**Gel Electrophoresis Lab Preview:**

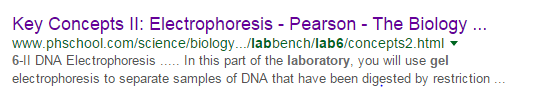
**Or, How to Look Wicked Smart the BioGen Community Lab (Adapted from Don Salvatore)**

DNA fingerprinting is one of the most powerful tools in biotechnology. By cutting DNA into smaller fragments with restriction enzymes and laying out these fragments in bands on a gell with the bands ordered by size, a “fingerprint” of the DNA is created. Since two different molecules of DNA wil not have the exact same sequence of bases, the enzymes may cut them in different places giving different size fragments. The banding pattern is based on the size of the fragments, so two identical samples of DNA will match while that of two different samples of DNA will not match.   
***Restriction enzymes***: restriction enzymes are chemicals that locate a specific sequence of base pairs along a molecule of DNA and cut the DNA within that sequence. Different enzymes can be used.

***Gel electrophoresis***: A method of separating DNA, RNA, or proteins by size. These molecules have an electrical charge. When they are placed in a porous gel and an electrical charge is placed across the gel, the molecules will move through the gel towards to opposite charge. For instance, if negatively charged DNA is placed in the well, it will migrate through the gel towards the positively charged end. The smaller the fragment, the faster it will move. When the current is turned off, the smaller pieces will line up further from the starting well than the larger pieces. The end result is distinct bands of similarly sized DNA, ordered by size.

***ONLINE LAB SIMULATION***

1. GO TO: <http://www.phschool.com/science/biology_place/labbench/lab6/concepts2.html> (You can also google “gel lab 6” and click on the first link.)



1. Read the intro.
   1. MAIN IDEA: “You will use gel electrophoresis to separate samples of DNA using that have been digested by restriction enzymes. Then you will compare fragments of **unknown size** to fragments of a **known size** to… \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.”
   2. Click “Next Concept.”
2. **How Do Restriction Enzymes Work?** Practice “cutting” your DNA.
   1. Why is it called a “sticky end”? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. What kind of bonds are formed between the complementary bases? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Are these strong bonds or weak bonds? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. **Gel Electrophoresis:** Read and watch the simulation.
   1. DNA is a \_\_\_\_\_\_\_\_\_\_\_\_ charged molecule.
   2. Shorter segments will move \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. **Design of the Experiment II:** Read about the equipment you will use in this lab.
5. **Preparing the Gel:** Read the steps.
   1. The wells need to be at the \_\_\_\_\_\_\_\_\_\_\_\_ charged end of the electrodes.
6. **Filling the Wells:** Practice “filling the wells” with the indicator dye. BE CAREFUL NOT TO STAB THROUGH THE WELL!
7. Work through the next few pages to see the lab in action.
8. **WRAP UP:** order the steps below.

\_\_\_\_\_ Stain DNA fragments and measure distances

\_\_\_\_\_ Make gel

\_\_\_\_\_\_ Load samples into gel

\_\_\_\_\_\_ Obtain prepared DNA samples

***PAPER LAB SIMULATION***

1. See the handout. Each group member receives one piece of DNA.