

Post-Lab Questions *(Use a separate sheet of paper to answer the questions. Information to help answer them may be found by referencing the individual steps of the activity and the Background.)*

1. Before a DNA profile can be made, what must a scientist be able to obtain from the organisms involved in the profile?
2. Using restriction enzymes to cut DNA strands into RFLPs is referred to as “digestion.” Why?
3. If the DNA samples used in this activity were real, how many base pairs did the longest and shortest RFLPs have? [Express your answer according to the formula: 1 letter = 1 KB = 1000 bases]
4. If another type of molecular “scissors” had been used in this activity, do you think the RFLPs would have been the same lengths or different? Explain your answer.
5. Why is it necessary to make and run a standard set of RFLPs, cut from DNA with the same molecular “scissors,” alongside the RFLPs of the other DNA samples?
6. Why is the technique referred to as a Southern Blot such a critical part of this DNA profiling process? In other words, when the Southern Blot step is complete, what is it supposed to accomplish?
7. What was done in this activity to simulate the three major parts of the Southern Blot process? Be specific!
- 8 a. What was the target VNTR sequence to which the radioactive probes attached themselves?
 b. What was used to simulate the attachment of the probes to the VNTR sequence listed in Question #8a?
9. In this simulation, how was the location of the radioactive probes on the RFLPs detected?
- 10 a. From the evidence presented, who was Rachel’s real father?
 b. Briefly explain the evidence supporting your answer to Question #10a? [The explanation should include something about the size (length) of the RFLPs.]
 c. At which step in the profile-making process was the identity of the father overwhelmingly in favor of one man over the other?
 d. Why would it have been difficult to determine the real father prior to the step listed as your answer to Question #10c?
11. Besides the huge size, how else do you think the autoradiograph made in class differs from one that would be made in a DNA forensics or paternity-testing laboratory?
12. List at least three sources of error that could affect the outcome of any DNA profile.
13. If a lawsuit for non-payment of child support was filed against the person listed as your answer to Question #10a, based on the evidence presented, should this person be required to pay? Why or why not?
14. (a) Make a vertical copy of the flow chart below on your answer sheet. (b) Fill in the blanks in front of each partial statement with a verb(s) that describes each step of the DNA fingerprinting process. (c) Identify, by letter, the step(s) in the flow chart that constitute a Southern Blot.
 A) _____ DNA from tissue samples. → B) _____ RFLPs using restriction enzymes. →
 C) _____ samples into wells of agarose gel. → D) _____ standard RFLPs alongside samples for comparison. →
 E) _____ double-stranded DNA samples to single strands. → F) _____ single strands to nylon membrane. →
 G) _____ nylon membrane with radioactive probes. → H) _____ X-ray film to nylon membrane. →
 I) _____ target DNA RFLPs using autoradiography.