

Gel electrophoresis: sort and see the DNA

Pre-class activity

Directions:

1. Go to the DNAI website www.dnai.org > Manipulation > Techniques > sorting and sequencing.
2. View the *Gel Electrophoresis* 2-D animation, and answer the following questions.

Questions:

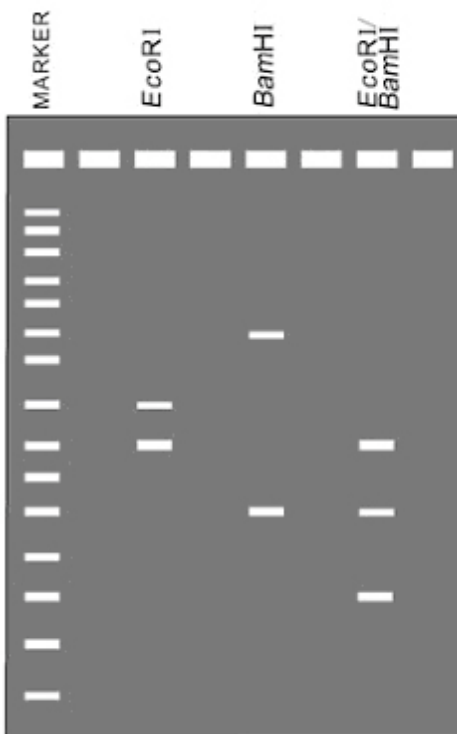
1. How does the process of gel electrophoresis separate DNA fragments?
2. What is the purpose of the agarose gel?
3. What is the purpose of adding blue "tracking" dye to the DNA samples?
4. Explain why DNA has an overall negative charge.
5. Why is the fact that DNA has a negative charge so important in the gel electrophoresis process?
6. Explain how an agarose gel can separate DNA fragments of different lengths.
7. What is the purpose of ethidium bromide in gel electrophoresis?

8. Why is a marker used when running the fragments through the gel?

9. What is a restriction map?

10. On the gel picture below,
 - (a) circle the smallest fragment produced by a restriction enzyme and label it "smallest."
 - (b) circle the largest fragment produced by a restriction enzyme and label it "largest."

GEL PHOTO



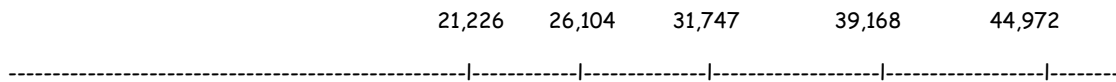
11. In one or two sentences, summarize the technique of gel electrophoresis.

Restriction maps of the linear λ genome

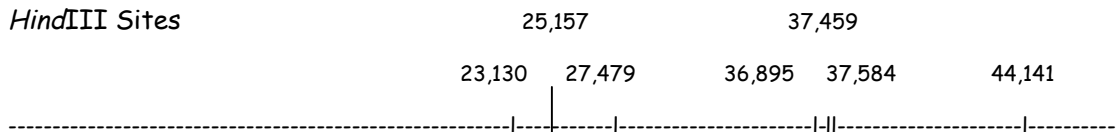
Lambda (λ)



EcoRI Sites



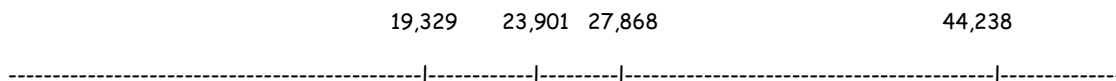
HindIII Sites



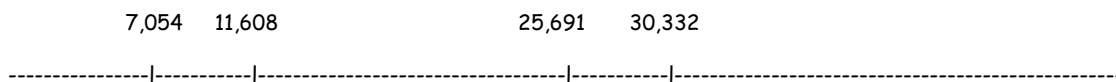
BamHI Sites



NcoI Sites



BmrI Sites



StuI Sites



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Making a DNA fingerprint

In this activity, you will model the construction of DNA fingerprints for a viral genome using different restriction enzymes. You will also practice interpreting restriction maps and visualize how the process of gel electrophoresis separates DNA fragments.

DNA restriction fragment size chart

Directions:

List your DNA fragments in the following chart under the column of the appropriate restriction enzyme.

List each fragment, from largest to smallest.

<i>EcoRI</i>	<i>HindIII</i>	<i>BamHI</i>	<i>NcoI</i>	<i>BmrI</i>	<i>StuI</i>

Name: _____

Date: _____

DNA fingerprints

<u>Marker</u>	<u>EcoRI</u>	<u>HindIII</u>	<u>BamHI</u>	<u>NcoI</u>	<u>BmrI</u>	<u>StuI</u>
(50,000)						
(30,000)						
(20,000)						
(15,000)						
(10,000)						
(5,000)						
(2,500)						
(1,000)						