

Name _____ Per _____

Gene Linkage – Crossing Over – Gene Mapping

Practice Problems

1. A wild-type fruit fly (heterozygous for gray body color and normal wings) was mated with a black fly with vestigial wings. The offspring had the following phenotypic distribution: Wild type = 778; black-vestigial = 785; black-normal = 158; gray-vestigial = 162. What is the recombination frequency between these genes for body color and wing type? How many map units apart are the genes for body color and wing shape?

2. In another cross, a wild-type fruit fly (heterozygous for gray body color and red eyes) was mated with a black fruit fly with purple eyes. The offspring were as follows: wild type = 721; black-purple = 751; gray-purple = 49; black-red = 45. What is the recombination frequency between these genes for body color and eye color? How many map units apart are the genes for body color and eye color?

3. In another cross, a wild-type fruit fly (heterozygous for normal wings and red eyes) was mated with a vestigial winged fruit fly with purple eyes. The offspring were as follows: wild type = 672; vestigial-purple = 684; normal-purple = 198; vestigial-red = 207. What is the recombination frequency between these genes for wing shape and eye color? How many map units apart are the genes for wing shape & eye color?

4. Using the information from problem # 1 & 2, construct a gene map & determine the sequence of genes along the chromosome. Be sure to include the map units between each gene

5. Determine the sequence of genes along a chromosome based on the following recombination frequencies: A-B = 8 map units; A-C = 28 map units; A-D = 25 map units; B-C = 20 map units; B-D = 33 map units.

6. Four genes, J, K, L and M, reside on the same chromosome. Given that the crossover frequency between K and J is 3, between K and L is 8, between J and M is 12, and between L and M is 7. What is the order of the genes on the chromosome?