



DNA Sequencing

STEM Sims

Lesson 1: Finding the Sequence

DNA sequencing is the process of determining the correct order of the nucleotide bases that are contained in the DNA structure. DNA contains the instructional code for the development and functioning of all living organisms. In this investigation, you will prepare and analyze a sample to determine its DNA sequence.

Doing the Science

1. Open the DNA Sequencing simulation.

Part I: Denaturing and Labeling the Sample

2. Select the marker and move the marker to one of the flasks to label the flask.
3. Move the marker to each of the other three flasks to label them.
4. Select a pipette from the shelf and move the pipette to the NaOH solution. Add the NaOH to each of the four flasks on the tabletop.
5. Select a pipette from the shelf and move the pipette to the DNA primer. Add the DNA primer to each of the four flasks on the tabletop.
6. Select a pipette from the shelf and move the pipette to the DNA polymerase. Add the DNA polymerase to each of the four flasks on the tabletop.

Part II: Adding Deoxynucleoside 5' Triphosphates

7. Select a pipette from the shelf and move the pipette to the container with dATP. Add the dATP to each of the four flasks on the tabletop.
8. Select a pipette from the shelf and move the pipette to the container with dTTP. Add the dTTP to each of the four flasks on the tabletop.
9. Select a pipette from the shelf and move the pipette to the container with dGTP. Add the dGTP to each of the four flasks on the tabletop.
10. Select a pipette from the shelf and move the pipette to the container with dCTP. Add the dCTP to each of the four flasks on the tabletop.

Part III: Adding 2, 3'-Dideoxynucleoside 5' Triphosphates

11. Select a pipette from the shelf and move the pipette to the container with ddATP. Move the pipette with the ddATP to *only* the flask labeled ddATP on the tabletop.
12. Select a pipette from the shelf and move the pipette to the container with ddTTP. Move the pipette with the ddTTP to *only* the flask labeled ddTTP on the tabletop.
13. Select a pipette from the shelf and move the pipette to the container with ddGTP. Move the pipette with the ddGTP to *only* the flask labeled ddGTP on the tabletop.
14. Select a pipette from the shelf and move the pipette to the container with ddCTP. Move the pipette with the ddCTP to *only* the flask labeled ddCTP on the tabletop.
15. Select the "Gel" button at the bottom of the screen to run the DNA samples.

Part IV: Running the Gel

16. Select the gel buffer and move the buffer to the electrophoresis chamber.
17. Select the pipette and move the pipette to the clean tips area.
18. Move the pipette to one of the flasks to load the sample.
19. Select the plunger to withdraw liquid from the flask.
20. Move the pipette to an empty well in the gel bed.
21. Select the plunger to dispense liquid from the pipette.
22. Move the pipette to the waste area to remove the tip.
23. Repeat this process (steps 17–22) until all four wells have been filled with one of the four samples.
24. Click on the + and – symbols on the power supply to connect the correct wire ends of the power supply to the electrophoresis chamber.
25. Select the “On” button on the power supply.
26. Please review the gel electrophoresis results. When ready, select the “Evaluate” button at the bottom of the screen.

Part V: Evaluating the Results

27. Select a letter in each box below to create the DNA sequence of your results and its complementary strand. The DNA primer used was C-T-A.
28. Record your results below and/or select the “Submit Results” button to have your results evaluated.

DNA Sequence Results

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DNA Sequence Complementary Strand

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Do You Understand?

1. Describe the structure of DNA.

2. A DNA strand had the following sequence: C, G, T, A, T, G, G. If the DNA primer used was C-T-A, what is the complementary strand’s sequence?

