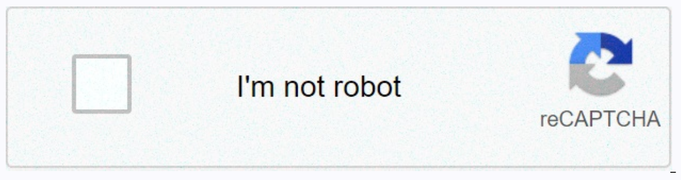


Continue

# Multiple alleles blood type worksheet answers

... Kousen is... Multiple Water Man ALLUS It makes absolutely no sense to continue if we don't know what the word allelo means. allele = (n) a gene form that encodes for a possible result of a phenotype For example, in mendel pea investigations, he found that there was a gene that determined the color of the pea pod. One shape of it (an allew) creates yellow pods, and the other shape (allelo) creates green pods. Did you understand?? Two possible phenotypes of a characteristic (pod color) are determined by two alllos (forms) of the gene of a color. SOME BACKGROUNDS When the gene for a trait exists as only two allels and alllinks play according to mendel's dominance law, there are 3 possible genotypes (combination of allels) and 2 possible phenotypes (the dominant or the recessive). Using the pea pod trace as an example, the possibilities are like this: Homozygous Dominant GENOTYPES (YY) Heterozygous Heterozygous Recessive (yy) RESULTING PHENOTYPE Yellow Yellow Green where Y = the dominant allolo for yellow & y = the recessive allallus for green If there are only two allos involved in the determination of the phenotype of a certain trait, but there are three possible phenotypes, then the inheritance of the trace illustrates both the incomplete domain and the codomain. In these situations, a heterozygous genotype (hybrid) produces a 3rd phenotype that is a mixture of the other two phenotypes (incomplete dominance) or a mixture of the other phenotypes with both appearing at the same time (cominance). Here is an example with Incomplete Dominance: GENOTYPES BB = Homozygous Black BW = Heterozygous WW = Homozygous White RESULTING PHENOTYPE Black Fur Grey Fur White Fur where B = allew for black & W = allew for white And here is an example with Codominance: GENOTYPES BB = Homozigous Black BW = Heterozygous WW = Homozygoos White RESULTING PHENNOTYPE Black and White Skin White Skin where B = allew for black & W = allew for white BUSINESS IN MULTIPLE NOW , if there are 4 or more possible phenotypes for a specific trait, then more than 2 allelos for this characteristic must exist in the population. We call it MULTIPLE ALLUs. Let me emphasize one thing. There may be several alllos within the population, but individuals have only two of these alllinks. Because? Because individuals have only two biological parents. We inherited half of our genes (allelos) from ma, and the other half of the pa, so we ended up with two alllos for each trait in our phenotype. An excellent example of multiple allallus inheritance is the human blood type. The blood type exists as four possible phenotypes: A, B, AB, & O. There are 3 allelos for the gene that determines the blood type. (Remember: you have only 2 of the 3 in your genotype --- 1 from mom and 1 from daddy). Alleles are as follows: ALLELE IA IB i CODES FOR Type A Blood Type B Blood The Blood Note that according to the symbols used in the table above, that allol to O (i) is recessive for alleatos for A&B. With three alllinks we have a greater number of possible combinations in the creation of a genotype. GENOTYPES IAIA IAi RESULTING PHENOTYPES Type A Type A IBIB IBi Type B Type B IAIB Type AB II Type O Notes: As you can count, there are 6 different genotypes and 4 different phenotypes for the blood type. Note that there are two genotypes for blood A and B --- homozygous (IAIA or IBIB) or heterozygous with a recessive allea for O (IAi or IBi). Also note that the only genotype for o blood is recessive homozygous (ii). And lastly, what's the problem with AB blood? What's this an example of? Trait A and dash B appear together in the phenotype. Think think think.... {ANSWER} SAMPLE QUESTIONS Let me inform you that in my time teaching this fabulous subject of biology and this incredibly fun unit on genetics, the only multiple allalle questions I've ever seen were about the human blood type trait. So, here included, for your academic pleasure, are some examples of these types of questions. Discover the problems on paper and click to see the solutions. (I realize that the role is old-fashioned on the internet o' of the world, but I have not become technically experienced enough to do it otherwise.... still.) 1. A woman with type O blood and a man who is type AB are expecting a child. What are the boy's possible blood types? {answer} 2. What are the possible blood types of a child that parents are both heterozygous for blood type B? {answer} 3. What are the chances of a woman with type AB and a man with type A having an O-type child? {answer} 4. Determine possible genotypes and phenotypes in relation to blood type for a couple that has homozygous blood types A & heterozygous B. {response} 5. Jill is type O. She has two older siblings (who tease her like crazy) with blood types A & B. What are her parents' genotypes in relation to this trait? {answer} 6. A test was done to determine the biological father of a child. The child's blood type is A and the mother's is B. Cara #1 has a blood type of O, and #2 has blood type AB. Which guy is the biological father? {answer} Well, that's all I have to say about that. I hope it was helpful. biotopic page click here TOP SECRET RESPONSE AREA 1. A woman with type O blood and a man who's type AB are expecting a child. What are the boy's possible blood types? Solve this using the symbols for blood type allebes and the good old punnett square. Step #1, discover the ma & pa genotypes using the information given. Woman with Type O should be ii, because that is the only genotype and unique for Type O. Man who is AB be IAIB, again because it is the only genotype and unique to blood AB. So, our ours is: ii x IAIB. The appropriate p-square would look like this: As you can see, our results are as follows: 50% of children will be heterozided with Type A blood 50% will be heterozidewith Blood Type B in #2 2. What are the possible blood types of a child that parents are both heterozygous for blood type B? Step 1 - determine genotypes of parents using information in the question. Heterozygous means a dominant allolo and a recessive. As they are type B, the dominant allallus is IB, and the only recessive allol for the blood type is i. So the two parents are IBi, and the cross is IBi x IBi. Step 2 - our friend the punnett sqaure: There is a 75% chance (3 of 4) that the child will be type B, and a 25% chance (1 of 4) that the child inherits Type O (ii). for #3 3. What are the chances of a woman with type AB and a man with type A having a child with Type O? Okay, no sweat. The genotypes of the parents are kindly provided to us, so it's just a matter of using the punnett square properly. But wait a minute, we don't know if the parent is homozygous A (IAIA) or heterozygous A (IAi). Hmmmm.... Well, let's just go with what we know. Shall we use one? to the unknown allallus. The correct use of a p-square should lead you to something that resembles this: Remember, the question is what are the chances of a child with TypeO? As you can see, none of the squares will be ii, so there is no chance of a child with type O. If one of the parents is AB, there is no chance of any child being O because the ab parent does not have an i to pass. to #4 4. Determine the possible genotypes & phenotypes in relation to the blood type for a couple that has homozygous blood types A & heterozigous B. Step #1 - homozygous A = IAIA, & heterozygous B = IBi Step #2 - Punnett Square Time ! All right, the results are in. 50% (2 out of 4 squares) are IAIB and these children would have AB blood. The other 50% (2 of 4 squares) are IAi, these children will have type A. blood #5 5. Jill is type O. She has two older siblings (who tease her like crazy) with blood types A & B. What are her parents' genotypes in relation to this trait? With some careful thinking we don't even need to do the p-square thing. Jill is type O, which means her genotype is ii. This means that each of her parents has at least one i in her genotype (since she inherited one from each parent). As a brother is type B, one of the parents must have the IB alleb, making that father IBi. And since the other brother is type A, the other father

