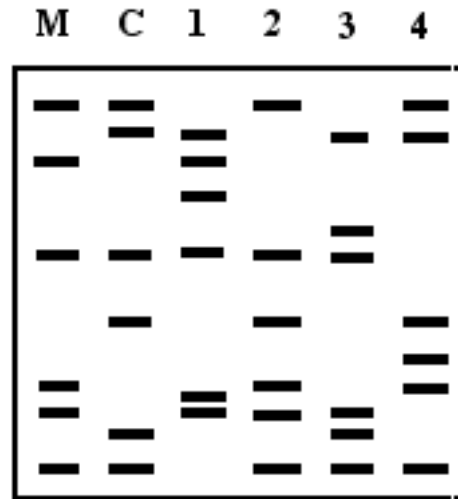
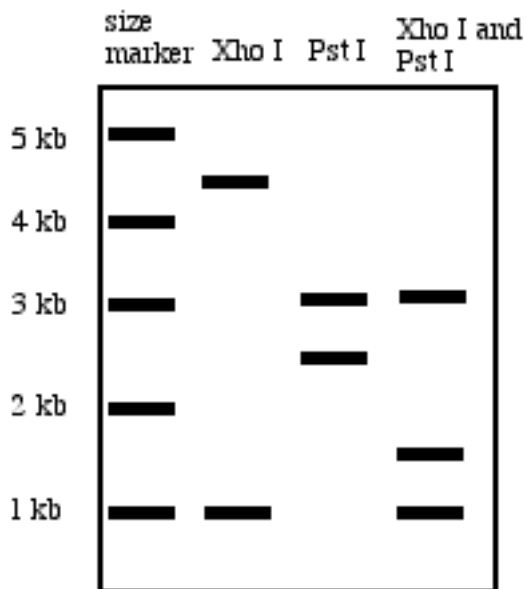


1. This is the result of a paternity test using 3 microsatellite markers. What is your analysis of the results? (M=mother, C=child, numbered individuals are potential fathers)



2. Here is the results of digesting a specific DNA molecule with 2 enzymes.



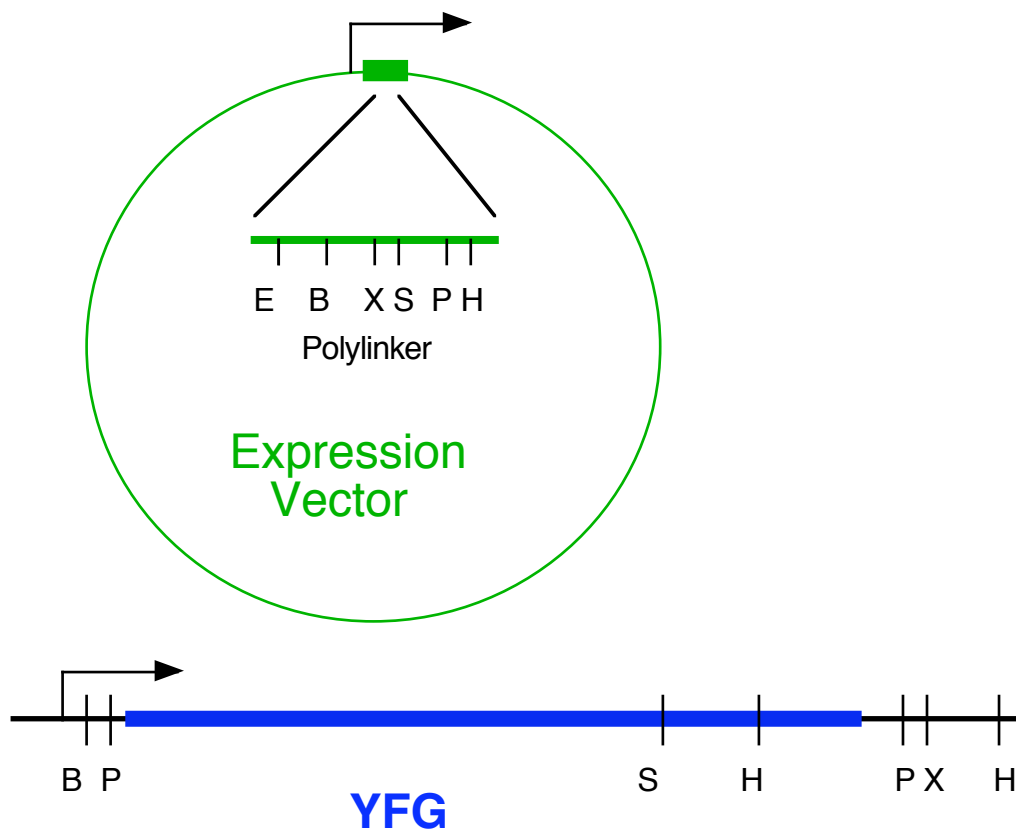
a) what size is the DNA molecule?

b) Is it linear or circular?

c) Draw a restriction enzyme map of this molecule showing enzyme cut positions in kilobases.

3. You want to clone your favorite gene (YFG) into an expression vector where your gene can be transcribed and translated into protein. Your gene conveniently has no introns and has several potentially useful restriction enzyme sites. The expression vector has an engineered “polylinker” site containing cut sites for a number of also useful restriction enzymes. The arrow indicates the transcription start site for the vector (top) and your favorite gene (bottom). The enzyme sites are BamHI (B), EcoRI (E), HindIII (H), PstI (P), SalI (S), and XhoI (X). The coding region of your favorite gene is shown by a thick blue line.

You choose to cut your gene and the vector with PstI and successfully clone the YFG insert into the vector, confirmed by digestion with PstI and gel electrophoresis. Unfortunately, no YFG protein is made by the expression vector.



a) What might have gone wrong?

b) What might you do next time to prevent that? (hint: feel free to research this topic - cloning genes into expression vectors - elsewhere)

4. a) In a type of diploid fly, there are 12 different chromosome types. How many chromosomes would expect to see on a karyotype? \_\_\_\_\_

b) A hexaploid plant has 11 different chromosomes. If you did a Karyotype, how many chromosomes would you find? \_\_\_\_\_

c) A woman has a chromosomal abnormality, trisomy for the X chromosome. How many Barr bodies (look this up in your book) would you expect to typically find in her cells?

\_\_\_\_\_

d) Humans are diploid organism with 23 different chromosomes. A woman with Turner syndrome has one X chromosome and no Y. How many chromosomes would you find in a karyotype of this child?

\_\_\_\_\_

2. If you wanted to construct a YAC that would be stably maintained in yeast cells that are missing the uracil biosynthesis pathway gene URA3, what 4 attributes should the YAC have? Answer with one word or set of words by each letter, followed by a **brief** explanation.

i)

ii)

iii)

iv)

Homework 4 due Wednesday June 11  
Genetics 2008

name (print) \_\_\_\_\_