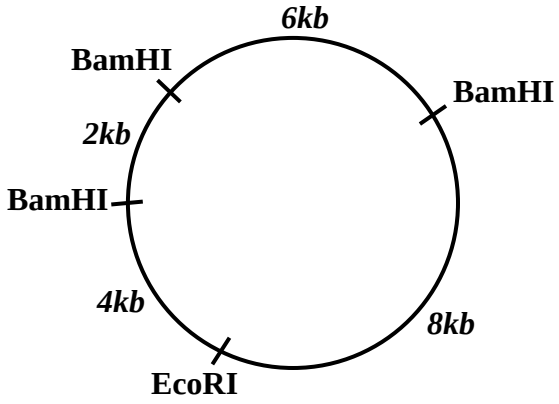
Restriction Mapping

1. **Below is a restriction map for the plasmid pGEN101 (total length = 20 kb). Using this map as a guide, give the number of restriction fragments along with their associated lengths that would result from digesting pGEN101 with the restriction enzymes EcoRI, BamHI, and a combination of EcoRI + BamHI.**



Digest Performed: **Sizes of Fragments Obtained:**

EcoRI……
BamHI……..

EcoRI + BamHI……...

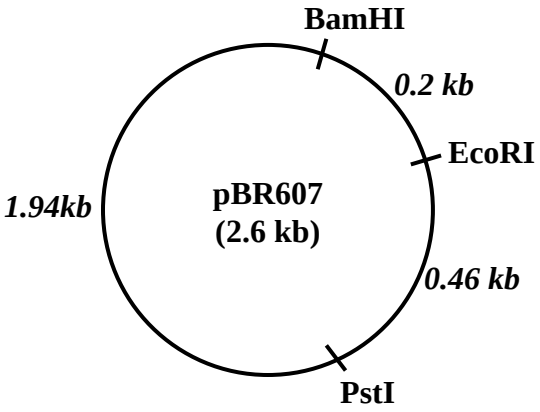
2. **Two freshmen college students, interested in becoming gene jocks, performed the following set of restriction digests on a newly isolated plasmid, pBLA230. The reaction they carries out, along with the fragment obtained in single and double digest reactions were:**

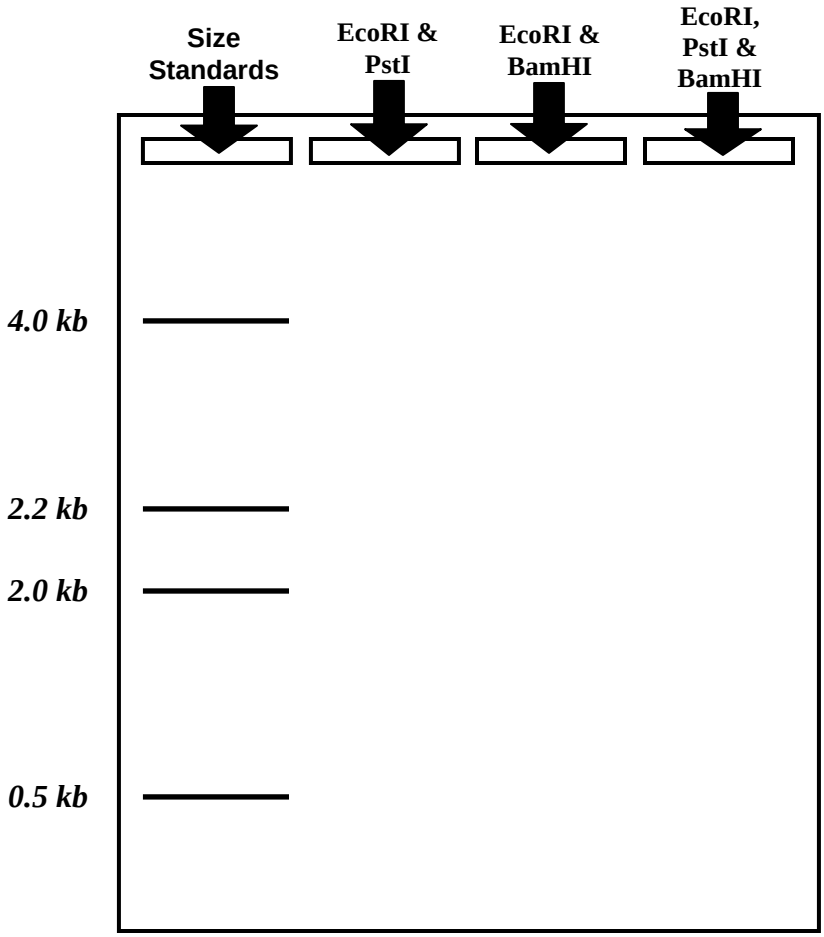
Enzyme(s)	Fragment Lengths Obtained:
HpaI	26 kb
HindIII	13 kb, 6 kb, 4 kb, 3 kb
HpaI + HindIII	7 kb, 6 kb (2), 4 kb, 3 kb

Using this information, construct a restriction map of pBLA230.

