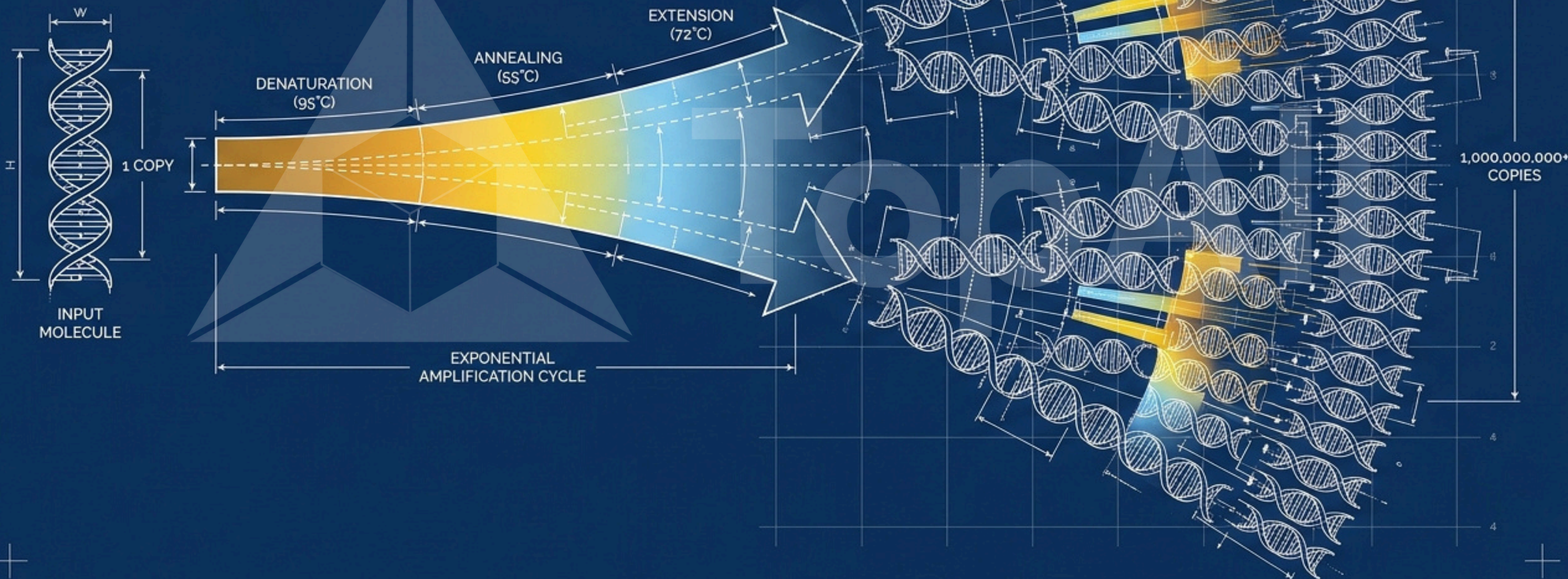


PCR: MAKING A BILLION COPIES OF DNA

Polymerase Chain Reaction (PCR):
Turning one invisible molecule into a billion.



