QUICK GUIDE

Polymerase Chain Reaction

WHAT IS THE POLYMERASE CHAIN REACTION (PCR)?

PCR is a technique that allows researchers to quickly create many copies of a specific region of DNA *in vitro*.

WHAT DO I NEED TO PERFORM PCR?

- **Template** – the purified, double-stranded piece of DNA we want to copy
- **Primers** – short synthetic DNA molecules that target a specific DNA sequence for amplification
- ***Taq* DNA Polymerase** – thermostable enzyme used to copy DNA
- **Free nucleotides** – the building blocks of DNA
- **Thermal Cycler** (a.k.a. PCR machine) – a specialized machine that rapidly heats and cools the samples.

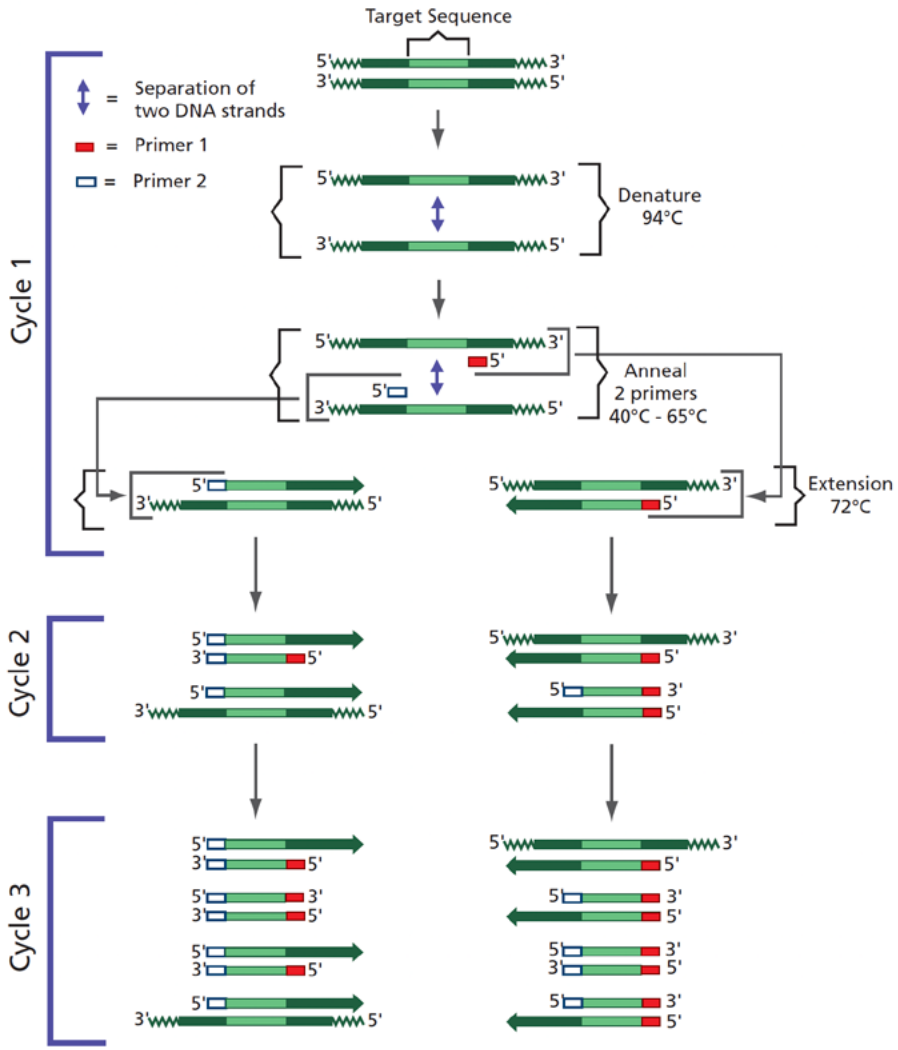
TIMSTAR

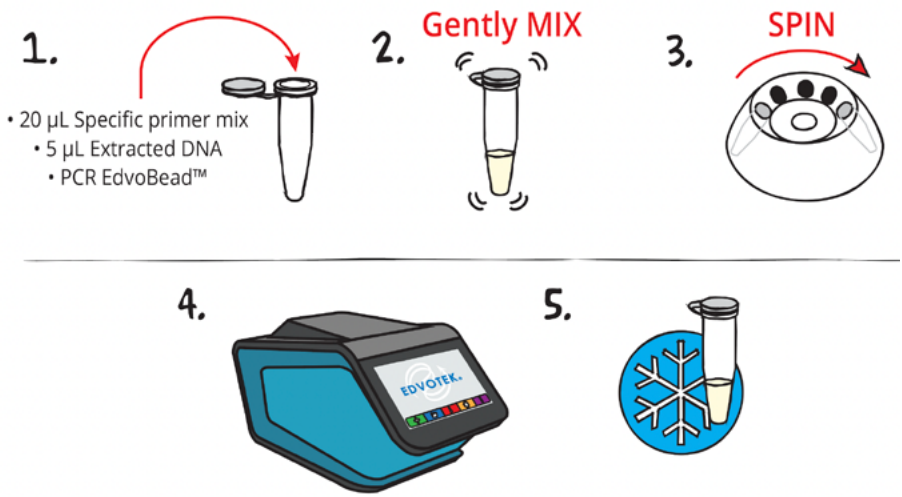
Part of WF Education Group

EDVOTEK®

HOW DOES PCR WORK?

To perform PCR, the template is mixed with primers, *Taq* polymerase and nucleotides. The mixture is heated to 94°C to denature the DNA duplex (i.e., unzip it into single strands). Next, the sample is then cooled to 45°C-60°C, allowing the primers to base pair with the target DNA sequence (called "annealing"). Lastly, the temperature is raised to 72°C, the optimal temperature at which *Taq* polymerase will extend the primer to synthesize a new strand of DNA. Each "PCR cycle" (denaturation, annealing, extension) doubles the amount of the target sequence in less than five minutes. In order to produce enough DNA for analysis, twenty to forty cycles may be required.





