

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

## ***CROSSING OVER***

Breeding organisms and observing the frequency of specific traits in the offspring can help to identify the qualities of the genes controlling the traits (dominance & recessiveness). Unusual or unexpected combinations of traits are generally the result of crossing over. Mapping the location of genes on chromosomes can be done by determining the frequency of crossing over between genes. Genes that are far apart from each other on a chromosome are exchanged more frequently than genes that are close together. Suppose on chromosome number 5 in a species of mouse the following crossing over frequencies between genes were observed:

	gene cdk	gene vrg	gene ps81	gene alu16
gene cdk	X	.19	.12	.10
gene vrg	.19	X	.07	.09
gene ps81	.12	.07	X	.02
gene alu16	.10	.09	.02	X

What would be the sequence of the genes on chromosome number 5 of this species of mouse? Draw the chromosome and illustrate the position of the four genes. Also indicate the distance between each individual gene.

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## ***CHROMOSOME MAPPING***

The following data were collected from repeated matings of fruit flies (*D. melanogaster*). The data record the frequency, to 0.1 percent, of the recombinant characteristics for seven genes located on the same side of the centromere on chromosome 3. The veinlet gene is located one mapping unit from the centromere and acts as an effective base point for comparison.

	Scarlet eyes	Cardinal eyes	Javelin bristles	Stripe body	Minute bristles	Hairy body	Hairless bristles
Scarlet eyes			24.8	18.0			
Cardinal eyes				12.7	31.5		
Javelin bristles						7.3	50.3
Stripe body						35.5	
Minute bristles							36.7
Veinlet veins		74.6				26.4	
Hairy body							43.0

Construct a scaled chromosome map for chromosome 3 of *D. melanogaster*, using a scale of 1 mapping unit = 1 mm (or 2 mm). Show the locations of the eight genes including the veinlet gene.