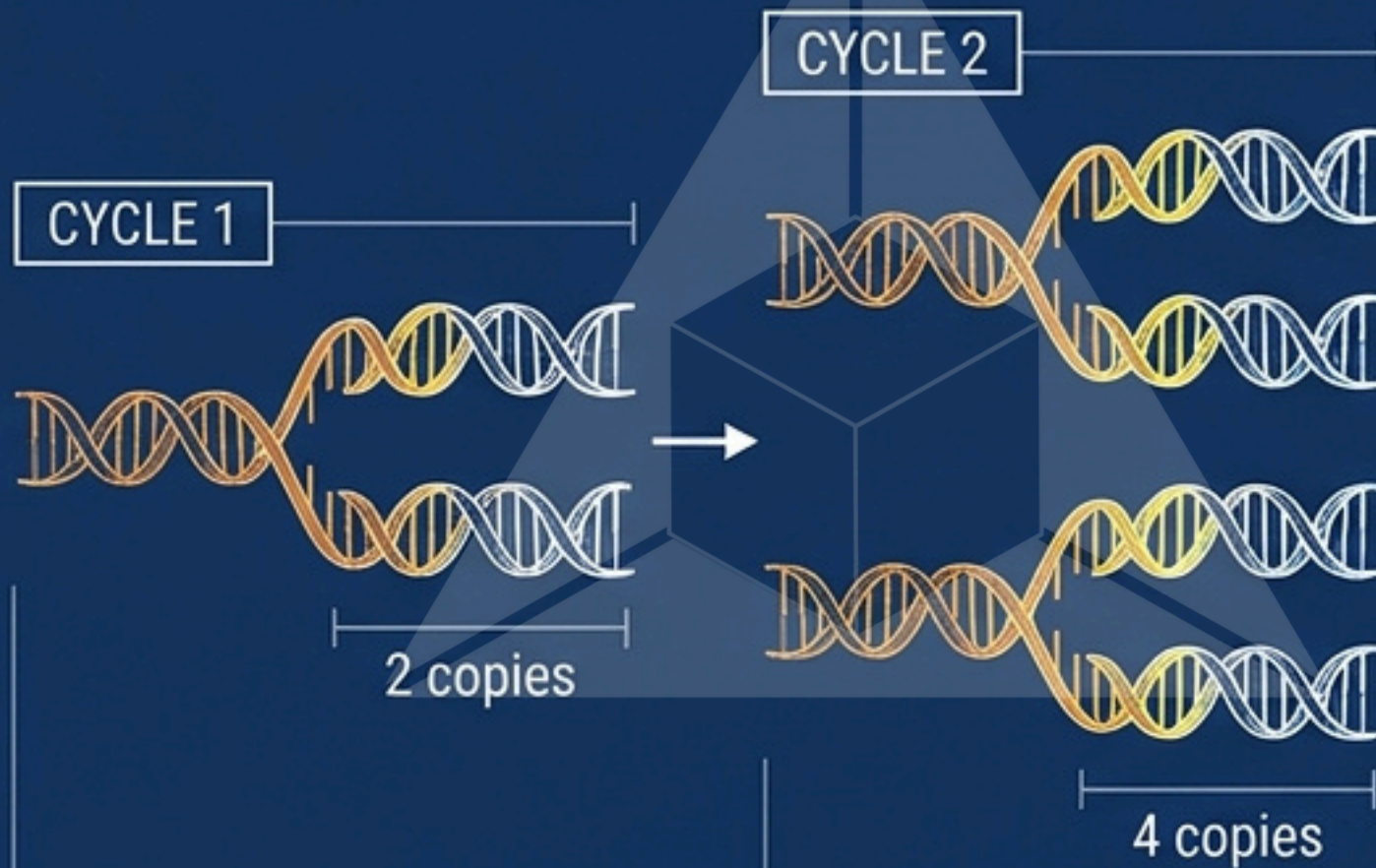
THE MOLECULAR PHOTOCOPIER

PCR DEFINITION

PCR is an in vitro technique used to synthesize multiple copies of a specific gene (or DNA segment) of interest.