must have the Internal Affairs allebe and have an IAi genotype. There you go, there you go. Jill's parents are iAi & IB, and her brothers shouldn't be so bad. to #6 6. A test was done to determine the biological father of a child. The blood type of the child is A and the mother's is B. #1 has a blood type of O, and #2 has blood type Which guy is the biological father? Well, well, a real kind of brain teaser.  Sherlock Holmes asks accordingly.  First solve the facts.  So make two squares of punnet, each guy crossed with the mother to see what the possible offspring could or could not be in relation to the blood type. Fact 1 - The child is IAIA or IAi. Fact 2 - Mom has B blood, so she's IBIB or IBi.  But if she were IBIB the child would have inherited an IB from her and could not have a blood type of just A (which he does).  So Mom must be iBi. Fact 3 - Cara #1 has type O blood, so its genotype should be ii, because this is the only genotype that encodes for blood O. Fact 4 - Cara #2 is type AB.  The only genotype for AB blood is IAIB, so that's what it is. Now, let's determine the possible blood types of children produced by the mother with each of the guys.  Woman x Cara #1 IBi x ii Possible descendant of Woman & Face #1 50% Type B, 50% Type O Woman x Cara #2 IBi x IAIB Possible descendant of Woman & Face #1 25% chance AB child 25% chance A child 50% chance B child The child is type A, so #1 guy can not be the father.  Dude #2 could be. The question can be answered more quickly and realize that because the child's blood type is different from his mother,this alleall must have come from the father.  Thus, the A alleall that makes it type A came from the father, and #2 is the only one with this alleall in its genotype (IAIB).  Dude #1 has no alleles, he's type O (ii).  Back Type AB is an example of codomain.  The ia alllet and the IB alllet are the same.  What I mean is that neither of them dominates the other.  Instead, when inherited together in the genotype, they appear together in the phenotype.  Wath it!  Cominance. Back