1. **ADD** 20 µL specific primer mix, 5 µL extracted DNA and the PCR EdvoBead™ to a labeled 0.2 mL tube.

2. **MIX** the PCR sample. Make sure the PCR EdvoBead™ is completely dissolved.

3. **CENTRIFUGE** to collect the sample at the bottom of the tube.

4. **AMPLIFY** DNA using PCR. ***(NOTE: Actual PCR cycling conditions will vary. Reference your experiment's instructions for specific times and temperatures.)***

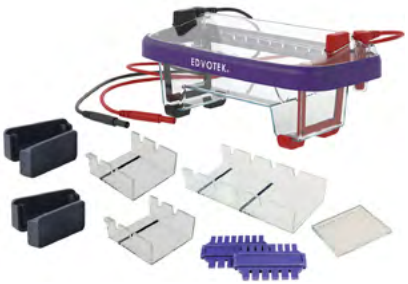
   PCR cycling conditions:
   Initial denaturation 94°C for 3-5 min.
   94°C for 30-60 sec.
   45-65°C for 30-60 sec. } 20-40 cycles
   72°C for 30-60 sec.
   Final Extension 72°C for 5-10 min.

5. **PLACE** tubes on ice. **ANALYZE** samples using agarose gel electrophoresis.

Related Products

EdvoCycler™ Junior
Holds 16 x 0.2 mL PCR Samples
Code: BT200806

Classroom PCR Labstation™
Supports up to 25 students
Code: BT150886



M12 Complete Electrophoresis Package
Code: BT180800

M36 HexaGel Electrophoresis Apparatus
Code: BT97820

PCR Tubes
Thin-walled 0.2 mL PCR microtest tubes, 100 pack.
Code: BT100562

PCR EdvoBeads™
Bottle of 25 beads.
Code: BT140596

DuoSource Power Supply
75 or 150 V
Code: BT150802

Details for all these products and MORE can be found on our website!