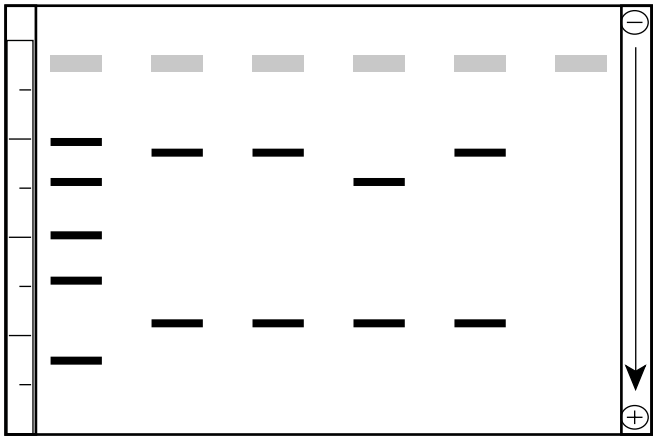
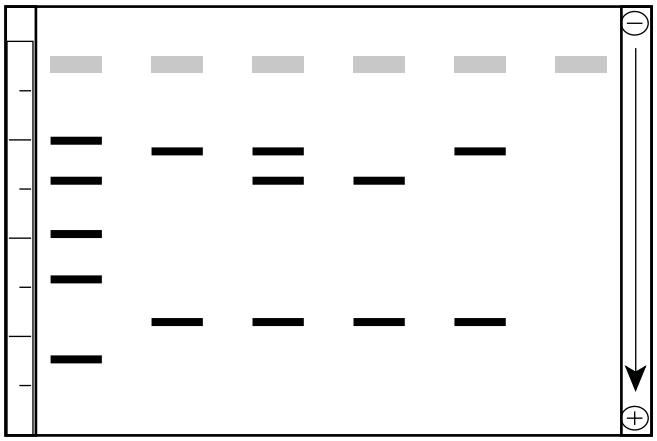
Gel Analysis Questions (Student's Worksheet)

DNA SAMPLE	DESCRIPTION
M1M	MiniOne DNA Marker: Contains 5 DNA fragments of 100, 300, 500, 1000 and 2000 bp sizes
1 Kb Ladder	1 Kb DNA Ladder: Contains 15 DNA fragments ranging from 1000 bp to 15000 bp sizes
SRS	*Shigella* Reference Standard: PCR product of *Shigella sonnei* (as found in nature) which contains two targeted gene products at 175 bp and 1000 bp sizes
+LC	Positive control: PCR product of the lab-made *Shigella* strain which contains two targeted gene products 175 bp and 1800 bp sizes
-C	Negative Control: PCR Product of the reagent mixture only. No DNA template
5L	PCR products using a homogenous mixture of the five layer Bean Dip and the positive control (+LC) as DNA templates
C	PCR products using the Cheese Layer and the positive control (+LC) as DNA templates
SC	PCR products using the Sour Cream Layer and the positive control (+LC) as DNA templates
B	PCR products using the Bean Layer and the positive control (+LC) as DNA templates
S	PCR products using the Salsa Layer and the positive control (+LC) as DNA templates
G	PCR products using the Guacamole Layer and the positive control (+LC) as DNA templates

1. Group 1 decided to run the following 6 samples: M1M, 5L, G, SRS, +LC, –C. Here are their results. What inferences can you make about their hypothesis based on their choice of samples?

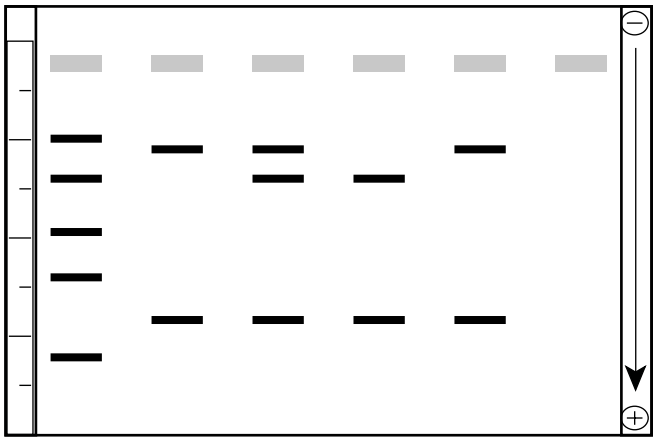


2. Group 2 decided to run the following 6 samples: M1M, SC, C, SRS, +LC, -C. What inferences can you make about their hypothesis based on their choice of samples? Can you trust their results?

