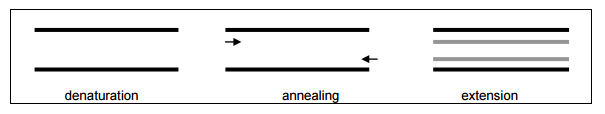
**Creating a DNA profile**

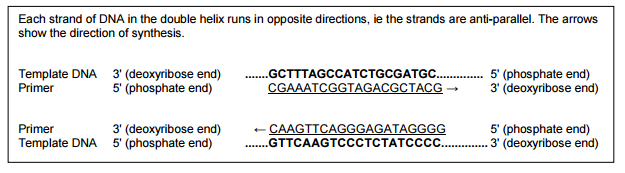
**using polymerase chain reaction**

Forensic science has made a great progress during the last decades and has assisted jurisdiction to convict culprits more effectively. An important tool is the DNA fingerprinting where DNA evidence can be matched with DNA samples from suspects. Whereas great amounts of DNA were necessary in the past to carry out a restriction digest, very few amounts of DNA are sufficient nowadays to obtain a DNA fingerprint, thanks to the method of "polymerase chain reaction" (PCR).

The human genome has regions of DNA called short tandem repeats (STRs) where short sequences are repeated randomly so that each individual differs in the number of repeating sequences. As primers are used which bind to these sequences, these STR regions are amplified in PCR. Afterwards, the amplified DNA strands are separated in a gel electrophoresis.



**Figure 1. The three steps in polymerase chain reaction which are repeated in every cycle by shifting the temperature.**

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**Figure 2. The binding of primers at complementary DNA strands.**

**Figure 3. Crime scene analysis using PCR on only one STR: Sample A) was collected from the crime scene. Both samples B) and C) are from suspects.**

**Task: Write a lab report for the polymerase chain reaction (PCR) including the sections:**

**1. Introduction:** Here, you should explain the biological principle of this method with its temperature shifts. You should also explain why the obtained DNA pattern is unique in every individual. Explain in one sentence the step of electrophoresis and why it is applied here.

**2. Question and hypothesis:** You should state the scientific question that is answered in the experiment, shown in figure 3., and you should propose a possible hypothesis ( you could form an if-clause ).

**2. Materials:** You should list the materials and chemicals required for a polymerase chain reaction.

**3. Procedure:** You should describe the single steps of PCR, **in passive voice,** beginning with pipetting the ingredients. You don't need to write the exact volumes and concentrations of the chemicals. At the end, mention in one sentence the step of electrophoresis.

**4. Result/Conclusion:** You shouls interpret the results from figure 3. and identify the criminal.

**5. Discussion:** Here, you come up with possible errors that could have occurred and you propose further application or discuss the social and moral impacts which this scientific method implies. You could also add more information you already know about PCR and its modern applications.

**Content :** \_\_\_\_\_\_\_\_\_ /40 P. **Language:** \_\_\_\_\_\_\_\_\_\_\_\_ /60 P.

**Total points: \_\_\_\_\_\_\_\_\_\_\_\_\_**

**GRADE: \_\_\_\_\_\_\_\_\_\_\_**

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| Note | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Punkte | 100-95 | 95-90 | 90-85 | 85-80 | 80-75 | 75-70 | 70-65 | 65-60 | 60-55 | 55-50 | 50-45 | 45-36 | 36-27 | 27-18 | 18-9 | 9-0 |

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