

Due June 4, beginning of class. Staple or print double-sided.

1. Given the map \underline{d} (5 m.u.) \underline{e} (18 m.u.) \underline{f} ,

a) If you mate an organism with the genotype DD ee FF to one with the genotype dd EE ff, and then mate the F1 heterozygote to a tester strain, what **genotypes and phenotypes** would you expect in the offspring, and in what proportions if there is no interference? (hint: do the double recombinants 1st)

b) What if there is 20% interference?

2. The following are ordered tetrads involving genes C and D

c D	c D	c d	Cd	c D	c d	c D
c D	c d	c d	c D	CD	CD	Cd
Cd	CD	CD	c D	c d	c d	c d
<u>Cd</u>	<u>Cd</u>	<u>CD</u>	<u>Cd</u>	<u>Cd</u>	<u>CD</u>	<u>CD</u>
1	17	41	1	5	3	1

Calculate distances between the genes, and between the centromere and the genes. draw a map.

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3. The cross $abg \times ABG$ is made in an ascomycete (haploid fungus with unordered tetrads). You dissect out the meiotic products from 100 asci and get the following results (listed in columns):

abg	abG	aBg	aBG
abg	abG	ABg	ABG
ABG	ABg	abG	abg
<u>ABG</u>	<u>ABg</u>	<u>AbG</u>	<u>Abg</u>
40	42	10	8

AB

AG

BG

a) Write under each tetrad whether that tetrad is PD, NPD, or T for each gene pair listed at the side.

b) What genes are linked? Calculate the distances, draw a map.

4. *Saccharomyces cerevisiae* yeast cells were mutagenized and histidine auxotrophs selected. The mutants were put into both mating types then mated. The resulting diploids were plated onto minimal media plates. + means that the cells grew, and - means no growth.

	1	2	3	4	5	6	7
1	-	+	+	-	+	+	+
2	+	-	+	+	-	+	-
3	+	+	-	+	+	+	+
4	-	+	+	-	+	+	+
5	+	-	+	+	-	+	-
6	+	+	+	+	+	-	+
7	+	-	+	+	-	+	-

a) Put the mutations into complementation groups according to these results.

b) How many genes involved in histidine biosynthesis have you isolated mutants of?