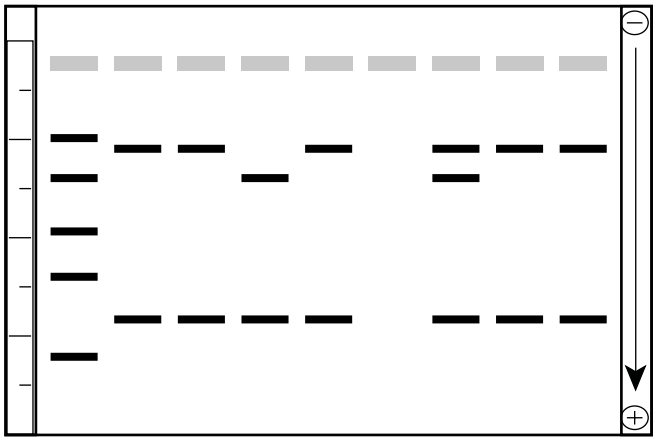


Gel Analysis Questions continued

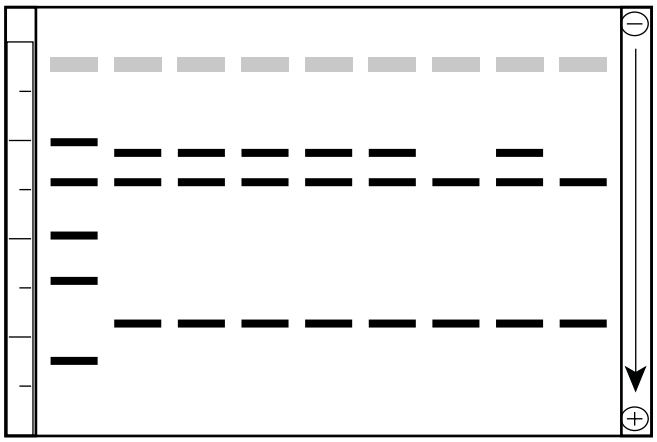
3. Group 3 decided to run the following 5 samples: M1M, 5L, C, SRS, +LC. Here are their results. What conclusion(s) can you come to about their choice of samples? What inferences can you make about their hypothesis? Can you trust their results? Explain.



4. Group 4 decided to run the following 9 samples: M1M, 5L, S, SRS, +LC, -C, C, SC, B. Here are their results. What conclusion(s) can you come to about their choice of samples? What inferences can you make about their hypothesis? Can you trust their results? Explain.

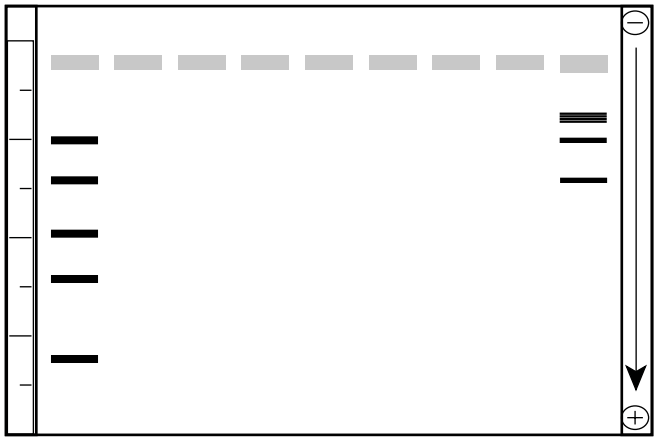


5. Group 5 decided to run the following 9 samples from a separate batch of PCR samples: M1M, SC, C, B, S, G, -C, +LC, SRS. Here are their results. What conclusion would they have drawn from the data? What (if anything) went wrong?

