X-Linked Worksheet Name: Key

1. Pam has a colorblind daughter with her colorblind husband, Matt. Pam's dad is colorblind but she and her mother are not. Matt learned in biology that it is unusual for females to be colorblind. You know that colorblindness is X-linked so please explain to him why this is or is not possible.

This is possible. Colourblindness can skip generation because Pam would have been heterozygous (X^CX^c) ∴ she's the carrier which means she could have passed the colourblind genes to her daughter.

2. Sickle Cell Anemia is a X-linked trait. A couple comes to you questioning the possibility that a child is theirs. This is the reasoning, Nate does not have Sickle Cell Anemia and neither does his wife Liz. They have two sons; one who has the trait and one does not. Explain how this is possible.

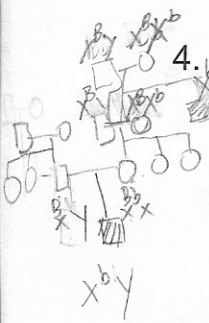
	X^R	Y
X^R	X^RX^R	X^RY
X^r	X^RX^r	X^rY

For this to be possible, Liz would have to be heterozygous (X^RX^r) for the recessive alleles, since she would be passing either X^R or X^r to the 2 boys. Nate would be X^RY but only passes the Y

3. Kevin was diagnosed with Hemophilia, an X-linked disorder, at the age of 2 months. He marries Kathy who does not have the trait. They are discussing children and want to know what their chances are of the following.

	X^H	X^H
X^h	X^HX^h	X^HX^h
Y	X^HY	X^HY

a. Having children with Hemophilia? no hemophilia
b. Having a girl with Hemophilia? all girls are carriers
c. Having a boy with Hemophilia? no hemophilia



4. Gary has been diagnosed as colorblind since kindergarten. His parents Kim and Mark are confused because neither of them nor their parents are colorblind. Kim has three sisters who are not colorblind and Mark has two sisters who are not colorblind. The only colorblind relative is Kim's Uncle Tom. Mark is convinced that Kim has an affair and Kim is convinced they have the wrong child. Both have agreed to have tests done to determine what is going on. The first step is genetic counseling to avoid costly testing. What do you find?

Since colourblindness is x-linked. Kim and her mother and grandmother need to be heterozygous for colourblindness, therefore they are carriers. Mark can be the father.

What is the next step? Family counciling since it is possible that

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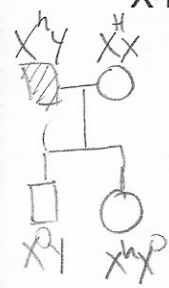
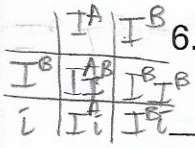


5. Justin has been diagnosed with Huntington's disease at the age of 35. Justin and Adrienne have two children. Kelly who is a girl and John who is a boy. Who to they need to tell they will inherit the disease and whom do they need to talk about the risks of passing it on? Why do they need to discuss all of this information?

Kelly will only get the disease if Adrienne is a carrier (X^HX^h) but she will definetly be a carrier and could pass it on. Depending on Adrienne, John will either have Huntington's or be disease free since Justin only passes on the Y chromosome to him.



6. Tony has blood type AB and Tina is heterozygous B. They have a child that has B blood. Is this possible, explain.

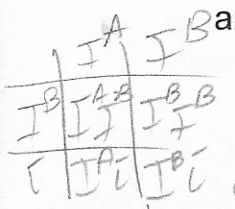
Yes it is. The child has a 50% chance of blood type B. It can be either I^BI^B or I^Bi (homozygous or heterozygous)

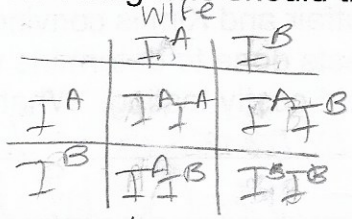
7. Tara, the star of a soap opera, has and affair with Devin, but Tara is married to Jack. Tara gets pregnant and knows that Devin has blood type A and Jack is heterozygous B. The baby is O.

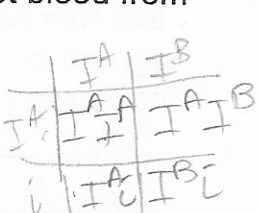
   a. What is Tara's blood type? I^Bi or I^Ai or ii
   b. Who is the father? Jack

8. Walter is married and the father of three, has been in an accident. He needs blood desperately and the Red Cross has a war they are saving blood for so there is none locally for Walter to receive. His wife and children are at the hospital and volunteer to give blood. Walter is in surgery and his blood has not been tested, nor do they have time to test it. Of the following who should they get blood from and why?

   a. Wife – Blood Type AB
   b. Lisa – Blood Type B
   c. Kevin – Blood Type AB
   d. Tony – Blood Type A







Lisa - type B

Wife & Kevin type AB

Tony - type A