EXPONENTIAL AMPLIFICATION

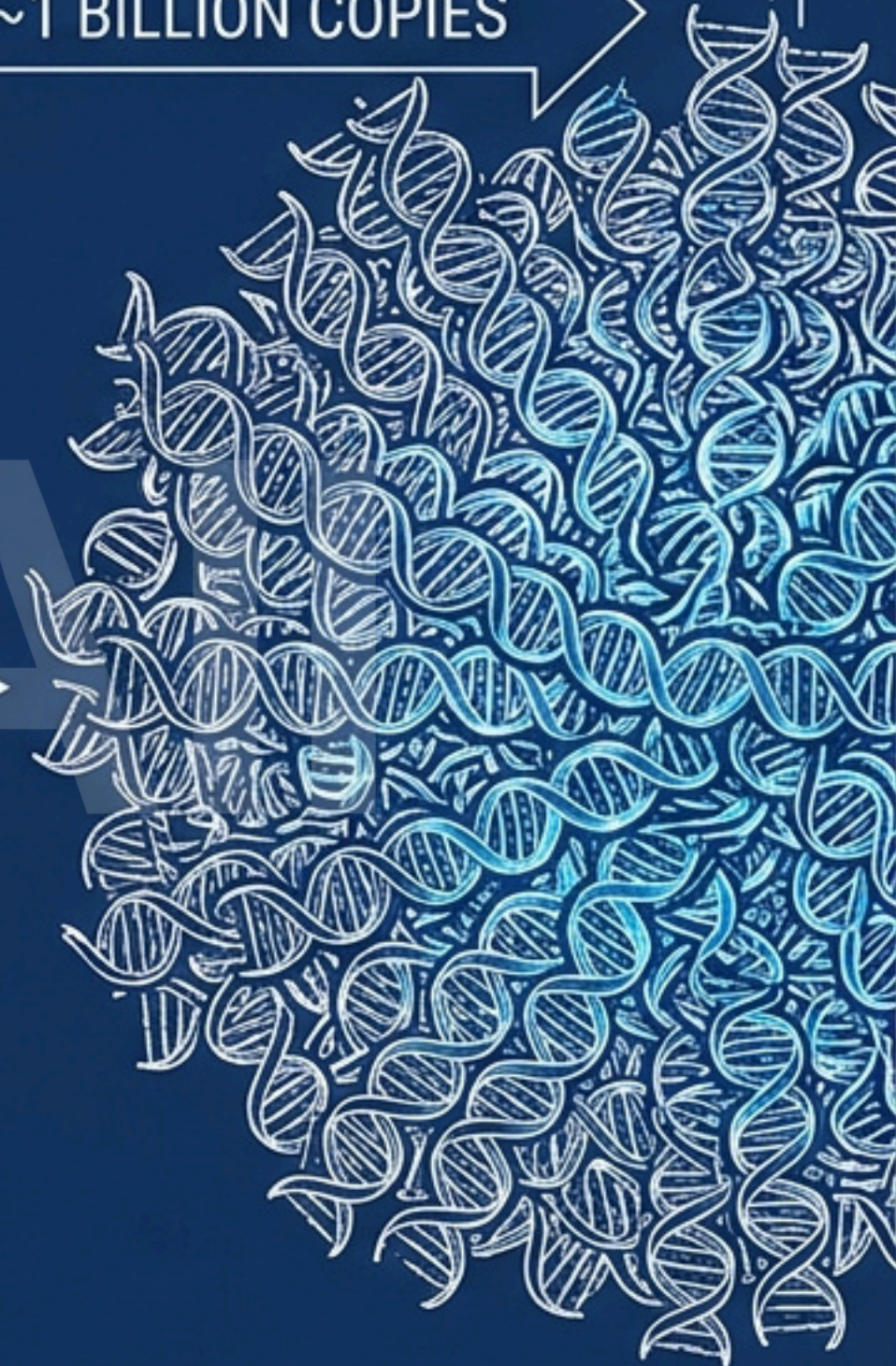
Because the output of one cycle becomes the template for the next, amplification happens exponentially.



CYCLE 3



30 CYCLES: ~1 BILLION COPIES



THE FOUR ESSENTIAL COMPONENTS



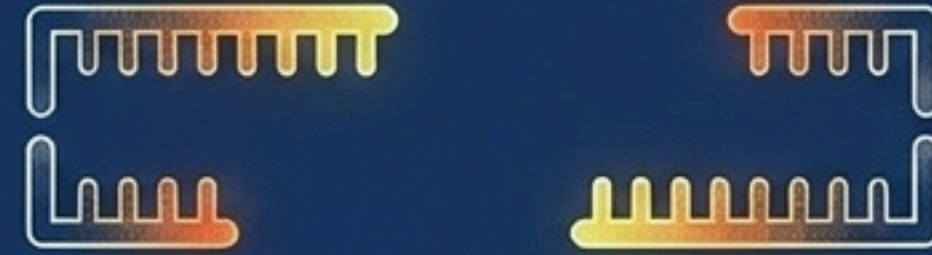
TopAll

TEMPLATE



The original DNA containing the target region.

