Name _____ Course/Section_____

Date _____ Professor/TA _____

Activity 15.1 Solving Genetics Problems

Refer to Activity 14.3 and to Chapters 14 and 15 in *Biology,* 7th edition, to complete this activity.

1. An organism that has the genotype *AaBbCc* is crossed with an organism that has the genotype *AABbCc*. Assume all genes are on separate sets of chromosomes (that is, they are not linked).

a. What is the probability that any of the offspring will have the genotype *AABBCC*? (*Hint:* To get the answer, consider the six possible types of autosomal crosses. Determine the individual probabilities of getting *AA* offspring from the monohybrid cross. Then do the same to determine the probabilities of getting *BB* offspring and *CC* offspring. Multiply these probabilities together.)

b. What is the probability that any of the offspring will have the genotype *AaBbcc*?

2. Consider the cross *AaBbCcddEe* x *AABBccDDEe*.

a. What is the probability that any offspring will have the genotype *AaBBCcDdEE*?

b. What is the probability that any offspring will have the genotype *AABBCCDDee*?

3. In fruit flies (*Drosophila melanogaster*) the most common eye color is red. A mutation (or allele) of the gene for eye color produces white eyes. The gene is located on the X chromosome.

a. What is the probability that a heterozygous red-eyed female fruit fly mated with a white-eyed male will produce any white-eyed offspring?

b. What is the probability that the mating in part a will produce any white-eyed females?

c. What is the probability that this mating will produce any white-eyed males?

4. A heterozygous brown-eyed human female who is a carrier of color blindness marries a blue-eyed male who is not color-blind. Color blindness is a sex-linked trait. Assume that eye color is an autosomal trait and that brown is dominant over blue. What is the probability that any of the offspring produced have the traits listed?

a. Brown eyes

b. Blue eyes

c. Color blindness

d. Color-blind males

e. Brown-eyed, color-blind males

f. Blue-eyed, color-blind females

g. What is the probability that any of the males will be color-blind?

h. Why do males show sex-linked traits more often than females?