

Gel Electrophoresis Intro

Go to the following website and answer the questions as you go through the simulation.

<https://learn.genetics.utah.edu/content/labs/gel/>

1. What does the process of gel electrophoresis allow scientists to do?

Gel electrophoresis is a technique used to separate DNA fragments from RNA and protein and RNA from protein, based on their sizes and charge

2. Describe the gel and what it looks like close up.

The gel looks like a small tablet but when close up it has holes that catches DNA

3. What goes into the holes at one end of the gel?

DNA Samples are put in the holes at one end of the gel

4. Why is the gel hooked up to electricity?

By and by adding electric current in the gel filter, the DNA strands are separated and, pushed down from the DNA samples that makes it move to the hole.

5. Describe how the different length strands move through the gel differently.

Some strands move longer and faster, some strands move a little. The shorter strand of DNA moves to the holes faster that the longer strands while DNA strands with the same length moves with the same speed and ended up being grouped together.

6. Why would one stain DNA?

Staining is a way to make the sorted group of DNA visible in the naked eye.

7. Briefly describe step 1 in gel electrophoresis.

Step one is all about making the gel. Cooking liquid buffer and agarose in the microwave then letting it sit to the mold until it hardens and solidify with a comb notches on it to make holes.

8. Once the gel liquid is poured into the mold how long does it take for the gel to solidify?

It usually takes about half an hour to solidify the gel.

9. What is the purpose of inserting the comb?

The comb is placed on the end of the gel to make notches that will hold DNA samples.

10. Briefly describe step 2 in gel electrophoresis.

Step 2 is all about setting up the gel apparatus. It is simply done by pouring buffer in electrophoresis box followed by submerging the gel into the buffer, the buffer will make the current flow from one end of the gel to another, and will also keep the gel from drying out.

11. What is placed into the well of the gel? What is the name of equipment that does this?

DNA samples are added by a buffer that contains dye to make them visible then placed into the well of the gel through micropipettor.

12. What is the purpose of a DNA size standard?

DNA size standard contain DNA strand of known length that gives a reference on how to estimate the lengths of the DNA strands in your samples.

13. Describe how the electric power cords are set up and why they are in the order that they are.

The black cord will generate negative charge and the red cord will generate positive charge when connected to the power supply. Once the power supply is turn on, the gel in electrophoresis box will move.

14. How can you tell if the gel is actually running after turning on the electricity?

The gel is actually running when there are tiny bubbles coming out of the electrodes in the both end of electrophoresis box

15. Describe how the DNA moves through the gel when the power is turned on.

The DNA will be repelled by the negative charge and it will move through the gel towards the positive charge at the other end, making the shorter strand move to the hole more quickly that the longer strand.

16. How long does it take for the stain to set?

It takes about half an hour to stain the set.

17. Using the DNA size standard, estimate the length of each DNA stain and type your estimates into the boxes. What were the correct answers for the lengths of each DNA samples?

6000 bp, 3500 bp, and 1500 bp are the correct answers.

Virtual Gel Electrophoresis

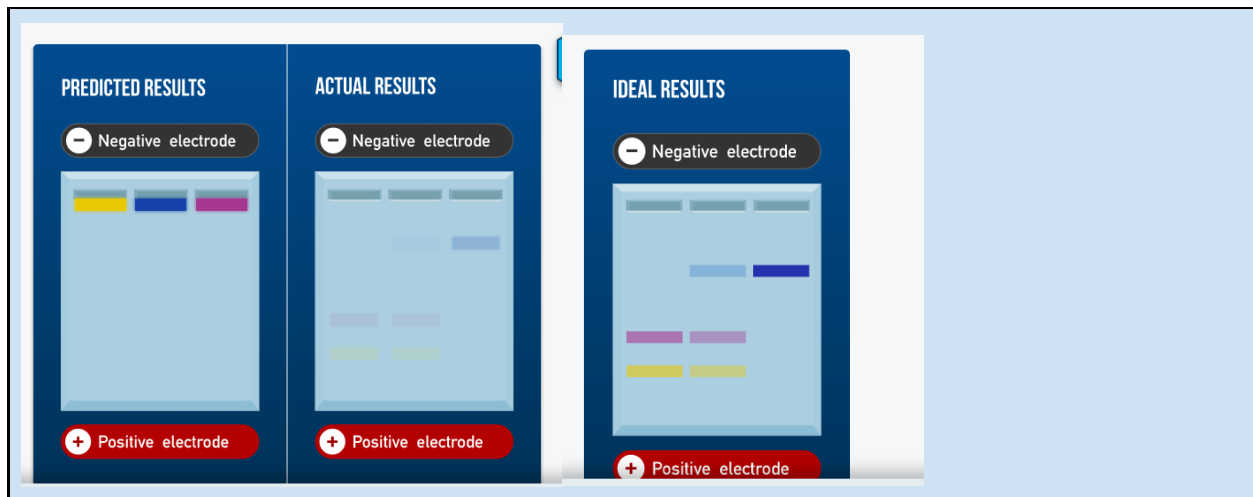
You will be running a virtual gel. Go to the following website (which is the same site you used for the pipette simulation)

https://www.labxchange.org/library/pathway/lx-pathway:c3833fc3-acbe-4649-a0ed-aa1cb2fca3e5/items/lx-pb:c3833fc3-acbe-4649-a0ed-aa1cb2fca3e5:lx_simulation:2f735a59

1. Click on click on level 1 and start the simulation.
2. Read the information and click next section.
3. Look at the materials and click next section.
4. Using the arrows, drag the dyes to the positions you think they may end up in after running the gel. Click next section.
5. Read through the protocol and click start simulation.
6. Follow the steps along the right side of the screen to prepare the box. Click next when you've successfully completed each step.
7. Follow the steps along the right side of the screen to centrifuge the solution tubes. Click next when you've successfully completed each step.
8. Follow the steps along the right side of the screen to draw up solution 1. Click next when you've successfully completed each step.
9. Follow the steps along the right side of the screen to pipette solution 1 into well 1. Click next when you've successfully completed each step.
10. Follow the steps along the right side of the screen to pipette the other solutions into the wells. Click next when you've successfully completed each step.
11. Follow the steps along the right side of the screen to conduct the gel electrophoresis. Click next when you've successfully completed each step.
12. Take a screenshot of **BOTH** your predictions and your results and insert the screenshot into the blue box below. (To screenshot on a chromebook, press control, shift and the button highlighted in yellow in the picture on the right.)

13.





1. Complete the reflection questions.
2. Click next section.
3. Read the summary and click on end simulation.
4. What are 4 things you learned while doing this online simulation?

1. First, I learned the proper procedure of DNA Gel Electrophoresis as well as the proper handling of the equipment.
2. I learned how to manipulate and separate the DNA strands from the sample and how my predicted result differs from the actual result.
3. I learned the correct way to load and run gel electrophoresis in a lab setting and run a gel using electrophoresis to separate molecular fragments based on size and charge.
4. I learned to Interpret the banding pattern you obtain after gel electrophoresis.