PRIMERS



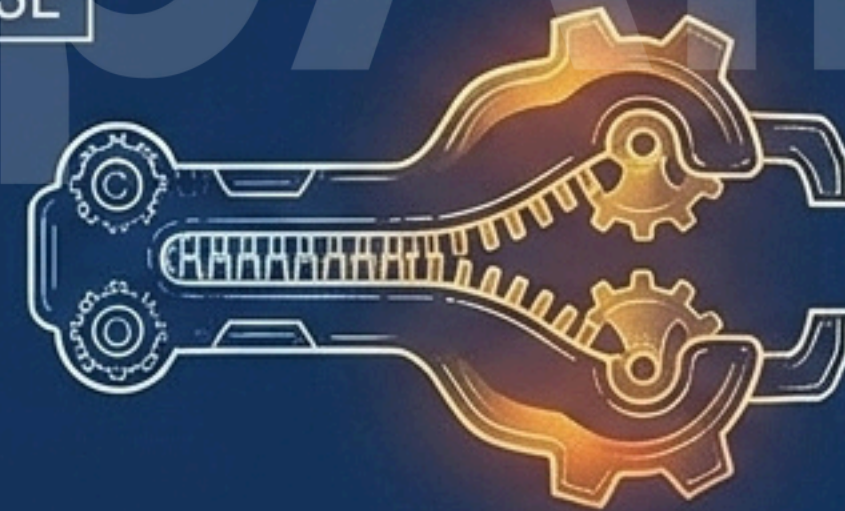
Small, chemically synthesized oligonucleotides complementary to the start and end of the target region.

NUCLEOTIDES



The raw building blocks used to construct the new DNA strands.

