DNA Fingerprinting Lab – Background, Analysis, and Conclusion Questions

Scenario
Investigators were called to the scene of a burglary where it appeared that as the burglar rushed to leave, he ran into a glass door, cutting his arm and tearing his shirt. The investigators removed small pieces of bloodstained fabric from the door to be tested; the blood sample was determined to be type A. Two suspects were apprehended; unfortunately, both had type A blood. Investigators have resorted to DNA fingerprinting to determine which of the two suspects is the burglar.

Background / Procedure:
1) What is the purpose of adding restriction enzymes to a DNA sample?

2) What are 2 characteristics of the DNA sequences typically recognized by most restriction enzymes?

3) Describe the make-up of a DNA sample that has been treated with restriction enzymes. (in other words, is it still one long DNA sequence?)

4) What is the purpose of “loading” a DNA sample that has been treated with enzymes into a gel for electrophoresis? (During electrophoresis, what happens to the components of the DNA sample?)

5) How is the size of a DNA fragment related to how quickly it travels through a gel?

6) Why is it necessary to switch tips on the micropipette between different DNA samples?

7) Describe the crime scene in this investigation. What do we know about the suspects?

8) The DNA samples in this lab have been mixed with a “loading dye.” What are the TWO purposes served by this loading dye?

9) Why is the DNA pattern that results from gel electrophoresis called a “fingerprint”?
**POST-LAB ANALYSIS / CONCLUSION:**

10) In the space below, DRAW what the gel looks like. *Include the results of the group that shared the gel with yours!*

<table>
<thead>
<tr>
<th>Well #1</th>
<th>Well #2</th>
<th>Well #3</th>
<th>Well #4</th>
<th>Well #5</th>
<th>Well #6</th>
<th>Well #7</th>
<th>Well #8</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNA Marker</td>
<td>Crime scene DNA</td>
<td>Suspect #1 DNA</td>
<td>Suspect #2 DNA</td>
<td>DNA Marker</td>
<td>Crime scene DNA</td>
<td>Suspect #1 DNA</td>
<td>Suspect #2 DNA</td>
</tr>
</tbody>
</table>

11) Into how many pieces is each DNA sample cut?

12) Why is it important to look at the results from the other group(s)?

13) On the gel, which bands contain the SMALLEST fragments of DNA? Which bands contain the LARGEST fragments of DNA?

14) Which suspect appears to be guilty? What made you choose that person?

15) What is the purpose of the “DNA Marker”?

16) What kind of societal or ethical issues are raised by the application of DNA fingerprinting?

17) Are there other uses of DNA fingerprinting that could be harmful or discriminating to the average citizen?

18) Would you be willing to have your DNA fingerprint on file with a government agency or a national medical registry? Why or why not?