Crime Scene Investigator PCR Basics™ Kit: How Does DNA Solve Crimes?

This introductory PCR kit allows students to simulate DNA profiling as commonly used in forensic labs. The lab is designed to introduce the concepts of PCR to students in two lesson periods without the need for complex genomic DNA extraction steps.

DNA profiling determines the exact genotype of a DNA sample and distinguishes one human being from another by identifying a DNA "barcode" that is unique to every individual. This powerful tool assists in investigations of crime scenes, missing persons, mass disasters, immigration disputes, and paternity testing.

What kinds of human DNA sequences are used in crime scene investigations? There are ~3 billion bases in the human genetic blueprint, and more than 99.5% of them do not vary among human beings. Within the variant areas of the genome are the special polymorphic ("many forms") sequences used in forensic applications. The DNA sequences used for forensic typing are derived from regions of our chromosomes that do not control any known traits and have no known functions. They contain segments of short tandem repeats, called STRs. STRs are very short DNA sequences that are repeated in direct head-to-tail fashion. The example below shows a locus (known as TH01) actually used in forensic DNA profiling. Its specific DNA sequence contains five repeats of [TCAT].

. . . C C C TCAT TCAT TCAT TCAT TCAT A A A . . .

For the TH01 STR locus, there are many alternate forms (alleles) that differ from each other by the number of [TCAT] repeats present in the sequence. More than 20 different alleles of TH01 have been discovered in people worldwide. Each of us still has only two alleles, one inherited from our mother and one inherited from our father.

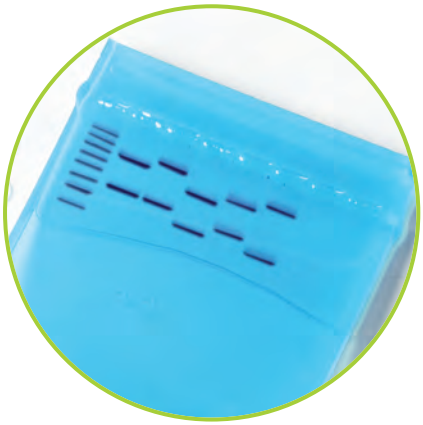
Two sample TH01 genotypes

Suspect A's DNA type for the TH01 locus is (5–3)		Suspect B's DNA type for TH01 locus is (6–10)	
C C C [ ] [ ] [ ] [ ] [ ] A A A	5*	C C C [ ] [ ] [ ] [ ] [ ] [ ] A A A	6*
C C C [ ] [ ] [ ] A A A	3*	C C C [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] A A A	10*

* Number of [TCAT] repeats

How are STR alleles detected? Each STR allele has a different length depending on the number of tandem repeats it contains. When the alleles are amplified by PCR, alleles of different lengths can be distinguished by electrophoresis. The number of tandem repeats contained in each allele can be determined by comparing the locations of the DNA bands with a DNA size standard that corresponds to the known sizes of TH01 alleles.

The DNA samples contained in this kit are plasmids that have been engineered to mimic the natural variations in human DNA that exist between one human being and another at a single STR locus. In real crime scene applications, using the international Combined DNA Index System (CODIS), DNA profiling is performed using 13 loci to increase the power of discrimination. Extension exercises in the kit curriculum provide access to real profiling data, enabling students to perform statistical analyses and apply the power of discrimination. With the addition of each locus to the analysis, the possibility that any two genotypes will match due to chance drops off significantly. This exercise allows students to grasp the concept of the power of discrimination — the more loci that are used, the finer the discrimination between any two samples.



Crime Scene Investigator PCR Basics Kit

Each kit supports 32 students.

Crime Scene Investigator PCR Basics Kit

Catalog #	List Price	EDU Price
1662600EDU	$220.00	**$176.00**

Ships at room temperature.

Store reagents bag at –20°C. Electrophoresis reagents not included — available separately.

Small Fast Blast™ DNA Electrophoresis Reagent Pack

1660450EDU	114.00	**55.01**

To pour, run, and stain forty-eight 1% or sixteen 3% 7 x 10 cm agarose gels

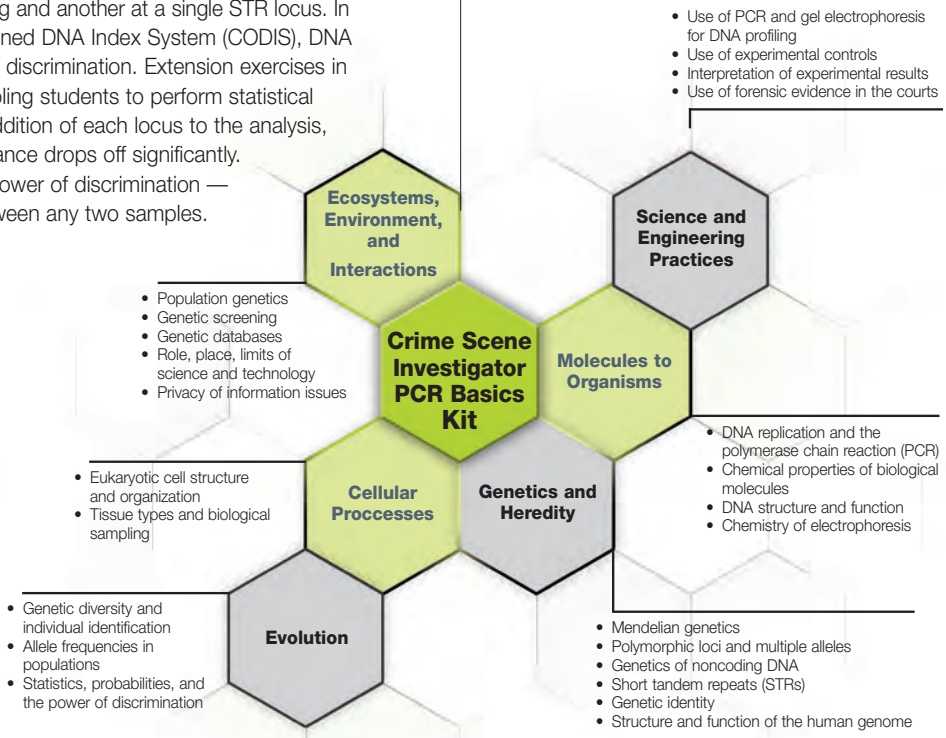
Crime Scene Investigator PCR Basics Kit Plus Small Fast Blast DNA Electrophoresis Reagent Pack

1662650EDU	276.25	**221.00**

Key Kit Features

- Perform real-world DNA profiling
- Use PCR to amplify multiple DNA samples
- Use electrophoresis to visualize results
- Complete in two 45 minute lab sessions

Educational discounts apply only to items ordered with an EDU suffix. EDU price discounts are for qualified educational institutions and educators only.



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To learn more, visit
https://www.bio-rad.com/en-sg/product/crime-scene-investigator-pcr-basics-kit?ID=58d47ce8-b4da-4c0c-9017-f217f27f27a4