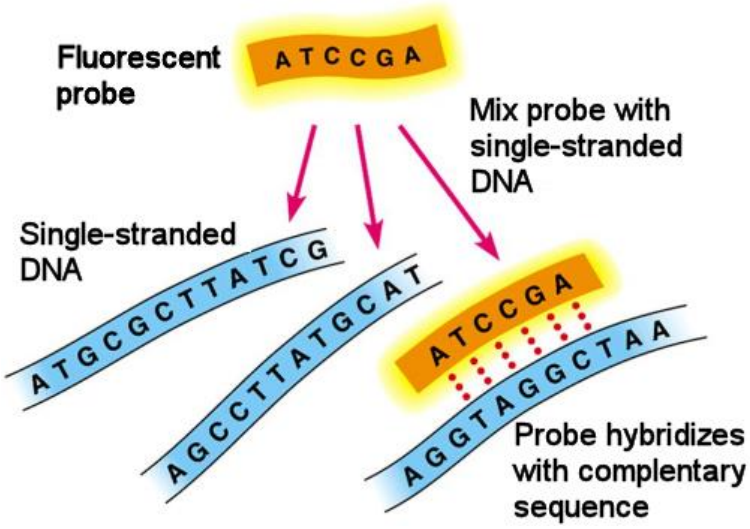
Using DNA Probes

A DNA probe is a short piece of single-stranded DNA with some kind of detectable tag (usually a fluorescent molecule) attached.



A sample of DNA can be heated to separate the two strands and then the probe is added. Because the probe is single-stranded, it can bind to (hybridize with) any strand of DNA containing a complementary sequence (Figure 1).

Figure 1 Hybridization of a DNA probe to a DNA sample

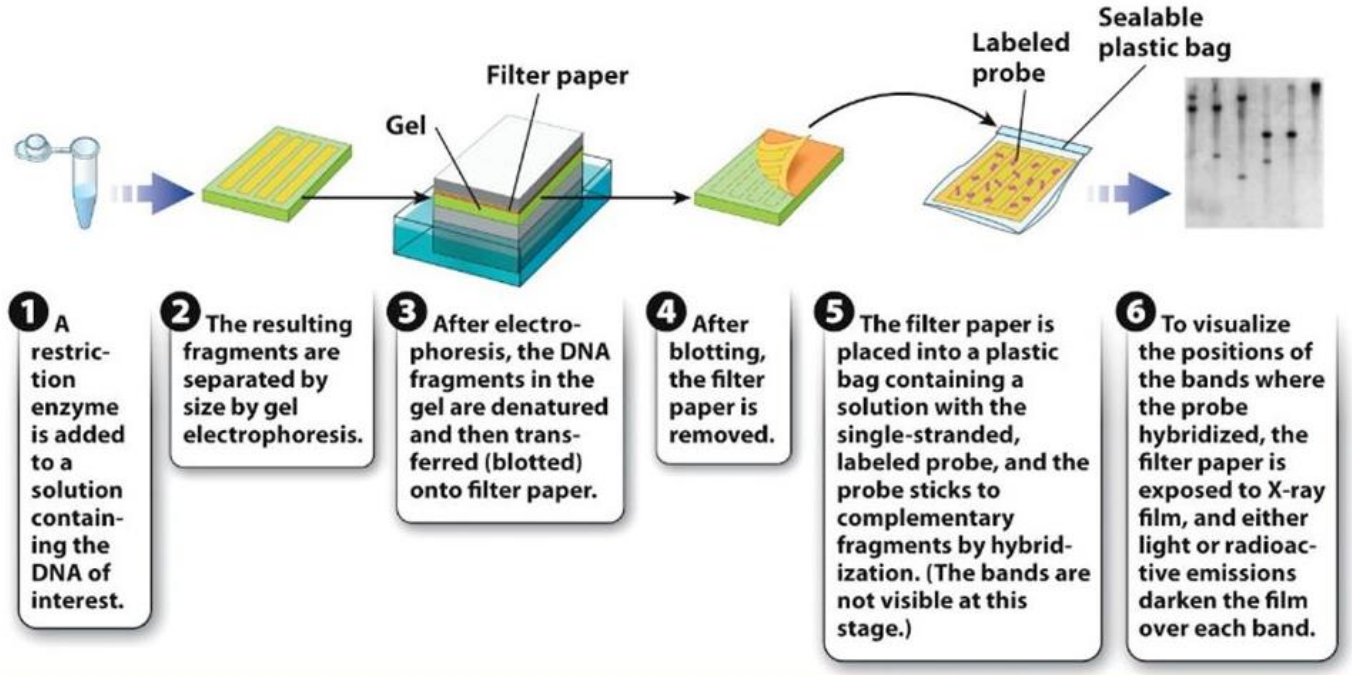


Figure 2 **Using a probe in gel electrophoresis**

1. Why is a fluorescent molecule attached to the probe?

2. Using Figure 2, describe how a probe can be used to determine if a particular DNA sequence is present in a DNA sample?

Figure 3 DNA sequences from five individuals

DNA sequences from five individuals are shown in Figure 3. Each sample is exposed to a probe with the sequence TCCGAG.

3. a) Which individuals have DNA that would be indentified by the probe?
b) How is it possible that more than one person was identified by this particular probe?

4. What can you conclude if the filter paper from an individual does not have any fluorescence?

5. a) What changes would you make to this procedure if you wanted the probe to identify just a single person?
b) Design a probe that would identify only one of the five individuals given.