What is the size of the PCR product?

Gel electrophoresis separates DNA fragments on the basis of size.

Gel Electrophoresis

What is it?
- a method used to separate macromolecules like proteins and nucleic acids (ie DNA/RNA) based on their size and electric charge

How is Gel Electrophoresis Achieved?
- The electrical current creates an anode and cathode at either end of the gel and these attract or repel the DNA molecules depending on their charge
- DNA being negatively charged is repelled from the cathode (+) and attracted to the anode (-)

How is Gel Electrophoresis Done?
- The agarose gel is a solid jelly like substance to which the DNA mixture (with a dye) is added to
- An electrical current is added to the gel and forces the pieces of DNA to move across the gel

Summary of Gel Electrophoresis of DNA

1. Restriction enzymes cleave DNA into smaller segments of various sizes.
2. DNA segments are loaded into wells in a porous gel. The gel is surrounded by a buffer solution within a chamber between two electrodes.
3. When an electric current is passed through the chamber, DNA fragments move toward the positively charged cathode.
4. Smaller DNA segments move faster and farther than larger DNA segments.

The Gel Results
- In this technique the rate at which the different pieces of DNA move across the gel depends on their size
- The smaller pieces move fast and make it further down the gel than the larger fragments
- The DNA appears as a banding pattern spread from one end of the gel to the other.
Why do we use Gel Electrophoresis?

- Gel electrophoresis is an important tool in biology
- It can be used to identify specific DNA molecules that have been isolated and cut up by restriction enzymes
- We also use it to determine differences in the genomes of different plant and animal species

Why do we use Gel Electrophoresis?

- Gel electrophoresis is also used in forensic science to compare the DNA fingerprints found at the Crime Scene and that of the suspect
- DNA samples collected from blood or semen are separated using GE
- The number and positions of the bands formed on each lane of gel is the actual DNA fingerprint and is unique to each person

Sequencing deciphers the DNA text

- The letters of the DNA alphabet are strung together to create instructions

Sequence terminator

- Cannot form a phosphodiester bond with next incoming dNTP

X-ray film image of Acrylamide gel

- DNA sequence of original strand
DNA sequencing is currently automated and generates a text file of the DNA sequence and a chromatogram image of the sequencing.

**Sequencing Chromatogram**

Fluorescently labelled sequence terminators