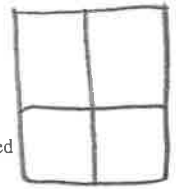
Mini-Lab: How is colorblindness transmitted?



Punnett Square w/ parents

Procedure:
1. Obtain 2 cups, 3 white beans, and one red bean.
2. Label one cup 'mother' and the other cup 'father.'
3. White beans represent X chromosomes. Put a dot on one white bean to represent the X-linked allele for colorblindness. Place this bean, plus one unmarked white bean in the 'mother' cup. The mother is a *carrier* for this sex-linked trait. mom's genotype= _____
4. Mark a black dot on one more white bean. Place this bean, plus 1 red bean, into the cup labeled 'father.' dad's genotype: _____
5. Close your eyes and pick one bean from each cup to represent how each parent contributes a sex chromosome to a fertilized egg.
6. In your data table, record the color of each bean and the sex of the individual who would carry this pair of chromosomes. Also record how many X-linked alleles the individual has. Put the beans back in the cups they came from.
7. Repeat steps 5-7 until you have completed 10 trials.

dot = B
no dot = b

Data:

Trial	Colors	Sex of Individual	~~Number of X-linked alleles~~ Genotype
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Total number of colorblind females: _____ Class total: _____
Total number of colorblind males: _____ Class total: _____

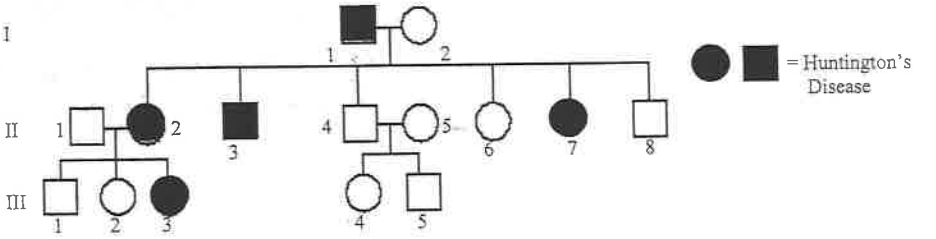
Conclusions: (IN COMPLETE SENTENCES!)
1. How do the sex chromosomes keep the number of males and females roughly equal?

2. How many males and how many females were colorblind? Explain these results.

3. Explain the special pattern of inheritance for sex-linked genes. Why does this pattern exist?

Pedigree Worksheet

Name$ _____



1. Which members of the family above are afflicted with Huntington's Disease? _____

2. There are no carriers for Huntington's Disease- you either have it or you don't. With this in mind, is Huntington's disease caused by a dominant or recessive trait? _____

3. How many children did individuals I-1 and I-2 have? _____

4. How many girls did II-1 and II-2 have? _____ How many have Huntington's Disease? _____

5. How are individuals III-2 and II-4 related? _____ I-2 and III-5? _____

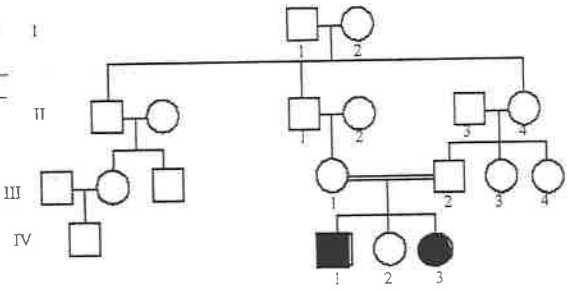
6. The pedigree to the right shows a family's pedigree for Hitchhiker's Thumb. Is this trait dominant or recessive? _____

7. How do you know? _____

8. How are individuals III-1 and III-2 related? _____

9. What are the genotypes of the 2 individuals that have hitchhiker's thumb? _____

10. Name the 2 individuals that were definitely carriers of hitchhiker's thumb. _____



11. Is it possible for individual IV-2 to be a carrier? _____ Why? _____

12. The pedigree to the right shows a family's pedigree for colorblindness. Which sex can be carriers of colorblindness and not have it? _____

13. With this in mind, what kind of trait is colorblindness (use your notes)? _____

14. Why does individual IV-7 have colorblindness? _____

15. Why do all the daughters in generation II carry the colorblind gene? _____

16. Identify 2 generation IV colorblind males. _____