

Enzyme Analysis in the Professional Research Laboratory

Even though you are doing this kind of work in a pre-college classroom, today's scientists are **STILL** applying the same principles and strategies you will use. Many thousands of enzymes are yet to be discovered, and for the ones we do already know something about, scientists are still searching among newly discovered organisms for the analogous enzyme that may have special properties that can be exploited for medical or commercial use. An important example is the DNA polymerase used for polymerase chain reaction. The first experiments used the enzyme from *E.coli* bacteria, which live at 37C. In order to separate the DNA strands, the reaction mix had to be heated to 95C (nearly boiling), and this "killed" the *E.coli* enzyme, a scientist had to add fresh enzyme for every replication cycle. When the similar activity was finally isolated from a hot springs-loving organism, *Thermus aquaticus* (Taq), the replication reaction could be automated since the Taq enzyme survived the short treatments at 95C every cycle. Now polymerases have been isolated from organisms that live in deep sea vents, which are even hotter environments!