



*Thermocycler and
Gradient Thermocycler*

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THERMOCYCLER

1.1 Brand **Applied Biosystems** Model **2720 Thermal Cycler**

Technical specifications

- Peltier heating/cooling unit with 96-well sample block.
- Volume ranges from 10 to 80 μL .
- Temperature range from 4°C to 99.9°C. Accuracy $\pm 0.25^\circ\text{C}$ from 35°C to 100°C.
- Long term stability and high reliability.
- LCD Screen 7x40 character display.

GRADIENT THERMOCYCLER

1.2 Brand **Applied Biosystems** Model **Veriti Thermal Cycler**

Technical specifications

- Six separated Peltier heating/cooling blocks.
- Volume range from 10 to 80 μL .
- Wide temperature range from 4°C to 99.9°C. Accuracy $\pm 0.25^\circ\text{C}$ from 35°C to 100°C.
- 6.5" VGA 32k colour screen with Touch Screen.

Technique description

The polymerase chain reaction (PCR) is a technique that amplifies a DNA template to produce specific DNA fragments in vitro. An amplification reaction includes target DNA, a thermostable DNA polymerase, two oligonucleotide primers, deoxynucleotide triphosphates (dNTPs), reaction buffer and magnesium.

The method relies on thermal cycling, consisting of cycles of repeated heating and cooling of the reaction for DNA melting and enzymatic replication of DNA.

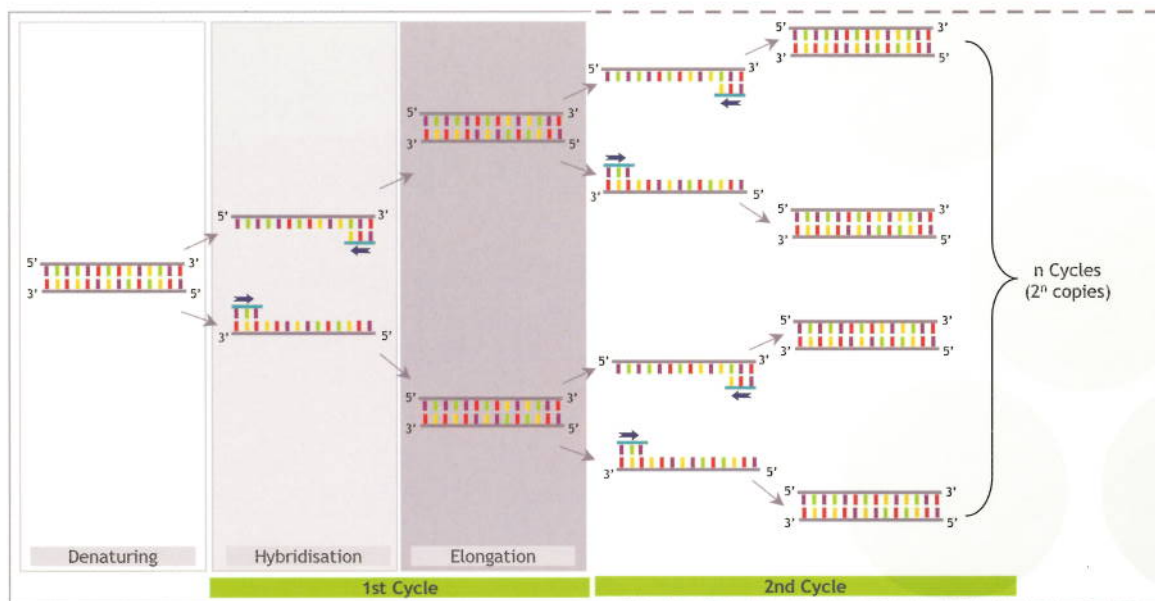
A PCR cycle consists of three steps:

- 1.- Denaturing double-stranded DNA by heating to 95°C.
- 2.- Hybridization of primers to the DNA by lowering the temperature to 50-65°C.
- 3.- Elongation of the chain by the action of DNA polymerase by increasing the temperature to 72°C.

Each step of the cycle should be optimized for each template and primer set. After 20 cycles about a million molecules are replicated from a single segment of double stranded DNA.

Applications

- > Determine the quality of drinking water, surface and waste water through the detection of genes.
- > RNA amplification by reverse transcriptase (RT-PCR).
- > Diagnosis of diseases through genetic screening of bacteria / virus.
- > Determine food quality and safety.
- > Studies with restriction enzymes.



PCR operation scheme