POLYMERASE



The enzyme machine that builds the new strand.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

Practice Now



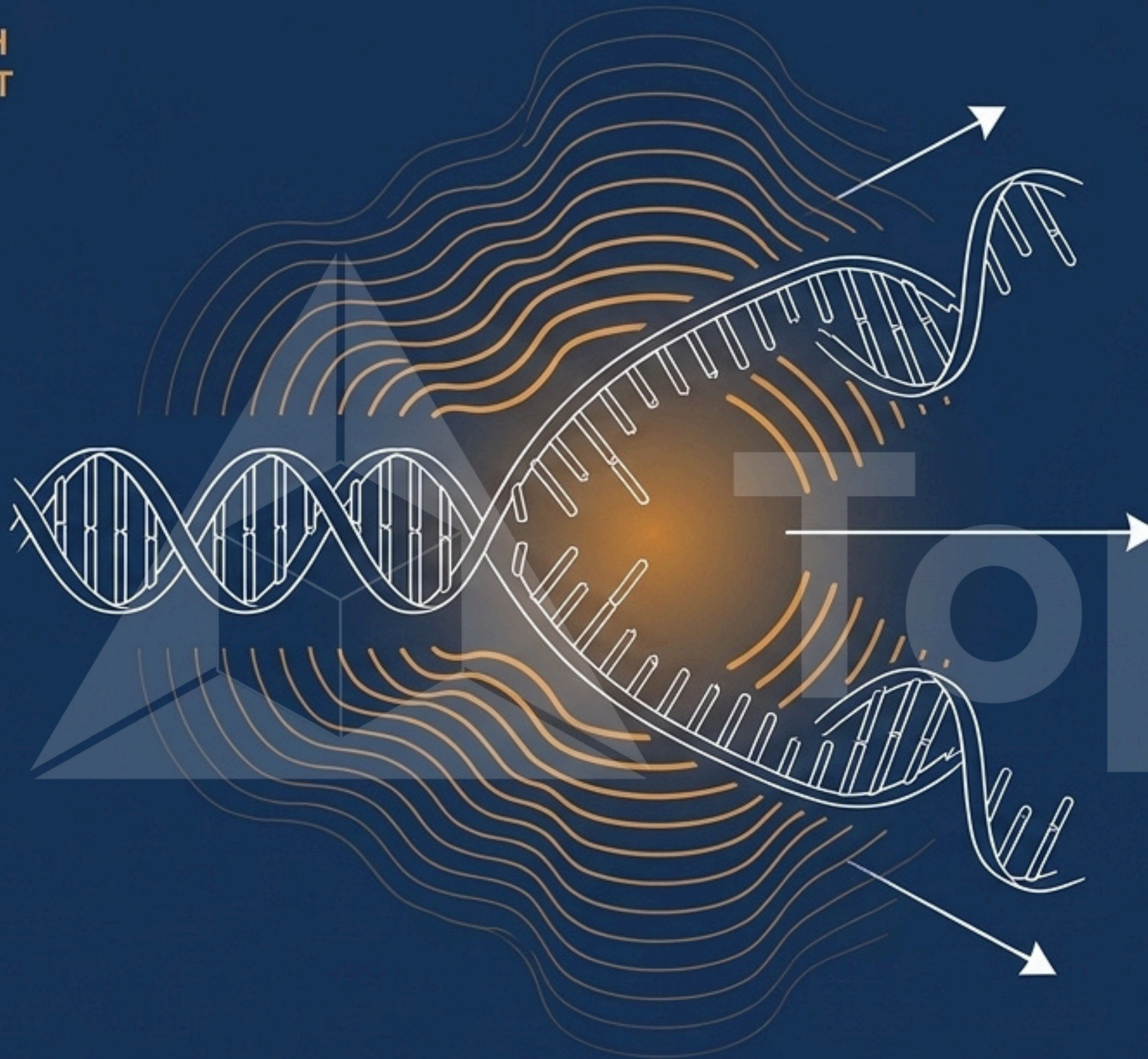
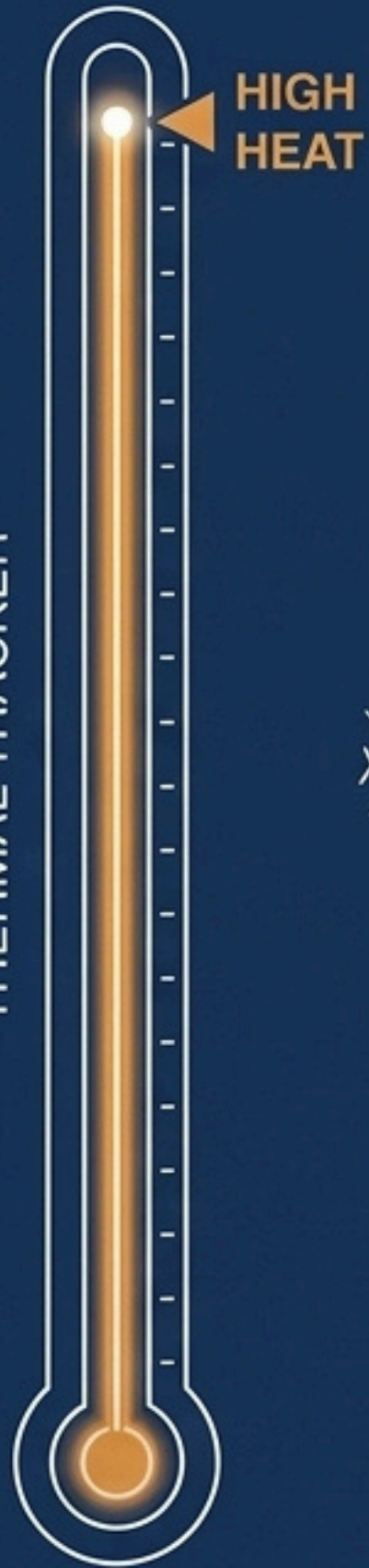
At prep.topall.app

Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



THERMAL TRACKER



Step 1: Denaturation

Action:

High temperatures are applied to the reaction.

Result:

The heat breaks the bonds holding the double helix together, separating it into two single strands that will act as individual templates.

Step 2: Primer Annealing

Action:

The reaction is rapidly cooled.

Result:

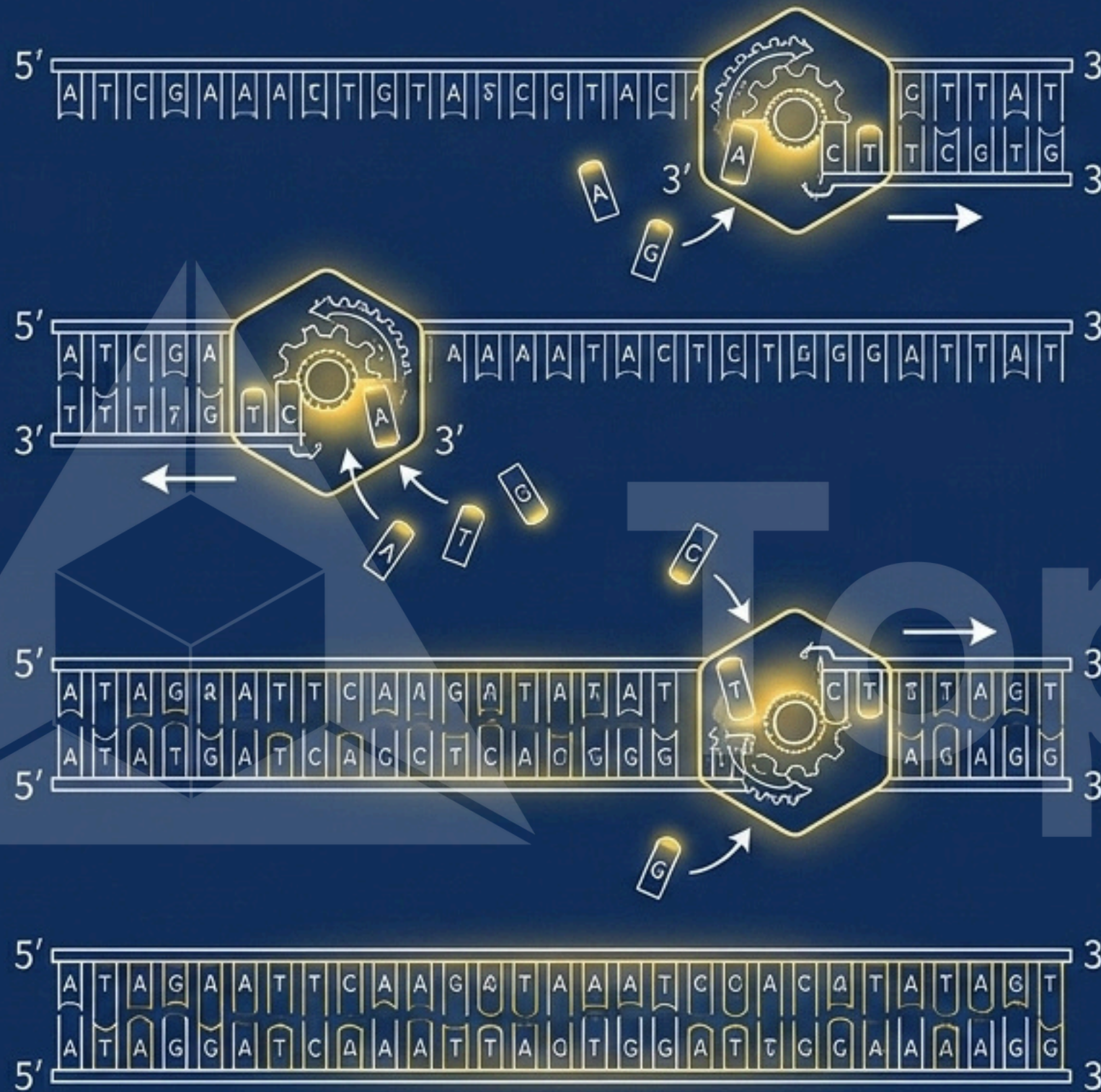
The drop in temperature allows the chemically synthesized primers to bind (anneal) to their complementary sequences on the DNA, marking the exact starting points for copying.



Thermal Tracker



OPTIMAL
TEMP



Step 3: Extension of Primers

Action:

