Sickle cell anemia punnett square worksheet

-A Nigerian student June 28, 2017 To quickly answer your question, your third child still has a chance to end up with the sickle trait. In fact, assuming your husband isn't a courier, your next child is as likely as the 50% the other two children did. Think of it as tossing a coin. When you throw a coin, there's a 50% chance you'll get heads and a 50% chance of having the tail. Do the possibilities change with each reversal? №. If you toss a coin twice and get heads both times and flip again, you still have a 50% chance of getting your head on your third flip. The coin has no memory of the toss that came before. The same idea can also be applied to this question. Each of your children has a 50% chance of having a mowable trait essentially for the same reason as the coin toss. Half of the eggs have DNA for the mowed tract and half don't. The ovaies do not remember which egg was last released. Now let's go a little deeper into how it works to see where that 50% comes from. Sickle genetics Instructions to make you and your husband are found in each of your DNA sets. This means that the sickle trait is in your DNA. DNA is packaged in long traits called chromosomes. Most people have 23 chromosomal pairs for a total of 46. We inherit a copy of each chromosome from each of our parents. Traits, like sickle cell disease, come from small sections of our DNA called genes. Each gene encodes a small part of you. The gene involved in the mowed tract is located on chromosome number 11. It's called HBB and it produces hemoglobin, the part of our blood that carries oxygen. The HBB gene may be present in at least two versions (or alleles): HbA and HbS. The HbA allele does not cause problems, but the HbS version can lead to mowable stroke or the most serious mowable disease. The key to understanding where the risk of 50% of your children comes from is the fact that we have two copies of each chromosome. Which means we also have two copies of most genes. This means that there are three possible combinations of these alleles: your husband is most likely the first case, two copies of HbA. (There are other possibilities you can read about here that can affect your child's chances.) Since you've been mowing, you're the second. You have a copy of HbA and a copy of HbS. Remember that when we have children, we only pass a copy of each of our genes. As I said before, since your husband didn't get mowed, he probably has two copies of HbA. This means that it will always pass an HBA copy to each of your children. That is all he has to give! You have an HbA allele and an HbS allele. Each of your children has a 50% chance of getting HbA from you and 50% of Hbs. If they get HbS, then they will have a sickle trait like you. So it's like a coin with HbS on one side and HbA on the other instead of the usual heads and tails. Every time you have a child, the coin is flipped and and HbS comes out, so your child will have drawn sickle. Note: I've simplified hemoglobin genetics a little bit here for the purposes of this question. There are other options for HBB alleles that can affect your children, you can read more about hemoglobin alleles and sickle cell disease here. Punnett Squares: Train the probability We use a Punnett Square to show another way to understand the chances that your child has drawn sickle. To compile a Punnett Square let's start by putting your copies of the HBB allele on the side and your husband's alleles on top. Each of you is equally likely to pass down each of your alleles, so each of the four boxes represents an equally likely event: we can now fill the square by pulling down the alleles from above and in front of the left. Here's the first square: now fill the rest of Punnett Square in the same way: you see that 50% of the boxes are HbAA and 50% of the boxes are HbSA: this means that every child has a 50% chance of having a sickle trait. What it doesn't mean is that half of your kids will have been mowed down and half won't. This is a point that is often confusing about Punnett Squares: they do NOT mean that if you have four children, two will have sickle cell and two will not. He's just trying to figure out the odds for every child. How to understand the possibilities of heads or tails in a coin toss. It all depends on the version of the hemoglobin allele you translate. Every time you have a child there is a 50% chance that you will pass the HbS allele. The hidden benefits of HbS While sickle cell disease is very painful and difficult, there is a reason why hbs allele still exists. People who have a copy of the HbS allele and a copy of the HbA allele, or people like you with mowing tract, have increased resistance to malaria. Diseased blood cells make it harder for malaria to get into the blood. That's why we see more of the HbS allele in Africa where there's a higher case of malaria. Unfortunately, with this allele comes the possibility of having two copies of HbS, which causes the sickleable disease. But only if both parents have at least one copy of HbS. By Sage Hellerstedt, Stanford University The Punnett Square worksheet is a great teaching tool for genetics. This worksheet helps students get an idea of the different possible combinations for genetic traits and helps them calculate how likely each combination is. Here are some ideas to use punnett square in your class. The Punnett square is a diagram used to make sense of genetics and inheritance. The purpose of this diagram is to show the different possible combinations of alleles. This is a useful tool that you can use to teach biology and probabilities regardless of the level of your students. Here are some ideas to use the square of in your class. You should talk about genetics and alleles before introducing the punnett square worksheet into your class. Class. ideally it should also have a good understanding of how to calculate probabilities. Students should be familiar with genes and understand that genes are a unit of hereditary information while an allele is a possible sequence or variant of a gene. You should also talk about observable genetic traits, also known as phenotypes. Students should understand that there are dominant and recessive alleles that will not become phenotypes unless combined with another recessive allele. It is possible to introduce the concept of codominating alleles with high school students. Make sure punnett square activities are linked to genetics, inheritance, and allele classes. You can use these activities to introduce these concepts or to help students understand genetics and probabilities in more depth. The Punnett square is a simple diagram that shows the different possible combinations. Here's an example for the offspring of two organisms with the same combination of Aa alleles:Using this worksheet helps students see all the different possibilities and gives them an idea of which phenotype is most likely to occur. You can use