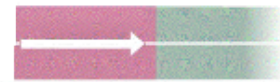
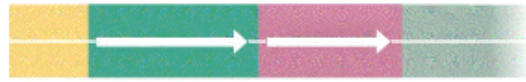
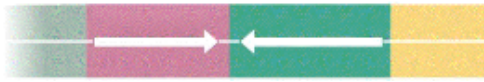


The following two diagrams show DNA transposable elements that are not functional due to a deletion of DNA. *Below each diagram indicate why they are not able to move.*



- a. In the space below, state whether the two elements pictured above would become mobile in the presence of an autonomous DNA transposable element? *Justify your answer.*

A species of toad has a diploid chromosome number of 26. How many chromosomes would be found in each cell in each of the following mutant forms of the toad? (10 pts)

- i. Nullisomic
- ii. Haploid
- iii. Double Monosomic
- iv. Double Trisomic
- v. Triploid

A 3 year-old child exhibited some early indication of turner syndrome which results from the presence of only one X chromosome (XO). Cells isolated from the child confirmed this diagnosis.

- b. If both of the parents have a normal karyotype, what genetic mechanism is responsible for their child being XO? Briefly explain which parent may be responsible. (5 points)

- c. Upon closer examination of the cells isolated from the child it was determined that some of these cells were XO and some were XX. What mechanism would explain this finding? (5 points)

Answer the following questions.

1. You are doing complementation studies with several rII mutants you have isolated from the phage T4. To determine what mutations are alleles of one another, you co-infect *E.coli strain K* with pair-wise combinations of your mutants. Your initial complementation crosses yield the following results:

Mutant Crosses	Results (+ = lysis, - = no lysis)
1 x 2	+
1 x 3	+
1 x 4	-
1 x 5	-

In the following table, predict the results for the following crosses:

Mutant Crosses	Results (+ = lysis, - = no lysis)
4 x 5	
2 x 4	
3 x 5	

You decide to determine the recombination frequency between rII mutants 4 and 5 from the previous problem. You co-infect *E.coli strain B* with mutants 4 and 5 and plate equal amounts of the resulting progeny on either *E.coli strain K* or *E.coli strain B*. The results are listed below:

Bacterial Host	# of Plaques
<i>E.coli strain B</i>	200,000
<i>E.coli strain K</i>	50

What is the recombination frequency between the 2 mutants?