**Biology 9: Unit 6 Genetics REVIEW Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Sex-Linked Practice Problems**

|  |  |  |  |
| --- | --- | --- | --- |
| "Normal" female | XCXC | Normal male | XCY |
| Carrier female | XCXc | Color-blind Male | XcY |
| Color-blind female | XcXc |  |  |

1. A normal female marries a color blind male.
   1. What are the chances that the offspring will be color blind if they are females?
   2. What are the chances that the offspring will be color blind if they are males?
2. A color-blind female marries a normal male.
   1. How many of the female offspring will be carries of the color-blind allele?
3. A carrier female marries a normal male.
   1. How many of the male offspring can be expected to be color-blind?
   2. How many of the male offspring can be expected to have normal vision?
   3. How many of the female offspring can be expected to be carriers?
   4. How many of the female offspring can be expected to be normal?
4. A man whose mother is color blind marries a woman with normal vision.
   1. What is the genotype of the husband?
   2. What percent of their offspring can be expected to be color-blind?
   3. What percent of the male offspring can be expected to be color-blind?
   4. What percentage of their offspring can be expected to be carriers?
5. The X-linked barred locus in chickens controls the pattern of the feathers, with the alleles B for barred pattern and b for no bars. If a barred male (XBY) is mated to a nonbarred female (XbXb), what will be the appearance of the male and female offspring?

**Co-Dominance Practice Problems**

1. What is the expected genotypic ratio among children born to a mother having the genotype AO and a father with the phenotype AB?
2. One parent has the blood type A and the other blood type B. What are the genotypes of the parents if they produce children with only blood type AB?
3. One parent has the blood type A and the other blood type B. What are the genotypes of the parents if 1/2 the offspring are AB and the other 1/2 A?
4. One parent has the blood type A and the other blood type B. What are the genotypes of the parents if the offspring produce the following blood types...1/4 AB, 1/4 A, 1/4 B, and 1/4 O?
5. From the following blood types, determine which baby belongs to which parents.

Baby 1 belongs to the \_\_\_\_\_\_\_\_\_\_\_\_\_ Family Baby 2 belongs to the \_\_\_\_\_\_\_\_\_\_\_ Family

Mrs. Doe.............Type A Mrs. Jones ......... Type A Baby 1 ............. Type O

Mr. Doe .............Type A Mr. Jones .......... Type AB Baby 2 ............. Type B

1. In a particular family, one parent has Type A blood, the other has Type B. They have four children. One has Type A, one has Type B, one has Type AB, and the last has Type O. What are the genotypes of all six people in this family?
2. A woman has blood type is A, her child’s is B. She has three candidates for fatherhood. Their blood types are: Man #1 🡪 B; Man #2 🡪 AB; Man #3 🡪 O. Based on blood types, the mother says it must have been #1.
   1. Do you agree? Why or why not?
   2. This child, a son this time, is also colorblind. The only one of the men in question to share this characteristic is #2. The mother is not colorblind. Can you now determine who the father of the little boy is, assuming it must be one of these men? Explain your answer.

**Dihybrid Practice Problems**

1. In pepper plants, green (G) fruit color is dominant to red (g) and round (R) fruit shape is

      dominant to square (r) fruit shape.

* 1. What gamete types will be produced by a heterozygous green, round plant?
  2. If two such heterozygous plants are crossed, what genotypes and phenotypes will be seen in the offspring and in what proportions?

1. Wolves are sometimes observed to have black coats and blue eyes. Assume that these traits are controlled by single locus genes and are located on different [chromosomes](http://www.ksu.edu/biology/pob/genetics/defin.htm#chrom). Assume further that normal coat color (N) is dominant to black (n) and brown eyes (B) are dominant to blue (b). Suppose the alpha male is black with blue eyes and the alpha female is normal colored with brown eyes. The female is also heterozygous for both traits.
   1. What are the genotypes of the possible offspring?
   2. What percent of the offspring will be normal colored with blue eyes?

**Pedigree Practice Problems**

1. Pedigree I traces the dimples trait through three generations of a family. Blackened symbols represent people with dimples.

I

II

III

Although Jane and Joe Smith have dimples, daughter, Clarisse does not. Joe’s dad has dimples, but his mother and his sister, Grace, do not. Jane’s dad, Mr. Renaldo, her brother, Jorge, and her sister, Emily, do not have dimples but her mother does.

* 1. Write the name of each person below the correct shape in Pedigree 1, along with possible genotypes
  2. How are marriage and offspring symbolized?
  3. What do the Roman numerals symbolize?

1. Make a pedigree based on the following passage about freckles. Freckles are dominant over no freckles. Write the name of each person below the correct shape in your pedigree, along with possible genotypes. Andy, Penny, and Delbert have freckles, but their mother, Mrs. Commins does not. Mrs. Giordano, Mrs. Commins’ sister, has freckles, but only one of her parents, Mr. Lutz has freckles. Deidra and Darlene Giordano are freckled, but their sister, Dixie, like her father is not freckled.