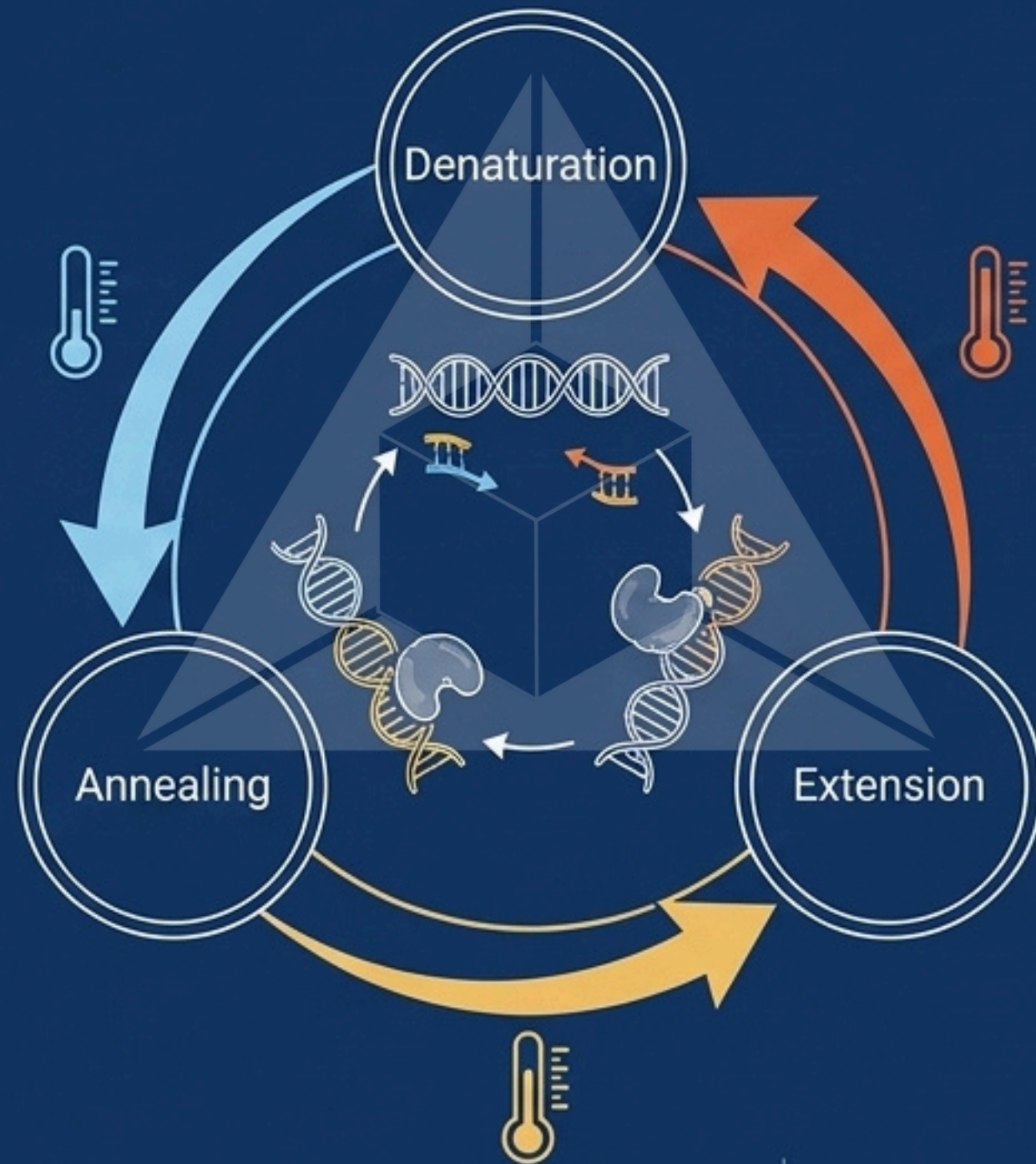
The temperature is raised slightly to the optimal working condition for the enzyme.

Result:

DNA polymerase extends the primers, reading the template and adding nucleotides to synthesize a brand new complementary strand.

The Continuous Amplification Loop

By repeating this thermal cycle up to 30 times, the specific segment of DNA is amplified roughly a billion times.



The *Thermus aquaticus* Advantage

How does the polymerase survive the extreme heat of Step 1?

Scientists isolated a unique, thermostable DNA polymerase from *Thermus aquaticus*, a bacterium found in hot springs.

Because this enzyme remains active during high-temperature denaturation, the cycle can run continuously without needing to manually add fresh enzyme every round.



You've Learned the Theory.

Now Let's Test It.

Reading notes gets you knowledge.

Practicing MCQs gets you marks.

That's exactly what TopAll Pro is built for.

Try TopAll Pro Now

What TopAll Pro Does Differently

-  **Stuck? Snap it. Solve it. — Doubts AI**
Photo → step-by-step solution in seconds, 24/7
-  **Your AI Coach finds your blind spots**
Concept-level weakness detection — not just chapter-level
-  **4.5 Lakh+ questions. Never run out.**
13× more content than any other prep app in India
-  **Build your own test in 60 seconds**
Pick a chapter, set difficulty — AI does the rest instantly.
-  **AI Recommendation that helps you improve**
AI Recommendation Analysis your Tests and tell you where you need to improve.



Practice the moment you finish studying
Jump in while the concept is still fresh in your head

4.5L+
MCQs

1.5L+
Students

AI Powered
In-Depth Analysis