3. **Plasmid pBR607 is a 2.6 kb plasmid containing Ampicillin and Tetracycline resistance markers, an origin of replication, and unique restriction sites for the restriction enzymes EcoRI, BamHI, and PstI.**

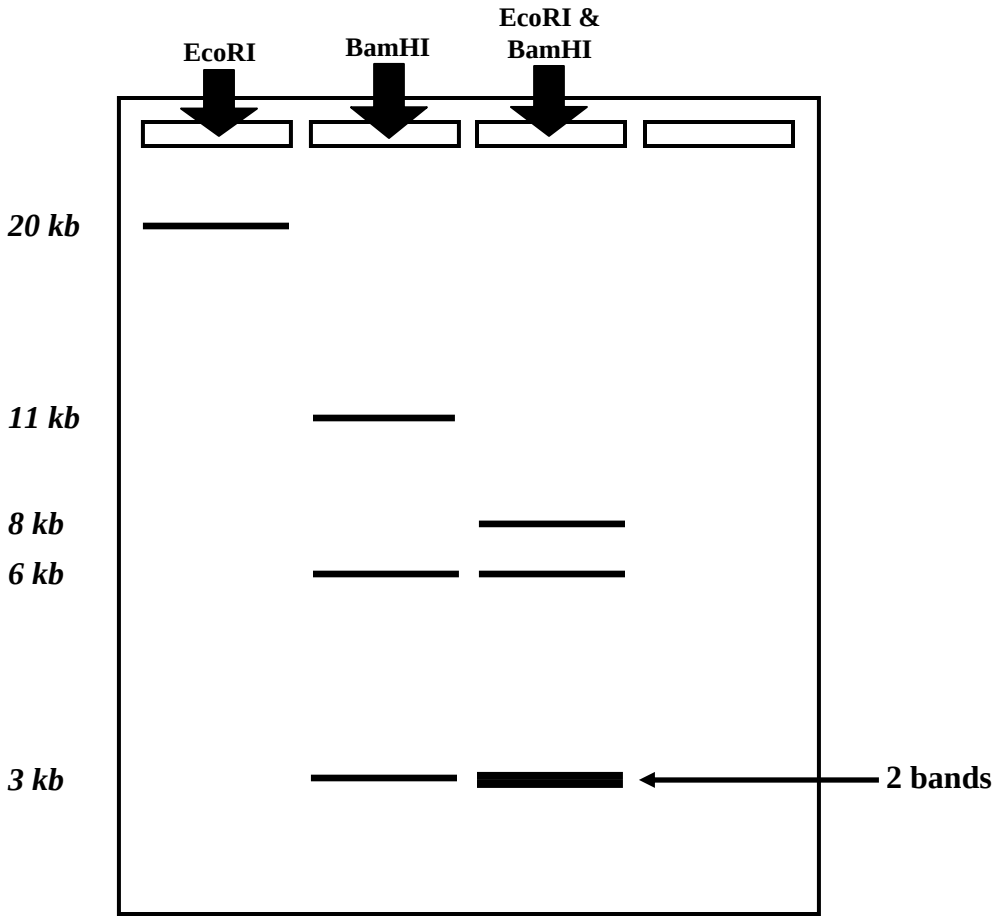
Given the restriction map for pBR607 for the enzymes EcoRI, BamHI, and PstI, show on the agarose gel picture below where the approximate positions of the restriction fragments generated from the given restriction digests would be located after carrying out electrophoresis.





4. **As part of an undergraduate project, a student was attempting to construct a restriction map for the plasmid pUC23 using the restriction enzymes EcoRI and BamHI. After carrying out both single and double enzyme digest reactions and electrophoresing each reaction mix through an aragose gel, the picture below is obtained, showing the number of DNA fragments produced in each reaction, along with the sizes of each fragment.**

From this information, construct a restriction map of the pUC23 for enzymes EcoRI and BamHI.



5. **A very determined graduate student set out to construct a restriction map for the plasmid pDA401 (total size = 4.0 kb). The restriction enzymes used were HindIII, BamHI, and EcoRI. After carrying out the digestions, the resulting DNA fragments were electrophoresed and sized using a set of DNA size standards. The data obtained in each digestion are shown below.**

From this data, construct a restriction map of pDA401 for the enzymes HindIII, BamHI, and EcoRI.

Enzyme(s):	**Segments observed after digestion:**
HindIII	**3.82 kb, 0.18 kb**
BamHI	**2.35 kb, 1.65 kb**
EcoRI	**3.00 kb, 1.00 kb**
HindIII + BamHI	**2.35 kb, 1.20 kb, 0.27 kb, 0.18 kb**
HindIII + EcoRI	**1.87 kb, 1.00 kb, 0.95 kb, 0.18 kb**
BamHI + EcoRI	**1.60 kb, 1.40 kb, 0.75 kb, 0.25 kb**

6. **A circular DNA plasmid, pDA102, has a size of 4.35 kb. When the plasmid DNA digested with combinations of restriction enzymes and the resulting fragments are electrophoresed, the following data is obtained.**

Using these data, construct a restriction map of plasmid pDA102 for the restriction enzymes SalI and HhaIII.

Restriction Enzyme(s):	**Fragment sizes:**
SalI	**2.30 kb, 0.25 kb, 1.80 kb**
HhaIII	**2.10 kb, 1.55 kb, 0.70 kb**
SalI + HhaIII	**1.20 kb, 1.10 kb, 0.75 kb, 0.70 kb, 0.35 kb, 0.25 kb**