be A female with a genotype 'XXX' may have a different X inactivation pattern A male with a 'XXY' genotype can express softer phenotype due to its X inactivation pattern