Legos to introduce Punnett Square to your students. This visual approach would be ideal for an activity that you will use to introduce concepts such as genetics and alleles. You must have Lego in two different shapes to represent the dominant and recessive alleles. Use cups or other small containers to represent animals or plants that inherit genetic material. Start with two cups that contain a different combination of two Lego shapes to represent parents. Have students fill the worksheet with the four possible combinations of Lego shapes. Students can then place the four different combinations inside four cups or small containers representing offspring. This approach helps students understand the logic behind Punnett's square and provides them with a visual reference that you can use once you start talking about alleles. Plants are a great example at the middle school level because you can easily identify a phenotype that students will understand, such as the color of a flower. You can even grow flowers in class to illustrate the lesson. Students can fill out a punnett square worksheet for plant genetics. The purpose of this activity is to introduce the idea of dominant and recessive alleles and get students accustomed to seeing a capital letter for the dominant trait and a lowercase letter for the recessive tract. Create a simple worksheet with four squares and ask students to write down the different possible combinations. You can use several phenotypes:Create a worksheet for a bb blue flower and a blue flower Bb.Create a worksheet for a blue flower Bb a white flower bb. Create a worksheet for a tall TT plant and a high plant Tt.Create a worksheet for a tall plant TT and a small plant. You can then ask students to identify the number of possible combinations and calculate the probability of a be blue or of a tall plant. You can also have students draw what the plants will look like. You can introduce advanced ideas at the high school level and connect Punnett Square with more real examples. You should introduce concepts such as homophobigous genes, heterozygous genes or mutations. You can also focus on the odds and have students use a worksheet to calculate the likelihood of a feature appearing in offspring. Introduce the idea that the expected result of a Punnett square does not always reflect what happens in real life. Students should be aware that these worksheets will show the probability of a combination of alleles. Have students use a Punnett square worksheet to predict the outcome of a coin toss or other random event. Once the worksheet is filled in, have students throw a coin and compare the result to what Punnett's square predicted. Provide students with a different combination of alleles for offspring and tell them how frequent each combination is. Have them use Punnett's square to find their parents' allele combinations. This is an activity that only takes a few minutes to complete, but it's a great way to dust off how Punnett's square works and to make sure students have a solid understanding of the legacy. You can work with observable phenotypes in animals and introduce the idea that there are several possible combinations of alleles for the same phenotype. The color of the brown bear's fur is a great example since a bear can have BB or Bb alleles and have brown fur. On the other hand, only a bear with a combination of alleles bb will have a black fur coat. Have your students use Punnett's square to calculate the likelihood of offspring having brown or black fur. This issue encourages students to create more complex tables since bear parents can have the combination of BB or Bb alleles. Predicting eye color is another interesting activity that you can introduce at the high school level. Start by making a list of the different possible combinations of alleles for each eye color. You can have students calculate the probability of eye color based on the color of their parents' eyes, or students determine the allele combinations of two parents based on their children's phenotypes. Eye color is more complex than other phenotypes and gives students the opportunity to create more advanced worksheets that reflect different possible combinations of parents' alleles based on their phenotypes. You can make things more complicated and combine eye color with hair color. Have students research different genetic traits and create a about how these traits are inherited. You can have students work in groups and assign a feature to each group. Students will need to define the feature you've assigned them, explain how it's inherited, and create several Punnett squares that show how the feature can be inherited, or skip a build. Here are some examples:A specific hair color. A specific eye Rolling. Freckles.Lobe of free or attached ears. This project will help students understand how complex genetic inheritance is and also help them connect what they learned in the classroom with real-world examples. Students can look at images of cats and predict what punnett square offspring will look like. This is similar to the activity of bear fur, but the genetics of the cat's coat is more complex. Students will have to work with genotypes that affect hair length and color. Here are some facts to help you start planning this activity:A cat with short hair will have a genotype LL or Ll. A cat with long hair will have a genotype ll. An all-white cat can have a WW or Ww genotype. A cat with white fur and some colored hair has a ww genotype. White cats may have a W allele and another allele for a dense pigment or piebald sighting. There is a gene for dense pigment. A black, brown or orange cat will have a combination of DD or Dd alleles. A cat with gray fur, cream or light brown will have a combination of allele dd. Piebald cats with the combination of alleles SS and Ss have some white hair, while piebald cats without white hair have genotype ss. You can combine punnett square with topics like genetic disorders. Studying how sickle cell anemia is inherited could be an interesting project for AP-level students. You can have students create a worksheet to determine the likelihood of a child inheriting sickle cell anemia based on their parent's allele combinations. Have students design a species from scratch to test their understanding of genetic rules. Ask them to make a list of dominant and recessive traits. Determine how many traits students will need to work with depending on how long you want them to switch to this project. Creating a species and determining how common some genetic traits will be is a great way to make sure students have a solid understanding of Punnett's square. You can have students create illustrations for different genetic combinations. You can go further and ask students to create genetic traits for an imaginary species, determine which traits are dominant and recessive, and ask them to create problems that other students will have to solve. Solve.