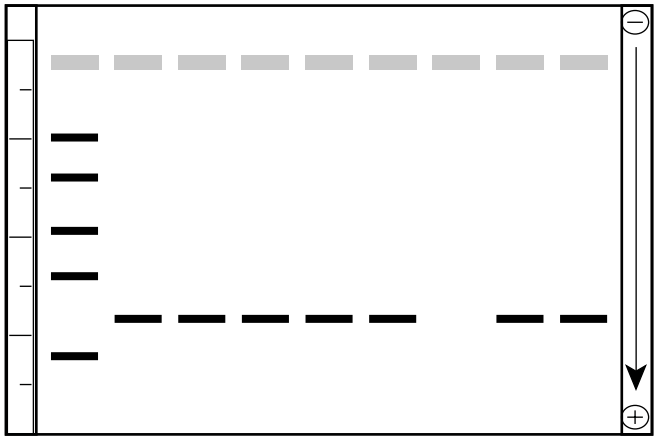


Gel Analysis Questions continued

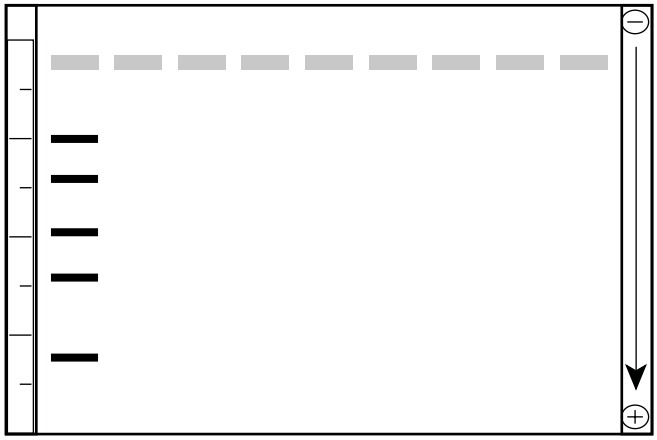
6. Group 6 decided to run another PCR without a positive internal control. They then chose to run 9 samples: M1M, C, SC, G, B, S, 5L, -C, 1Kb Ladder. Can you trust their results? Could something have gone wrong?



7. The other groups used up all the dip samples so Group 7 decided to run another set of PCR samples. They chose to run 9 samples M1M, C, SC, G, B, S, -C, +LC, SRS. Here are there results. What is the problem?

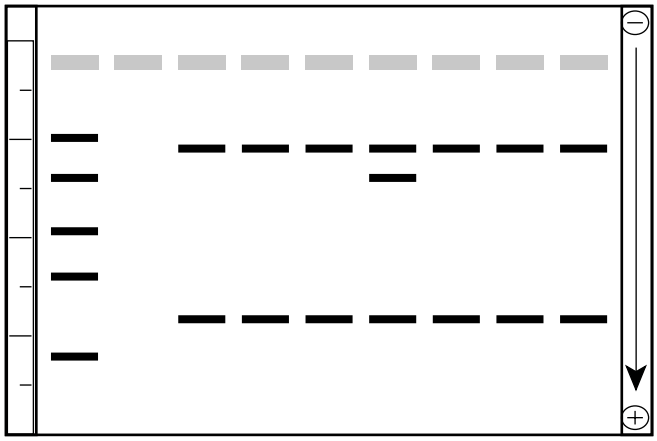


8. Since the PCR for Group 7 was not fully successful and they were still out of samples, the teacher ran another set of PCR samples using the same protocol as the original samples. The 8 PCR samples that were redone were -C, 5L, +LC, B, C, G, S, SC. The teacher also included M1M on the gel to check for the correct fragment sizes. When they ran a gel to test the reaction, they got these results. What could have caused this to happen?



Gel Analysis Questions continued

9. Group 8 ran their own PCR. They processed 9 samples –C, 5L, +LC, B, C, G, S, SC. During their gel analysis they included M1M to ensure the correct fragment sizes were amplified. Here are their results. How would you interpret these results?



10. Group 8 (from question 9 above) offered to share their PCR samples with Group 9 and when Group 9 ran their gel, they used the same samples in the same order. Here are their results. What might have happened? Why and how did you come to this conclusion?